Long-Term Monitoring Plan Technical Memorandum

1. Groundwater Monitoring Schedule Optimization
2. Groundwater Sampling Procedure Optimization
3. Vapor Intrusion Screening Evaluation

Coliseum Boulevard Plume Site
Montgomery, Alabama

Submitted By:

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Alabama Department of Transportation

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LTM Plan Technical Memorandum:

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Acronym	Definition
ADEM	Alabama Department of Environmental Management
ALDOT	Alabama Department of Transportation
ARBCA	Alabama Risk Based Corrective Action
BDY	Boundary (Well)
BKG	Background (Well)
CBP	Coliseum Boulevard Plume
CMIP	Corrective Measures Implementation Plan
COCs	Constituents of Concern
EFF	Effectiveness (Well)
ELCR	Excess Lifetime Cancer Risk
HI	Hazard Index
HQ	Hazard Quotient
ICB	Institutional Control Boundary
LTM	Long Term Monitoring
M	Meter
M&T	Material and Test
MW	Monitoring Well
NPDES	National Pollutant Discharge Elimination System
RBTL	Risk Based Target Level
SVP	Soil Vapor Point
TCE	Trichloroethylene
µg/L	micrograms per liter
µg/m3	Micrograms per cubic meter
USEPA	United States Environmental Protection Agency
VIS	Vapor Intrusion Screening (Well)
VISL	Vapor Intrusion Screening Level
VOCs	Volatile Organic Compounds

1 Groundwater Monitoring Schedule Optimization

The groundwater monitoring schedule optimization presents technical justification for modifying sample frequency for several of the interior Effectiveness (EFF) monitoring wells used to measure effectiveness of the Corrective Measures. No changes to compliance point Boundary (BDY) monitoring wells are proposed.

The Long Term Monitoring (LTM) Plan was adopted as part of the December 2011 CBP Agreement, and subsequently reviewed and modified three years later in 2014. The current LTM Plan (adopted 2014) consist of 100 groundwater monitoring wells, divided into the following categories shown in **Table 1-1** below and **Figure 1-1**:

Table 1-1. LTM Groundwater Monitoring Wells

Well Type	Number	Purpose
Boundary (BDY)	14	Compliance monitoring: demonstrate CBP remains contained within ICB
Effectiveness (EFF)	84	Performance monitoring: evaluate effectiveness of the Corrective Measures
Background (BKG)	2	Background groundwater quality

Only the 14 BDY wells are used for compliance monitoring purposes. The BDY wells are located downgradient of the maximum historical extent of the CBP and upgradient of the ICB and are used as a sentinel well system. The 84 EFF wells are all interior wells, most located within the CBP, and monitor changes in plume concentrations in response to the Corrective Measures. Initially, the EFF wells were sampled semi-annually. Based on well field optimization and trend assessment, sample frequency for 64 of the EFF wells were reduced to annual as part of the LTM Plan revisions adopted in 2014. After monitoring over an additional 5-years, sample frequencies for the EFF wells have been reassessed, as discussed in Section 1.2.

1.1 Groundwater Monitoring Schedule Evaluation

Groundwater sample frequency for the 22-performance monitoring (EFF) wells and 2 background (BKG) monitoring wells currently sampled semiannually (**Figure 1-1**) was evaluated. Sample frequency was not assessed for the BDY wells, which as compliance monitoring wells, will retain semi-annual sampling

frequency. Sample frequency for the 22 EFF wells and 2 BKG wells were evaluated using the following trend analysis and iterative thinning method:

- Select wells with a sufficient number of samples having detectable TCE. Eighteen of the 24 wells meet this criterion.
- Establish trend based on the Shewhart Statistic for all groundwater samples collected since implementation of the LTM (2011).
- Reduce the data set to annual samples only by removing all 3rd Quarter samples.
- Establish trend based on the Shewhart Statistic for the annual groundwater samples data set.
- Compare Trend results from the total data set and the annual (thinned) data set. Wells that exhibit no change in trend are appropriate for annual sample frequency.

The two BKG wells and four EFF wells (MW-123, MW-221, MW-262, and MW-358) did not have a sufficient number of detections of TCE to complete the trend analysis. Annual sampling frequency is appropriate for these wells.

Results of the trend analysis is presented on **Figure 1-2**. The trend for all 18 EFF wells did not change between the semi-annual (all data) and thinned annual (January data only) analysis. An empirical comparison of the TCE trend for each of these wells, with both semi-annual and annual results plotted are presented on **Figure 1-2** through **Figure 1-5**. Reducing sample frequency to annual for these wells would not change interpretation of the TCE trends for the EFF performance wells.

1.2 Groundwater Monitoring Schedule

The following conclusions are offered as a result of the sampling frequency evaluation:

- Retain semi-annual sample frequency for all (14) compliance (BDY) wells.
- Decrease sampling frequency to annual for performance EFF wells currently sampled semi-annually that do not have sufficient TCE detections to establish a trend (MW-123, MW-221, MW-262 and MW-358).
- Decrease sampling frequency to annual for EFF wells currently sampled semi-annually (see Table 1-2 on the following page) if the reduction does not change the trend assessment.

The conclusions do not apply to any wells that are also monitored under another program, such as current quarterly monitoring at MW-357 or semi-annual Vapor Intrusion Screening (VIS) groundwater monitoring for wells with calculated Risk Based Target Levels (RBTLs) in accordance with the ARBCA procedure and the LTM (R4, June 2019, r-4/17/20) to assess potential for vapor intrusion.

Table 1-2. Semi-annual wells to be converted to annual sampling.

WELL NUMBER	WELL TYPE	MONITORED ZONE
MW-111	EFF	Shallow
MW-116	EFF	Shallow
MW-117	EFF	Shallow
MW-123	EFF	Shallow
MW-125	EFF	Shallow
MW-153	EFF	Shallow
MW-156	EFF	Shallow
MW-211	EFF	Shallow
MW-216	EFF	Shallow
MW-217	EFF	Shallow
MW-221	EFF	Shallow
MW-221C	EFF	Shallow
MW-223	EFF	Shallow
MW-225	EFF	Shallow
MW-237C	EFF	Shallow
MW-250C	EFF	Shallow
MW-260	EFF	Shallow
MW-262	EFF	Shallow
MW-263	EFF	Shallow
MW-264	EFF	Shallow
MW-265	EFF	Shallow
MW-358	EFF	Deep
MW-112	BKG	Shallow
MW-212	BKG	Shallow

2 Groundwater Sampling Procedures Optimization

ADEM provides technical procedure guidance through the Alabama Environmental Investigation and Remediation Guidance (AEIRG)-(February 2017) and Region 4 EPA Science and Ecosystem Support Division (SESD) publishes individual technical procedures outlining techniques and quality control measures. SESD published SESDPROC-301-R4 on April 26, 2017 detailing the operating procedure for groundwater sampling. This procedure includes no-purge, minimum purge, low-flow and traditional purging techniques and outlines the advantages and disadvantages for each method.

ALDOT is optimizing the groundwater sampling procedure to the minimum single volume purge technique in accordance with the SESD guidance. The single volume sampling procedure meets the guidance requirements of ADEM and EPA. The procedure will limit the risk of injury for sampling personnel, limit the disruption of traffic flow during sampling events, and will limit the amount of waste generated during sampling. Evaluation and verification testing of the method shows that the minimum purge volume method will provide meaningful and reproducible data, will not affect data integrity, and will not modify the current trends for the CBP.

As part of verification testing to confirm that a single volume minimum purge is within acceptable quality control limits, wells were selected for evaluation and comparison to historic data. Between January 6 and January 15, 2020, nine wells (MW-135A, MW-137A, MW-216, MW-223, MW-232, MW-235B, MW-235C, MW-237B, and MW-237C) were purged and sampled using a single well volume purge following SESD guidance. Following the completion of this limited sampling, it was decided that additional sample data collected during the same purging event would provide a more reliable comparison. Therefore, between January 17 and January 23, 2020, twelve wells were sampled by single volume purge and three volume purge for comparison of results from each purge method (**Table 2-1**). Of the samples collected for direct comparison, 75% or 9 out of 12 of the single volume purge samples were at a higher concentration.

The relative percent difference (RPD) between the single and three well volume results was calculated for each well as an unbiased estimate of the difference in sample results. The RPD between the single well purge and three well purge was then compared to the RPD for duplicate samples collected as part of the LTM to establish if the purge volume introduces additional variability in sample results. Prior to comparison, RPD was evaluated with Dixon's test for outliers using the EPA's ProUCL software. Based on the EPA guidance, one RPD result (-72% for MW-156) was identified as an outlier (at a 1% significance level) and was excluded from the comparison.

Table 2-1. Sample Results for Purge Volume Evaluation.

Location	Sample Date	TCE (µg/L) Purge Volume		Relative Percent Difference
		1 well volume	3 well volumes	
MW-137A	1/22/2020	11	9.8	12%
MW-237B	1/22/2020	84.5	83.2	1.6%
MW-237C	1/22/2020	11,300	11,000	2.7%
MW-223	1/21/2020	2,920	2,340	22%
MW-135A	1/23/2020	666	687	-3.1%
MW-235B	1/23/2020	2,340	2,300	1.7%
MW-235C	1/23/2020	1,630	1,620	0.6%
MW-232	1/21/2020	521	520	0.2%
MW-153	1/21/2020	358	331	7.8%
MW-154	1/17/2020	NS	6.8	NS
MW-156	1/20/2020	56.2	119	-72%
MW-216	1/20/2020	10.3	10	3.0%

Note:
NS = Not Sampled

As illustrated on **Figure 2-1** on the following page, RPD distribution of the single and three well volume results closely align with the RPD for duplicate results for samples collected as part of the ADEM-approved LTM program for the CBP (January 2012 through July 2019). To further test that the RPDs for the single to three well volumes are no different from the duplicate sample results, the Wilcoxan-Mann-Whitney nonparametric two sample test was applied. The null hypothesis was not rejected, meaning that there is no reason to believe the RPDs for the purge volume tests are different from the duplicate sample results collected from January 2012 through July 2019.

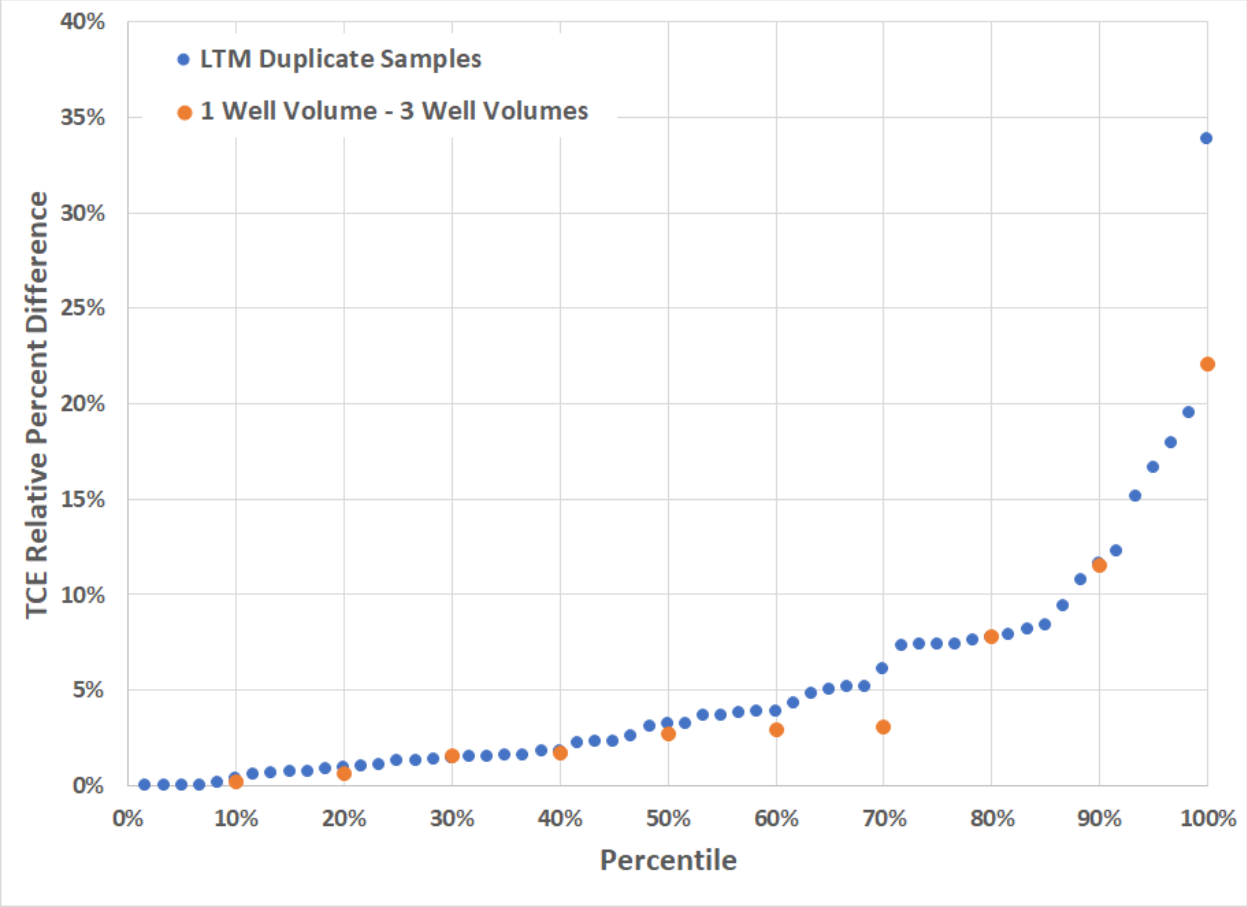

Figure 2-1 Comparison of Relative Percent Difference for Purge Volume Samples to Duplicate Samples

Monitoring well MW-135A was randomly selected for a duplicate for the January 2020 annual sampling event. The duplicate samples for both the single well volume and three well volume purge method were within historical duplicate results (**Table 2-2**). The specific well analytical results for the single and three volume well purge concentrations are provided in **Appendix A**.

Table 2-2. Well Purge Volume Duplicate Sample Results.

Location	Sample Date	Purge Volume	TCE (µg/L)		Relative Percent Difference
			Purge Results	Duplicate Results	
MW-135A	1/23/2020	1	576	666	14.5%
MW-135A	1/23/2020	3	618	687	10.6%

Based on comparing the purge sample results to historical duplicate samples, there is no difference in the sample variability (as expressed as RPD). Therefore, use of the single well purge will not introduce additional variability in the sample and analytical results. In no case did the results from the single volume purge result in a concentration that would have modified decisions regarding corrective measures or long-term monitoring of the CBP. For the purposes of future sampling and based on the direct comparison of results, the single volume purge provides representative concentrations of TCE in samples collected from the groundwater monitoring wells. **Table 2-3** below provides wells in high-traffic areas only that will be sampled using the single purge volume method. **Figure 2-2** shows the locations of wells that will be sampled using the single purge volume method. The sampling plan is presented in **Appendix B**.

Table 2-3. Wells to be Sampled via Single Volume Purge Method

MW-137A	MW-134	MW-244C
MW-237B	MW-234	MW-154
MW-237C	MW-153	MW-155
MW-123	MW-210	MW-156
MW-223	MW-117	MW-115
MW-135A	MW-217	MW-215
MW-235B	MW-221	MW-116
MW-235C	MW-221C	MW-216
MW-132	MW-133	MW-118
MW-232	MW-233	MW-218
MW-128	MW-144A	MW-112
MW-228	MW-244B	MW-212

Notes:
1. Wells do not include wells that are individual or nested/clustered with calculated Risk Based Target Levels (RBTLs)
2. Wells do not include limited volume purge wells such as BDY, 300, or 400 series wells that are sampled using screened interval purge method

3 Vapor Intrusion Screening Evaluation

This technical memorandum updates previous vapor intrusion evaluations for the Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP) using maximum shallow groundwater volatile organic compound (VOC) concentrations from 2016 to 2018 and current Alabama Department of Environmental Management (ADEM) risk assessment methodology and risk screening levels provided in the Alabama Risk-Based Corrective Action Guidance Manual (ARBCA).

The CBP is in an area in Montgomery, Alabama where trichloroethylene (TCE) is present in the groundwater. Groundwater samples are collected in accordance with the Long-Term Monitoring Program (LTM) approved by the Alabama Department of Environmental Management (ADEM).

In this evaluation, the most recent groundwater data from Vapor Intrusion Screening groundwater wells (VIS wells) are compared to the United States Environmental Protection Agency (USEPA) Vapor Intrusion Screening Levels (VISLs) for residential and commercial properties (USEPA 2018a) and further evaluated using the USEPA Johnson and Ettinger model (2017) for vapor intrusion. VIS wells are defined as monitoring wells with the top of screen within three feet of the water table. Additionally, the groundwater data from the most recent two years (2016 to 2018) are used in the analysis and the results are compared with the historical soil vapor data to provide an evaluation of conditions at the Site.

The focus of the CBP Site is TCE in groundwater. However, all detected constituents in monitoring wells are evaluated to provide a cumulative risk evaluation. In monitoring wells where TCE is detected with other constituents of concern (COCs) associated with the CBP, TCE is present at higher concentrations which drives the risk assessment results.

3.1 Vapor Intrusion Screening Background

Soil vapor and groundwater sampling have been conducted for the evaluation of the CBP. The sampling results are discussed separately by media below.

3.1.1 Soil Vapor Sampling and Pilot Test

In 2002, soil vapor pilot test sampling was conducted near the ALDOT Materials & Tests (M&T) Laboratory. Later In 2007, and amended in 2010, USEPA Region 4 adopted protocols for soil gas sampling. While the 2002 ALDOT sampling procedures followed many of the same protocols subsequently established by the previous 2010 USEPA guidance, the USEPA again adopted new protocols in March 2012 (draft guidance was available from USEPA in 2013). The updated 2013 USEPA guidance included some differences, mainly for sample collection duration. To establish if these variations affected sample results, soil vapor pilot test samples following both 2002 procedures and 2013 USEPA Region 4 procedures were collected and analyzed in 2013. The 2013 sampling points are shown in **Figure 3-1**, and all vapor sampling points are on the ALDOT M&T Laboratory (e.g., a commercial) property. The results of the two soil vapor pilot test

sampling events indicated similar soil vapor concentrations for TCE were detected at each location in 2002 and 2013, as shown in **Table 3-1**. No significant variation in soil vapor concentrations was observed between samples collected for different durations. The highest soil vapor concentrations were found in samples collected from sampling point SVP-01 near the M&T laboratory. **Table 3-1** also presents the analytical data for the other constituents detected in the soil gas samples. As provided in **Table 3-1**, only TCE was detected at concentrations above the VISLs. Additional evaluation of the soil vapor data will be discussed in later sections.

3.1.2 Groundwater Sampling

On December 6, 2011, the ADEM and the ALDOT executed a "Settlement Agreement for Voluntary Response" (the "Agreement") which set site response actions for assessment and remediation of the CBP. On March 10, 2015, the Agreement was revised and updated to document the implemented remedial responses and monitoring activities approved by ADEM. The Agreement requires ALDOT to operate and maintain approved Corrective Measures, conduct comprehensive monitoring of groundwater and surface water, and report annually the status and results of all investigations and corrective measures.

Routine groundwater monitoring events are performed, and collected data are evaluated to determine potential vapor intrusion within the CBP. Specifically, groundwater data collected from 24 shallow groundwater monitoring wells (e.g., VIS wells) are analyzed for TCE and other VOCs and the potential for vapor intrusion. VIS groundwater monitoring wells are defined as those wells that have screened intervals within three feet of the water table. Groundwater data collected from the most recent two years (2016 to 2018), as recommended by ADEM guidance (ADEM 2017), were compared to the USEPA VISLs (USEPA 2018a), as presented in **Table 3-2**. The VISLs represent conservative estimates of constituent concentrations in groundwater that would not pose unacceptable vapor intrusion risk. The VISLs were calculated using a default groundwater temperature of 25 degrees Celsius (^{o}C). This is a conservative assumption since the median temperature in the 24 VIS wells over the last 10 years was 21 ^{o}C.

The results of the comparison of COC groundwater concentrations to VISLs indicated that concentrations of TCE in ten VIS wells exceeded the USEPA residential and/or commercial groundwater VISLs. In addition to TCE, other constituents detected above the VISLs are carbon tetrachloride (MW-106) and chloroform in eight monitoring wells as seen in **Table 3-2**. Carbon tetrachloride exceeded both the residential and commercial VISLs for the maximum concentration at MW-106. Chloroform exceeded both the residential and commercial VISLs in four of the eight monitoring wells. Concentrations above these screening values do not necessarily indicate a risk, but instead, indicate the need for further evaluation.

In accordance with ARBCA guidance (ADEM 2017), and based on the constituent concentrations detected in groundwater samples from VIS wells exceeding the residential and/or commercial groundwater VISLs, further evaluation of the potential for vapors to migrate from groundwater to the ground surface or into

buildings built above the CBP was evaluated using the USEPA Johnson and Ettinger model (2017). VIS wells were evaluated for potential exposure in buildings used for residential or commercial purposes. The methodology and results are presented in this memorandum.

3.2 Vapor Intrusion Screening Sample Results

Analytical results from the 2016 to 2018 groundwater sampling events are presented in **Table 3-2** and are compared to the USEPA VISLs (USEPA 2018a). TCE was detected above the reporting limit in ten of the 24 groundwater samples collected from VIS wells from 2016 to 2018: MW-106, MW-108, MW-111, MW-117, MW-125, MW-128, MW-129, MW-130, MW-133 and MW-150A. While TCE is the risk driver, to provide a more conservative initial screening value, VISL screening levels were calculated for cumulative risk from all VOCs in groundwater at an excess lifetime cancer risk (ELCR) of $1x10^{-6}$ and a hazard index (HI) of 0.1. As shown in **3-2**, the detected TCE concentrations at these locations exceeded the cumulative risk residential VISL of 0.518 micrograms per liter (µg/L), as well as the cumulative risk commercial VISL of 2.18 µg/L based on an evaluation of cumulative risks.

Carbon tetrachloride was detected in MW-106 at a maximum concentration above both the residential and commercial VISLs. Chloroform was detected above the residential VISL in MW-104, MW-111, MW-115, MW-117, MW-125, MW-128, MW-130, and MW-150A and the commercial VISLs in MW-104, MW-111, MW-115, and MW-128. TCE exceeded the residential and commercial VISLs in MW-106, MW-108, MW-111, MW-117, MW-125, MW-128, MW-129, MW-130, MW-133, and MW-150A, based on an ELCR risk of 1×10^{-6} or a noncancer hazard quotient of 0.1, as required by ADEM (2017) in the ARBCA guidance. Therefore, carbon tetrachloride, chloroform, and TCE are carried through to the human health risk evaluation. It should be noted that the residential VISLs for carbon tetrachloride, chloroform, TCE, and vinyl chloride are less than laboratory detection limit for groundwater samples of 1 ug/L (see **Table 3-2**). These constituents, with the exception of vinyl chloride, are carried forward to the human health risk evaluation (Section 3.3). Vinyl chloride is not carried forward to the human health risk evaluation due to vinyl chloride being non-detect (e.g., non-detect at detection limit of 1 ug/L) in groundwater samples from VIS wells and also non-detect in vapor samples collected in 2002 and 2013.

Based on the results of this risk assessment, TCE is the only constituent contributing to overall risk and hazard above the ADEM benchmarks. The VISL for a single constituent (TCE is the risk driver) would rely on an ELCR of $1x10^{-5}$ and a HI of 1. The resulting residential VISL for TCE is 6.2 µg/L.

3.3 Human Health Risk Evaluation

The 2016 to 2018 groundwater sampling data were reviewed to refine the VIS wells to be evaluated further under the tiered approach required by the ARBCA. Ten VIS wells with TCE concentrations that exceeded

the residential or commercial VISLs, and an additional two monitoring wells that had chloroform concentrations above the VISLs, were separated into three categories (see **Figure 3-2**):

- Commercial use (located within ALDOT property at the M&T Laboratory): MW-104, MW-106, MW-108;
- Commercial use (former Christian Laboratory, Inc.): MW-111
- Residential use: MW-115, MW-117, MW-125, MW-128, MW-130, MW-150A; and,
- No development, nor buildings present: MW-129, MW-133.

The USEPA uses a distance between a source and a potential vapor intrusion receptor of 100 feet to determine if potential vapor intrusion exposures could occur (USEPA 2015). Therefore, potential receptors were identified based on this distance from a monitoring well. Undeveloped properties within 100 feet of a monitoring well location were not evaluated further. Monitoring wells MW-104, MW-106 and MW-108 are located within the ALDOT property boundary and were evaluated further using the USEPA Johnson and Ettinger model (2017) for a commercial use scenario. Monitoring well MW-111 is adjacent to a commercial facility and potential exposures were evaluated under a commercial scenario. Similarly, monitoring wells, MW-115, MW-117, MW-125, MW-128, MW-130, and MW-150A were evaluated further using the USEPA Johnson and Ettinger model (2017) for a residential use scenario.

The vapor intrusion pathway was evaluated for both commercial and residential exposure scenarios using the standard default exposure assumptions provided in the USEPA Johnson and Ettinger model (2017) with exceptions for site-specific parameters noted below. Slab on grade foundation type was selected for the model. The assumptions used in the vapor intrusion model are summarized below, and presented for the residential and commercial use scenarios in the tables of **Appendix C**:

- The commercial worker was assumed to be present 8 hours a day, 250 days per year, for 25 years. The resident was assumed to be present 24 hours a day, 350 days per year, for 26 years. TCE is considered by USEPA to be a mutagen and the mutagenic mode of action was incorporated into the model. While the lifetime is assumed to be 70 years, USEPA adjusts it to 72 years for mutagens.
- The vadose zone characteristics and depth to groundwater were selected based on the boring logs sampling records for each individual monitoring well (**Appendix D**).
- The temperature was adjusted to the median groundwater temperature for the shallow groundwater wells recorded in sampling logs over the last 10 years of 21^{o}C.
- Default values for the foundation thickness (0.2 meter for commercial; 0.1 meter for residential), depth below grade to base of foundation (0.2 meter for commercial; 0.1 meter for residential), the enclosed space area floor area (1,500 square meters for commercial and 150 square meters for residential) and the enclosed space mixing height (3 meter for commercial and 2.44 meter for residential) were used.

- Default air exchange rates of 1.5 exchanges per hour for commercial and 0.45 exchanges per hour for residential were used in the model.

Toxicity values for carbon tetrachloride, chloroform, and TCE were those included in the model downloaded from the USEPA website (USEPA 2017). These toxicity values were reviewed and compared to the toxicity values included in the USEPA April 2019 regional screening level (RSL) table (USEPA 2019b).

3.4 Human Health Risk Evaluation Results

Risk is characterized by combining the concentrations an individual might be exposed to with the toxicity values available for each constituent. A distinction is made between noncarcinogenic and carcinogenic endpoints, and, therefore, two general criteria are used to describe risk: the hazard quotient (HQ) for noncarcinogenic effects and the excess lifetime cancer risk (ELCR) for constituents evaluated as human carcinogens. ADEM uses a target ELCR of 1.0×10^{-5} and a noncancer HQ of 1.0 as benchmarks to evaluate potential exposures for the vapor intrusion pathway (ADEM 2017).

3.4.1 Commercial Results

Table C-1, **Appendix C** presents the results of the groundwater vapor intrusion modeling for a commercial scenario at the ALDOT M&T Laboratory. Chloroform was the only constituent detected in groundwater from MW-104 over the last two years. The calculated ELCR was 5.9×10^{-8} and the HQ was 0.000074. Both are below the ADEM benchmarks.

As shown in **Table C-2**, **Appendix C**, the results of the groundwater vapor intrusion modeling for a commercial use scenario at location MW-106 (commercial, M&T Laboratory) indicated an ELCR of 1.4×10^{-5} and a noncancer HI of 1.2, which are slightly above the ADEM benchmarks.

As shown in **Table C-3**, **Appendix C**, the results of the groundwater vapor intrusion modeling for a commercial use scenario at location MW-108 (commercial, M&T Laboratory) indicated an ELCR of 1.5×10^{-6} and a noncancer HI of 0.13, which are below the ADEM benchmarks.

Table C-4, **Appendix C** presents the results of the groundwater vapor intrusion modeling for a commercial scenario at a commercial property. Both chloroform and TCE were detected in groundwater from MW-111 over the last two years. The calculated ELCR was 4.5×10^{-7} and the HQ was 0.025. Both are below the ADEM benchmarks.

Only TCE was detected in groundwater samples collected in 2018. However, the maximum detected concentration for each constituent detected in monitoring wells MW-104, MW-106, MW-108, and MW-111

from 2016 to 2018, was included in the calculations. Nonetheless, the risks are driven by the TCE concentrations.

3.4.2 Residential Results

Table C-5, Appendix C presents the results of the groundwater vapor intrusion modeling for potential residential exposure based on groundwater data from MW-115. The calculated ELCR was 3.2×10^{-6} and the HQ was 0.0039. Both are below the ADEM benchmarks.

The results of the groundwater vapor intrusion modeling for potential residential exposure based on groundwater data from MW-117 are presented in **Table C-6, Appendix C**. The calculated ELCR was 1.8×10^{-6} and the HQ was 0.37. Both are below the ADEM benchmarks.

As shown in **Table C-7**, **Appendix C**, the results of the groundwater vapor intrusion modeling for a residential use scenario at location MW-125 indicated an ELCR of 1.2×10^{-5} and a noncancer HI of 2.7, which are above the ADEM benchmarks.

Table C-8, **Appendix C** presents the results of the groundwater vapor intrusion modeling for potential residential exposure based on groundwater data from MW-128. The calculated ELCR was 1.5×10^{-6} and the HQ was 0.098. Both are below the ADEM benchmarks.

The results of the groundwater vapor intrusion modeling for potential residential exposure based on groundwater data from MW-130 are presented in **Table C-9**, **Appendix C**. The calculated ELCR was 9.7×10^{-6} which is below the ADEM benchmark. The HQ was calculated to be 2.1 which is above the ADEM benchmark.

As shown in **Table C-10**,**Appendix C** the results of the groundwater vapor intrusion modeling for a residential use scenario at location MW-150A indicated an ELCR of 1.6×10^{-5} and a noncancer HI of 3.6, which are greater than the target ELCR of 1×10^{-5} and the noncancer ADEM benchmark of 1.0.

3.5 Screening Level Comparisons

In accordance with ADEM guidance (ADEM 2017), if any receptor's cumulative risk exceeds 1×10^{-5}, or their hazard index exceeds 1.0, risk-based target levels (RBTLs) are calculated based on cumulative risk and back calculated to develop target concentrations. RBTLs were calculated using the USEPA Johnson and Ettinger model (2017). Both the ELCR and HQ are slightly greater than the ADEM benchmarks at VIS groundwater well location MW-106 and exceed the benchmarks at VIS Wells MW-125, MW-130, and MW-150A. The RBTLs for these four locations are presented on the last page of **Tables C-3, C-7, C-9**, and **C-10**. A summary of the calculated risk and hazard results (summary of **Tables C-1** through **C-10**) is

presented in **Table 3-3**, as well as the calculated RBTLs for locations with a cumulative risk exceeding 1×10^{-5}, or a hazard index exceeding 1.0 (ADEM 2017). As summarized in the following **Table 3-4**, 2018 and 2019 TCE groundwater concentrations in these wells were below their respective RBTL.

Table 3-4. Summary Comparisons of TCE in Groundwater versus Risk Based Target Levels

VIS Groundwater Well Sample Location	TCE in Groundwater (µg/L)				
	Risk-Based Target Level	2018		2019	
		January	July	January	July
MW-106	1,796	947	NS	995	NS
MW-125	100	16.3	11.8	16.5	18.8
MW-130	79	13.3	NS	29.5	NS
MW-150A	58	26.2	NS	43	NS

NS = Not Sampled

3.6 Discussion

As discussed in Section 3.1.1, soil gas samples were collected from soil vapor points near the ALDOT M&T Laboratory building in 2002 and 2013 (see **Figure 3-1**). Though soil gas samples have not been collected since 2013, groundwater data collected at the time of the soil vapor sampling (2002 and 2013) and current groundwater samples in 2018 and 2019 provide an additional line of evidence for the evaluation of vapor intrusion. The maximum soil vapor concentration measured in 2013 was used in the USEPA Johnson and Ettinger model (2017) to predict indoor air exposure (e.g., risk and hazard). As seen in **Table C-11**, **Appendix C**, the ELCR was calculated to be 9.3×10^{-6} and the HQ was calculated to be 0.82 which are both below the ADEM benchmarks.

As provided in Section 3.5, the groundwater results for MW-106 slightly exceed the ADEM benchmarks but concentrations are below the calculated RBTL (see **Table 3-4**). Additionally, the maximum soil vapor concentration from vapor sampling corresponds to risk and hazard below the ADEM benchmarks. Based on the data through time as presented above, and actual measurement of soil vapor, these results support the conclusion that there is no risk to human health from vapor intrusion.

3.7 Conclusions

The results of the vapor intrusion modeling indicated that exposure to carbon tetrachloride, chloroform, and/or TCE in groundwater at locations MW-104, MW-108, MW-111, MW-115, MW-117, and MW-128 (using maximum concentrations from 2016 to 2018) does not result in an unacceptable risk.

Vapor intrusion modeling was completed using the USEPA Johnson and Ettinger model and indicated that the ELCR and/or HQ exceeded the ADEM benchmark(s) at wells MW-106, MW-125, MW-130, and MW-150A. As required by the ARBCA, RBTLs were calculated for these locations to provide target levels for future semi-annual sampling events. **Table 3-4** in Section 3.5, and **Table 3-3** in the "Tables" section, provide calculated RBTLs. As provided in **Table 3-4**, 2018 and 2019 TCE groundwater concentrations were below RBTLs.

The maximum soil vapor concentration measured in 2013 was used in the USEPA Johnson and Ettinger model (2017) to predict indoor air exposure (e.g., risk and hazard). Both risk and hazard were below the ADEM benchmarks. Additionally, a comparison of groundwater and soil vapor data from samples collected in 2002 and 2013 to the to 2018 and 2019 groundwater concentration data indicates that 2018 groundwater concentrations are less that the 2013 concentrations. This shows that the risk and hazard remain below ADEM benchmarks and shallow groundwater conditions at the Site are improving due to implemented corrective measures. ALDOT will continue to monitor TCE in groundwater samples collected from VIS monitoring wells to compare to VISLs and RBTLs as presented in Section 3.5 of the LTM Plan R4.

4 References

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TABLES

Table 3-1
Historical Soil Vapor Results for Detected Constituents
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Pilot Tests	Date	Sample Identification	Sample Collection Duration	Acetone (µg/m^3)	Benzene (µg/m^3)	Carbon Disulfide (µg/m^3)	Chloromethane (µg/m^3)	Cyclohexane (µg/m^3)	1,2-Dichlorobenzene (µg/m^3)	1,1-Dichloroethene (µg/m^3)	cis-1,2-Dichloroethene (µg/m^3)	trans-1,2-Dichloroethene (µg/m^3)	1,4-Dioxane (µg/m^3)	Ethylbenzene (µg/m^3)	Freon 11 (µg/m^3)	Freon 12 (µg/m^3)	Freon 113 (µg/m^3)	Heptane (µg/m^3)	Hexane (µg/m^3)	Methylene chloride (µg/m^3)
		Screening Level	Residential	107,000	12	2,430	313	20,900	695	695	NA	NA	18.7	37.4	NA	348	17,400	1,390	2,430	2,090
			Commercial	451,000	52.4	10,200	1,310	87,600	2,920	2,920	NA	NA	81.8	164	NA	1,460	73,000	5,840	10,200	8,760
Pilot Test 1	March 9, 2002	SVP - 01	24 hour	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pilot Test 2	March 28, 2002	SVP - 02	24 hour	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	March 28, 2002	SVP - 03	24 hour	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pilot Test 3	May 6, 2002	SVP - 03	24 hour	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
April 2013 Soil Vapor Pilot Test	April 21, 2013	SVP-01	0.5 hour	<710	<96	<370	<620	<110	<180	280	3,700	<120	<450	<140	<170	<150	<230	<130	<110	<1,100
	April 20, 2013	SVP-01	8 hour	<710	<96	<370	<620	<100	<180	290	4,700	120	<430	<130	<170	<150	<230	<120	<100	<1,000
	April 20, 2013	SVP-02	8 hour	9.8	<0.47	4.0	<0.30	<0.50	<0.88	<0.58	<0.58	<0.58	<0.53	<0.64	3.2	3.3	<1.1	<0.60	<0.52	<1.0
	April 22, 2013	SVP-02	24 hour	32	<0.54	3.9	1.6	3.8	<1.0	<0.67	<0.67	<0.67	<0.61	0.88	2.3	3.7	<1.3	12	6.0	27
	April 21, 2013	SVP-03	0.5 hour	5.7	<0.50	<2.4	<0.32	<0.54	<0.94	<0.62	<0.62	<0.62	<0.52	<0.68	46	3.0	2.5	<0.64	<0.63	<1.1
	April 21, 2013	SVP-03	8 hour	4.0	<0.46	<2.2	<0.30	<0.49	<0.86	<0.57	<0.57	<0.57	<0.52	<0.62	43	3.0	3.4	<0.59	<0.58	<0.99
	April 22, 2013	SVP-03	24 hour	7.3	<0.50	<2.4	0.51	<0.54	<0.94	<0.62	<0.62	<0.62	<0.56	<0.68	42	3.1	2.7	<0.64	<0.55	<1.1
	April 21, 2013	SVP-04	0.5 hour	43	<0.50	<2.5	<0.33	<0.54	<0.95	<0.63	<0.63	<0.63	0.71	<0.69	2.3	2.6	<1.2	<0.65	<0.56	<1.1
	April 20, 2013	SVP-04	8 hour	110	<0.80	7.2	<0.52	<0.86	6.2	<0.99	<0.99	<0.99	<0.90	<1.1	2.1	2.4	<1.9	<1.0	<0.88	<1.7
	April 22, 2013	SVP-04	24 hour	240	<1.4	31	<0.94	<1.6	2.9	<1.8	<1.8	<1.8	<1.6	<2.0	2.7	2.4	<3.5	<1.8	<1.6	<3.1
	April 22, 2013	Ambient Air 01	24 hour	17	0.54	<2.5	1.5	1.7	<0.95	<0.63	<0.63	<0.63	<0.57	<0.69	1.4	2.7	<1.2	0.66	1.2	<1.1

Notes:
All soil vapor samples collected using summa canisters.
Screening levels are the United States Environmental Protection Agency (USEPA) Vapor Intrusion Screening Level (VISLs) (USEPA 2018a).
The USEPA Residential VISLs (TCR=1E-06 or THQ=0.1) (USEPA 2018a) are presented for informational purposes only since the samples were collected at the ALDOT M&T Laboratory Site.
Underlined values exceed the USEPA Commercial VISL (TCR=1E-06 or THQ=0.1) (USEPA 2018a).

< 1.3 = Constituent was not detected. Reporting limit displayed.
µg/m^3 = Microgram per cubic meter.
N/A = Not applicable
ND = Not detected

Table 3-1
Historical Soil Vapor Results for Detected Constituents
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Pilot Tests	Date	Sample Identification	Sample Collection Duration	Methyl ethyl ketone (µg/m^3)	4-Methyl-2-pentanone (µg/m^3)	Styrene (µg/m^3)	Tetrachloroethene (µg/m^3)	Toluene (µg/m^3)	1,1,1-Trichloroethane (µg/m^3)	Trichloroethylene (µg/m^3)	m,p-Xylene (µg/m^3)	o-Xylene (µg/m^3)	Sample Identification Alias
		Screening Level	Residential	17,400	10,400	3,480	139	17,400	17,400	6.95	348	348	
			Commercial	73,000	43,800	14,600	584	73,000	73,000	29.2	1,460	1,460	
Pilot Test 1	March 9, 2002	SVP - 01	24 hour	N/A	N/A	N/A	N/A	N/A	N/A	22,000	N/A	N/A	SV - Implant
Pilot Test 2	March 28, 2002	SVP - 02	24 hour	N/A	N/A	N/A	N/A	N/A	N/A	5.3	N/A	N/A	SV - Implant 11
	March 28, 2002	SVP - 03	24 hour	N/A	N/A	N/A	N/A	N/A	N/A	2.6	N/A	N/A	SV - Implant 12
Pilot Test 3	May 6, 2002	SVP - 03	24 hour	N/A	N/A	N/A	N/A	N/A	N/A	ND	N/A	N/A	SV - Implant 12
April 2013 Soil Vapor Pilot Test	April 21, 2013	SVP-01	0.5 hour	<370	<130	<130	<210	<120	440	29,000	<140	<140	SV - Implant
	April 20, 2013	SVP-01	8 hour	<350	140	<130	<200	<110	450	30,000	<130	<130	SV - Implant
	April 20, 2013	SVP-02	8 hour	<2.2	<0.60	<0.63	<1.0	<0.55	<0.80	<0.79	<0.64	<0.64	SV - Implant 11
	April 22, 2013	SVP-02	24 hour	2.5	<0.69	1.1	<1.1	15	<0.92	<0.91	2.4	0.89	SV - Implant 11
	April 21, 2013	SVP-03	0.5 hour	<0.62	<0.64	<0.66	<1.0	<0.59	<0.85	1.8	<0.68	<0.68	SV - Implant 12
	April 21, 2013	SVP-03	8 hour	<2.1	<0.58	<0.61	<0.97	<0.62	<0.78	1.6	<0.62	<0.62	SV - Implant 12
	April 22, 2013	SVP-03	24 hour	13	1.0	<0.66	<1.0	<0.59	<0.85	1.2	<0.68	<0.68	SV - Implant 12
	April 21, 2013	SVP-04	0.5 hour	4.8	<0.65	<0.67	<1.1	32	<0.86	<0.85	<0.69	<0.69	N/A
	April 20, 2013	SVP-04	8 hour	13	1.0	<1.1	9.4	<1.1	<1.4	<1.3	<1.1	<1.1	N/A
	April 22, 2013	SVP-04	24 hour	16	<1.8	<1.9	<3.1	420	<2.5	<2.4	<2.0	3.5	N/A
	April 22, 2013	Ambient Air 01	24 hour	4.1	<0.65	<0.67	<1.1	8.6	<0.86	<0.85	1.2	<0.69	N/A

Notes:
All soil vapor samples collected using summa canisters.
Screening levels are the United States Environmental Protection Agency (USEPA)
The USEPA Residential VISLs (TCR=1E-06 or THQ=0.1) (USEPA 2018a) are presente
Underlined values exceed the USEPA Commercial VISL (TCR=1E-06 or THQ=0.1) (U

< 1.3 = Constituent was not detected. Reporting limit displayed.
µg/m^3 = Microgram per cubic meter.
N/A = Not applicable
ND = Not detected

Table 3-2
Maximum Shallow Groundwater Analytical Results for 2016-2018 Data
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Sampling Location	Total Depth (Feet)	Units	1,1-Dichloroethane	1,1-Dichloroethene	Carbon Tetrachloride	Chloroethane	Chloroform	cis-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethene	Trichloroethene	Vinyl Chloride
Vapor Intrusion Screening Level	Residential	µg/L	7.64	19.5	0.415	2,300	0.814	NA	471	5.76	0.518	0.147
	Commercial	µg/L	33.4	82.1	1.81	9,650	3.55	NA	1,980	24.2	2.18	2.45
MW-104	31	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	6.1	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-106	35	µg/L	< 5 ND	8.8	5.4	< 5 ND	< 5 ND	7.5	5.1	< 5 ND	947	< 5 ND
MW-108	25	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	1.2	< 1 ND	< 1 ND	77.9	< 1 ND
MW-109	33	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-111	46	µg/L	< 1 ND	3.2	< 1 ND	< 1 ND	17.3	< 1 ND	< 1 ND	< 1 ND	18.6	< 1 ND
MW-112	35	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-113	20.5	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-115	25	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	9.8	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-116	19	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-117	44	µg/L	< 1 ND	2.6	< 1 ND	< 1 ND	1.3	< 1 ND	< 1 ND	< 1 ND	18.8	< 1 ND
MW-118	19	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-123	26	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-125	25	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	1.5	< 1 ND	< 1 ND	< 1 ND	120	< 1 ND
MW-128	26.5	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	5.2	< 1 ND	< 1 ND	< 1 ND	3.4	< 1 ND
MW-129	27.5	µg/L	< 1 ND	3.7	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 5 ND	379	< 1 ND
MW-130	28	µg/L	< 1 ND	4.6	< 1 ND	< 1 ND	1.9	< 1 ND	< 1 ND	< 1 ND	73.6	< 1 ND
MW-132	29	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-133	18.5	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	1.5	2.5	< 1 ND
MW-134	26	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-143A	13.5	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-144A	31.5	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-146A	15.5	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-147A	15.5	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND	< 1 ND
MW-150A	18	µg/L	< 1 ND	< 1 ND	< 1 ND	< 1 ND	1.5	< 1 ND	< 1 ND	< 1 ND	91.4	< 1 ND

All results are in micrograms per liter (µg/L).
Screening levels are the United States Environmental Protection Agency (USEPA) Vapor Intrusion Screening Level (VISLs) (USEPA 2018a).
Shaded values exceed the USEPA Residential VISL (TCR=1E-06 or THQ=0.1) (USEPA 2018a).
Underlined values exceed the USEPA Commercial VISL (TCR=1E-06 or THQ=0.1) (USEPA 2018a).

< 1 = Constituent was not detected. Reporting limit displayed.
ND = Not detected.

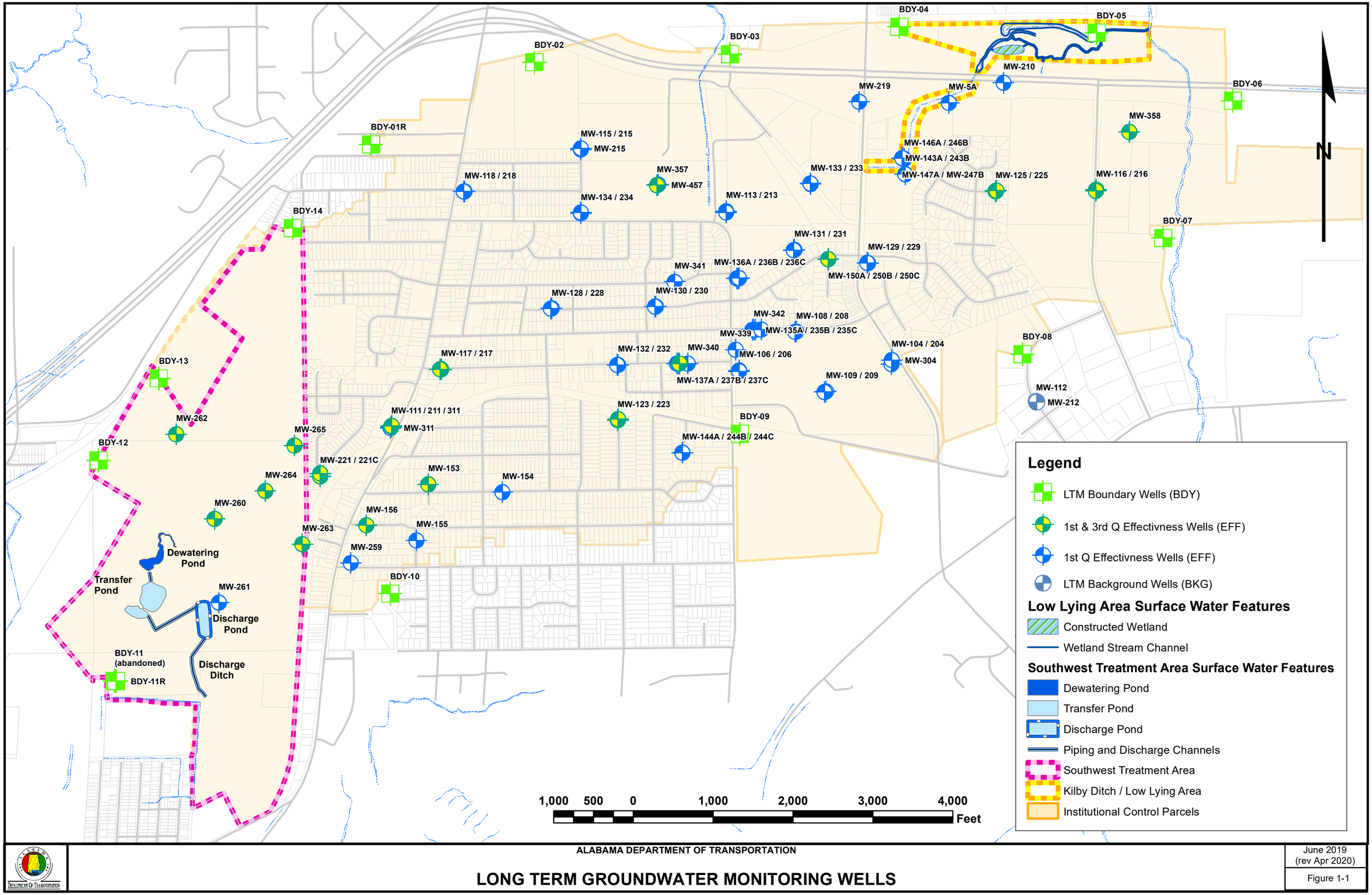
Table 3-3
Summary of Results Based on Maximum Detections and Risk-Based Target Levels
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Sampling Location	Maximum Calculated ELCR [a]	Maximum Calculated HQ [a]	Risk-Based Target Levels for Groundwater (µg/L) [b]	Source
			Trichloroethene	
MW-104	5.9E-08	0.000074	NR	Table C-1
MW-106	1.4E-05	1.2	1,796	Table C-2
MW-108	1.5E-06	0.13	NR	Table C-3
MW-111	4.5E-07	0.025	NR	Table C-4
MW-115	3.2E-06	0.0039	NR	Table C-5
MW-117	1.8E-06	0.37	NR	Table C-6
MW-125	1.2E-05	2.7	100	Table C-7
MW-128	1.5E-06	0.098	NR	Table C-8
MW-130	9.7E-06	2.1	79	Table C-9
MW-150A	1.6E-05	3.6	58	Table C-10
SVP-01	9.3E-06	0.82	NR	Table C-11

[a] Incremental cancer risks and hazards were calculated using the United States Environmental Protection Agency (USEPA) Johnson and Ettinger model (2017).
[b] In accordance with Alabama Department of Environmental Management guidance (ADEM 2017), risk-based target screening levels (RBTLs) are calculated if any receptor's cumulative risk exceeds 1×10^{-5}, or their hazard index exceeds 1.0. RBTLs were calculated using the USEPA Johnson and Ettinger model (2017).
Risk-based target levels (RBTLs) were based on a target risk of 1×10^{-5} and a target hazard quotient of 1.0 since only one constiutent of potential concern resulted in elevated risks or hazards.

ELCR Excess lifetime cancer risk.
HQ Hazard quotient.
µg/L Microgram per liter.
NR Not required.

FIGURES

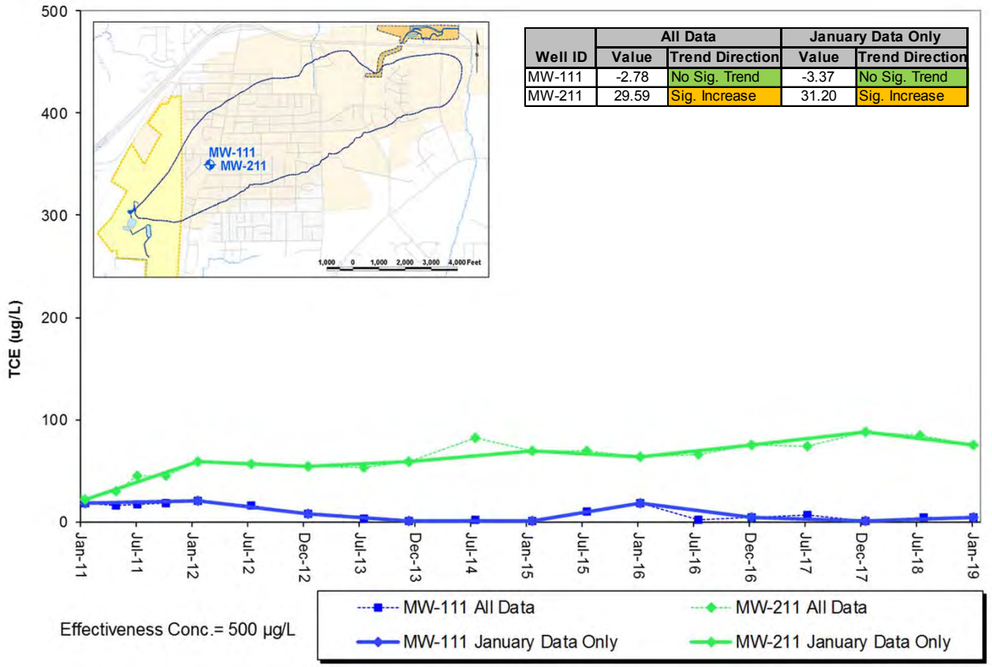


ALABAMA DEPARTMENT OF TRANSPORTATION

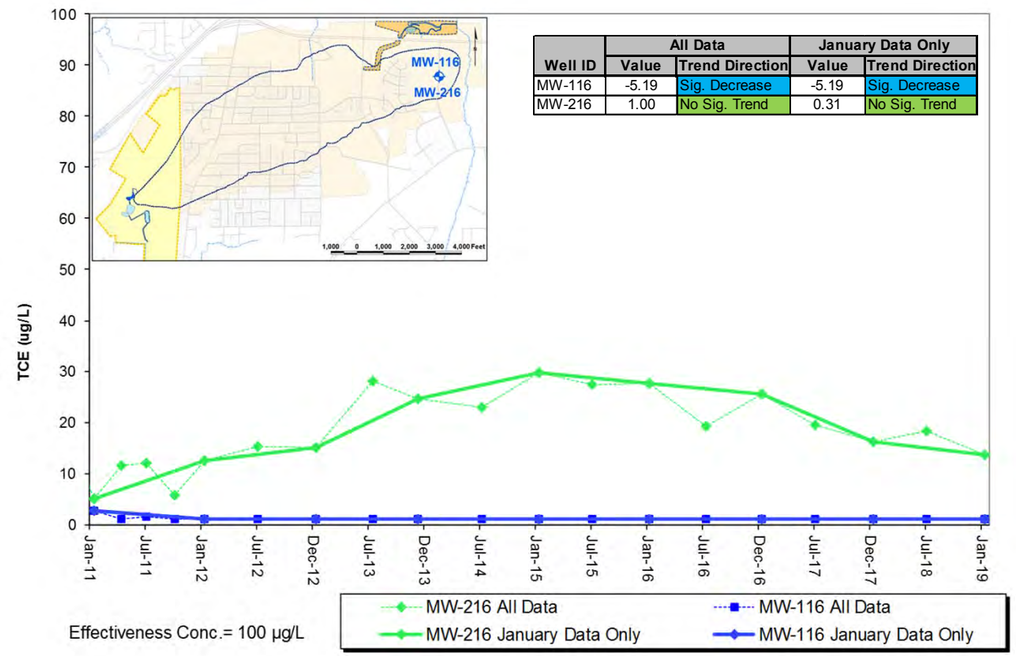
LONG TERM GROUNDWATER MONITORING WELLS

June 2019
(rev Apr 2020)

Figure 1-1



Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-111	-2.78	No Sig. Trend	-3.37	No Sig. Trend
MW-211	29.59	Sig. Increase	31.20	Sig. Increase



Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-116	-5.19	Sig. Decrease	-5.19	Sig. Decrease
MW-216	1.00	No Sig. Trend	0.31	No Sig. Trend

Shewhart Trend Statistics

Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-111	-2.78	No Sig. Trend	-3.37	No Sig. Trend
MW-116	-5.19	Sig. Decrease	-5.19	Sig. Decrease
MW-117	-7.56	Sig. Decrease	-7.43	Sig. Decrease
MW-125	17.04	Sig. Increase	24.85	Sig. Increase
MW-153	7.68	Sig. Increase	4.55	Sig. Increase
MW-156	7.46	Sig. Increase	7.95	Sig. Increase
MW-211	29.59	Sig. Increase	31.20	Sig. Increase
MW-216	1.00	No Sig. Trend	0.31	No Sig. Trend
MW-217	20.77	Sig. Increase	24.15	Sig. Increase
MW-221C	1.66	No Sig. Trend	1.01	No Sig. Trend
MW-223	971.07	Sig. Increase	583.80	Sig. Increase
MW-225	36.44	Sig. Increase	29.44	Sig. Increase
MW-237C	20.08	Sig. Increase	12.44	Sig. Increase
MW-250C	-2.61	No Sig. Trend	-1.92	No Sig. Trend
MW-260	6.35	Sig. Increase	5.93	Sig. Increase
MW-263	-0.75	No Sig. Trend	-1.20	No Sig. Trend
MW-264	0.34	No Sig. Trend	0.20	No Sig. Trend
MW-265	2.99	No Sig. Trend	3.19	No Sig. Trend

Notes:

Sig. Decrease = Shewhart Statistic < -4.5

No Sig. Trend = Shewhart Statistic -4.5 to 4.5

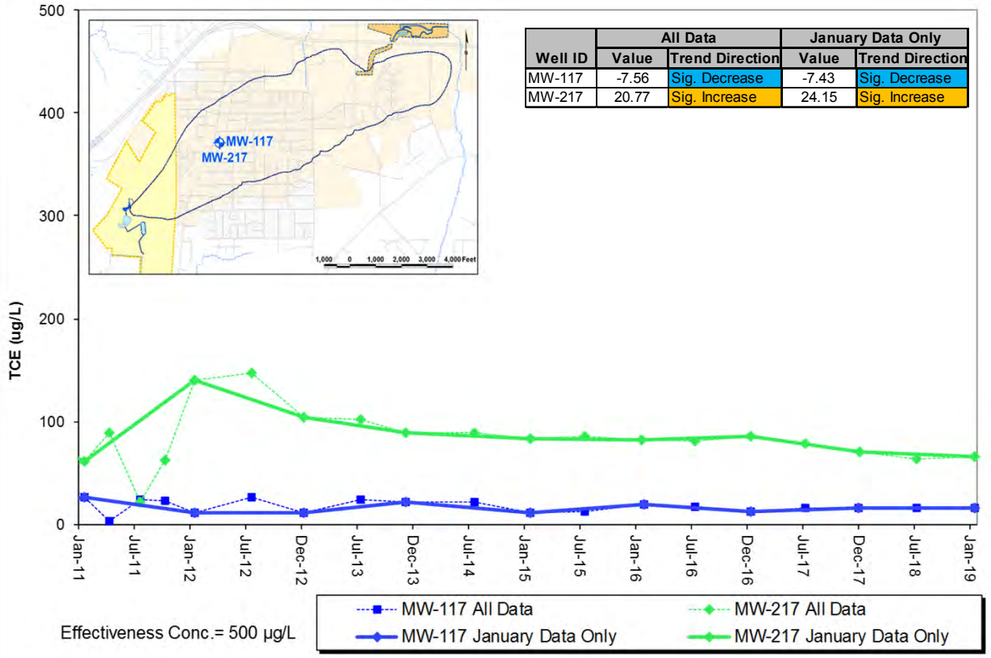
Sig. Increase = Shewhart Statistic > 4.5

ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME ANNUAL REPORT

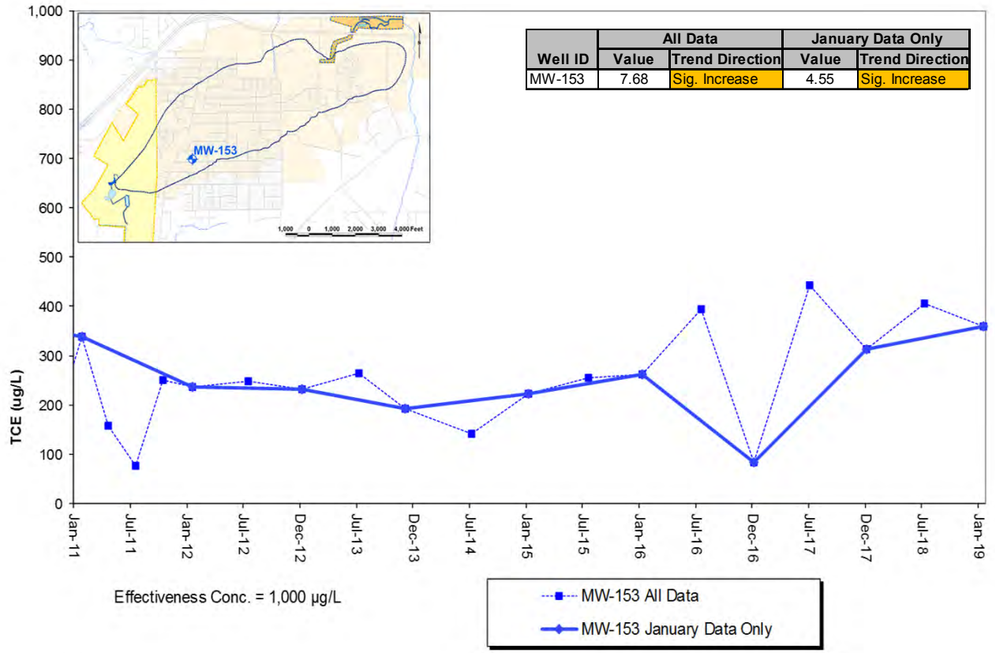
Comparison of Semi-Annual to Annual TCE Trends

JUNE 2019

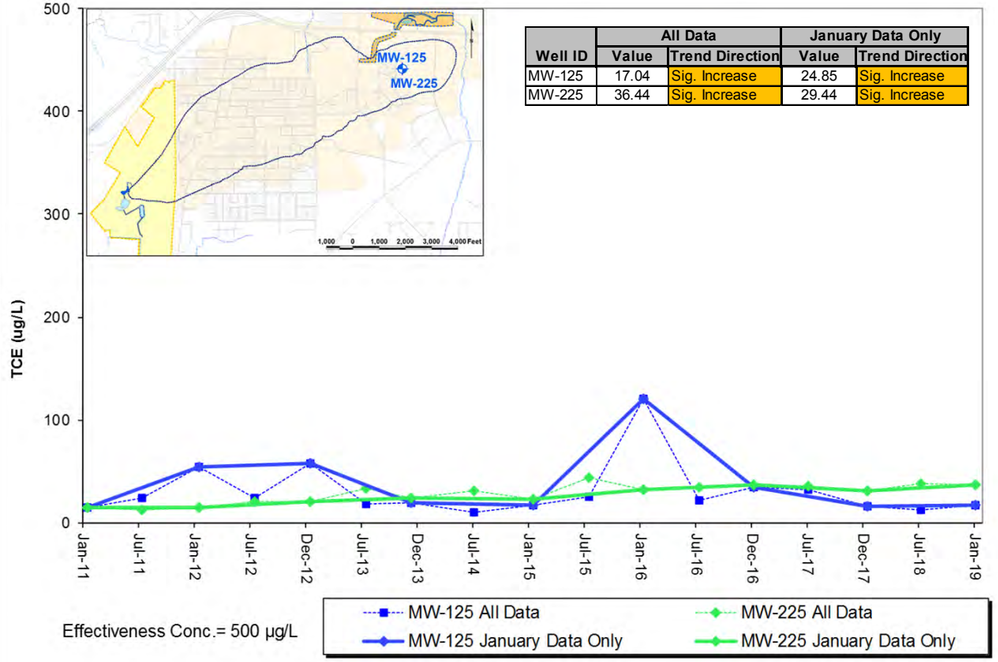
FIGURE 1-2



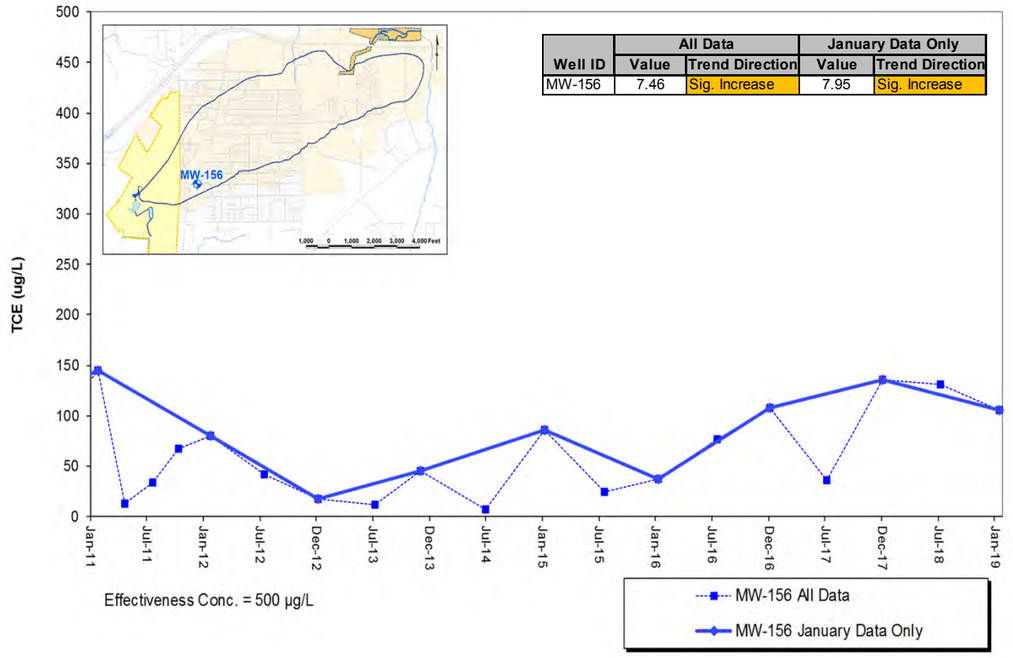
Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-117	-7.56	Sig. Decrease	-7.43	Sig. Decrease
MW-217	20.77	Sig. Increase	24.15	Sig. Increase



Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-153	7.68	Sig. Increase	4.55	Sig. Increase



Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-125	17.04	Sig. Increase	24.85	Sig. Increase
MW-225	36.44	Sig. Increase	29.44	Sig. Increase



Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-156	7.46	Sig. Increase	7.95	Sig. Increase

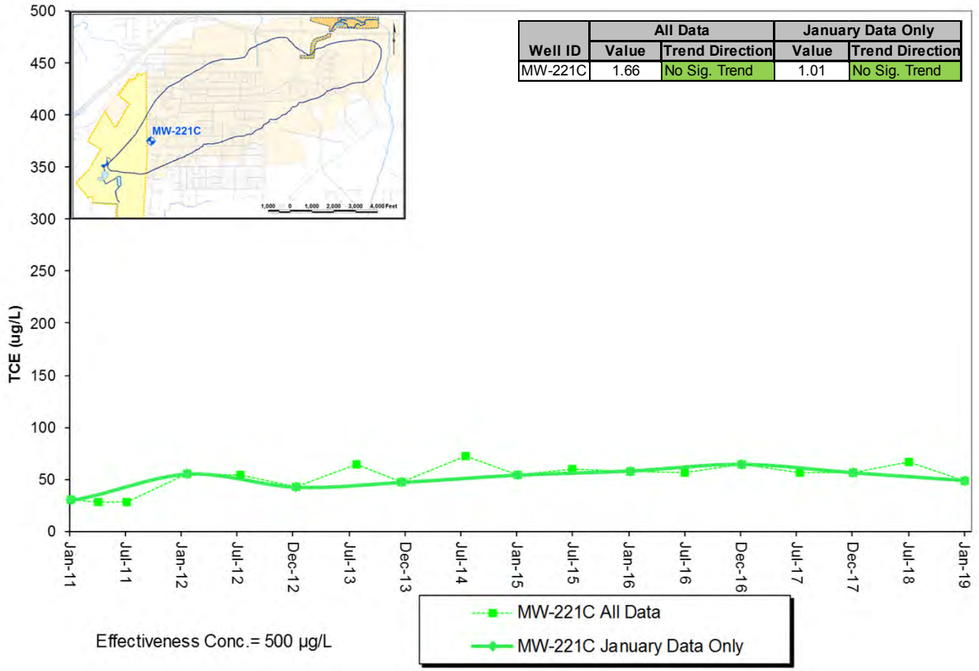
DEPARTMENT OF TRANSPORTATION

ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME ANNUAL REPORT

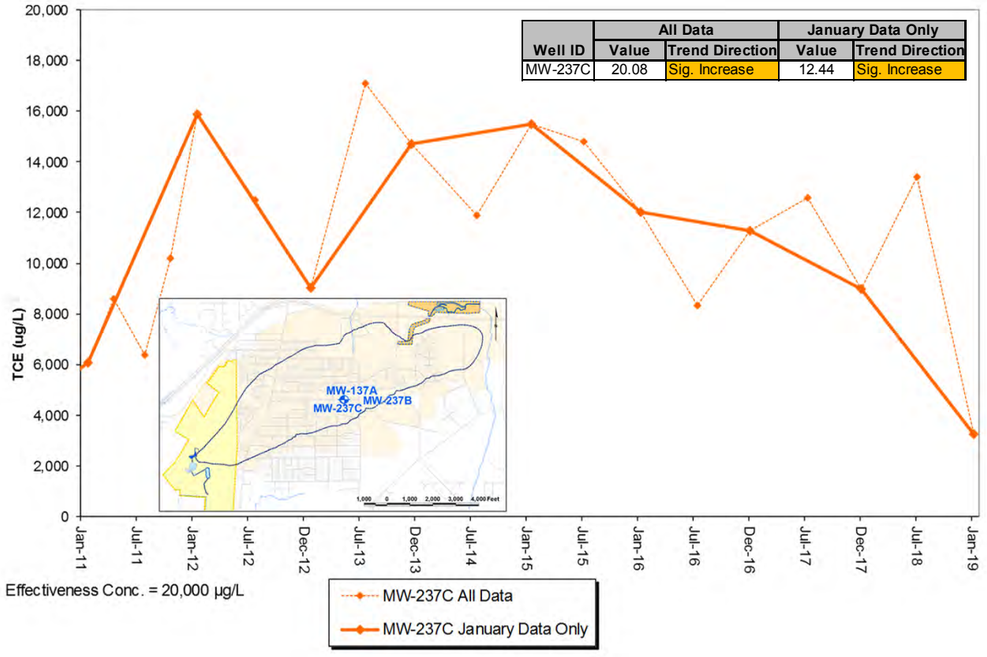
Comparison of Semi-Annual to Annual TCE Trends

JUNE 2019

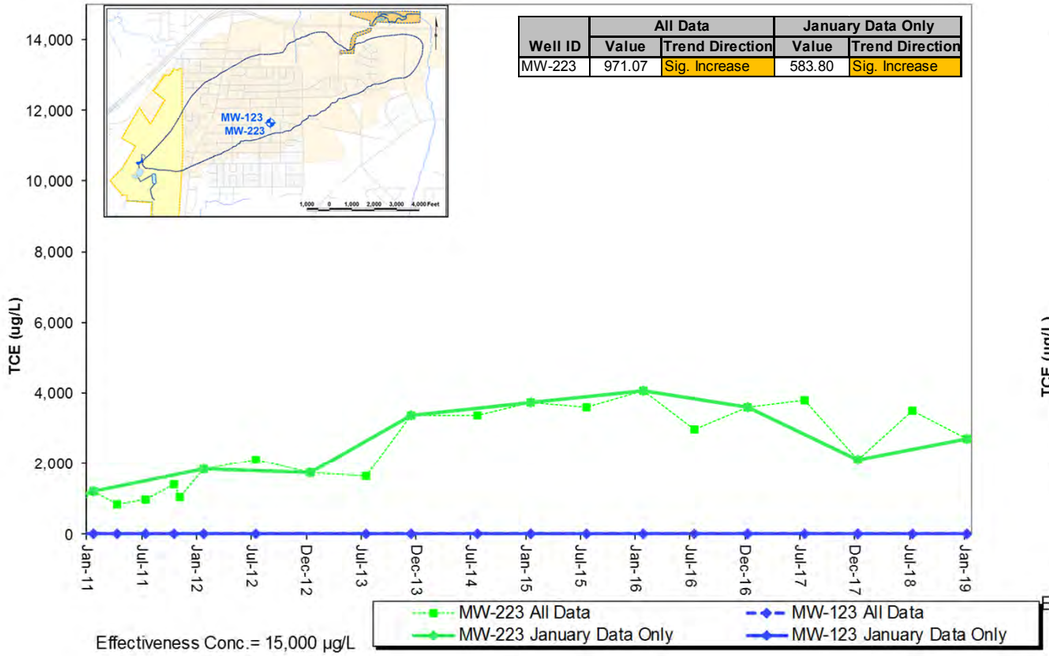
FIGURE 1-3



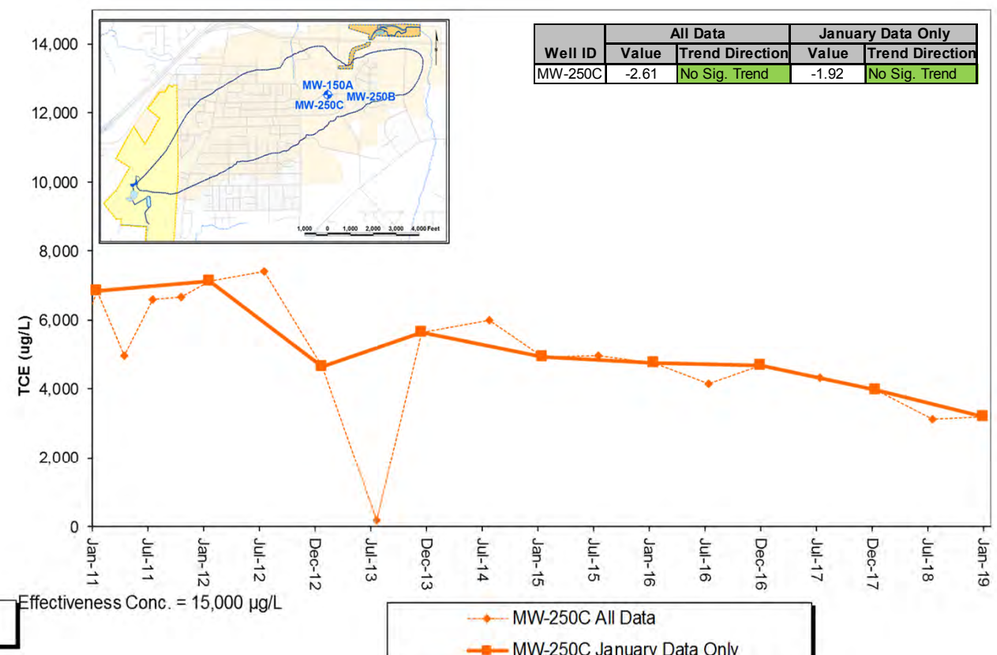
Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-221C	1.66	No Sig. Trend	1.01	No Sig. Trend



Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-237C	20.08	Sig. Increase	12.44	Sig. Increase



Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-223	971.07	Sig. Increase	583.80	Sig. Increase



Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-250C	-2.61	No Sig. Trend	-1.92	No Sig. Trend

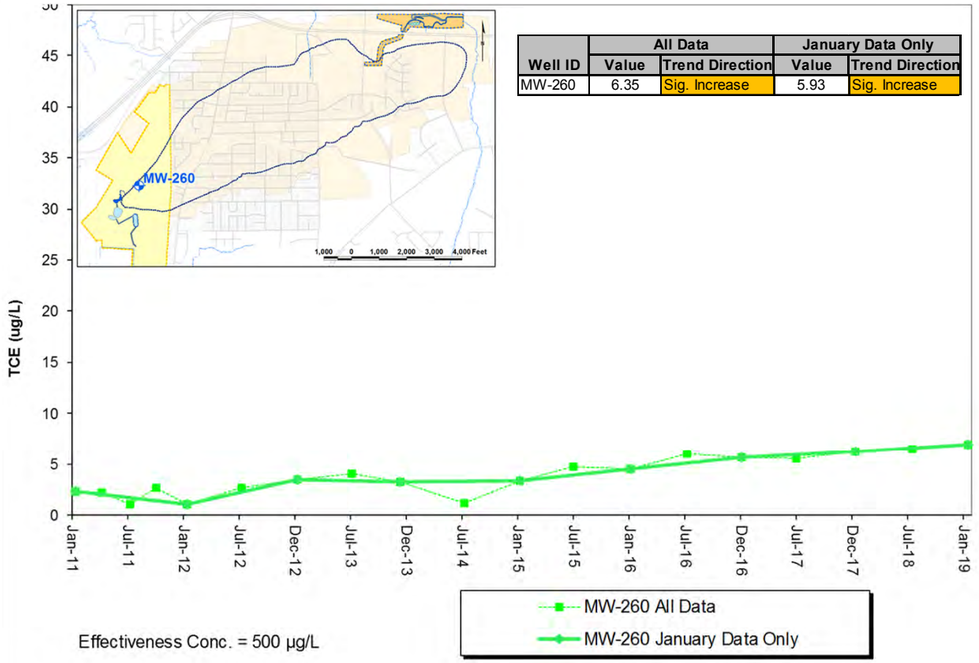
DEPARTMENT OF TRANSPORTATION

ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME ANNUAL REPORT

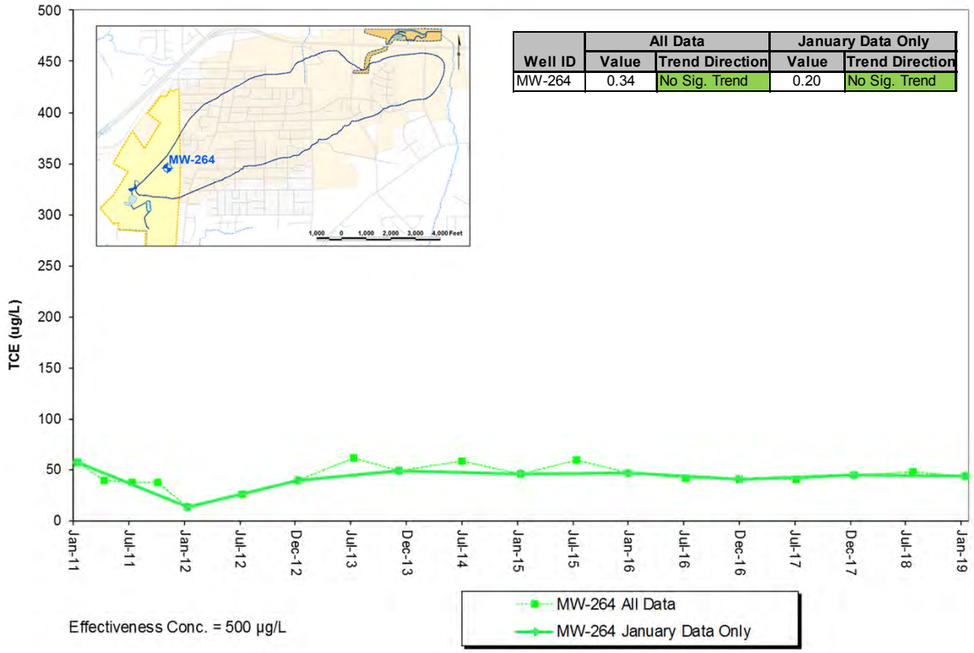
Comparison of Semi-Annual to Annual TCE Trends

JUNE 2019

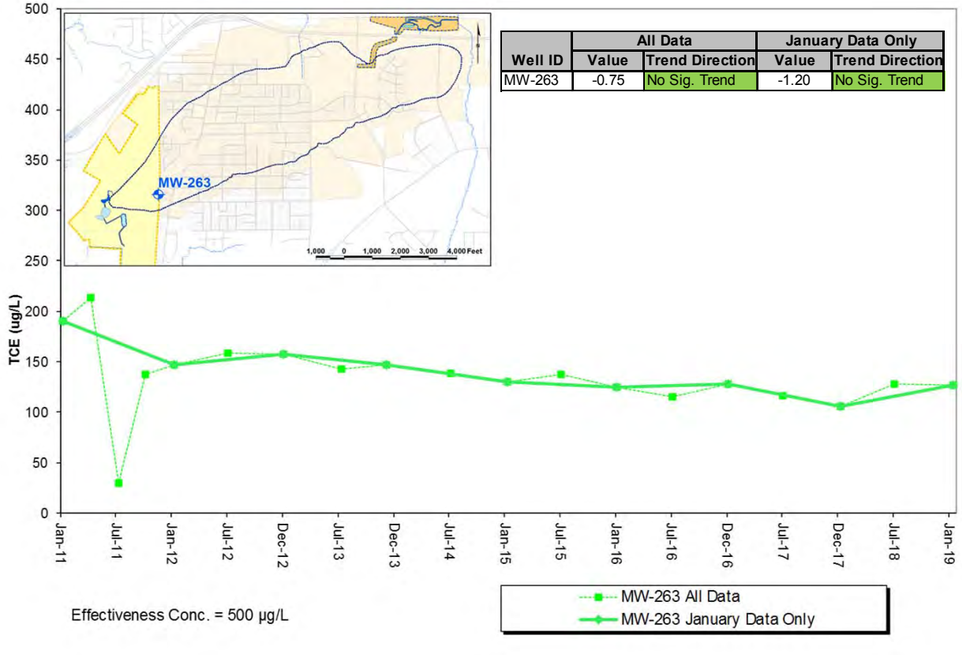
FIGURE 1-4



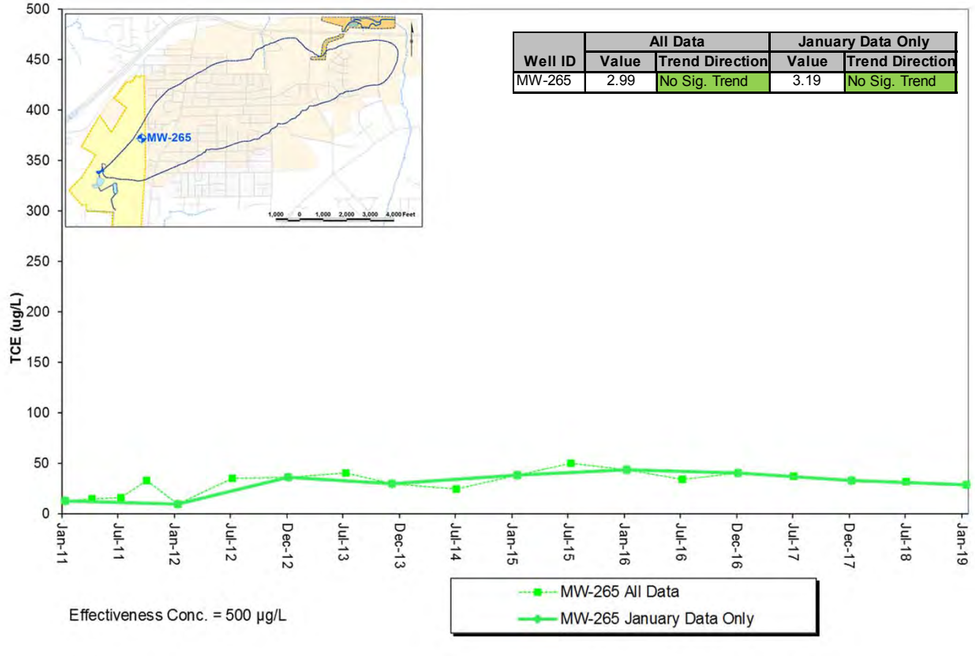
Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-260	6.35	Sig. Increase	5.93	Sig. Increase



Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-264	0.34	No Sig. Trend	0.20	No Sig. Trend



Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-263	-0.75	No Sig. Trend	-1.20	No Sig. Trend



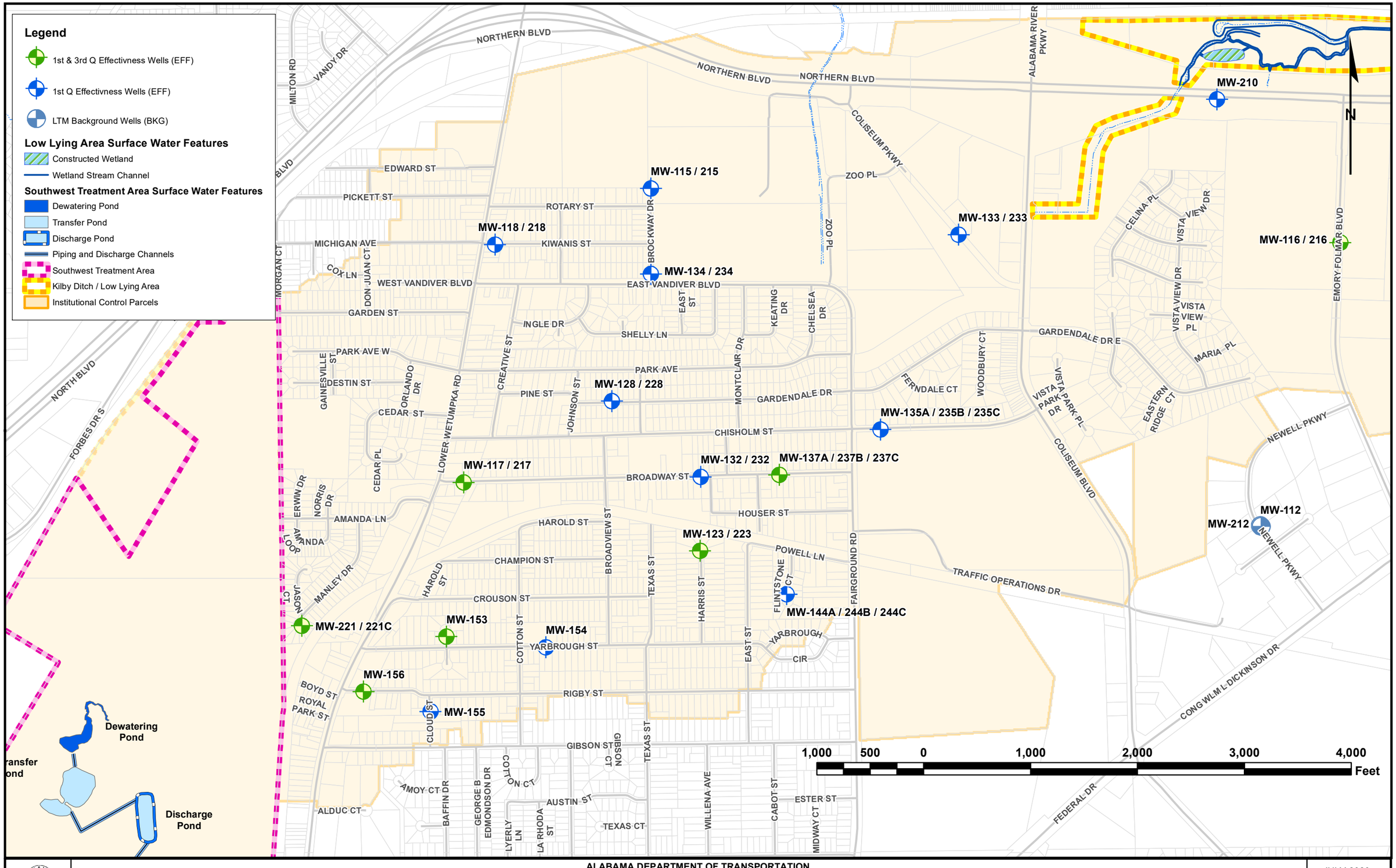
Well ID	All Data		January Data Only	
	Value	Trend Direction	Value	Trend Direction
MW-265	2.99	No Sig. Trend	3.19	No Sig. Trend

ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME ANNUAL REPORT

Comparison of Semi-Annual to Annual TCE Trends

JUNE 2019

FIGURE 1-5

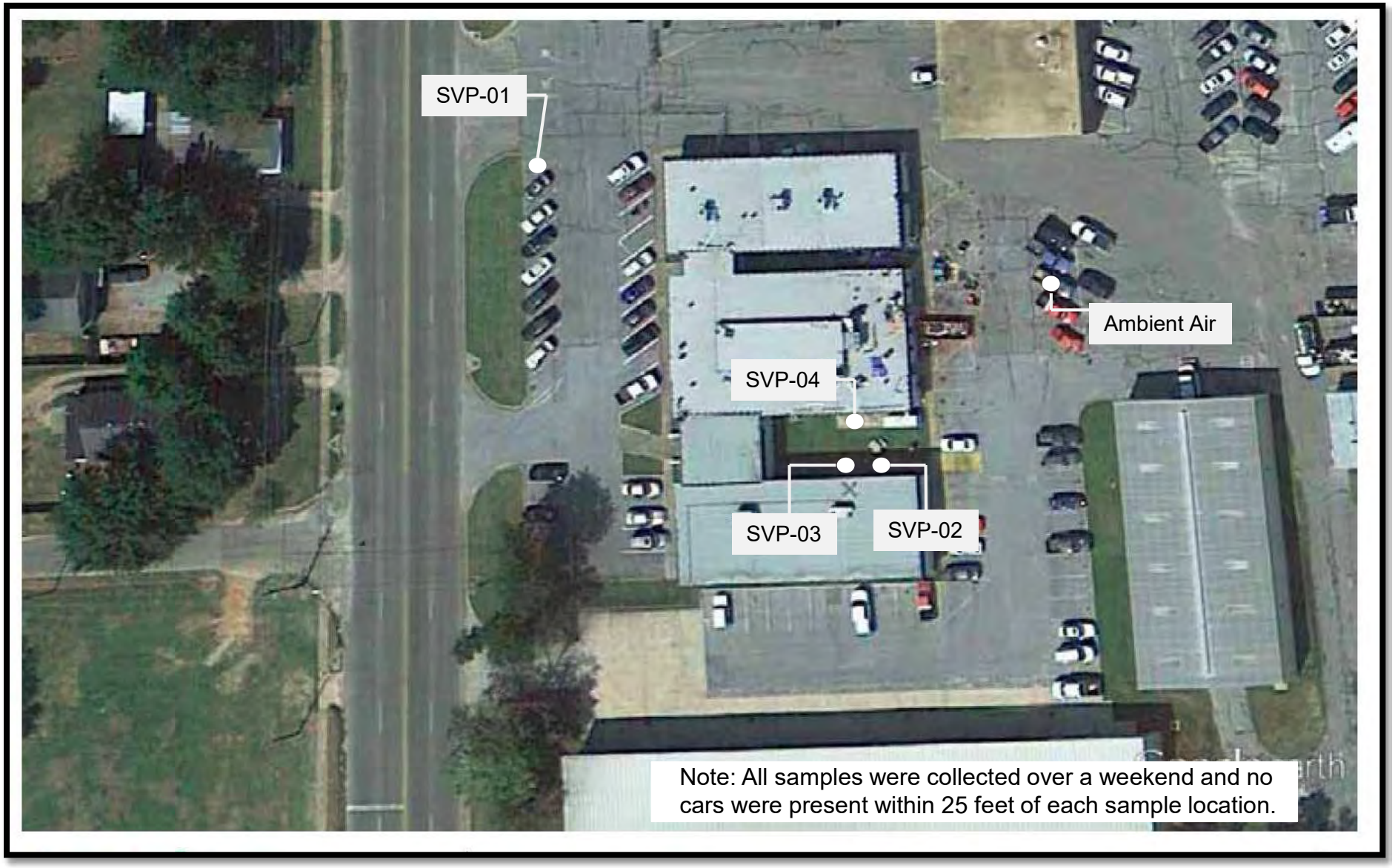


ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME ANNUAL REPORT

WELLS SAMPLED VIA SINGLE VOLUME PURGE METHOD

JULY 2020

Figure 2-2



Soil Vapor and Ambient Air locations near the
ALDOT Materials and Test Administration Building

Figure 3-1

Legend

Shallow Effectiveness Monitoring Wells

- VOCs Not Detected
- VOCs Below ELCR and HQ Screening Levels
- TCE Risk-Based Target Levels Established
- Kilby Ditch and Low Lying Area
- Southwest Treatment Area
- Streams and Ditches
- Institutional Control Boundary

MW-115
MW-118
MW-134
MW-113
MW-133
MW-146A
MW-147A
MW-143A
MW-125
RBTL = 100 ug/L
MW-116
MW-150A
RBTL = 58 ug/L
MW-129
MW-130
RBTL = 79 ug/L
MW-128
MW-108
MW-106
RBTL = 1,796 ug/L
MW-104
MW-109
MW-112
MW-117
MW-132
MW-123
MW-144A
MW-111
Dewatering Pond
Transfer Pond
Discharge Pond
Discharge Ditch

0 500 1,000 2,000 3,000 4,000
Feet

N

DRAFT ATTORNEY-CLIENT PRIVILEGED

ALABAMA DEPARTMENT OF TRANSPORTATION

COLISEUM BOULEVARD PLUME

2018 Vapor Evaluation Monitoring Wells

APRIL 2019

FIGURE 3-2

APPENDIX A
Groundwater Analytical Data- Equipment Purge/Standard Purge

Comparison of Single and Three Volume Purge Volume and Trichlorethene Concentration

Sample ID	Collected Date	Parameter	Results	Units	PQL
MW-137A	**01/06/2020 10:30**	**Trichloroethene**	**14.2**	**ug/L**	**1.0**
MW-137A 1 VOL	**01/22/2020 13:58**	**Trichloroethene**	**11.0**	**ug/L**	**1.0**
MW-137A	01/22/2020 14:40	Trichloroethene	9.8	ug/L	1.0
MW-237B	**01/06/2020 09:45**	**Trichloroethene**	**135**	**ug/L**	**1.0**
MW-237 B 1 VOL	**01/22/2020 13:30**	**Trichloroethene**	**84.5**	**ug/L**	**1.0**
MW-237B	01/22/2020 14:15	Trichloroethene	83.2	ug/L	1.0
MW-237C	01/06/2020 10:05	Trichloroethene	11600	ug/L	100
MW-237C 1 VOL	01/22/2020 13:40	Trichloroethene	11300	ug/L	100
MW-237C	01/22/2020 14:55	Trichloroethene	11000	ug/L	100
MW-223	**01/15/2020 13:40**	**Trichloroethene**	**2780**	**ug/L**	**25.0**
MW-223 1 VOL	**01/21/2020 09:55**	**Trichloroethene**	**2920**	**ug/L**	**20.0**
MW-223	01/21/2020 11:00	Trichloroethene	2340	ug/L	20.0
MW-135A	01/06/2020 12:05	Trichloroethene	679	ug/L	10.0
MW-135A 1 VOL	01/23/2020 09:40	Trichloroethene	576	ug/L	10.0
MW-135A DUP 1 VOL	01/23/2020 09:40	Trichloroethene	666	ug/L	5.0
MW-135A	01/23/2020 10:07	Trichloroethene	618	ug/L	10.0
MW-135A DUP	**01/23/2020 10:07**	**Trichloroethene**	**687**	**ug/L**	**10.0**
MW-235B	**01/06/2020 11:25**	**Trichloroethene**	**2590**	**ug/L**	**20.0**
MW-235B 1 VOL	**01/23/2020 09:12**	**Trichloroethene**	**2340**	**ug/L**	**20.0**
MW-235B	01/23/2020 09:50	Trichloroethene	2300	ug/L	20.0
MW-235C	01/06/2020 11:55	Trichloroethene	1470	ug/L	10.0
MW-235C 1 VOL	**01/23/2020 09:21**	**Trichloroethene**	**1630**	**ug/L**	**10.0**
MW-235C	01/23/2020 10:15	Trichloroethene	1620	ug/L	10.0
MW-232	**01/10/2020 11:20**	**Trichloroethene**	**565**	**ug/L**	**5.0**
MW-232 1 VOL	**01/21/2020 11:54**	**Trichloroethene**	**521**	**ug/L**	**5.0**
MW-232	01/21/2020 12:32	Trichloroethene	520	ug/L	5.0
MW-153 1 VOL	**01/21/2020 11:15**	**Trichloroethene**	**358**	**ug/L**	**5.0**
MW-153	01/21/2020 13:05	Trichloroethene	331	ug/L	5.0
MW-154 1st	01/17/2020 08:25	Trichloroethene	6.6	ug/L	1.0
MW-154	**01/17/2020 10:10**	**Trichloroethene**	**6.8**	**ug/L**	**1.0**
MW-156 1 VOL	01/20/2020 14:40	Trichloroethene	56.2	ug/L	1.0
MW-156	**01/20/2020 16:20**	**Trichloroethene**	**119**	**ug/L**	**1.0**
MW-216	**01/07/2020 09:40**	**Trichloroethene**	**10.3**	**ug/L**	**1.0**
MW-216 1 VOL	**01/20/2020 13:51**	**Trichloroethene**	**10.3**	**ug/L**	**1.0**
MW-216	01/20/2020 14:31	Trichloroethene	10.0	ug/L	1.0

Shading denotes single well volume purge

"**BOLD**" indicates highest concentration of trichloroethene within samples collected

Pace Analytical Services, LLC
4320 Midmost Dr
Mobile, AL 36609
251-344-9106

January 15, 2020

Eric Guarino
Southern Earth Sciences, Inc.
5460 Rangeline Road
Mobile, AL 36619

RE: Project: CBP/ C06-401
Pace Project No.: 20137302

Dear Eric Guarino:
Enclosed are the analytical results for sample(s) received by the laboratory on January 08, 2020. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Savannah Wallace
savannah.wallace@pacelabs.com
251-344-9106
Project Manager

Enclosures

cc: Andrew Guarino, Arcadis Alabama
Stacey Guarino, Southern Earth Sciences
Marty Reaves, Southern Earth Sciences, Inc.

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
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251-344-9106

CERTIFICATIONS

Project: CBP/ C06-401
Pace Project No.: 20137302

Pace Analytical Services New Orleans

California Env. Lab Accreditation Program Branch: 11277CA
Florida Department of Health (NELAC): E87595
Illinois Environmental Protection Agency: 0025721
Kansas Department of Health and Environment (NELAC): E-10266
Louisiana Dept. of Environmental Quality (NELAC/LELAP): 02006
Pennsylvania Dept. of Env Protection (NELAC): 68-04202
Texas Commission on Env. Quality (NELAC): T104704405-09-TX
U.S. Dept. of Agriculture Foreign Soil Import: P330-10-00119
Commonwealth of Virginia (TNI): 480246

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251-344-9106

SAMPLE SUMMARY

Project: CBP/ C06-401
Pace Project No.: 20137302

Lab ID	Sample ID	Matrix	Date Collected	Date Received
20137302001	MW-146A	Water	01/02/20 14:35	01/08/20 08:30
20137302002	MW-246B	Water	01/02/20 14:39	01/08/20 08:30
20137302003	MW-246B DUP	Water	01/02/20 14:39	01/08/20 08:30
20137302004	MW147A	Water	01/02/20 13:18	01/08/20 08:30
20137302005	MW-247B	Water	01/02/20 13:03	01/08/20 08:30
20137302006	Trip	Water	01/07/20 15:40	01/08/20 08:30
20137302007	MW-150A	Water	01/06/20 15:50	01/08/20 08:30
20137302008	MW-250B	Water	01/06/20 14:30	01/08/20 08:30
20137302009	MW-250C	Water	01/06/20 14:35	01/08/20 08:30
20137302010	MW-250C DUP	Water	01/06/20 14:35	01/08/20 08:30
20137302011	MW-125	Water	01/03/20 13:55	01/08/20 08:30
20137302012	MW-225	Water	01/03/20 14:00	01/08/20 08:30
20137302013	MW-104	Water	01/04/20 14:30	01/08/20 08:30
20137302014	MW-204	Water	01/04/20 15:10	01/08/20 08:30
20137302015	MW-304	Water	01/04/20 15:05	01/08/20 08:30
20137302016	MW-135A DUP	Water	01/06/20 12:05	01/08/20 08:30
20137302017	BDY-02	Water	01/06/20 16:05	01/08/20 08:30
20137302018	BDY-09	Water	01/06/20 13:35	01/08/20 08:30
20137302019	MW-135A	Water	01/06/20 12:05	01/08/20 08:30
20137302020	MW-235B	Water	01/06/20 11:25	01/08/20 08:30
20137302021	MW-235C	Water	01/06/20 11:55	01/08/20 08:30
20137302022	MW-137A	Water	01/06/20 10:30	01/08/20 08:30
20137302023	MW-237B	Water	01/06/20 09:45	01/08/20 08:30
20137302024	MW-237C	Water	01/06/20 10:05	01/08/20 08:30
20137302025	MW-143A	Water	01/03/20 11:40	01/08/20 08:30
20137302026	MW-243B	Water	01/03/20 11:00	01/08/20 08:30
20137302027	BDY-4	Water	01/07/20 08:15	01/08/20 08:30
20137302028	BDY-5	Water	01/07/20 07:10	01/08/20 08:30
20137302029	BDY-10	Water	01/07/20 16:20	01/08/20 08:30
20137302030	BDY-1R	Water	01/07/20 11:45	01/08/20 08:30
20137302031	BDY-4 Dup	Water	01/07/20 08:15	01/08/20 08:30
20137302032	MW-116	Water	01/07/20 09:45	01/08/20 08:30
20137302033	MW-216	Water	01/07/20 09:40	01/08/20 08:30
20137302034	MW-130	Water	01/07/20 11:40	01/08/20 08:30
20137302035	MW-230	Water	01/07/20 11:25	01/08/20 08:30
20137302036	MW-111	Water	01/07/20 13:25	01/08/20 08:30
20137302037	MW-211	Water	01/07/20 14:40	01/08/20 08:30

REPORT OF LABORATORY ANALYSIS

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251-344-9106

SAMPLE SUMMARY

Project: CBP/ C06-401
Pace Project No.: 20137302

Lab ID	Sample ID	Matrix	Date Collected	Date Received
20137302038	**MW-311**	Water	01/07/20 15:20	01/08/20 08:30

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SAMPLE ANALYTE COUNT

Project: CBP/ C06-401
Pace Project No.: 20137302

Lab ID	Sample ID	Method	Analysts	Analytes Reported
20137302001	MW-146A	EPA 5030B/8260	GEM	13
20137302002	MW-246B	EPA 5030B/8260	GEM	13
20137302003	MW-246B DUP	EPA 5030B/8260	GEM	13
20137302004	MW147A	EPA 5030B/8260	GEM	13
20137302005	MW-247B	EPA 5030B/8260	GEM	13
20137302006	Trip	EPA 5030B/8260	GEM	13
20137302007	MW-150A	EPA 5030B/8260	GEM	13
20137302008	MW-250B	EPA 5030B/8260	GEM	13
20137302009	MW-250C	EPA 5030B/8260	GEM	13
20137302010	MW-250C DUP	EPA 5030B/8260	GEM	13
20137302011	MW-125	EPA 5030B/8260	GEM	13
20137302012	MW-225	EPA 5030B/8260	GEM	13
20137302013	MW-104	EPA 5030B/8260	GEM	13
20137302014	MW-204	EPA 5030B/8260	GEM	13
20137302015	MW-304	EPA 5030B/8260	GEM	13
20137302016	MW-135A DUP	EPA 5030B/8260	GEM	13
20137302017	BDY-02	EPA 5030B/8260	GEM	13
20137302018	BDY-09	EPA 5030B/8260	GEM	13
20137302019	MW-135A	EPA 5030B/8260	GEM	13
20137302020	MW-235B	EPA 5030B/8260	GEM	13
20137302021	MW-235C	EPA 5030B/8260	GEM	13
20137302022	MW-137A	EPA 5030B/8260	GEM	13
20137302023	MW-237B	EPA 5030B/8260	GEM	13
20137302024	MW-237C	EPA 5030B/8260	GEM	13
20137302025	MW-143A	EPA 5030B/8260	GEM	13
20137302026	MW-243B	EPA 5030B/8260	GEM	13
20137302027	BDY-4	EPA 5030B/8260	JRP	13
20137302028	BDY-5	EPA 5030B/8260	JRP	13
20137302029	BDY-10	EPA 5030B/8260	JRP	13
20137302030	BDY-1R	EPA 5030B/8260	JRP	13
20137302031	BDY-4 Dup	EPA 5030B/8260	JRP	13
20137302032	MW-116	EPA 5030B/8260	JRP	13
20137302033	MW-216	EPA 5030B/8260	JRP	13
20137302034	MW-130	EPA 5030B/8260	JRP	13
20137302035	MW-230	EPA 5030B/8260	GEM	13
20137302036	MW-111	EPA 5030B/8260	GEM	13
20137302037	MW-211	EPA 5030B/8260	GEM	13

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SAMPLE ANALYTE COUNT

Project: CBP/ C06-401
Pace Project No.: 20137302

Lab ID	Sample ID	Method	Analysts	Analytes Reported
20137302038	**MW-311**	EPA 5030B/8260	GEM	13

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PROJECT NARRATIVE

Project: CBP/ C06-401
Pace Project No.: 20137302

Method: **EPA 5030B/8260**
Description: 8260 MSV Low Level
Client: Southern Earth Sciences, Inc.
Date: January 15, 2020

General Information:
38 samples were analyzed for EPA 5030B/8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 171129

D4: Sample was diluted due to the presence of high levels of target analytes.

- MW-250B (Lab ID: 20137302008)
  - Carbon tetrachloride
- MW-250C (Lab ID: 20137302009)
  - Carbon tetrachloride
- MW-250C DUP (Lab ID: 20137302010)
  - Carbon tetrachloride

QC Batch: 171173

D4: Sample was diluted due to the presence of high levels of target analytes.

- MW-135A DUP (Lab ID: 20137302016)
  - Carbon tetrachloride

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PROJECT NARRATIVE

Project: CBP/ C06-401
Pace Project No.: 20137302

Method: **EPA 5030B/8260**
Description: 8260 MSV Low Level
Client: Southern Earth Sciences, Inc.
Date: January 15, 2020

Analyte Comments:

QC Batch: 171514

D4: Sample was diluted due to the presence of high levels of target analytes.

- MW-135A (Lab ID: 20137302019)
  - Carbon tetrachloride
- MW-235B (Lab ID: 20137302020)
  - Carbon tetrachloride
- MW-235C (Lab ID: 20137302021)
  - Carbon tetrachloride
- MW-237C (Lab ID: 20137302024)
  - Carbon tetrachloride

QC Batch: 171705

D4: Sample was diluted due to the presence of high levels of target analytes.

- MW-230 (Lab ID: 20137302035)
  - Carbon tetrachloride

This data package has been reviewed for quality and completeness and is approved for release.

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Mobile, AL 36609
251-344-9106

ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-146A **Lab ID: 20137302001** Collected: 01/02/20 14:35 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 15:31	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 15:31	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 15:31	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 15:31	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 15:31	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 15:31	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 15:31	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 15:31	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/09/20 15:31	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 15:31	75-01-4	
Surrogates								
Dibromofluoromethane (S)	101	%.	72-126	1		01/09/20 15:31	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	1		01/09/20 15:31	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/09/20 15:31	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-246B **Lab ID: 20137302002** Collected: 01/02/20 14:39 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 15:49	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 15:49	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 15:49	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 15:49	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 15:49	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 15:49	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 15:49	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 15:49	127-18-4	
Trichloroethene	**2.5**	ug/L	1.0	1		01/09/20 15:49	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 15:49	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	1		01/09/20 15:49	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	1		01/09/20 15:49	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/09/20 15:49	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-246B DUP **Lab ID: 20137302003** Collected: 01/02/20 14:39 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 16:07	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 16:07	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 16:07	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 16:07	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 16:07	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 16:07	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 16:07	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 16:07	127-18-4	
Trichloroethene	**2.6**	ug/L	1.0	1		01/09/20 16:07	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 16:07	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	1		01/09/20 16:07	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	1		01/09/20 16:07	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/09/20 16:07	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW147A **Lab ID: 20137302004** Collected: 01/02/20 13:18 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 16:24	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 16:24	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 16:24	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 16:24	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 16:24	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 16:24	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 16:24	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 16:24	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/09/20 16:24	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 16:24	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	1		01/09/20 16:24	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	68-124	1		01/09/20 16:24	460-00-4	
Toluene-d8 (S)	96	%.	79-119	1		01/09/20 16:24	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-247B **Lab ID: 20137302005** Collected: 01/02/20 13:03 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 16:42	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 16:42	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 16:42	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 16:42	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 16:42	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 16:42	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 16:42	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 16:42	127-18-4	
Trichloroethene	**1.7**	ug/L	1.0	1		01/09/20 16:42	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 16:42	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	1		01/09/20 16:42	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	68-124	1		01/09/20 16:42	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/09/20 16:42	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: Trip **Lab ID: 20137302006** Collected: 01/07/20 15:40 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 17:00	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 17:00	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 17:00	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 17:00	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 17:00	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 17:00	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 17:00	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 17:00	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/09/20 17:00	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 17:00	75-01-4	
Surrogates								
Dibromofluoromethane (S)	101	%.	72-126	1		01/09/20 17:00	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/09/20 17:00	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/09/20 17:00	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-150A **Lab ID: 20137302007** Collected: 01/06/20 15:50 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 17:17	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 17:17	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 17:17	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 17:17	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 17:17	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 17:17	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 17:17	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 17:17	127-18-4	
Trichloroethene	**142**	ug/L	1.0	1		01/09/20 17:17	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 17:17	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	1		01/09/20 17:17	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	1		01/09/20 17:17	460-00-4	
Toluene-d8 (S)	96	%.	79-119	1		01/09/20 17:17	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-250B **Lab ID: 20137302008** Collected: 01/06/20 14:30 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	20.0	20		01/09/20 17:35	56-23-5	D4
Chloroethane	ND	ug/L	20.0	20		01/09/20 17:35	75-00-3	
Chloroform	ND	ug/L	20.0	20		01/09/20 17:35	67-66-3	
1,1-Dichloroethane	ND	ug/L	20.0	20		01/09/20 17:35	75-34-3	
1,1-Dichloroethene	ND	ug/L	20.0	20		01/09/20 17:35	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	20.0	20		01/09/20 17:35	156-59-2	
Methylene Chloride	ND	ug/L	20.0	20		01/09/20 17:35	75-09-2	
Tetrachloroethene	ND	ug/L	20.0	20		01/09/20 17:35	127-18-4	
Trichloroethene	**1940**	ug/L	20.0	20		01/09/20 17:35	79-01-6	
Vinyl chloride	ND	ug/L	20.0	20		01/09/20 17:35	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	20		01/09/20 17:35	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	68-124	20		01/09/20 17:35	460-00-4	
Toluene-d8 (S)	96	%.	79-119	20		01/09/20 17:35	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-250C **Lab ID: 20137302009** Collected: 01/06/20 14:35 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	25.0	25		01/09/20 17:53	56-23-5	D4
Chloroethane	ND	ug/L	25.0	25		01/09/20 17:53	75-00-3	
Chloroform	ND	ug/L	25.0	25		01/09/20 17:53	67-66-3	
1,1-Dichloroethane	ND	ug/L	25.0	25		01/09/20 17:53	75-34-3	
1,1-Dichloroethene	ND	ug/L	25.0	25		01/09/20 17:53	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	25.0	25		01/09/20 17:53	156-59-2	
Methylene Chloride	ND	ug/L	25.0	25		01/09/20 17:53	75-09-2	
Tetrachloroethene	ND	ug/L	25.0	25		01/09/20 17:53	127-18-4	
Trichloroethene	**2810**	ug/L	25.0	25		01/09/20 17:53	79-01-6	
Vinyl chloride	ND	ug/L	25.0	25		01/09/20 17:53	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	25		01/09/20 17:53	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	25		01/09/20 17:53	460-00-4	
Toluene-d8 (S)	96	%.	79-119	25		01/09/20 17:53	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-250C DUP **Lab ID: 20137302010** Collected: 01/06/20 14:35 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	25.0	25		01/09/20 18:11	56-23-5	D4
Chloroethane	ND	ug/L	25.0	25		01/09/20 18:11	75-00-3	
Chloroform	ND	ug/L	25.0	25		01/09/20 18:11	67-66-3	
1,1-Dichloroethane	ND	ug/L	25.0	25		01/09/20 18:11	75-34-3	
1,1-Dichloroethene	ND	ug/L	25.0	25		01/09/20 18:11	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	25.0	25		01/09/20 18:11	156-59-2	
Methylene Chloride	ND	ug/L	25.0	25		01/09/20 18:11	75-09-2	
Tetrachloroethene	ND	ug/L	25.0	25		01/09/20 18:11	127-18-4	
Trichloroethene	**3350**	ug/L	25.0	25		01/09/20 18:11	79-01-6	
Vinyl chloride	ND	ug/L	25.0	25		01/09/20 18:11	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	25		01/09/20 18:11	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	68-124	25		01/09/20 18:11	460-00-4	
Toluene-d8 (S)	95	%.	79-119	25		01/09/20 18:11	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-125 **Lab ID: 20137302011** Collected: 01/03/20 13:55 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 18:29	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 18:29	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 18:29	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 18:29	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 18:29	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 18:29	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 18:29	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 18:29	127-18-4	
Trichloroethene	**18.8**	ug/L	1.0	1		01/09/20 18:29	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 18:29	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	1		01/09/20 18:29	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	68-124	1		01/09/20 18:29	460-00-4	
Toluene-d8 (S)	96	%.	79-119	1		01/09/20 18:29	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-225 **Lab ID: 20137302012** Collected: 01/03/20 14:00 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 18:46	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 18:46	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 18:46	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 18:46	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 18:46	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 18:46	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 18:46	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 18:46	127-18-4	
Trichloroethene	**41.6**	ug/L	1.0	1		01/09/20 18:46	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 18:46	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	1		01/09/20 18:46	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	68-124	1		01/09/20 18:46	460-00-4	
Toluene-d8 (S)	95	%.	79-119	1		01/09/20 18:46	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-104 **Lab ID: 20137302013** Collected: 01/04/20 14:30 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 19:04	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 19:04	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 19:04	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 19:04	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 19:04	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 19:04	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 19:04	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 19:04	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/09/20 19:04	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 19:04	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	1		01/09/20 19:04	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/09/20 19:04	460-00-4	
Toluene-d8 (S)	96	%.	79-119	1		01/09/20 19:04	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-204 **Lab ID: 20137302014** Collected: 01/04/20 15:10 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 21:25	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 21:25	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 21:25	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 21:25	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 21:25	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 21:25	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 21:25	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 21:25	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/09/20 21:25	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 21:25	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	1		01/09/20 21:25	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	68-124	1		01/09/20 21:25	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/09/20 21:25	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-304 **Lab ID: 20137302015** Collected: 01/04/20 15:05 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 21:43	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 21:43	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 21:43	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 21:43	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 21:43	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 21:43	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 21:43	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 21:43	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/09/20 21:43	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 21:43	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	1		01/09/20 21:43	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	68-124	1		01/09/20 21:43	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/09/20 21:43	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-135A DUP **Lab ID: 20137302016** Collected: 01/06/20 12:05 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	5.0	5		01/09/20 22:00	56-23-5	D4
Chloroethane	ND	ug/L	5.0	5		01/09/20 22:00	75-00-3	
Chloroform	ND	ug/L	5.0	5		01/09/20 22:00	67-66-3	
1,1-Dichloroethane	ND	ug/L	5.0	5		01/09/20 22:00	75-34-3	
1,1-Dichloroethene	ND	ug/L	5.0	5		01/09/20 22:00	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	5		01/09/20 22:00	156-59-2	
Methylene Chloride	ND	ug/L	5.0	5		01/09/20 22:00	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	5		01/09/20 22:00	127-18-4	
Trichloroethene	**737**	ug/L	5.0	5		01/09/20 22:00	79-01-6	
Vinyl chloride	ND	ug/L	5.0	5		01/09/20 22:00	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	5		01/09/20 22:00	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	5		01/09/20 22:00	460-00-4	
Toluene-d8 (S)	96	%.	79-119	5		01/09/20 22:00	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: BDY-02 **Lab ID: 20137302017** Collected: 01/06/20 16:05 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/13/20 16:47	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/13/20 16:47	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/13/20 16:47	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/13/20 16:47	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/13/20 16:47	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/13/20 16:47	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/13/20 16:47	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/13/20 16:47	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/13/20 16:47	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/13/20 16:47	75-01-4	
Surrogates								
Dibromofluoromethane (S)	106	%.	72-126	1		01/13/20 16:47	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/13/20 16:47	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/13/20 16:47	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: BDY-09 **Lab ID: 20137302018** Collected: 01/06/20 13:35 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/13/20 17:05	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/13/20 17:05	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/13/20 17:05	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/13/20 17:05	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/13/20 17:05	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/13/20 17:05	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/13/20 17:05	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/13/20 17:05	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/13/20 17:05	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/13/20 17:05	75-01-4	
Surrogates								
Dibromofluoromethane (S)	105	%.	72-126	1		01/13/20 17:05	1868-53-7	
4-Bromofluorobenzene (S)	106	%.	68-124	1		01/13/20 17:05	460-00-4	
Toluene-d8 (S)	101	%.	79-119	1		01/13/20 17:05	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-135A **Lab ID: 20137302019** Collected: 01/06/20 12:05 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	10.0	10		01/13/20 17:23	56-23-5	D4
Chloroethane	ND	ug/L	10.0	10		01/13/20 17:23	75-00-3	
Chloroform	ND	ug/L	10.0	10		01/13/20 17:23	67-66-3	
1,1-Dichloroethane	ND	ug/L	10.0	10		01/13/20 17:23	75-34-3	
1,1-Dichloroethene	ND	ug/L	10.0	10		01/13/20 17:23	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	10.0	10		01/13/20 17:23	156-59-2	
Methylene Chloride	ND	ug/L	10.0	10		01/13/20 17:23	75-09-2	
Tetrachloroethene	ND	ug/L	10.0	10		01/13/20 17:23	127-18-4	
Trichloroethene	**679**	ug/L	10.0	10		01/13/20 17:23	79-01-6	
Vinyl chloride	ND	ug/L	10.0	10		01/13/20 17:23	75-01-4	
Surrogates								
Dibromofluoromethane (S)	105	%.	72-126	10		01/13/20 17:23	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	10		01/13/20 17:23	460-00-4	
Toluene-d8 (S)	98	%.	79-119	10		01/13/20 17:23	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-235B **Lab ID: 20137302020** Collected: 01/06/20 11:25 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	20.0	20		01/13/20 17:41	56-23-5	D4
Chloroethane	ND	ug/L	20.0	20		01/13/20 17:41	75-00-3	
Chloroform	ND	ug/L	20.0	20		01/13/20 17:41	67-66-3	
1,1-Dichloroethane	ND	ug/L	20.0	20		01/13/20 17:41	75-34-3	
1,1-Dichloroethene	**28.4**	ug/L	20.0	20		01/13/20 17:41	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	20.0	20		01/13/20 17:41	156-59-2	
Methylene Chloride	ND	ug/L	20.0	20		01/13/20 17:41	75-09-2	
Tetrachloroethene	ND	ug/L	20.0	20		01/13/20 17:41	127-18-4	
Trichloroethene	**2590**	ug/L	20.0	20		01/13/20 17:41	79-01-6	
Vinyl chloride	ND	ug/L	20.0	20		01/13/20 17:41	75-01-4	
Surrogates								
Dibromofluoromethane (S)	107	%.	72-126	20		01/13/20 17:41	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	20		01/13/20 17:41	460-00-4	
Toluene-d8 (S)	101	%.	79-119	20		01/13/20 17:41	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-235C **Lab ID: 20137302021** Collected: 01/06/20 11:55 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**12.1**	ug/L	10.0	10		01/13/20 18:00	56-23-5	D4
Chloroethane	ND	ug/L	10.0	10		01/13/20 18:00	75-00-3	
Chloroform	ND	ug/L	10.0	10		01/13/20 18:00	67-66-3	
1,1-Dichloroethane	ND	ug/L	10.0	10		01/13/20 18:00	75-34-3	
1,1-Dichloroethene	**36.4**	ug/L	10.0	10		01/13/20 18:00	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	10.0	10		01/13/20 18:00	156-59-2	
Methylene Chloride	ND	ug/L	10.0	10		01/13/20 18:00	75-09-2	
Tetrachloroethene	ND	ug/L	10.0	10		01/13/20 18:00	127-18-4	
Trichloroethene	**1470**	ug/L	10.0	10		01/13/20 18:00	79-01-6	
Vinyl chloride	ND	ug/L	10.0	10		01/13/20 18:00	75-01-4	
Surrogates								
Dibromofluoromethane (S)	107	%.	72-126	10		01/13/20 18:00	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	10		01/13/20 18:00	460-00-4	
Toluene-d8 (S)	98	%.	79-119	10		01/13/20 18:00	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-137A **Lab ID: 20137302022** Collected: 01/06/20 10:30 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/13/20 18:18	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/13/20 18:18	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/13/20 18:18	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/13/20 18:18	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/13/20 18:18	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/13/20 18:18	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/13/20 18:18	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/13/20 18:18	127-18-4	
Trichloroethene	**14.2**	ug/L	1.0	1		01/13/20 18:18	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/13/20 18:18	75-01-4	
Surrogates								
Dibromofluoromethane (S)	109	%.	72-126	1		01/13/20 18:18	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	1		01/13/20 18:18	460-00-4	
Toluene-d8 (S)	102	%.	79-119	1		01/13/20 18:18	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-237B **Lab ID: 20137302023** Collected: 01/06/20 09:45 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/13/20 18:36	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/13/20 18:36	75-00-3	
Chloroform	**1.0**	ug/L	1.0	1		01/13/20 18:36	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/13/20 18:36	75-34-3	
1,1-Dichloroethene	**1.2**	ug/L	1.0	1		01/13/20 18:36	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/13/20 18:36	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/13/20 18:36	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/13/20 18:36	127-18-4	
Trichloroethene	**135**	ug/L	1.0	1		01/13/20 18:36	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/13/20 18:36	75-01-4	
Surrogates								
Dibromofluoromethane (S)	108	%.	72-126	1		01/13/20 18:36	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	1		01/13/20 18:36	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		01/13/20 18:36	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-237C **Lab ID: 20137302024** Collected: 01/06/20 10:05 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**113**	ug/L	100	100		01/13/20 18:54	56-23-5	D4
Chloroethane	ND	ug/L	100	100		01/13/20 18:54	75-00-3	
Chloroform	ND	ug/L	100	100		01/13/20 18:54	67-66-3	
1,1-Dichloroethane	ND	ug/L	100	100		01/13/20 18:54	75-34-3	
1,1-Dichloroethene	**312**	ug/L	100	100		01/13/20 18:54	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	100	100		01/13/20 18:54	156-59-2	
Methylene Chloride	ND	ug/L	100	100		01/13/20 18:54	75-09-2	
Tetrachloroethene	ND	ug/L	100	100		01/13/20 18:54	127-18-4	
Trichloroethene	**11600**	ug/L	100	100		01/13/20 18:54	79-01-6	
Vinyl chloride	ND	ug/L	100	100		01/13/20 18:54	75-01-4	
Surrogates								
Dibromofluoromethane (S)	109	%.	72-126	100		01/13/20 18:54	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	100		01/13/20 18:54	460-00-4	
Toluene-d8 (S)	100	%.	79-119	100		01/13/20 18:54	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-143A **Lab ID: 20137302025** Collected: 01/03/20 11:40 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 20:49	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 20:49	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 20:49	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 20:49	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 20:49	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/09/20 20:49	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 20:49	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 20:49	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/09/20 20:49	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 20:49	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	1		01/09/20 20:49	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	68-124	1		01/09/20 20:49	460-00-4	
Toluene-d8 (S)	95	%.	79-119	1		01/09/20 20:49	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-243B **Lab ID: 20137302026** Collected: 01/03/20 11:00 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/09/20 21:07	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/09/20 21:07	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/09/20 21:07	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/09/20 21:07	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/09/20 21:07	75-35-4	
cis-1,2-Dichloroethene	**2.5**	ug/L	1.0	1		01/09/20 21:07	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/09/20 21:07	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/09/20 21:07	127-18-4	
Trichloroethene	**56.9**	ug/L	1.0	1		01/09/20 21:07	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/09/20 21:07	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	1		01/09/20 21:07	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/09/20 21:07	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/09/20 21:07	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: BDY-4 **Lab ID: 20137302027** Collected: 01/07/20 08:15 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/15/20 02:28	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/15/20 02:28	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/15/20 02:28	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/15/20 02:28	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/15/20 02:28	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/15/20 02:28	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/15/20 02:28	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/15/20 02:28	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/15/20 02:28	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/15/20 02:28	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	1		01/15/20 02:28	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/15/20 02:28	460-00-4	
Toluene-d8 (S)	100	%.	79-119	1		01/15/20 02:28	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: BDY-5 **Lab ID: 20137302028** Collected: 01/07/20 07:10 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/15/20 02:46	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/15/20 02:46	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/15/20 02:46	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/15/20 02:46	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/15/20 02:46	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/15/20 02:46	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/15/20 02:46	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/15/20 02:46	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/15/20 02:46	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/15/20 02:46	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	1		01/15/20 02:46	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	1		01/15/20 02:46	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		01/15/20 02:46	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: BDY-10 **Lab ID: 20137302029** Collected: 01/07/20 16:20 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/15/20 03:04	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/15/20 03:04	75-00-3	
Chloroform	**2.0**	ug/L	1.0	1		01/15/20 03:04	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/15/20 03:04	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/15/20 03:04	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/15/20 03:04	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/15/20 03:04	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/15/20 03:04	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/15/20 03:04	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/15/20 03:04	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	1		01/15/20 03:04	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	68-124	1		01/15/20 03:04	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		01/15/20 03:04	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: BDY-1R **Lab ID: 20137302030** Collected: 01/07/20 11:45 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/15/20 03:22	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/15/20 03:22	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/15/20 03:22	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/15/20 03:22	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/15/20 03:22	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/15/20 03:22	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/15/20 03:22	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/15/20 03:22	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/15/20 03:22	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/15/20 03:22	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	1		01/15/20 03:22	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	1		01/15/20 03:22	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/15/20 03:22	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: BDY-4 Dup **Lab ID: 20137302031** Collected: 01/07/20 08:15 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/15/20 03:40	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/15/20 03:40	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/15/20 03:40	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/15/20 03:40	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/15/20 03:40	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/15/20 03:40	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/15/20 03:40	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/15/20 03:40	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/15/20 03:40	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/15/20 03:40	75-01-4	
Surrogates								
Dibromofluoromethane (S)	96	%.	72-126	1		01/15/20 03:40	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/15/20 03:40	460-00-4	
Toluene-d8 (S)	100	%.	79-119	1		01/15/20 03:40	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-116 **Lab ID: 20137302032** Collected: 01/07/20 09:45 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/15/20 03:57	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/15/20 03:57	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/15/20 03:57	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/15/20 03:57	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/15/20 03:57	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/15/20 03:57	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/15/20 03:57	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/15/20 03:57	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/15/20 03:57	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/15/20 03:57	75-01-4	
Surrogates								
Dibromofluoromethane (S)	96	%.	72-126	1		01/15/20 03:57	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	1		01/15/20 03:57	460-00-4	
Toluene-d8 (S)	101	%.	79-119	1		01/15/20 03:57	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-216 **Lab ID: 20137302033** Collected: 01/07/20 09:40 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/15/20 04:15	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/15/20 04:15	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/15/20 04:15	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/15/20 04:15	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/15/20 04:15	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/15/20 04:15	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/15/20 04:15	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/15/20 04:15	127-18-4	
Trichloroethene	**10.3**	ug/L	1.0	1		01/15/20 04:15	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/15/20 04:15	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	1		01/15/20 04:15	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/15/20 04:15	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/15/20 04:15	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-130 **Lab ID: 20137302034** Collected: 01/07/20 11:40 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/15/20 04:33	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/15/20 04:33	75-00-3	
Chloroform	**5.1**	ug/L	1.0	1		01/15/20 04:33	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/15/20 04:33	75-34-3	
1,1-Dichloroethene	**2.3**	ug/L	1.0	1		01/15/20 04:33	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/15/20 04:33	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/15/20 04:33	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/15/20 04:33	127-18-4	
Trichloroethene	**45.1**	ug/L	1.0	1		01/15/20 04:33	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/15/20 04:33	75-01-4	
Surrogates								
Dibromofluoromethane (S)	96	%.	72-126	1		01/15/20 04:33	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	1		01/15/20 04:33	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/15/20 04:33	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-230 **Lab ID: 20137302035** Collected: 01/07/20 11:25 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**62.0**	ug/L	10.0	10		01/14/20 22:25	56-23-5	D4
Chloroethane	ND	ug/L	10.0	10		01/14/20 22:25	75-00-3	
Chloroform	ND	ug/L	10.0	10		01/14/20 22:25	67-66-3	
1,1-Dichloroethane	ND	ug/L	10.0	10		01/14/20 22:25	75-34-3	
1,1-Dichloroethene	**297**	ug/L	10.0	10		01/14/20 22:25	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	10.0	10		01/14/20 22:25	156-59-2	
Methylene Chloride	ND	ug/L	10.0	10		01/14/20 22:25	75-09-2	
Tetrachloroethene	ND	ug/L	10.0	10		01/14/20 22:25	127-18-4	
Trichloroethene	**812**	ug/L	10.0	10		01/14/20 22:25	79-01-6	
Vinyl chloride	ND	ug/L	10.0	10		01/14/20 22:25	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	10		01/14/20 22:25	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	10		01/14/20 22:25	460-00-4	
Toluene-d8 (S)	99	%.	79-119	10		01/14/20 22:25	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-111 **Lab ID: 20137302036** Collected: 01/07/20 13:25 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/14/20 21:30	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/14/20 21:30	75-00-3	
Chloroform	**3.4**	ug/L	1.0	1		01/14/20 21:30	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/14/20 21:30	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/14/20 21:30	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/14/20 21:30	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/14/20 21:30	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/14/20 21:30	127-18-4	
Trichloroethene	**6.0**	ug/L	1.0	1		01/14/20 21:30	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/14/20 21:30	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	1		01/14/20 21:30	1868-53-7	
4-Bromofluorobenzene (S)	106	%.	68-124	1		01/14/20 21:30	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/14/20 21:30	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-211 **Lab ID: 20137302037** Collected: 01/07/20 14:40 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**1.7**	ug/L	1.0	1		01/14/20 21:49	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/14/20 21:49	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/14/20 21:49	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/14/20 21:49	75-34-3	
1,1-Dichloroethene	**6.0**	ug/L	1.0	1		01/14/20 21:49	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/14/20 21:49	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/14/20 21:49	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/14/20 21:49	127-18-4	
Trichloroethene	**75.0**	ug/L	1.0	1		01/14/20 21:49	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/14/20 21:49	75-01-4	
Surrogates								
Dibromofluoromethane (S)	96	%.	72-126	1		01/14/20 21:49	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	68-124	1		01/14/20 21:49	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		01/14/20 21:49	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20137302

Sample: MW-311 **Lab ID: 20137302038** Collected: 01/07/20 15:20 Received: 01/08/20 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/14/20 22:07	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/14/20 22:07	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/14/20 22:07	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/14/20 22:07	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/14/20 22:07	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/14/20 22:07	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/14/20 22:07	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/14/20 22:07	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/14/20 22:07	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/14/20 22:07	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	1		01/14/20 22:07	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/14/20 22:07	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/14/20 22:07	2037-26-5	

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20137302

QC Batch: 171129 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20137302001, 20137302002, 20137302003, 20137302004, 20137302005, 20137302006, 20137302007, 20137302008, 20137302009, 20137302010, 20137302011, 20137302012, 20137302013

METHOD BLANK: 777118 Matrix: Water
Associated Lab Samples: 20137302001, 20137302002, 20137302003, 20137302004, 20137302005, 20137302006, 20137302007, 20137302008, 20137302009, 20137302010, 20137302011, 20137302012, 20137302013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/09/20 11:34	
1,1-Dichloroethene	ug/L	ND	1.0	01/09/20 11:34	
Carbon tetrachloride	ug/L	ND	1.0	01/09/20 11:34	
Chloroethane	ug/L	ND	1.0	01/09/20 11:34	
Chloroform	ug/L	ND	1.0	01/09/20 11:34	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/09/20 11:34	
Methylene Chloride	ug/L	ND	1.0	01/09/20 11:34	
Tetrachloroethene	ug/L	ND	1.0	01/09/20 11:34	
Trichloroethene	ug/L	ND	1.0	01/09/20 11:34	
Vinyl chloride	ug/L	ND	1.0	01/09/20 11:34	
4-Bromofluorobenzene (S)	%.	100	68-124	01/09/20 11:34	
Dibromofluoromethane (S)	%.	101	72-126	01/09/20 11:34	
Toluene-d8 (S)	%.	97	79-119	01/09/20 11:34	

LABORATORY CONTROL SAMPLE: 777119

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	40.5	81	63-129	
1,1-Dichloroethene	ug/L	50	46.6	93	51-139	
Carbon tetrachloride	ug/L	50	59.4	119	54-144	
Chloroethane	ug/L	50	45.2	90	17-195	
Chloroform	ug/L	50	43.9	88	73-134	
cis-1,2-Dichloroethene	ug/L	50	42.1	84	68-129	
Methylene Chloride	ug/L	50	39.9	80	46-168	
Tetrachloroethene	ug/L	50	56.8	114	46-157	
Trichloroethene	ug/L	50	50.4	101	67-132	
Vinyl chloride	ug/L	50	44.0	88	27-149	
4-Bromofluorobenzene (S)	%.			101	68-124	
Dibromofluoromethane (S)	%.			99	72-126	
Toluene-d8 (S)	%.			96	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 777120 777121

Parameter	Units	20137299001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	45.9	44.2	92	88	59-133	4	20	
1,1-Dichloroethene	ug/L	ND	50	50	53.9	50.0	108	100	44-146	7	20	

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20137302

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 777120 777121

Parameter	Units	20137299001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Carbon tetrachloride	ug/L	ND	50	50	67.7	62.6	135	125	48-146	8	20	
Chloroethane	ug/L	ND	50	50	51.8	49.5	104	99	12-192	5	20	
Chloroform	ug/L	ND	50	50	49.1	47.0	98	94	66-143	4	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	46.4	45.0	93	90	56-141	3	20	
Methylene Chloride	ug/L	ND	50	50	44.3	43.6	89	87	45-166	2	20	
Tetrachloroethene	ug/L	ND	50	50	64.0	59.1	128	118	48-143	8	20	
Trichloroethene	ug/L	ND	50	50	58.1	54.6	115	108	58-140	6	20	
Vinyl chloride	ug/L	ND	50	50	52.7	48.7	105	97	21-150	8	20	
4-Bromofluorobenzene (S)	%.						102	101	68-124			
Dibromofluoromethane (S)	%.						99	100	72-126			
Toluene-d8 (S)	%.						96	95	79-119			

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20137302

QC Batch: 171173 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20137302014, 20137302015, 20137302016, 20137302025, 20137302026

METHOD BLANK: 777429 Matrix: Water
Associated Lab Samples: 20137302014, 20137302015, 20137302016, 20137302025, 20137302026

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/09/20 19:22	
1,1-Dichloroethene	ug/L	ND	1.0	01/09/20 19:22	
Carbon tetrachloride	ug/L	ND	1.0	01/09/20 19:22	
Chloroethane	ug/L	ND	1.0	01/09/20 19:22	
Chloroform	ug/L	ND	1.0	01/09/20 19:22	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/09/20 19:22	
Methylene Chloride	ug/L	ND	1.0	01/09/20 19:22	
Tetrachloroethene	ug/L	ND	1.0	01/09/20 19:22	
Trichloroethene	ug/L	ND	1.0	01/09/20 19:22	
Vinyl chloride	ug/L	ND	1.0	01/09/20 19:22	
4-Bromofluorobenzene (S)	%.	100	68-124	01/09/20 19:22	
Dibromofluoromethane (S)	%.	99	72-126	01/09/20 19:22	
Toluene-d8 (S)	%.	96	79-119	01/09/20 19:22	

LABORATORY CONTROL SAMPLE: 777430

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	40.2	80	63-129	
1,1-Dichloroethene	ug/L	50	47.4	95	51-139	
Carbon tetrachloride	ug/L	50	60.8	122	54-144	
Chloroethane	ug/L	50	44.9	90	17-195	
Chloroform	ug/L	50	44.0	88	73-134	
cis-1,2-Dichloroethene	ug/L	50	40.2	80	68-129	
Methylene Chloride	ug/L	50	39.7	79	46-168	
Tetrachloroethene	ug/L	50	59.0	118	46-157	
Trichloroethene	ug/L	50	52.4	105	67-132	
Vinyl chloride	ug/L	50	43.4	87	27-149	
4-Bromofluorobenzene (S)	%.			100	68-124	
Dibromofluoromethane (S)	%.			96	72-126	
Toluene-d8 (S)	%.			96	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 777431 777432

Parameter	Units	20137302025 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	44.7	42.1	89	84	59-133	6	20	
1,1-Dichloroethene	ug/L	ND	50	50	52.9	49.7	106	99	44-146	6	20	
Carbon tetrachloride	ug/L	ND	50	50	67.0	62.1	134	124	48-146	8	20	

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20137302

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 777431 777432

Parameter	Units	20137302025 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloroethane	ug/L	ND	50	50	51.1	48.5	102	97	12-192	5	20	
Chloroform	ug/L	ND	50	50	47.2	45.3	94	91	66-143	4	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	44.4	42.7	89	85	56-141	4	20	
Methylene Chloride	ug/L	ND	50	50	43.7	42.3	87	85	45-166	3	20	
Tetrachloroethene	ug/L	ND	50	50	61.6	59.5	123	119	48-143	4	20	
Trichloroethene	ug/L	ND	50	50	56.6	53.1	113	106	58-140	6	20	
Vinyl chloride	ug/L	ND	50	50	51.2	47.0	102	94	21-150	9	20	
4-Bromofluorobenzene (S)	%.						101	102	68-124			
Dibromofluoromethane (S)	%.						98	96	72-126			
Toluene-d8 (S)	%.						95	95	79-119			

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20137302

QC Batch: 171514 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20137302017, 20137302018, 20137302019, 20137302020, 20137302021, 20137302022, 20137302023, 20137302024

METHOD BLANK: 779049 Matrix: Water
Associated Lab Samples: 20137302017, 20137302018, 20137302019, 20137302020, 20137302021, 20137302022, 20137302023, 20137302024

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/13/20 14:03	
1,1-Dichloroethene	ug/L	ND	1.0	01/13/20 14:03	
Carbon tetrachloride	ug/L	ND	1.0	01/13/20 14:03	
Chloroethane	ug/L	ND	1.0	01/13/20 14:03	
Chloroform	ug/L	ND	1.0	01/13/20 14:03	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/13/20 14:03	
Methylene Chloride	ug/L	ND	1.0	01/13/20 14:03	
Tetrachloroethene	ug/L	ND	1.0	01/13/20 14:03	
Trichloroethene	ug/L	ND	1.0	01/13/20 14:03	
Vinyl chloride	ug/L	ND	1.0	01/13/20 14:03	
4-Bromofluorobenzene (S)	%.	100	68-124	01/13/20 14:03	
Dibromofluoromethane (S)	%.	106	72-126	01/13/20 14:03	
Toluene-d8 (S)	%.	100	79-119	01/13/20 14:03	

LABORATORY CONTROL SAMPLE: 779050

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	51.4	103	63-129	
1,1-Dichloroethene	ug/L	50	56.5	113	51-139	
Carbon tetrachloride	ug/L	50	54.0	108	54-144	
Chloroethane	ug/L	50	55.0	110	17-195	
Chloroform	ug/L	50	51.3	103	73-134	
cis-1,2-Dichloroethene	ug/L	50	51.6	103	68-129	
Methylene Chloride	ug/L	50	53.9	108	46-168	
Tetrachloroethene	ug/L	50	52.0	104	46-157	
Trichloroethene	ug/L	50	51.8	104	67-132	
Vinyl chloride	ug/L	50	48.1	96	27-149	
4-Bromofluorobenzene (S)	%.			100	68-124	
Dibromofluoromethane (S)	%.			105	72-126	
Toluene-d8 (S)	%.			101	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 779051 779052

Parameter	Units	20137302017 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	56.3	54.5	113	109	59-133	3	20	
1,1-Dichloroethene	ug/L	ND	50	50	65.9	62.4	132	125	44-146	6	20	

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20137302

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 779051 779052

Parameter	Units	20137302017 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Carbon tetrachloride	ug/L	ND	50	50	56.8	59.2	114	118	48-146	4	20	
Chloroethane	ug/L	ND	50	50	59.5	58.1	119	116	12-192	2	20	
Chloroform	ug/L	ND	50	50	56.5	52.9	113	106	66-143	7	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	57.2	54.7	114	109	56-141	5	20	
Methylene Chloride	ug/L	ND	50	50	57.7	56.7	115	113	45-166	2	20	
Tetrachloroethene	ug/L	ND	50	50	55.2	55.1	110	110	48-143	0	20	
Trichloroethene	ug/L	ND	50	50	56.1	56.7	112	113	58-140	1	20	
Vinyl chloride	ug/L	ND	50	50	55.6	52.5	111	105	21-150	6	20	
4-Bromofluorobenzene (S)	%.						100	100	68-124			
Dibromofluoromethane (S)	%.						107	105	72-126			
Toluene-d8 (S)	%.						97	102	79-119			

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20137302

QC Batch: 171684 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20137302027, 20137302028, 20137302029, 20137302030, 20137302031, 20137302032, 20137302033, 20137302034

METHOD BLANK: 779851 Matrix: Water
Associated Lab Samples: 20137302027, 20137302028, 20137302029, 20137302030, 20137302031, 20137302032, 20137302033, 20137302034

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/14/20 21:27	
1,1-Dichloroethene	ug/L	ND	1.0	01/14/20 21:27	
Carbon tetrachloride	ug/L	ND	1.0	01/14/20 21:27	
Chloroethane	ug/L	ND	1.0	01/14/20 21:27	
Chloroform	ug/L	ND	1.0	01/14/20 21:27	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/14/20 21:27	
Methylene Chloride	ug/L	ND	1.0	01/14/20 21:27	
Tetrachloroethene	ug/L	ND	1.0	01/14/20 21:27	
Trichloroethene	ug/L	ND	1.0	01/14/20 21:27	
Vinyl chloride	ug/L	ND	1.0	01/14/20 21:27	
4-Bromofluorobenzene (S)	%.	99	68-124	01/14/20 21:27	
Dibromofluoromethane (S)	%.	98	72-126	01/14/20 21:27	
Toluene-d8 (S)	%.	101	79-119	01/14/20 21:27	

LABORATORY CONTROL SAMPLE: 779852

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	49.5	99	63-129	
1,1-Dichloroethene	ug/L	50	50.5	101	51-139	
Carbon tetrachloride	ug/L	50	49.6	99	54-144	
Chloroethane	ug/L	50	42.2	84	17-195	
Chloroform	ug/L	50	48.7	97	73-134	
cis-1,2-Dichloroethene	ug/L	50	52.3	105	68-129	
Methylene Chloride	ug/L	50	50.1	100	46-168	
Tetrachloroethene	ug/L	50	48.5	97	46-157	
Trichloroethene	ug/L	50	50.9	102	67-132	
Vinyl chloride	ug/L	50	43.5	87	27-149	
4-Bromofluorobenzene (S)	%.			102	68-124	
Dibromofluoromethane (S)	%.			99	72-126	
Toluene-d8 (S)	%.			100	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 779853 779854

Parameter	Units	20137296011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	54.6	52.5	109	105	59-133	4	20	
1,1-Dichloroethene	ug/L	ND	50	50	58.3	56.2	117	112	44-146	4	20	

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4320 Midmost Dr
Mobile, AL 36609
251-344-9106

QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20137302

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 779853 779854

Parameter	Units	20137296011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Carbon tetrachloride	ug/L	ND	50	50	57.6	54.8	115	110	48-146	5	20	
Chloroethane	ug/L	ND	50	50	47.1	46.3	94	93	12-192	2	20	
Chloroform	ug/L	ND	50	50	52.6	51.4	105	102	66-143	2	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	57.1	56.0	114	112	56-141	2	20	
Methylene Chloride	ug/L	ND	50	50	53.9	52.5	108	105	45-166	3	20	
Tetrachloroethene	ug/L	ND	50	50	54.4	50.1	109	100	48-143	8	20	
Trichloroethene	ug/L	2.4	50	50	57.7	56.1	111	107	58-140	3	20	
Vinyl chloride	ug/L	ND	50	50	50.4	48.6	101	97	21-150	4	20	
4-Bromofluorobenzene (S)	%.						103	102	68-124			
Dibromofluoromethane (S)	%.						97	99	72-126			
Toluene-d8 (S)	%.						99	99	79-119			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
4320 Midmost Dr
Mobile, AL 36609
251-344-9106

QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20137302

QC Batch: 171705 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20137302035, 20137302036, 20137302037, 20137302038

METHOD BLANK: 780058 Matrix: Water
Associated Lab Samples: 20137302035, 20137302036, 20137302037, 20137302038

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/14/20 20:00	
1,1-Dichloroethene	ug/L	ND	1.0	01/14/20 20:00	
Carbon tetrachloride	ug/L	ND	1.0	01/14/20 20:00	
Chloroethane	ug/L	ND	1.0	01/14/20 20:00	
Chloroform	ug/L	ND	1.0	01/14/20 20:00	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/14/20 20:00	
Methylene Chloride	ug/L	ND	1.0	01/14/20 20:00	
Tetrachloroethene	ug/L	ND	1.0	01/14/20 20:00	
Trichloroethene	ug/L	ND	1.0	01/14/20 20:00	
Vinyl chloride	ug/L	ND	1.0	01/14/20 20:00	
4-Bromofluorobenzene (S)	%.	101	68-124	01/14/20 20:00	
Dibromofluoromethane (S)	%.	100	72-126	01/14/20 20:00	
Toluene-d8 (S)	%.	100	79-119	01/14/20 20:00	

LABORATORY CONTROL SAMPLE: 780059

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	47.1	94	63-129	
1,1-Dichloroethene	ug/L	50	55.7	111	51-139	
Carbon tetrachloride	ug/L	50	54.1	108	54-144	
Chloroethane	ug/L	50	50.1	100	17-195	
Chloroform	ug/L	50	48.7	97	73-134	
cis-1,2-Dichloroethene	ug/L	50	47.8	96	68-129	
Methylene Chloride	ug/L	50	50.6	101	46-168	
Tetrachloroethene	ug/L	50	50.5	101	46-157	
Trichloroethene	ug/L	50	52.0	104	67-132	
Vinyl chloride	ug/L	50	45.0	90	27-149	
4-Bromofluorobenzene (S)	%.			99	68-124	
Dibromofluoromethane (S)	%.			96	72-126	
Toluene-d8 (S)	%.			98	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 780060 780061

Parameter	Units	20137302036 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	51.9	47.3	104	95	59-133	9	20	
1,1-Dichloroethene	ug/L	ND	50	50	61.0	54.4	121	108	44-146	11	20	
Carbon tetrachloride	ug/L	ND	50	50	58.0	54.8	116	110	48-146	6	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
4320 Midmost Dr
Mobile, AL 36609
251-344-9106

QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20137302

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 780060 780061

Parameter	Units	20137302036 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloroethane	ug/L	ND	50	50	58.0	53.1	116	106	12-192	9	20	
Chloroform	ug/L	3.4	50	50	55.8	51.6	105	96	66-143	8	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	52.9	48.6	106	97	56-141	8	20	
Methylene Chloride	ug/L	ND	50	50	55.8	50.9	112	102	45-166	9	20	
Tetrachloroethene	ug/L	ND	50	50	55.1	50.4	110	100	48-143	9	20	
Trichloroethene	ug/L	6.0	50	50	60.9	57.2	110	102	58-140	6	20	
Vinyl chloride	ug/L	ND	50	50	53.9	48.5	108	97	21-150	11	20	
4-Bromofluorobenzene (S)	%.						99	96	68-124			
Dibromofluoromethane (S)	%.						99	98	72-126			
Toluene-d8 (S)	%.						97	98	79-119			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
4320 Midmost Dr
Mobile, AL 36609
251-344-9106

QUALIFIERS

Project: CBP/ C06-401
Pace Project No.: 20137302

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

ANALYTE QUALIFIERS

D4 Sample was diluted due to the presence of high levels of target analytes.

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4320 Midmost Dr
Mobile, AL 36609
251-344-9106

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CBP/ C06-401
Pace Project No.: 20137302

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
20137302001	MW-146A	EPA 5030B/8260	171129		
20137302002	MW-246B	EPA 5030B/8260	171129		
20137302003	MW-246B DUP	EPA 5030B/8260	171129		
20137302004	MW147A	EPA 5030B/8260	171129		
20137302005	MW-247B	EPA 5030B/8260	171129		
20137302006	Trip	EPA 5030B/8260	171129		
20137302007	MW-150A	EPA 5030B/8260	171129		
20137302008	MW-250B	EPA 5030B/8260	171129		
20137302009	MW-250C	EPA 5030B/8260	171129		
20137302010	MW-250C DUP	EPA 5030B/8260	171129		
20137302011	MW-125	EPA 5030B/8260	171129		
20137302012	MW-225	EPA 5030B/8260	171129		
20137302013	MW-104	EPA 5030B/8260	171129		
20137302014	MW-204	EPA 5030B/8260	171173		
20137302015	MW-304	EPA 5030B/8260	171173		
20137302016	MW-135A DUP	EPA 5030B/8260	171173		
20137302017	BDY-02	EPA 5030B/8260	171514		
20137302018	BDY-09	EPA 5030B/8260	171514		
20137302019	MW-135A	EPA 5030B/8260	171514		
20137302020	MW-235B	EPA 5030B/8260	171514		
20137302021	MW-235C	EPA 5030B/8260	171514		
20137302022	MW-137A	EPA 5030B/8260	171514		
20137302023	MW-237B	EPA 5030B/8260	171514		
20137302024	MW-237C	EPA 5030B/8260	171514		
20137302025	MW-143A	EPA 5030B/8260	171173		
20137302026	MW-243B	EPA 5030B/8260	171173		
20137302027	BDY-4	EPA 5030B/8260	171684		
20137302028	BDY-5	EPA 5030B/8260	171684		
20137302029	BDY-10	EPA 5030B/8260	171684		
20137302030	BDY-1R	EPA 5030B/8260	171684		
20137302031	BDY-4 Dup	EPA 5030B/8260	171684		
20137302032	MW-116	EPA 5030B/8260	171684		
20137302033	MW-216	EPA 5030B/8260	171684		
20137302034	MW-130	EPA 5030B/8260	171684		
20137302035	MW-230	EPA 5030B/8260	171705		
20137302036	MW-111	EPA 5030B/8260	171705		
20137302037	MW-211	EPA 5030B/8260	171705		
20137302038	MW-311	EPA 5030B/8260	171705		

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CHAIN-OF-CUSTODY Analytical Request Document

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LAB USE ONLY- Affix Wo

ALL SHA

WO# : 20137302

20137302

Company: SOUTHERN EARTH SCIENCES, INC.

Billing Information: SESI PO BOX 160745 MOBILE, AL 36616

Address: 5460 RANGELINE ROAD MOBILE, AL 36619

Report To: ERIC GUARINO

Email To: EGUARINO@SOEARTH.COM

Copy To:

Site Collection Info/Address: CBP

Customer Project Name/Number: CBP/C06-401

State: AL / County/City: MONTGOMERY Time Zone Collected: [ ]PT [ ]MT [X]CT [ ]ET

Phone: 251-344-7711
Email:EGUARINO@SOEARTH.COM

Site/Facility ID #:

Compliance Monitoring? [X] Yes [ ] No

Collected By (print): EAG/SK

Purchase Order # :
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature):

Turnaround Date Required: STANDARD

Immediately Packed on Ice: [X] Yes [ ] No

Sample Disposal:
[X] Dispose as appropriate [ ] Return
[ ] Archive: _____
[ ] Hold: _____

Rush:
[ ] Same Day [ ] Next Day
[ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day
(Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [X] No

Analysis: _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	8260 HALOGENATED
MW-146A	GW	G	1/2/2020	1435					3
MW-246B	GW	G	1/2/2020	1439					3
MW-246B DUP	GW	G	1/2/2020	1439					3
MW147A	GW	G	1/2/2020	1318					3
MW-247B	GW	G	1/2/2020	1303					3
TRIP	GW	G	1/7/2020	1540					2

Container Preservative Type **

3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Lab Project Manager:

Analyses

Lab Profile/Line:

Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA
Residual Chlorine Present Y N NA
Cl Strips: _____
Sample pH Acceptable Y N NA
pH Strips: _____
Sulfide Present Y N NA
Lead Acetate Strips: _____

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #:

Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: IR01
Cooler 1 Temp Upon Receipt: 1.6oC
Cooler 1 Therm Corr. Factor: 0.1oC
Cooler 1 Corrected Temp: 1.7 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
SESI	1/8/20 0830		1/8/2020 830
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 1 of: 1

5

CHAIN-OF-CUSTODY Analytical Request Document

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ALL SHAD

WO# : 20137302

PM: SLW Due Date: 01/22/20

CLIENT: MO-SES

Company: SOUTHERN EARTH SCIENCES, INC.

Billing Information: SESI PO BOX 160745 MOBILE, AL 36616

Address: 5460 RANGELINE ROAD MOBILE, AL 36619

Report To: ERIC GUARINO

Email To: EGUARINO@SOEARTH.COM

Copy To:

Site Collection Info/Address: CBP

Customer Project Name/Number: CBP/C06-401

State: AL / County/City: MONTGOMERY Time Zone Collected: [ ]PT [ ]MT [X]CT [ ]ET

Phone: 251-344-7711
Email:EGUARINO@SOEARTH.COM

Site/Facility ID #:

Compliance Monitoring? [X] Yes [ ] No

Collected By (print): EAG/SK

Purchase Order # :
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature):

Turnaround Date Required: STANDARD

Immediately Packed on Ice: [X] Yes [ ] No

Sample Disposal:
[X] Dispose as appropriate [ ] Return
[ ] Archive: _____
[ ] Hold: _____

Rush:
[ ] Same Day [ ] Next Day
[ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day
(Expedite Charges Apply)

Field Filtered (if applicable):
[ ] Yes [X] No

Analysis: _____

Container Preservative Type

3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Analyses

8260 HALOGENATED

Lab Profile/Line:

Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA
Residual Chlorine Present Y N NA
Cl Strips: _____
Sample pH Acceptable Y N NA
pH Strips: _____
Sulfide Present Y N NA
Lead Acetate Strips: _____

LAB USE ONLY:
Lab Sample # / Comments:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	8260 HALOGENATED
MW-150A	GW	G	1/6/2020	1550					3
MW-250B	GW	G	1/6/2020	1430					3
MW-250C	GW	G	1/6/2020	1435					3
MW-250C DUP	GW	G	1/6/2020	1435					3
MW-125	GW	G	1/3/2020	1355					3
MW-225	GW	G	1/3/2020	1400					3
MW-104	GW	G	1/4/2020	1430					3
MW-204	GW	G	1/4/2020	1510					3
MW-304	GW	G	1/4/2020	1505					3
MW-135A Dup	GW	G	1/6/20	1205					3

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #:

Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: IR-01
Cooler 1 Temp Upon Receipt: 1.5 oC
Cooler 1 Therm Corr. Factor: -0.2 oC
Cooler 1 Corrected Temp: 1.7 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
SESI	1/8/20 0830		1/8/20 833
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 1 2
of: 1 5

CHAIN-OF-CUSTODY Analytical Request Document

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LAB USE ONLY- Affix W

WO# : 20137302

PM: SLW Due Date: 01/22/20

CLIENT: MO-SES

ALL SH

Company: SOUTHERN EARTH SCIENCES, INC.	Billing Information: SESI PO BOX 160745 MOBILE, AL 36616
Address: 5460 RANGELINE ROAD MOBILE, AL 36619	
Report To: ERIC GUARINO	Email To: EGUARINO@SOEARTH.COM
Copy To:	Site Collection Info/Address: CBP
Customer Project Name/Number: CBP/C06-401	State: AL / County/City: MONTGOMERY Time Zone Collected: [ ]PT [ ]MT [X]CT [ ]ET
Phone: 251-344-7711 Email:EGUARINO@SOEARTH.COM	Site/Facility ID #: Compliance Monitoring? [X] Yes [ ] No
Collected By (print): EAG/SK	Purchase Order # : Quote #: DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required: STANDARD Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [ ] Yes [X] No Analysis: _____

Container Preservati.

3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: 8260 HALOGENATED
BDY-02	GW	G	1/6/2020	1605					3
BDY-09	GW	G	1/6/2020	1335					3
MW-135A	GW	G	1/6/2020	1205					3
MW-235B	GW	G	1/6/2020	1125					3
MW-235C	GW	G	1/6/2020	1155					3
MW-137A	GW	G	1/6/2020	1030					3
MW-237B	GW	G	1/6/2020	945					3
MW-237C	GW	G	1/6/2020	1005					3
MW-143A	GW	G	~~1/5/2020~~	1140	1/3/2020				3
MW-243B	GW	G	~~1/5/2020~~	1100	1/3/2020				3

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y	N	NA
Custody Signatures Present	Y	N	NA
Collector Signature Present	Y	N	NA
Bottles Intact	Y	N	NA
Correct Bottles	Y	N	NA
Sufficient Volume	Y	N	NA
Samples Received on Ice	Y	N	NA
VOA - Headspace Acceptable	Y	N	NA
USDA Regulated Soils	Y	N	NA
Samples in Holding Time	Y	N	NA
Residual Chlorine Present	Y	N	NA
Cl Strips: _____			
Sample pH Acceptable	Y	N	NA
pH Strips: _____			
Sulfide Present	Y	N	NA
Lead Acetate Strips: _____			

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #:

Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: IR-01
Cooler 1 Temp Upon Receipt: 1.8 oC
Cooler 1 Therm Corr. Factor: -0.1 oC
Cooler 1 Corrected Temp: 1.7 oC
Comments:

Relinquished by/Company: (Signature) SESI	Date/Time: 1/8/20 0830	Received by/Company: (Signature)	Date/Time: 1/8/2020 830	MTJL LAB USE ONLY Table #:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Acctnum: Template: Prelogin:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	PM: PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix W

ALL SH

WO# : 20137302

PM: SLW Due Date: 01/22/20

CLIENT: MO-SES

Company: SOUTHERN EARTH SCIENCES, INC.	Billing Information: SESI PO BOX 160745 MOBILE, AL 36616
Address: 5460 RANGELINE ROAD MOBILE, AL 36619	
Report To: ERIC GUARINO	Email To: EGUARINO@SOEARTH.COM
Copy To:	Site Collection Info/Address: CBP
Customer Project Name/Number: CBP/C06-401	State: AL / County/City: MONTGOMERY Time Zone Collected: [ ]PT [ ]MT [X]CT [ ]ET
Phone: 251-344-7711 Email:EGUARINO@SOEARTH.COM	Site/Facility ID #: Compliance Monitoring? [X] Yes [ ] No
Collected By (print): EAG/SK	Purchase Order # : Quote #: DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required: STANDARD Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: (X] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [ ] Yes [X] No Analysis:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	8260 HALOGENATED
BDY-4	GW	G	1/7/2020	815					3
BDY-5	GW	G	1/7/2020	710					3
BDY-10	GW	G	1/7/2020	1620					3
BDY-1R	GW	G	1/7/2020	1145					3
BDY-4 DUP	GW	G	1/7/2020	815					3

Container Preserva.

3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Analyses

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y	N	(NA)
Custody Signatures Present	(Y)	N	NA
Collector Signature Present	(Y)	N	NA
Bottles Intact	(Y)	N	NA
Correct Bottles	(Y)	N	NA
Sufficient Volume	(Y)	N	NA
Samples Received on Ice	(Y)	N	NA
VOA - Headspace Acceptable	(Y)	N	NA
USDA Regulated Soils	Y	N	(NA)
Samples in Holding Time	(Y)	N	NA
Residual Chlorine Present	Y	N	(NA)
Cl Strips:			
Sample pH Acceptable	Y	N	(NA)
pH Strips:			
Sulfide Present	Y	N	(NA)
Lead Acetate Strips:			

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y (N) N/A

Lab Tracking #:

Samples received via: FEDEX UPS (Client) Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y (N) NA
Therm ID#: IR-01
Cooler 1 Temp Upon Receipt: 1.8 oC
Cooler 1 Therm Corr. Factor: -.2 oC
Cooler 1 Corrected Temp: 1.7 oC
Comments:

Relinquished by/Company: (Signature) (SESI	Date/Time: 1/8/20 830	Received by/Company: (Signature)	Date/Time: 1/8/20 830	MTJL LAB USE ONLY Table #:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Acctnum: Template: Prelogin:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	PM: PB:

Trip Blank Received: Y (N) NA
HCL MeOH TSP Other

Non Conformance(s): YES / (NO)

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CLIENT: MO-SES

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Company: SOUTHERN EARTH SCIENCES, INC.	Billing Information: SESI PO BOX 160745 MOBILE, AL 36616
Address: 5460 RANGELINE ROAD MOBILE, AL 36619	
Report To: ERIC GUARINO	Email To: EGUARINO@SOEARTH.COM
Copy To:	Site Collection Info/Address: CBP
Customer Project Name/Number: CBP/C06-401	State: AL / County/City: MONTGOMERY Time Zone Collected: [ ]PT [ ]MT [X]CT [ ]ET
Phone: 251-344-7711 Email:EGUARINO@SOEARTH.COM	Site/Facility ID #: Compliance Monitoring? [X] Yes [ ] No
Collected By (print): EAG/SK	Purchase Order # : Quote #: DW PWS ID #: DW Location Code:
Collected By (Signature):	Turnaround Date Required: STANDARD Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: {X } Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [ ] Yes [X] No Analysis: _____

Container Preservative

3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Analyses

Lab Profile/Line:

Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N (NA)
Custody Signatures Present (Y) N NA
Collector Signature Present (Y) N NA
Bottles Intact (Y) N NA
Correct Bottles (Y) N NA
Sufficient Volume (Y) N NA
Samples Received on Ice (Y) N NA
VOA - Headspace Acceptable (Y) N NA
USDA Regulated Soils Y N (NA)
Samples in Holding Time (Y) N NA
Residual Chlorine Present Y N (NA)
Cl Strips: _____
Sample pH Acceptable Y N (NA)
pH Strips: _____
Sulfide Present Y N (NA)
Lead Acetate Strips: _____

LAB USE ONLY:
Lab Sample # / Comments:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	8260 HALOGENATED
MW-116	GW	G	1/7/2020	945					3
MW-216	GW	G	1/7/2020	940					3
MW-130	GW	G	1/7/2020	1140					3
MW-230	GW	G	1/7/2020	1125					3
MW-111	GW	G	1/7/2020	1325					3
MW-211	GW	G	1/7/2020	1440					3
MW-311	GW	G	1/7/2020	1520					3

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y (N) N/A

Lab Tracking #:

Samples received via: FEDEX UPS (Client) Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y (N) NA
Therm ID#: IR01
Cooler 1 Temp Upon Receipt: 1.5 oC
Cooler 1 Therm Corr. Factor: 0.0 oC
Cooler 1 Corrected Temp: 1.1 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time: 1/8/20 0830	Received by/Company: (Signature)	Date/Time: 1/8/20 830	MTJL LAB USE ONLY Table #:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Acctnum: Template: Prelogin:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	PM: PB:

Trip Blank Received: Y (N) NA
HCL MeOH TSP Other

Non Conformance(s): YES / (NO)

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Pace Analytical Services, LLC
4320 Midmost Dr
Mobile, AL 36609
251-344-9106

January 29, 2020

Eric Guarino
Southern Earth Sciences, Inc.
5460 Rangeline Road
Mobile, AL 36619

RE: Project: CPB/ C06-401
Pace Project No.: 20139007

Dear Eric Guarino:
Enclosed are the analytical results for sample(s) received by the laboratory on January 20, 2020. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Savannah Wallace
savannah.wallace@pacelabs.com
251-344-9106
Project Manager

Enclosures

cc: Andrew Guarino, Arcadis Alabama
Stacey Guarino, Southern Earth Sciences
Marty Reaves, Southern Earth Sciences, Inc.

REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: CPB/ C06-401
Pace Project No.: 20139007

Pace Analytical Services New Orleans

California Env. Lab Accreditation Program Branch: 11277CA
Florida Department of Health (NELAC): E87595
Illinois Environmental Protection Agency: 0025721
Kansas Department of Health and Environment (NELAC): E-10266
Louisiana Dept. of Environmental Quality (NELAC/LELAP): 02006
Pennsylvania Dept. of Env Protection (NELAC): 68-04202
Texas Commission on Env. Quality (NELAC): T104704405-09-TX
U.S. Dept. of Agriculture Foreign Soil Import: P330-10-00119
Commonwealth of Virginia (TNI): 480246

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SAMPLE SUMMARY

Project: CPB/ C06-401
Pace Project No.: 20139007

Lab ID	Sample ID	Matrix	Date Collected	Date Received
20139007001	**MW-113**	Water	01/17/20 11:00	01/20/20 15:00
20139007002	**MW-213**	Water	01/17/20 11:10	01/20/20 15:00
20139007003	**MW-131**	Water	01/17/20 13:00	01/20/20 15:00
20139007004	**MW-231**	Water	01/17/20 12:55	01/20/20 15:00
20139007005	**MW-264**	Water	01/17/20 13:15	01/20/20 15:00
20139007006	**MW-154 1st**	Water	01/17/20 08:25	01/20/20 15:00
20139007007	**MW-154**	Water	01/17/20 10:10	01/20/20 15:00
20139007008	**MW-112**	Water	01/16/20 10:37	01/20/20 15:00
20139007009	**MW-212**	Water	01/16/20 10:10	01/20/20 15:00
20139007010	**MW-128**	Water	01/16/20 13:05	01/20/20 15:00
20139007011	**MW-228**	Water	01/16/20 13:30	01/20/20 15:00
20139007012	**MW-108**	Water	01/16/20 14:48	01/20/20 15:00
20139007013	**MW-108 DUP**	Water	01/16/20 14:48	01/20/20 15:00
20139007014	**MW-208**	Water	01/16/20 15:20	01/20/20 15:00
20139007015	**MW-260**	Water	01/16/20 15:00	01/20/20 15:00
20139007016	**MW-261**	Water	01/16/20 13:05	01/20/20 15:00
20139007017	**MW-262**	Water	01/16/20 10:35	01/20/20 15:00

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SAMPLE ANALYTE COUNT

Project: CPB/ C06-401
Pace Project No.: 20139007

Lab ID	Sample ID	Method	Analysts	Analytes Reported
20139007001	**MW-113**	EPA 5030B/8260	GEM	13
20139007002	**MW-213**	EPA 5030B/8260	GEM	13
20139007003	**MW-131**	EPA 5030B/8260	GEM	13
20139007004	**MW-231**	EPA 5030B/8260	GEM	13
20139007005	**MW-264**	EPA 5030B/8260	GEM	13
20139007006	**MW-154 1st**	EPA 5030B/8260	GEM	13
20139007007	**MW-154**	EPA 5030B/8260	GEM	13
20139007008	**MW-112**	EPA 5030B/8260	GEM	13
20139007009	**MW-212**	EPA 5030B/8260	GEM	13
20139007010	**MW-128**	EPA 5030B/8260	GEM	13
20139007011	**MW-228**	EPA 5030B/8260	JRP	13
20139007012	**MW-108**	EPA 5030B/8260	JRP	13
20139007013	**MW-108 DUP**	EPA 5030B/8260	JRP	13
20139007014	**MW-208**	EPA 5030B/8260	JRP	13
20139007015	**MW-260**	EPA 5030B/8260	JRP	13
20139007016	**MW-261**	EPA 5030B/8260	JRP	13
20139007017	**MW-262**	EPA 5030B/8260	JRP	13

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PROJECT NARRATIVE

Project: CPB/ C06-401
Pace Project No.: 20139007

Method: **EPA 5030B/8260**
Description: 8260 MSV Low Level
Client: Southern Earth Sciences, Inc.
Date: January 29, 2020

General Information:
17 samples were analyzed for EPA 5030B/8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 173150

D4: Sample was diluted due to the presence of high levels of target analytes.
- MW-208 (Lab ID: 20139007014)
  - Trichloroethene

QC Batch: 173157

D4: Sample was diluted due to the presence of high levels of target analytes.
- MW-231 (Lab ID: 20139007004)
  - Carbon tetrachloride

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-113 **Lab ID: 20139007001** Collected: 01/17/20 11:00 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/27/20 15:43	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/27/20 15:43	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/27/20 15:43	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/27/20 15:43	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/27/20 15:43	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/27/20 15:43	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/27/20 15:43	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/27/20 15:43	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/27/20 15:43	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/27/20 15:43	75-01-4	
Surrogates								
Dibromofluoromethane (S)	102	%.	72-126	1		01/27/20 15:43	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	1		01/27/20 15:43	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/27/20 15:43	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-213 **Lab ID: 20139007002** Collected: 01/17/20 11:10 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/27/20 16:01	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/27/20 16:01	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/27/20 16:01	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/27/20 16:01	75-34-3	
1,1-Dichloroethene	**1.9**	ug/L	1.0	1		01/27/20 16:01	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/27/20 16:01	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/27/20 16:01	75-09-2	
Tetrachloroethene	**10.1**	ug/L	1.0	1		01/27/20 16:01	127-18-4	
Trichloroethene	**27.3**	ug/L	1.0	1		01/27/20 16:01	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/27/20 16:01	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	1		01/27/20 16:01	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	68-124	1		01/27/20 16:01	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/27/20 16:01	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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251-344-9106

ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-131 **Lab ID: 20139007003** Collected: 01/17/20 13:00 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/27/20 15:25	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/27/20 15:25	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/27/20 15:25	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/27/20 15:25	75-34-3	
1,1-Dichloroethene	**1.0**	ug/L	1.0	1		01/27/20 15:25	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/27/20 15:25	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/27/20 15:25	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/27/20 15:25	127-18-4	
Trichloroethene	**160**	ug/L	1.0	1		01/27/20 15:25	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/27/20 15:25	75-01-4	
Surrogates								
Dibromofluoromethane (S)	101	%.	72-126	1		01/27/20 15:25	1868-53-7	
4-Bromofluorobenzene (S)	106	%.	68-124	1		01/27/20 15:25	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/27/20 15:25	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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4320 Midmost Dr
Mobile, AL 36609
251-344-9106

ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-231 **Lab ID: 20139007004** Collected: 01/17/20 12:55 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	10.0	10		01/27/20 18:44	56-23-5	D4
Chloroethane	ND	ug/L	10.0	10		01/27/20 18:44	75-00-3	
Chloroform	ND	ug/L	10.0	10		01/27/20 18:44	67-66-3	
1,1-Dichloroethane	ND	ug/L	10.0	10		01/27/20 18:44	75-34-3	
1,1-Dichloroethene	ND	ug/L	10.0	10		01/27/20 18:44	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	10.0	10		01/27/20 18:44	156-59-2	
Methylene Chloride	ND	ug/L	10.0	10		01/27/20 18:44	75-09-2	
Tetrachloroethene	ND	ug/L	10.0	10		01/27/20 18:44	127-18-4	
Trichloroethene	**603**	ug/L	10.0	10		01/27/20 18:44	79-01-6	
Vinyl chloride	ND	ug/L	10.0	10		01/27/20 18:44	75-01-4	
Surrogates								
Dibromofluoromethane (S)	103	%.	72-126	10		01/27/20 18:44	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	10		01/27/20 18:44	460-00-4	
Toluene-d8 (S)	96	%.	79-119	10		01/27/20 18:44	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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Mobile, AL 36609
251-344-9106

ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-264 **Lab ID: 20139007005** Collected: 01/17/20 13:15 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/27/20 19:02	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/27/20 19:02	75-00-3	
Chloroform	**1.2**	ug/L	1.0	1		01/27/20 19:02	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/27/20 19:02	75-34-3	
1,1-Dichloroethene	**2.0**	ug/L	1.0	1		01/27/20 19:02	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/27/20 19:02	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/27/20 19:02	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/27/20 19:02	127-18-4	
Trichloroethene	**27.9**	ug/L	1.0	1		01/27/20 19:02	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/27/20 19:02	75-01-4	
Surrogates								
Dibromofluoromethane (S)	103	%.	72-126	1		01/27/20 19:02	1868-53-7	
4-Bromofluorobenzene (S)	107	%.	68-124	1		01/27/20 19:02	460-00-4	
Toluene-d8 (S)	96	%.	79-119	1		01/27/20 19:02	2037-26-5	

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-154 1st **Lab ID: 20139007006** Collected: 01/17/20 08:25 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/27/20 19:20	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/27/20 19:20	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/27/20 19:20	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/27/20 19:20	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/27/20 19:20	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/27/20 19:20	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/27/20 19:20	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/27/20 19:20	127-18-4	
Trichloroethene	**6.6**	ug/L	1.0	1		01/27/20 19:20	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/27/20 19:20	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	1		01/27/20 19:20	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	68-124	1		01/27/20 19:20	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/27/20 19:20	2037-26-5	

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-154 **Lab ID: 20139007007** Collected: 01/17/20 10:10 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/27/20 19:38	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/27/20 19:38	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/27/20 19:38	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/27/20 19:38	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/27/20 19:38	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/27/20 19:38	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/27/20 19:38	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/27/20 19:38	127-18-4	
Trichloroethene	**6.8**	ug/L	1.0	1		01/27/20 19:38	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/27/20 19:38	75-01-4	
Surrogates								
Dibromofluoromethane (S)	101	%.	72-126	1		01/27/20 19:38	1868-53-7	
4-Bromofluorobenzene (S)	107	%.	68-124	1		01/27/20 19:38	460-00-4	
Toluene-d8 (S)	96	%.	79-119	1		01/27/20 19:38	2037-26-5	

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-112 **Lab ID: 20139007008** Collected: 01/16/20 10:37 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/24/20 21:39	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/24/20 21:39	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/24/20 21:39	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/24/20 21:39	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/24/20 21:39	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/24/20 21:39	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/24/20 21:39	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/24/20 21:39	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/24/20 21:39	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/24/20 21:39	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	1		01/24/20 21:39	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	68-124	1		01/24/20 21:39	460-00-4	
Toluene-d8 (S)	95	%.	79-119	1		01/24/20 21:39	2037-26-5	

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-212 **Lab ID: 20139007009** Collected: 01/16/20 10:10 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/24/20 21:57	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/24/20 21:57	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/24/20 21:57	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/24/20 21:57	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/24/20 21:57	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/24/20 21:57	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/24/20 21:57	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/24/20 21:57	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/24/20 21:57	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/24/20 21:57	75-01-4	
Surrogates								
Dibromofluoromethane (S)	96	%.	72-126	1		01/24/20 21:57	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/24/20 21:57	460-00-4	
Toluene-d8 (S)	95	%.	79-119	1		01/24/20 21:57	2037-26-5	

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-128 **Lab ID: 20139007010** Collected: 01/16/20 13:05 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/24/20 22:16	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/24/20 22:16	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/24/20 22:16	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/24/20 22:16	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/24/20 22:16	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/24/20 22:16	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/24/20 22:16	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/24/20 22:16	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/24/20 22:16	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/24/20 22:16	75-01-4	
Surrogates								
Dibromofluoromethane (S)	95	%.	72-126	1		01/24/20 22:16	1868-53-7	
4-Bromofluorobenzene (S)	107	%.	68-124	1		01/24/20 22:16	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		01/24/20 22:16	2037-26-5	

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-228 **Lab ID: 20139007011** Collected: 01/16/20 13:30 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**4.7**	ug/L	1.0	1		01/27/20 16:09	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/27/20 16:09	75-00-3	
Chloroform	**1.2**	ug/L	1.0	1		01/27/20 16:09	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/27/20 16:09	75-34-3	
1,1-Dichloroethene	**16.8**	ug/L	1.0	1		01/27/20 16:09	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/27/20 16:09	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/27/20 16:09	75-09-2	
Tetrachloroethene	**2.5**	ug/L	1.0	1		01/27/20 16:09	127-18-4	
Trichloroethene	**194**	ug/L	1.0	1		01/27/20 16:09	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/27/20 16:09	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	1		01/27/20 16:09	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	1		01/27/20 16:09	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/27/20 16:09	2037-26-5	

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-108 **Lab ID: 20139007012** Collected: 01/16/20 14:48 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/27/20 16:27	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/27/20 16:27	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/27/20 16:27	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/27/20 16:27	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/27/20 16:27	75-35-4	
cis-1,2-Dichloroethene	**1.5**	ug/L	1.0	1		01/27/20 16:27	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/27/20 16:27	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/27/20 16:27	127-18-4	
Trichloroethene	**73.2**	ug/L	1.0	1		01/27/20 16:27	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/27/20 16:27	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	1		01/27/20 16:27	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	68-124	1		01/27/20 16:27	460-00-4	
Toluene-d8 (S)	96	%.	79-119	1		01/27/20 16:27	2037-26-5	

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-108 DUP **Lab ID: 20139007013** Collected: 01/16/20 14:48 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/27/20 16:45	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/27/20 16:45	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/27/20 16:45	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/27/20 16:45	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/27/20 16:45	75-35-4	
cis-1,2-Dichloroethene	**1.3**	ug/L	1.0	1		01/27/20 16:45	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/27/20 16:45	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/27/20 16:45	127-18-4	
Trichloroethene	**69.6**	ug/L	1.0	1		01/27/20 16:45	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/27/20 16:45	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	1		01/27/20 16:45	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/27/20 16:45	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/27/20 16:45	2037-26-5	

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-208 **Lab ID: 20139007014** Collected: 01/16/20 15:20 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/27/20 17:02	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/27/20 17:02	75-00-3	
Chloroform	**4.0**	ug/L	1.0	1		01/27/20 17:02	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/27/20 17:02	75-34-3	
1,1-Dichloroethene	**3.7**	ug/L	1.0	1		01/27/20 17:02	75-35-4	
cis-1,2-Dichloroethene	**36.6**	ug/L	1.0	1		01/27/20 17:02	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/27/20 17:02	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/27/20 17:02	127-18-4	
Trichloroethene	**1010**	ug/L	10.0	10		01/28/20 11:10	79-01-6	D4
Vinyl chloride	ND	ug/L	1.0	1		01/27/20 17:02	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	1		01/27/20 17:02	1868-53-7	
Dibromofluoromethane (S)	95	%.	72-126	10		01/28/20 11:10	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	10		01/28/20 11:10	460-00-4	
4-Bromofluorobenzene (S)	103	%.	68-124	1		01/27/20 17:02	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/27/20 17:02	2037-26-5	
Toluene-d8 (S)	97	%.	79-119	10		01/28/20 11:10	2037-26-5	

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-260 **Lab ID: 20139007015** Collected: 01/16/20 15:00 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/28/20 11:28	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/28/20 11:28	75-00-3	
Chloroform	**1.5**	ug/L	1.0	1		01/28/20 11:28	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/28/20 11:28	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/28/20 11:28	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/28/20 11:28	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/28/20 11:28	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/28/20 11:28	127-18-4	
Trichloroethene	**5.3**	ug/L	1.0	1		01/28/20 11:28	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/28/20 11:28	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	1		01/28/20 11:28	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	68-124	1		01/28/20 11:28	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/28/20 11:28	2037-26-5	

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-261 **Lab ID: 20139007016** Collected: 01/16/20 13:05 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/27/20 17:38	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/27/20 17:38	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/27/20 17:38	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/27/20 17:38	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/27/20 17:38	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/27/20 17:38	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/27/20 17:38	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/27/20 17:38	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/27/20 17:38	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/27/20 17:38	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	1		01/27/20 17:38	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	1		01/27/20 17:38	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/27/20 17:38	2037-26-5	

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ANALYTICAL RESULTS

Project: CPB/ C06-401
Pace Project No.: 20139007

Sample: MW-262 **Lab ID: 20139007017** Collected: 01/16/20 10:35 Received: 01/20/20 15:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/27/20 17:55	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/27/20 17:55	75-00-3	
Chloroform	**2.4**	ug/L	1.0	1		01/27/20 17:55	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/27/20 17:55	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/27/20 17:55	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/27/20 17:55	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/27/20 17:55	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/27/20 17:55	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/27/20 17:55	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/27/20 17:55	75-01-4	
Surrogates								
Dibromofluoromethane (S)	96	%.	72-126	1		01/27/20 17:55	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	1		01/27/20 17:55	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/27/20 17:55	2037-26-5	

REPORT OF LABORATORY ANALYSIS

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251-344-9106

QUALITY CONTROL DATA

Project: CPB/ C06-401
Pace Project No.: 20139007

QC Batch: 172982 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20139007008, 20139007009, 20139007010

METHOD BLANK: 786389 Matrix: Water
Associated Lab Samples: 20139007008, 20139007009, 20139007010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/24/20 17:08	
1,1-Dichloroethene	ug/L	ND	1.0	01/24/20 17:08	
Carbon tetrachloride	ug/L	ND	1.0	01/24/20 17:08	
Chloroethane	ug/L	ND	1.0	01/24/20 17:08	
Chloroform	ug/L	ND	1.0	01/24/20 17:08	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/24/20 17:08	
Methylene Chloride	ug/L	ND	1.0	01/24/20 17:08	
Tetrachloroethene	ug/L	ND	1.0	01/24/20 17:08	
Trichloroethene	ug/L	ND	1.0	01/24/20 17:08	
Vinyl chloride	ug/L	ND	1.0	01/24/20 17:08	
4-Bromofluorobenzene (S)	%.	103	68-124	01/24/20 17:08	
Dibromofluoromethane (S)	%.	97	72-126	01/24/20 17:08	
Toluene-d8 (S)	%.	98	79-119	01/24/20 17:08	

METHOD BLANK: 786938 Matrix: Water
Associated Lab Samples: 20139007008, 20139007009, 20139007010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/27/20 13:19	
1,1-Dichloroethene	ug/L	ND	1.0	01/27/20 13:19	
Carbon tetrachloride	ug/L	ND	1.0	01/27/20 13:19	
Chloroethane	ug/L	ND	1.0	01/27/20 13:19	
Chloroform	ug/L	ND	1.0	01/27/20 13:19	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/27/20 13:19	
Methylene Chloride	ug/L	ND	1.0	01/27/20 13:19	
Tetrachloroethene	ug/L	ND	1.0	01/27/20 13:19	
Trichloroethene	ug/L	ND	1.0	01/27/20 13:19	
Vinyl chloride	ug/L	ND	1.0	01/27/20 13:19	
4-Bromofluorobenzene (S)	%.	104	68-124	01/27/20 13:19	
Dibromofluoromethane (S)	%.	101	72-126	01/27/20 13:19	
Toluene-d8 (S)	%.	98	79-119	01/27/20 13:19	

LABORATORY CONTROL SAMPLE: 786390

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	41.9	84	63-129	
1,1-Dichloroethene	ug/L	50	52.5	105	51-139	
Carbon tetrachloride	ug/L	50	53.4	107	54-144	

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QUALITY CONTROL DATA

Project: CPB/ C06-401
Pace Project No.: 20139007

LABORATORY CONTROL SAMPLE: 786390

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloroethane	ug/L	50	49.2	98	17-195	
Chloroform	ug/L	50	45.0	90	73-134	
cis-1,2-Dichloroethene	ug/L	50	44.6	89	68-129	
Methylene Chloride	ug/L	50	49.7	99	46-168	
Tetrachloroethene	ug/L	50	56.4	113	46-157	
Trichloroethene	ug/L	50	49.5	99	67-132	
Vinyl chloride	ug/L	50	42.8	86	27-149	
4-Bromofluorobenzene (S)	%.			103	68-124	
Dibromofluoromethane (S)	%.			99	72-126	
Toluene-d8 (S)	%.			98	79-119	

LABORATORY CONTROL SAMPLE: 786939

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	41.3	83	63-129	
1,1-Dichloroethene	ug/L	50	49.1	98	51-139	
Carbon tetrachloride	ug/L	50	52.7	105	54-144	
Chloroethane	ug/L	50	49.7	99	17-195	
Chloroform	ug/L	50	44.5	89	73-134	
cis-1,2-Dichloroethene	ug/L	50	44.1	88	68-129	
Methylene Chloride	ug/L	50	47.5	95	46-168	
Tetrachloroethene	ug/L	50	55.6	111	46-157	
Trichloroethene	ug/L	50	48.6	97	67-132	
Vinyl chloride	ug/L	50	42.2	84	27-149	
4-Bromofluorobenzene (S)	%.			103	68-124	
Dibromofluoromethane (S)	%.			95	72-126	
Toluene-d8 (S)	%.			93	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 786391 786392

Parameter	Units	20138928002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	46.2	43.9	92	88	59-133	5	20	
1,1-Dichloroethene	ug/L	ND	50	50	57.2	53.8	114	108	44-146	6	20	
Carbon tetrachloride	ug/L	ND	50	50	56.7	54.2	113	108	48-146	5	20	
Chloroethane	ug/L	ND	50	50	54.2	50.3	108	101	12-192	8	20	
Chloroform	ug/L	ND	50	50	48.1	45.8	96	92	66-143	5	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	47.0	45.7	94	91	56-141	3	20	
Methylene Chloride	ug/L	ND	50	50	51.5	49.1	103	98	45-166	5	20	
Tetrachloroethene	ug/L	ND	50	50	56.3	51.9	113	104	48-143	8	20	
Trichloroethene	ug/L	ND	50	50	51.3	48.3	103	97	58-140	6	20	
Vinyl chloride	ug/L	ND	50	50	48.2	46.7	96	93	21-150	3	20	
4-Bromofluorobenzene (S)	%.						99	101	68-124			
Dibromofluoromethane (S)	%.						97	100	72-126			

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QUALITY CONTROL DATA

Project: CPB/ C06-401
Pace Project No.: 20139007

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 786391 786392

Parameter	Units	20138928002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Toluene-d8 (S)	%.						98	96	79-119			

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QUALITY CONTROL DATA

Project: CPB/ C06-401
Pace Project No.: 20139007

QC Batch: 173150 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20139007011, 20139007012, 20139007013, 20139007014, 20139007015, 20139007016, 20139007017

METHOD BLANK: 787207 Matrix: Water
Associated Lab Samples: 20139007011, 20139007012, 20139007013, 20139007014, 20139007015, 20139007016, 20139007017

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/27/20 11:26	
1,1-Dichloroethene	ug/L	ND	1.0	01/27/20 11:26	
Carbon tetrachloride	ug/L	ND	1.0	01/27/20 11:26	
Chloroethane	ug/L	ND	1.0	01/27/20 11:26	
Chloroform	ug/L	ND	1.0	01/27/20 11:26	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/27/20 11:26	
Methylene Chloride	ug/L	ND	1.0	01/27/20 11:26	
Tetrachloroethene	ug/L	ND	1.0	01/27/20 11:26	
Trichloroethene	ug/L	ND	1.0	01/27/20 11:26	
Vinyl chloride	ug/L	ND	1.0	01/27/20 11:26	
4-Bromofluorobenzene (S)	%.	103	68-124	01/27/20 11:26	
Dibromofluoromethane (S)	%.	99	72-126	01/27/20 11:26	
Toluene-d8 (S)	%.	96	79-119	01/27/20 11:26	

METHOD BLANK: 787603 Matrix: Water
Associated Lab Samples: 20139007011, 20139007012, 20139007013, 20139007014, 20139007015, 20139007016, 20139007017

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/28/20 09:59	
1,1-Dichloroethene	ug/L	ND	1.0	01/28/20 09:59	
Carbon tetrachloride	ug/L	ND	1.0	01/28/20 09:59	
Chloroethane	ug/L	ND	1.0	01/28/20 09:59	
Chloroform	ug/L	ND	1.0	01/28/20 09:59	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/28/20 09:59	
Methylene Chloride	ug/L	ND	1.0	01/28/20 09:59	
Tetrachloroethene	ug/L	ND	1.0	01/28/20 09:59	
Trichloroethene	ug/L	ND	1.0	01/28/20 09:59	
Vinyl chloride	ug/L	ND	1.0	01/28/20 09:59	
4-Bromofluorobenzene (S)	%.	102	68-124	01/28/20 09:59	
Dibromofluoromethane (S)	%.	96	72-126	01/28/20 09:59	
Toluene-d8 (S)	%.	97	79-119	01/28/20 09:59	

LABORATORY CONTROL SAMPLE: 787208

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	44.8	90	63-129	
1,1-Dichloroethene	ug/L	50	48.2	96	51-139	
Carbon tetrachloride	ug/L	50	54.4	109	54-144	

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QUALITY CONTROL DATA

Project: CPB/ C06-401
Pace Project No.: 20139007

LABORATORY CONTROL SAMPLE: 787208

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloroethane	ug/L	50	43.1	86	17-195	
Chloroform	ug/L	50	48.3	97	73-134	
cis-1,2-Dichloroethene	ug/L	50	47.5	95	68-129	
Methylene Chloride	ug/L	50	43.8	88	46-168	
Tetrachloroethene	ug/L	50	51.3	103	46-157	
Trichloroethene	ug/L	50	53.6	107	67-132	
Vinyl chloride	ug/L	50	41.1	82	27-149	
4-Bromofluorobenzene (S)	%.			102	68-124	
Dibromofluoromethane (S)	%.			94	72-126	
Toluene-d8 (S)	%.			98	79-119	

LABORATORY CONTROL SAMPLE: 787604

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	43.3	87	63-129	
1,1-Dichloroethene	ug/L	50	49.4	99	51-139	
Carbon tetrachloride	ug/L	50	53.2	106	54-144	
Chloroethane	ug/L	50	40.7	81	17-195	
Chloroform	ug/L	50	45.8	92	73-134	
cis-1,2-Dichloroethene	ug/L	50	45.8	92	68-129	
Methylene Chloride	ug/L	50	44.0	88	46-168	
Tetrachloroethene	ug/L	50	53.1	106	46-157	
Trichloroethene	ug/L	50	52.7	105	67-132	
Vinyl chloride	ug/L	50	39.8	80	27-149	
4-Bromofluorobenzene (S)	%.			104	68-124	
Dibromofluoromethane (S)	%.			92	72-126	
Toluene-d8 (S)	%.			97	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 787209 787210

Parameter	Units	20139007017 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	49.6	47.0	99	94	59-133	6	20	
1,1-Dichloroethene	ug/L	ND	50	50	54.8	51.2	110	102	44-146	7	20	
Carbon tetrachloride	ug/L	ND	50	50	62.9	57.8	126	116	48-146	9	20	
Chloroethane	ug/L	ND	50	50	46.4	44.9	93	90	12-192	3	20	
Chloroform	ug/L	2.4	50	50	53.9	51.9	103	99	66-143	4	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	50.7	48.7	101	97	56-141	4	20	
Methylene Chloride	ug/L	ND	50	50	45.7	44.8	91	90	45-166	2	20	
Tetrachloroethene	ug/L	ND	50	50	58.2	53.6	116	107	48-143	8	20	
Trichloroethene	ug/L	ND	50	50	60.1	56.2	119	111	58-140	7	20	
Vinyl chloride	ug/L	ND	50	50	47.6	44.8	95	90	21-150	6	20	
4-Bromofluorobenzene (S)	%.						100	103	68-124			
Dibromofluoromethane (S)	%.						92	93	72-126			

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QUALITY CONTROL DATA

Project: CPB/ C06-401
Pace Project No.: 20139007

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 787209 787210

Parameter	Units	20139007017 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Toluene-d8 (S)	%.						98	99	79-119			

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QUALITY CONTROL DATA

Project: CPB/ C06-401
Pace Project No.: 20139007

QC Batch: 173157 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20139007001, 20139007002, 20139007003, 20139007004, 20139007005, 20139007006, 20139007007

METHOD BLANK: 787263 Matrix: Water
Associated Lab Samples: 20139007001, 20139007002, 20139007003, 20139007004, 20139007005, 20139007006, 20139007007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/27/20 13:19	
1,1-Dichloroethene	ug/L	ND	1.0	01/27/20 13:19	
Carbon tetrachloride	ug/L	ND	1.0	01/27/20 13:19	
Chloroethane	ug/L	ND	1.0	01/27/20 13:19	
Chloroform	ug/L	ND	1.0	01/27/20 13:19	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/27/20 13:19	
Methylene Chloride	ug/L	ND	1.0	01/27/20 13:19	
Tetrachloroethene	ug/L	ND	1.0	01/27/20 13:19	
Trichloroethene	ug/L	ND	1.0	01/27/20 13:19	
Vinyl chloride	ug/L	ND	1.0	01/27/20 13:19	
4-Bromofluorobenzene (S)	%.	104	68-124	01/27/20 13:19	
Dibromofluoromethane (S)	%.	101	72-126	01/27/20 13:19	
Toluene-d8 (S)	%.	98	79-119	01/27/20 13:19	

LABORATORY CONTROL SAMPLE: 787264

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	41.3	83	63-129	
1,1-Dichloroethene	ug/L	50	49.1	98	51-139	
Carbon tetrachloride	ug/L	50	52.7	105	54-144	
Chloroethane	ug/L	50	49.7	99	17-195	
Chloroform	ug/L	50	44.5	89	73-134	
cis-1,2-Dichloroethene	ug/L	50	44.1	88	68-129	
Methylene Chloride	ug/L	50	47.5	95	46-168	
Tetrachloroethene	ug/L	50	55.6	111	46-157	
Trichloroethene	ug/L	50	48.6	97	67-132	
Vinyl chloride	ug/L	50	42.2	84	27-149	
4-Bromofluorobenzene (S)	%.			103	68-124	
Dibromofluoromethane (S)	%.			95	72-126	
Toluene-d8 (S)	%.			93	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 787265 787266

Parameter	Units	20139049002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	47.9	45.3	96	91	59-133	5	20	
1,1-Dichloroethene	ug/L	ND	50	50	59.4	55.4	119	111	44-146	7	20	
Carbon tetrachloride	ug/L	ND	50	50	62.6	59.4	125	119	48-146	5	20	

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QUALITY CONTROL DATA

Project: CPB/ C06-401
Pace Project No.: 20139007

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 787265 787266

Parameter	Units	20139049002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloroethane	ug/L	ND	50	50	57.5	56.3	115	113	12-192	2	20	
Chloroform	ug/L	ND	50	50	51.3	48.6	103	97	66-143	5	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	51.0	47.1	102	94	56-141	8	20	
Methylene Chloride	ug/L	ND	50	50	54.5	52.6	109	105	45-166	4	20	
Tetrachloroethene	ug/L	ND	50	50	61.2	58.0	122	116	48-143	5	20	
Trichloroethene	ug/L	ND	50	50	55.9	53.3	112	107	58-140	5	20	
Vinyl chloride	ug/L	ND	50	50	54.1	49.4	108	99	21-150	9	20	
4-Bromofluorobenzene (S)	%.						106	105	68-124			
Dibromofluoromethane (S)	%.						100	98	72-126			
Toluene-d8 (S)	%.						98	98	79-119			

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QUALIFIERS

Project: CPB/ C06-401
Pace Project No.: 20139007

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

ANALYTE QUALIFIERS

D4 Sample was diluted due to the presence of high levels of target analytes.

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4320 Midmost Dr
Mobile, AL 36609
251-344-9106

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CPB/ C06-401
Pace Project No.: 20139007

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
20139007001	**MW-113**	EPA 5030B/8260	173157		
20139007002	**MW-213**	EPA 5030B/8260	173157		
20139007003	**MW-131**	EPA 5030B/8260	173157		
20139007004	**MW-231**	EPA 5030B/8260	173157		
20139007005	**MW-264**	EPA 5030B/8260	173157		
20139007006	**MW-154 1st**	EPA 5030B/8260	173157		
20139007007	**MW-154**	EPA 5030B/8260	173157		
20139007008	**MW-112**	EPA 5030B/8260	172982		
20139007009	**MW-212**	EPA 5030B/8260	172982		
20139007010	**MW-128**	EPA 5030B/8260	172982		
20139007011	**MW-228**	EPA 5030B/8260	173150		
20139007012	**MW-108**	EPA 5030B/8260	173150		
20139007013	**MW-108 DUP**	EPA 5030B/8260	173150		
20139007014	**MW-208**	EPA 5030B/8260	173150		
20139007015	**MW-260**	EPA 5030B/8260	173150		
20139007016	**MW-261**	EPA 5030B/8260	173150		
20139007017	**MW-262**	EPA 5030B/8260	173150		

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CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or

WO# : 20139007

20139007

Company: SOUTHERN EARTH SCIENCES, INC.	Billing Information: PO BOX 160745 MOBILE, AL 36616
Address: 5460 RANGELINE ROAD MOBILE, AL 36619	
Report To: ERIC GUARINO	Email To: EGUARINO@SOEARTH.COM
Copy To:	Site Collection Info/Address: CBP
Customer Project Name/Number: CBP/C06-401	State: AL / County/City: MONTGOMERY / Time Zone Collected: [ ]PT [ ]MT
Phone: 251-344-7711 Email: EGUARINO@SOEARTH.COM	Site/Facility ID #: / Compliance Monitoring? [X] Yes [ ] No
Collected By (print): EAG/SK/CR	Purchase Order # : / Quote #: / DW PWS ID #: / DW Location Code:
Collected By (signature):	Turnaround Date Required: / Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) / Field Filtered (if applicable): [ ] Yes [X] No / Analysis:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: 8260 HALOGENATED	Lab Profile/Line:
MW-113	GW	G	1/17/20	1100				3	3	
MW-213	GW	G	1/17/20	1110				3	3	
MW-131	GW	G	1/17/20	1300				3	3	
MW-231	GW	G	1/17/20	1255				3	3	
MW-264	GW	G	1/17/20	1315				3	3	
MW-154 1ST	GW	G	1/17/20	825				3	3	
MW-154	GW	G	1/17/20	1010				3	3	
MW-112	GW	G	1/16/20	1037				3	3	
MW-212	GW	G	1/16/20	1010				3	3	
MW-128	GW	G	1/16/20	1305				3	3	

Container Preservative: 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Lab Profile/Line:

Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N (NA)
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N (NA)
Samples in Holding Time Y N NA
Residual Chlorine Present Y N (NA)
Cl Strips: _____
Sample pH Acceptable Y N (NA)
pH Strips: _____
Sulfide Present Y N (NA)
Lead Acetate Strips: _____

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y (N) N/A

Lab Tracking #:

Samples received via: FEDEX UPS (Client) Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y (N) NA
Therm ID#: IR-00 P
Cooler 1 Temp Upon Receipt: 3.3 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 3.3 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time: 1.20.20 1500	Received by/Company: (Signature)	Date/Time: 1/20/20 1500
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y (N) NA
HCL MeOH TSP Other

Non Conformance(s): YES / (NO)

Page: 1 of: 2

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder Label

WO#: 20139007

PM: SLW Due Date: 02/03/20

CLIENT: MO-SES

ALL SHADED

Company: SOUTHERN EARTH SCIENCES, INC.	Billing Information: PO BOX 160745 MOBILE, AL 36616
Address: 5460 RANGELINE ROAD MOBILE, AL 36619	
Report To: ERIC GUARINO	Email To: EGUARINO@SOEARTH.COM
Copy To:	Site Collection Info/Address: CBP
Customer Project Name/Number: CBP/C06-401	State: AL / County/City: MONTGOMERY / Time Zone Collected: [ ]PT [ ]MT [
Phone: 251-344-7711 Email: EGUARINO@SOEARTH.COM	Site/Facility ID #: / Compliance Monitoring? [X] Yes [ ] No
Collected By (print): EAG/SK/CR	Purchase Order # : / Quote #: / DW PWS ID #: / DW Location Code:
Collected By (signature):	Turnaround Date Required: / Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) / Field Filtered (if applicable): [ ] Yes [X] No / Analysis: _____

Container Preservative Type: 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: 8260 HALOGENATED
MW-228	GW	G	1/16/20	1330				3	3
MW-108	GW	G	1/16/20	1448				3	3
MW-108 DUP	GW	G	1/16/20	1448				3	3
MW-208	GW	G	1/16/20	1520				3	3
MW-260	GW	G	1/16/20	1500				3	3
MW-261	GW	G	1/16/20	1305				3	3
MW-262	GW	G	1/16/20	1035				3	3

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y	N	NA
Custody Signatures Present	Y	N	NA
Collector Signature Present	Y	N	NA
Bottles Intact	Y	N	NA
Correct Bottles	Y	N	NA
Sufficient Volume	Y	N	NA
Samples Received on Ice	Y	N	NA
VOA - Headspace Acceptable	Y	N	NA
USDA Regulated Soils	Y	N	NA
Samples in Holding Time	Y	N	NA
Residual Chlorine Present	Y	N	NA
Cl Strips: _____			
Sample pH Acceptable	Y	N	NA
pH Strips: _____			
Sulfide Present	Y	N	NA
Lead Acetate Strips: _____			

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #:

Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: IR-001
Cooler 1 Temp Upon Receipt: 5.3 °C
Cooler 1 Therm Corr. Factor: 0 °C
Cooler 1 Corrected Temp: 5.3 °C
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
[signature]	1-20-20 1510	[signature]	1/20/20 1500
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
[signature]			
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 2 of: 2

Pace Analytical Services, LLC
4320 Midmost Dr
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251-344-9106

February 07, 2020

Eric Guarino
Southern Earth Sciences, Inc.
5460 Rangeline Road
Mobile, AL 36619

RE: Project: CBP/ C06-401
Pace Project No.: 20139691

Dear Eric Guarino:
Enclosed are the analytical results for sample(s) received by the laboratory on January 24, 2020. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Savannah Wallace
savannah.wallace@pacelabs.com
251-344-9106
Project Manager

Enclosures

cc: Andrew Guarino, Arcadis Alabama
Stacey Guarino, Southern Earth Sciences
Marty Reaves, Southern Earth Sciences, Inc.

REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: CBP/ C06-401
Pace Project No.: 20139691

Pace Analytical Services New Orleans

California Env. Lab Accreditation Program Branch: 11277CA
Florida Department of Health (NELAC): E87595
Illinois Environmental Protection Agency: 0025721
Kansas Department of Health and Environment (NELAC): E-10266
Louisiana Dept. of Environmental Quality (NELAC/LELAP): 02006
Pennsylvania Dept. of Env Protection (NELAC): 68-04202
Texas Commission on Env. Quality (NELAC): T104704405-09-TX
U.S. Dept. of Agriculture Foreign Soil Import: P330-10-00119
Commonwealth of Virginia (TNI): 480246

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SAMPLE SUMMARY

Project: CBP/ C06-401
Pace Project No.: 20139691

Lab ID	Sample ID	Matrix	Date Collected	Date Received
20139691001	TRIP	Water	01/24/20 07:00	01/24/20 11:35
20139691002	PURGEWATER	Water	01/24/20 06:30	01/24/20 11:35
20139691003	MW-135A	Water	01/23/20 10:07	01/24/20 11:35
20139691004	MW-135A 1 VOL	Water	01/23/20 09:40	01/24/20 11:35
20139691005	MW-135A DUP	Water	01/23/20 10:07	01/24/20 11:35
20139691006	MW-235B	Water	01/23/20 09:50	01/24/20 11:35
20139691007	MW-235B 1 VOL	Water	01/23/20 09:12	01/24/20 11:35
20139691008	MW-235C 1 VOL	Water	01/23/20 09:21	01/24/20 11:35
20139691009	MW-235C	Water	01/23/20 10:15	01/24/20 11:35
20139691010	MW-342	Water	01/23/20 07:15	01/24/20 11:35
20139691011	MW-340	Water	01/22/20 10:35	01/24/20 11:35
20139691012	MW-210	Water	01/21/20 15:40	01/24/20 11:35
20139691013	MW-210 DUP	Water	01/21/20 15:40	01/24/20 11:35
20139691014	MW-219	Water	01/21/20 15:00	01/24/20 11:35
20139691015	MW-223	Water	01/21/20 11:00	01/24/20 11:35
20139691016	MW-223 1 VOL	Water	01/21/20 09:55	01/24/20 11:35
20139691017	MW-232	Water	01/21/20 12:32	01/24/20 11:35
20139691018	MW-232 1 VOL	Water	01/21/20 11:54	01/24/20 11:35
20139691019	MW-109	Water	01/21/20 14:15	01/24/20 11:35
20139691020	MW-209	Water	01/21/20 15:00	01/24/20 11:35
20139691021	MW-339	Water	01/23/20 07:00	01/24/20 11:35
20139691022	MW-357	Water	01/22/20 11:15	01/24/20 11:35
20139691023	MW-457	Water	01/22/20 12:15	01/24/20 11:35
20139691024	MW-5A	Water	01/22/20 08:05	01/24/20 11:35
20139691025	MW-137A 1 VOL	Water	01/22/20 13:58	01/24/20 11:35
20139691026	MW-137A	Water	01/22/20 14:40	01/24/20 11:35
20139691027	MW-237 B 1 VOL	Water	01/22/20 13:30	01/24/20 11:35
20139691028	MW-237B	Water	01/22/20 14:15	01/24/20 11:35
20139691029	MW-237C 1 VOL	Water	01/22/20 13:40	01/24/20 11:35
20139691030	MW-237C	Water	01/22/20 14:55	01/24/20 11:35
20139691031	MW-156	Water	01/20/20 16:20	01/24/20 11:35
20139691032	MW-156 1 VOL	Water	01/20/20 14:40	01/24/20 11:35
20139691033	MW-259	Water	01/20/20 13:10	01/24/20 11:35
20139691034	MW-106	Water	01/20/20 09:54	01/24/20 11:35
20139691035	MW-206	Water	01/20/20 10:15	01/24/20 11:35
20139691036	MW-206 DUP	Water	01/20/20 10:15	01/24/20 11:35
20139691037	MW-129	Water	01/20/20 12:23	01/24/20 11:35

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: CBP/ C06-401
Pace Project No.: 20139691

Lab ID	Sample ID	Matrix	Date Collected	Date Received
20139691038	**MW-216**	Water	01/20/20 14:31	01/24/20 11:35
20139691039	**MW-216 1 VOL**	Water	01/20/20 13:51	01/24/20 11:35
20139691040	**MW-229**	Water	01/20/20 12:30	01/24/20 11:35
20139691041	**MW-155**	Water	01/21/20 09:40	01/24/20 11:35
20139691042	**MW-135A DUO 1 VOL**	Water	01/23/20 09:40	01/24/20 11:35
20139691043	**MW-153 1 VOL**	Water	01/21/20 11:15	01/24/20 11:35
20139691044	**MW-153**	Water	01/21/20 13:05	01/24/20 11:35

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SAMPLE ANALYTE COUNT

Project: CBP/ C06-401
Pace Project No.: 20139691

Lab ID	Sample ID	Method	Analysts	Analytes Reported
20139691001	TRIP	EPA 5030B/8260	GEM	13
20139691002	PURGEWATER	EPA 5030B/8260	GEM	13
20139691003	MW-135A	EPA 5030B/8260	GEM	13
20139691004	MW-135A 1 VOL	EPA 5030B/8260	GEM	13
20139691005	MW-135A DUP	EPA 5030B/8260	GEM	13
20139691006	MW-235B	EPA 5030B/8260	GEM	13
20139691007	MW-235B 1 VOL	EPA 5030B/8260	GEM	13
20139691008	MW-235C 1 VOL	EPA 5030B/8260	GEM	13
20139691009	MW-235C	EPA 5030B/8260	GEM	13
20139691010	MW-342	EPA 5030B/8260	GEM	13
20139691011	MW-340	EPA 5030B/8260	GEM	13
20139691012	MW-210	EPA 5030B/8260	GEM	13
20139691013	MW-210 DUP	EPA 5030B/8260	GEM	13
20139691014	MW-219	EPA 5030B/8260	GEM	13
20139691015	MW-223	EPA 5030B/8260	GEM	13
20139691016	MW-223 1 VOL	EPA 5030B/8260	GEM	13
20139691017	MW-232	EPA 5030B/8260	GEM	13
20139691018	MW-232 1 VOL	EPA 5030B/8260	GEM	13
20139691019	MW-109	EPA 5030B/8260	GEM	13
20139691020	MW-209	EPA 5030B/8260	GEM	13
20139691021	MW-339	EPA 5030B/8260	GEM	13
20139691022	MW-357	EPA 5030B/8260	GEM	13
20139691023	MW-457	EPA 5030B/8260	GEM	13
20139691024	MW-5A	EPA 5030B/8260	GEM	13
20139691025	MW-137A 1 VOL	EPA 5030B/8260	GEM	13
20139691026	MW-137A	EPA 5030B/8260	GEM	13
20139691027	MW-237 B 1 VOL	EPA 5030B/8260	GEM	13
20139691028	MW-237B	EPA 5030B/8260	GEM	13
20139691029	MW-237C 1 VOL	EPA 5030B/8260	GEM	13
20139691030	MW-237C	EPA 5030B/8260	GEM	13
20139691031	MW-156	EPA 5030B/8260	JRP	13
20139691032	MW-156 1 VOL	EPA 5030B/8260	JRP	13
20139691033	MW-259	EPA 5030B/8260	JRP	13
20139691034	MW-106	EPA 5030B/8260	JRP	13
20139691035	MW-206	EPA 5030B/8260	JRP	13
20139691036	MW-206 DUP	EPA 5030B/8260	JRP	13
20139691037	MW-129	EPA 5030B/8260	JRP	13

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4320 Midmost Dr
Mobile, AL 36609
251-344-9106

SAMPLE ANALYTE COUNT

Project: CBP/ C06-401
Pace Project No.: 20139691

Lab ID	Sample ID	Method	Analysts	Analytes Reported
20139691038	**MW-216**	EPA 5030B/8260	JRP	13
20139691039	**MW-216 1 VOL**	EPA 5030B/8260	JRP	13
20139691040	**MW-229**	EPA 5030B/8260	JRP	13
20139691041	**MW-155**	EPA 5030B/8260	GEM	13
20139691042	**MW-135A DUO 1 VOL**	EPA 5030B/8260	GEM	13
20139691043	**MW-153 1 VOL**	EPA 5030B/8260	GEM	13
20139691044	**MW-153**	EPA 5030B/8260	GEM	13

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Pace Analytical Services, LLC
4320 Midmost Dr
Mobile, AL 36609
251-344-9106

PROJECT NARRATIVE

Project: CBP/ C06-401
Pace Project No.: 20139691

Method: **EPA 5030B/8260**
Description: 8260 MSV Low Level
Client: Southern Earth Sciences, Inc.
Date: February 07, 2020

General Information:
44 samples were analyzed for EPA 5030B/8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 174266

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 20140307001

R1: RPD value was outside control limits.

- MSD (Lab ID: 792882)
  - Methylene Chloride

Additional Comments:

Analyte Comments:

QC Batch: 173517

D4: Sample was diluted due to the presence of high levels of target analytes.

- MW-106 (Lab ID: 20139691034)
  - Carbon tetrachloride
- MW-229 (Lab ID: 20139691040)
  - Trichloroethene

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Pace Analytical Services, LLC
4320 Midmost Dr
Mobile, AL 36609
251-344-9106

PROJECT NARRATIVE

Project: CBP/ C06-401
Pace Project No.: 20139691

Method: **EPA 5030B/8260**
Description: 8260 MSV Low Level
Client: Southern Earth Sciences, Inc.
Date: February 07, 2020

Analyte Comments:

QC Batch: 173729

D4: Sample was diluted due to the presence of high levels of target analytes.

- MW-153 (Lab ID: 20139691044)
  - Carbon tetrachloride
- MW-153 1 VOL (Lab ID: 20139691043)
  - Carbon tetrachloride
- MW-223 (Lab ID: 20139691015)
  - Carbon tetrachloride
- MW-223 1 VOL (Lab ID: 20139691016)
  - Carbon tetrachloride
- MW-232 (Lab ID: 20139691017)
  - Carbon tetrachloride
- MW-232 1 VOL (Lab ID: 20139691018)
  - Carbon tetrachloride

QC Batch: 174224

D4: Sample was diluted due to the presence of high levels of target analytes.

- MW-237C (Lab ID: 20139691030)
  - Carbon tetrachloride
- MW-237C 1 VOL (Lab ID: 20139691029)
  - Carbon tetrachloride
  - Trichloroethene

QC Batch: 174266

D4: Sample was diluted due to the presence of high levels of target analytes.

- MW-135A (Lab ID: 20139691003)
  - Carbon tetrachloride
- MW-135A 1 VOL (Lab ID: 20139691004)
  - Carbon tetrachloride
- MW-135A DUP (Lab ID: 20139691005)
  - Carbon tetrachloride
- MW-235B (Lab ID: 20139691006)
  - Carbon tetrachloride
- MW-235B 1 VOL (Lab ID: 20139691007)
  - Carbon tetrachloride
- MW-235C (Lab ID: 20139691009)
  - Carbon tetrachloride
- MW-235C 1 VOL (Lab ID: 20139691008)
  - Carbon tetrachloride

QC Batch: 174397

D4: Sample was diluted due to the presence of high levels of target analytes.

- MW-135A DUO 1 VOL (Lab ID: 20139691042)
  - Carbon tetrachloride

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PROJECT NARRATIVE

Project: CBP/ C06-401
Pace Project No.: 20139691

Method: **EPA 5030B/8260**
Description: 8260 MSV Low Level
Client: Southern Earth Sciences, Inc.
Date: February 07, 2020

Analyte Comments:

QC Batch: 174397

D4: Sample was diluted due to the presence of high levels of target analytes.

- PURGEWATER (Lab ID: 20139691002)
  - Trichloroethene

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: TRIP **Lab ID: 20139691001** Collected: 01/24/20 07:00 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		02/06/20 15:20	56-23-5	
Chloroethane	ND	ug/L	1.0	1		02/06/20 15:20	75-00-3	
Chloroform	ND	ug/L	1.0	1		02/06/20 15:20	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		02/06/20 15:20	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		02/06/20 15:20	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/06/20 15:20	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		02/06/20 15:20	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		02/06/20 15:20	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		02/06/20 15:20	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		02/06/20 15:20	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	1		02/06/20 15:20	1868-53-7	
4-Bromofluorobenzene (S)	99	%.	68-124	1		02/06/20 15:20	460-00-4	
Toluene-d8 (S)	96	%.	79-119	1		02/06/20 15:20	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: PURGEWATER **Lab ID: 20139691002** Collected: 01/24/20 06:30 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**2.0**	ug/L	1.0	1		02/06/20 15:38	56-23-5	
Chloroethane	ND	ug/L	1.0	1		02/06/20 15:38	75-00-3	
Chloroform	ND	ug/L	1.0	1		02/06/20 15:38	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		02/06/20 15:38	75-34-3	
1,1-Dichloroethene	**5.2**	ug/L	1.0	1		02/06/20 15:38	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/06/20 15:38	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		02/06/20 15:38	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		02/06/20 15:38	127-18-4	
Trichloroethene	**226**	ug/L	5.0	5		02/06/20 16:51	79-01-6	D4
Vinyl chloride	ND	ug/L	1.0	1		02/06/20 15:38	75-01-4	
Surrogates								
Dibromofluoromethane (S)	101	%.	72-126	5		02/06/20 16:51	1868-53-7	
Dibromofluoromethane (S)	101	%.	72-126	1		02/06/20 15:38	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	1		02/06/20 15:38	460-00-4	
4-Bromofluorobenzene (S)	100	%.	68-124	5		02/06/20 16:51	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		02/06/20 15:38	2037-26-5	
Toluene-d8 (S)	98	%.	79-119	5		02/06/20 16:51	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-135A **Lab ID: 20139691003** Collected: 01/23/20 10:07 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	10.0	10		02/05/20 17:52	56-23-5	D4
Chloroethane	ND	ug/L	10.0	10		02/05/20 17:52	75-00-3	
Chloroform	ND	ug/L	10.0	10		02/05/20 17:52	67-66-3	
1,1-Dichloroethane	ND	ug/L	10.0	10		02/05/20 17:52	75-34-3	
1,1-Dichloroethene	ND	ug/L	10.0	10		02/05/20 17:52	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	10.0	10		02/05/20 17:52	156-59-2	
Methylene Chloride	ND	ug/L	10.0	10		02/05/20 17:52	75-09-2	
Tetrachloroethene	ND	ug/L	10.0	10		02/05/20 17:52	127-18-4	
Trichloroethene	**618**	ug/L	10.0	10		02/05/20 17:52	79-01-6	
Vinyl chloride	ND	ug/L	10.0	10		02/05/20 17:52	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	10		02/05/20 17:52	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	68-124	10		02/05/20 17:52	460-00-4	
Toluene-d8 (S)	100	%.	79-119	10		02/05/20 17:52	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-135A 1 VOL **Lab ID: 20139691004** Collected: 01/23/20 09:40 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	10.0	10		02/05/20 18:10	56-23-5	D4
Chloroethane	ND	ug/L	10.0	10		02/05/20 18:10	75-00-3	
Chloroform	ND	ug/L	10.0	10		02/05/20 18:10	67-66-3	
1,1-Dichloroethane	ND	ug/L	10.0	10		02/05/20 18:10	75-34-3	
1,1-Dichloroethene	ND	ug/L	10.0	10		02/05/20 18:10	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	10.0	10		02/05/20 18:10	156-59-2	
Methylene Chloride	ND	ug/L	10.0	10		02/05/20 18:10	75-09-2	
Tetrachloroethene	ND	ug/L	10.0	10		02/05/20 18:10	127-18-4	
Trichloroethene	**576**	ug/L	10.0	10		02/05/20 18:10	79-01-6	
Vinyl chloride	ND	ug/L	10.0	10		02/05/20 18:10	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	10		02/05/20 18:10	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	10		02/05/20 18:10	460-00-4	
Toluene-d8 (S)	96	%.	79-119	10		02/05/20 18:10	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-135A DUP **Lab ID: 20139691005** Collected: 01/23/20 10:07 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	10.0	10		02/05/20 18:28	56-23-5	D4
Chloroethane	ND	ug/L	10.0	10		02/05/20 18:28	75-00-3	
Chloroform	ND	ug/L	10.0	10		02/05/20 18:28	67-66-3	
1,1-Dichloroethane	ND	ug/L	10.0	10		02/05/20 18:28	75-34-3	
1,1-Dichloroethene	ND	ug/L	10.0	10		02/05/20 18:28	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	10.0	10		02/05/20 18:28	156-59-2	
Methylene Chloride	ND	ug/L	10.0	10		02/05/20 18:28	75-09-2	
Tetrachloroethene	ND	ug/L	10.0	10		02/05/20 18:28	127-18-4	
Trichloroethene	**687**	ug/L	10.0	10		02/05/20 18:28	79-01-6	
Vinyl chloride	ND	ug/L	10.0	10		02/05/20 18:28	75-01-4	
Surrogates								
Dibromofluoromethane (S)	94	%.	72-126	10		02/05/20 18:28	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	10		02/05/20 18:28	460-00-4	
Toluene-d8 (S)	98	%.	79-119	10		02/05/20 18:28	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-235B **Lab ID: 20139691006** Collected: 01/23/20 09:50 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	20.0	20		02/05/20 18:46	56-23-5	D4
Chloroethane	ND	ug/L	20.0	20		02/05/20 18:46	75-00-3	
Chloroform	ND	ug/L	20.0	20		02/05/20 18:46	67-66-3	
1,1-Dichloroethane	ND	ug/L	20.0	20		02/05/20 18:46	75-34-3	
1,1-Dichloroethene	**21.8**	ug/L	20.0	20		02/05/20 18:46	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	20.0	20		02/05/20 18:46	156-59-2	
Methylene Chloride	ND	ug/L	20.0	20		02/05/20 18:46	75-09-2	
Tetrachloroethene	ND	ug/L	20.0	20		02/05/20 18:46	127-18-4	
Trichloroethene	**2300**	ug/L	20.0	20		02/05/20 18:46	79-01-6	
Vinyl chloride	ND	ug/L	20.0	20		02/05/20 18:46	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	20		02/05/20 18:46	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	20		02/05/20 18:46	460-00-4	
Toluene-d8 (S)	99	%.	79-119	20		02/05/20 18:46	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-235B 1 VOL **Lab ID: 20139691007** Collected: 01/23/20 09:12 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	20.0	20		02/05/20 19:05	56-23-5	D4
Chloroethane	ND	ug/L	20.0	20		02/05/20 19:05	75-00-3	
Chloroform	ND	ug/L	20.0	20		02/05/20 19:05	67-66-3	
1,1-Dichloroethane	ND	ug/L	20.0	20		02/05/20 19:05	75-34-3	
1,1-Dichloroethene	**23.7**	ug/L	20.0	20		02/05/20 19:05	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	20.0	20		02/05/20 19:05	156-59-2	
Methylene Chloride	ND	ug/L	20.0	20		02/05/20 19:05	75-09-2	
Tetrachloroethene	ND	ug/L	20.0	20		02/05/20 19:05	127-18-4	
Trichloroethene	**2340**	ug/L	20.0	20		02/05/20 19:05	79-01-6	
Vinyl chloride	ND	ug/L	20.0	20		02/05/20 19:05	75-01-4	
Surrogates								
Dibromofluoromethane (S)	102	%.	72-126	20		02/05/20 19:05	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	68-124	20		02/05/20 19:05	460-00-4	
Toluene-d8 (S)	97	%.	79-119	20		02/05/20 19:05	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-235C 1 VOL **Lab ID: 20139691008** Collected: 01/23/20 09:21 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**13.6**	ug/L	10.0	10		02/05/20 19:23	56-23-5	D4
Chloroethane	ND	ug/L	10.0	10		02/05/20 19:23	75-00-3	
Chloroform	ND	ug/L	10.0	10		02/05/20 19:23	67-66-3	
1,1-Dichloroethane	ND	ug/L	10.0	10		02/05/20 19:23	75-34-3	
1,1-Dichloroethene	**37.8**	ug/L	10.0	10		02/05/20 19:23	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	10.0	10		02/05/20 19:23	156-59-2	
Methylene Chloride	ND	ug/L	10.0	10		02/05/20 19:23	75-09-2	
Tetrachloroethene	ND	ug/L	10.0	10		02/05/20 19:23	127-18-4	
Trichloroethene	**1630**	ug/L	10.0	10		02/05/20 19:23	79-01-6	
Vinyl chloride	ND	ug/L	10.0	10		02/05/20 19:23	75-01-4	
Surrogates								
Dibromofluoromethane (S)	102	%.	72-126	10		02/05/20 19:23	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	10		02/05/20 19:23	460-00-4	
Toluene-d8 (S)	95	%.	79-119	10		02/05/20 19:23	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-235C **Lab ID: 20139691009** Collected: 01/23/20 10:15 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**12.3**	ug/L	10.0	10		02/05/20 19:41	56-23-5	D4
Chloroethane	ND	ug/L	10.0	10		02/05/20 19:41	75-00-3	
Chloroform	ND	ug/L	10.0	10		02/05/20 19:41	67-66-3	
1,1-Dichloroethane	ND	ug/L	10.0	10		02/05/20 19:41	75-34-3	
1,1-Dichloroethene	**40.0**	ug/L	10.0	10		02/05/20 19:41	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	10.0	10		02/05/20 19:41	156-59-2	
Methylene Chloride	ND	ug/L	10.0	10		02/05/20 19:41	75-09-2	
Tetrachloroethene	ND	ug/L	10.0	10		02/05/20 19:41	127-18-4	
Trichloroethene	**1620**	ug/L	10.0	10		02/05/20 19:41	79-01-6	
Vinyl chloride	ND	ug/L	10.0	10		02/05/20 19:41	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	10		02/05/20 19:41	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	10		02/05/20 19:41	460-00-4	
Toluene-d8 (S)	95	%.	79-119	10		02/05/20 19:41	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-342 **Lab ID: 20139691010** Collected: 01/23/20 07:15 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		02/05/20 19:59	56-23-5	
Chloroethane	ND	ug/L	1.0	1		02/05/20 19:59	75-00-3	
Chloroform	ND	ug/L	1.0	1		02/05/20 19:59	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		02/05/20 19:59	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		02/05/20 19:59	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/05/20 19:59	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		02/05/20 19:59	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		02/05/20 19:59	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		02/05/20 19:59	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		02/05/20 19:59	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	1		02/05/20 19:59	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	1		02/05/20 19:59	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		02/05/20 19:59	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-340 **Lab ID: 20139691011** Collected: 01/22/20 10:35 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		02/03/20 16:45	56-23-5	
Chloroethane	ND	ug/L	1.0	1		02/03/20 16:45	75-00-3	
Chloroform	ND	ug/L	1.0	1		02/03/20 16:45	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		02/03/20 16:45	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		02/03/20 16:45	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/03/20 16:45	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		02/03/20 16:45	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		02/03/20 16:45	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		02/03/20 16:45	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		02/03/20 16:45	75-01-4	
Surrogates								
Dibromofluoromethane (S)	101	%.	72-126	1		02/03/20 16:45	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	1		02/03/20 16:45	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		02/03/20 16:45	2037-26-5	

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Mobile, AL 36609
251-344-9106

ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-210 **Lab ID: 20139691012** Collected: 01/21/20 15:40 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/31/20 12:03	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/31/20 12:03	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/31/20 12:03	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/31/20 12:03	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/31/20 12:03	75-35-4	
cis-1,2-Dichloroethene	**7.5**	ug/L	1.0	1		01/31/20 12:03	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/31/20 12:03	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/31/20 12:03	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/31/20 12:03	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/31/20 12:03	75-01-4	
Surrogates								
Dibromofluoromethane (S)	96	%.	72-126	1		01/31/20 12:03	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/31/20 12:03	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/31/20 12:03	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-210 DUP **Lab ID: 20139691013** Collected: 01/21/20 15:40 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/31/20 13:34	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/31/20 13:34	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/31/20 13:34	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/31/20 13:34	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/31/20 13:34	75-35-4	
cis-1,2-Dichloroethene	**7.1**	ug/L	1.0	1		01/31/20 13:34	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/31/20 13:34	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/31/20 13:34	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/31/20 13:34	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/31/20 13:34	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	1		01/31/20 13:34	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	68-124	1		01/31/20 13:34	460-00-4	
Toluene-d8 (S)	100	%.	79-119	1		01/31/20 13:34	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-219 **Lab ID: 20139691014** Collected: 01/21/20 15:00 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/31/20 13:52	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/31/20 13:52	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/31/20 13:52	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/31/20 13:52	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/31/20 13:52	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/31/20 13:52	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/31/20 13:52	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/31/20 13:52	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/31/20 13:52	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/31/20 13:52	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	1		01/31/20 13:52	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/31/20 13:52	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/31/20 13:52	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-223 **Lab ID: 20139691015** Collected: 01/21/20 11:00 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	20.0	20		01/31/20 14:11	56-23-5	D4
Chloroethane	ND	ug/L	20.0	20		01/31/20 14:11	75-00-3	
Chloroform	ND	ug/L	20.0	20		01/31/20 14:11	67-66-3	
1,1-Dichloroethane	ND	ug/L	20.0	20		01/31/20 14:11	75-34-3	
1,1-Dichloroethene	**23.2**	ug/L	20.0	20		01/31/20 14:11	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	20.0	20		01/31/20 14:11	156-59-2	
Methylene Chloride	ND	ug/L	20.0	20		01/31/20 14:11	75-09-2	
Tetrachloroethene	ND	ug/L	20.0	20		01/31/20 14:11	127-18-4	
Trichloroethene	**2340**	ug/L	20.0	20		01/31/20 14:11	79-01-6	
Vinyl chloride	ND	ug/L	20.0	20		01/31/20 14:11	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	20		01/31/20 14:11	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	68-124	20		01/31/20 14:11	460-00-4	
Toluene-d8 (S)	95	%.	79-119	20		01/31/20 14:11	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-223 1 VOL **Lab ID: 20139691016** Collected: 01/21/20 09:55 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	20.0	20		01/31/20 16:01	56-23-5	D4
Chloroethane	ND	ug/L	20.0	20		01/31/20 16:01	75-00-3	
Chloroform	ND	ug/L	20.0	20		01/31/20 16:01	67-66-3	
1,1-Dichloroethane	ND	ug/L	20.0	20		01/31/20 16:01	75-34-3	
1,1-Dichloroethene	**24.5**	ug/L	20.0	20		01/31/20 16:01	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	20.0	20		01/31/20 16:01	156-59-2	
Methylene Chloride	ND	ug/L	20.0	20		01/31/20 16:01	75-09-2	
Tetrachloroethene	ND	ug/L	20.0	20		01/31/20 16:01	127-18-4	
Trichloroethene	**2920**	ug/L	20.0	20		01/31/20 16:01	79-01-6	
Vinyl chloride	ND	ug/L	20.0	20		01/31/20 16:01	75-01-4	
Surrogates								
Dibromofluoromethane (S)	102	%.	72-126	20		01/31/20 16:01	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	20		01/31/20 16:01	460-00-4	
Toluene-d8 (S)	98	%.	79-119	20		01/31/20 16:01	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-232 **Lab ID: 20139691017** Collected: 01/21/20 12:32 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**11.2**	ug/L	5.0	5		01/31/20 14:29	56-23-5	D4
Chloroethane	ND	ug/L	5.0	5		01/31/20 14:29	75-00-3	
Chloroform	ND	ug/L	5.0	5		01/31/20 14:29	67-66-3	
1,1-Dichloroethane	ND	ug/L	5.0	5		01/31/20 14:29	75-34-3	
1,1-Dichloroethene	**34.2**	ug/L	5.0	5		01/31/20 14:29	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	5		01/31/20 14:29	156-59-2	
Methylene Chloride	ND	ug/L	5.0	5		01/31/20 14:29	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	5		01/31/20 14:29	127-18-4	
Trichloroethene	**520**	ug/L	5.0	5		01/31/20 14:29	79-01-6	
Vinyl chloride	ND	ug/L	5.0	5		01/31/20 14:29	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	5		01/31/20 14:29	1868-53-7	
4-Bromofluorobenzene (S)	102	%.	68-124	5		01/31/20 14:29	460-00-4	
Toluene-d8 (S)	94	%.	79-119	5		01/31/20 14:29	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-232 1 VOL **Lab ID: 20139691018** Collected: 01/21/20 11:54 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**9.7**	ug/L	5.0	5		01/31/20 16:19	56-23-5	D4
Chloroethane	ND	ug/L	5.0	5		01/31/20 16:19	75-00-3	
Chloroform	ND	ug/L	5.0	5		01/31/20 16:19	67-66-3	
1,1-Dichloroethane	ND	ug/L	5.0	5		01/31/20 16:19	75-34-3	
1,1-Dichloroethene	**33.2**	ug/L	5.0	5		01/31/20 16:19	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	5		01/31/20 16:19	156-59-2	
Methylene Chloride	ND	ug/L	5.0	5		01/31/20 16:19	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	5		01/31/20 16:19	127-18-4	
Trichloroethene	**521**	ug/L	5.0	5		01/31/20 16:19	79-01-6	
Vinyl chloride	ND	ug/L	5.0	5		01/31/20 16:19	75-01-4	
Surrogates								
Dibromofluoromethane (S)	101	%.	72-126	5		01/31/20 16:19	1868-53-7	
4-Bromofluorobenzene (S)	106	%.	68-124	5		01/31/20 16:19	460-00-4	
Toluene-d8 (S)	99	%.	79-119	5		01/31/20 16:19	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-109 **Lab ID: 20139691019** Collected: 01/21/20 14:15 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/31/20 15:06	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/31/20 15:06	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/31/20 15:06	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/31/20 15:06	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/31/20 15:06	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/31/20 15:06	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/31/20 15:06	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/31/20 15:06	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/31/20 15:06	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/31/20 15:06	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	1		01/31/20 15:06	1868-53-7	
4-Bromofluorobenzene (S)	108	%.	68-124	1		01/31/20 15:06	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/31/20 15:06	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-209 **Lab ID: 20139691020** Collected: 01/21/20 15:00 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/31/20 15:24	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/31/20 15:24	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/31/20 15:24	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/31/20 15:24	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/31/20 15:24	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/31/20 15:24	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/31/20 15:24	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/31/20 15:24	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/31/20 15:24	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/31/20 15:24	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	1		01/31/20 15:24	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	68-124	1		01/31/20 15:24	460-00-4	
Toluene-d8 (S)	95	%.	79-119	1		01/31/20 15:24	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-339 **Lab ID: 20139691021** Collected: 01/23/20 07:00 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		02/05/20 20:17	56-23-5	
Chloroethane	ND	ug/L	1.0	1		02/05/20 20:17	75-00-3	
Chloroform	ND	ug/L	1.0	1		02/05/20 20:17	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		02/05/20 20:17	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		02/05/20 20:17	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/05/20 20:17	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		02/05/20 20:17	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		02/05/20 20:17	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		02/05/20 20:17	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		02/05/20 20:17	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	1		02/05/20 20:17	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	68-124	1		02/05/20 20:17	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		02/05/20 20:17	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-357 **Lab ID: 20139691022** Collected: 01/22/20 11:15 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**1.6**	ug/L	1.0	1		02/03/20 20:42	56-23-5	
Chloroethane	ND	ug/L	1.0	1		02/03/20 20:42	75-00-3	
Chloroform	ND	ug/L	1.0	1		02/03/20 20:42	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		02/03/20 20:42	75-34-3	
1,1-Dichloroethene	**7.1**	ug/L	1.0	1		02/03/20 20:42	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/03/20 20:42	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		02/03/20 20:42	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		02/03/20 20:42	127-18-4	
Trichloroethene	**79.2**	ug/L	1.0	1		02/03/20 20:42	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		02/03/20 20:42	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	1		02/03/20 20:42	1868-53-7	
4-Bromofluorobenzene (S)	107	%.	68-124	1		02/03/20 20:42	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		02/03/20 20:42	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-457 **Lab ID: 20139691023** Collected: 01/22/20 12:15 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		02/04/20 20:04	56-23-5	
Chloroethane	ND	ug/L	1.0	1		02/04/20 20:04	75-00-3	
Chloroform	ND	ug/L	1.0	1		02/04/20 20:04	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		02/04/20 20:04	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		02/04/20 20:04	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/04/20 20:04	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		02/04/20 20:04	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		02/04/20 20:04	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		02/04/20 20:04	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		02/04/20 20:04	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	1		02/04/20 20:04	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	68-124	1		02/04/20 20:04	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		02/04/20 20:04	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-5A **Lab ID: 20139691024** Collected: 01/22/20 08:05 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		02/04/20 20:23	56-23-5	
Chloroethane	ND	ug/L	1.0	1		02/04/20 20:23	75-00-3	
Chloroform	ND	ug/L	1.0	1		02/04/20 20:23	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		02/04/20 20:23	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		02/04/20 20:23	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/04/20 20:23	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		02/04/20 20:23	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		02/04/20 20:23	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		02/04/20 20:23	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		02/04/20 20:23	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	1		02/04/20 20:23	1868-53-7	
4-Bromofluorobenzene (S)	107	%.	68-124	1		02/04/20 20:23	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		02/04/20 20:23	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-137A 1 VOL **Lab ID: 20139691025** Collected: 01/22/20 13:58 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		02/04/20 20:41	56-23-5	
Chloroethane	ND	ug/L	1.0	1		02/04/20 20:41	75-00-3	
Chloroform	ND	ug/L	1.0	1		02/04/20 20:41	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		02/04/20 20:41	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		02/04/20 20:41	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/04/20 20:41	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		02/04/20 20:41	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		02/04/20 20:41	127-18-4	
Trichloroethene	**11.0**	ug/L	1.0	1		02/04/20 20:41	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		02/04/20 20:41	75-01-4	
Surrogates								
Dibromofluoromethane (S)	96	%.	72-126	1		02/04/20 20:41	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	68-124	1		02/04/20 20:41	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		02/04/20 20:41	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-137A **Lab ID: 20139691026** Collected: 01/22/20 14:40 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		02/04/20 20:59	56-23-5	
Chloroethane	ND	ug/L	1.0	1		02/04/20 20:59	75-00-3	
Chloroform	ND	ug/L	1.0	1		02/04/20 20:59	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		02/04/20 20:59	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		02/04/20 20:59	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/04/20 20:59	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		02/04/20 20:59	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		02/04/20 20:59	127-18-4	
Trichloroethene	**9.8**	ug/L	1.0	1		02/04/20 20:59	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		02/04/20 20:59	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	1		02/04/20 20:59	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	68-124	1		02/04/20 20:59	460-00-4	
Toluene-d8 (S)	93	%.	79-119	1		02/04/20 20:59	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-237 B 1 VOL **Lab ID: 20139691027** Collected: 01/22/20 13:30 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		02/04/20 21:18	56-23-5	
Chloroethane	ND	ug/L	1.0	1		02/04/20 21:18	75-00-3	
Chloroform	ND	ug/L	1.0	1		02/04/20 21:18	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		02/04/20 21:18	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		02/04/20 21:18	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/04/20 21:18	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		02/04/20 21:18	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		02/04/20 21:18	127-18-4	
Trichloroethene	**84.5**	ug/L	1.0	1		02/04/20 21:18	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		02/04/20 21:18	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	1		02/04/20 21:18	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	1		02/04/20 21:18	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		02/04/20 21:18	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-237B **Lab ID: 20139691028** Collected: 01/22/20 14:15 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		02/04/20 21:36	56-23-5	
Chloroethane	ND	ug/L	1.0	1		02/04/20 21:36	75-00-3	
Chloroform	ND	ug/L	1.0	1		02/04/20 21:36	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		02/04/20 21:36	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		02/04/20 21:36	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		02/04/20 21:36	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		02/04/20 21:36	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		02/04/20 21:36	127-18-4	
Trichloroethene	**83.2**	ug/L	1.0	1		02/04/20 21:36	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		02/04/20 21:36	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	1		02/04/20 21:36	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	1		02/04/20 21:36	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		02/04/20 21:36	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-237C 1 VOL **Lab ID: 20139691029** Collected: 01/22/20 13:40 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**110**	ug/L	50.0	50		02/05/20 13:00	56-23-5	D4
Chloroethane	ND	ug/L	50.0	50		02/05/20 13:00	75-00-3	
Chloroform	ND	ug/L	50.0	50		02/05/20 13:00	67-66-3	
1,1-Dichloroethane	ND	ug/L	50.0	50		02/05/20 13:00	75-34-3	
1,1-Dichloroethene	**270**	ug/L	50.0	50		02/05/20 13:00	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	50.0	50		02/05/20 13:00	156-59-2	
Methylene Chloride	ND	ug/L	50.0	50		02/05/20 13:00	75-09-2	
Tetrachloroethene	ND	ug/L	50.0	50		02/05/20 13:00	127-18-4	
Trichloroethene	**11300**	ug/L	100	100		02/05/20 14:12	79-01-6	D4
Vinyl chloride	ND	ug/L	50.0	50		02/05/20 13:00	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	50		02/05/20 13:00	1868-53-7	
Dibromofluoromethane (S)	99	%.	72-126	100		02/05/20 14:12	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	68-124	50		02/05/20 13:00	460-00-4	
4-Bromofluorobenzene (S)	102	%.	68-124	100		02/05/20 14:12	460-00-4	
Toluene-d8 (S)	99	%.	79-119	50		02/05/20 13:00	2037-26-5	
Toluene-d8 (S)	98	%.	79-119	100		02/05/20 14:12	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-237C **Lab ID: 20139691030** Collected: 01/22/20 14:55 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	**102**	ug/L	100	100		02/05/20 13:54	56-23-5	D4
Chloroethane	ND	ug/L	100	100		02/05/20 13:54	75-00-3	
Chloroform	ND	ug/L	100	100		02/05/20 13:54	67-66-3	
1,1-Dichloroethane	ND	ug/L	100	100		02/05/20 13:54	75-34-3	
1,1-Dichloroethene	**262**	ug/L	100	100		02/05/20 13:54	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	100	100		02/05/20 13:54	156-59-2	
Methylene Chloride	ND	ug/L	100	100		02/05/20 13:54	75-09-2	
Tetrachloroethene	ND	ug/L	100	100		02/05/20 13:54	127-18-4	
Trichloroethene	**11000**	ug/L	100	100		02/05/20 13:54	79-01-6	
Vinyl chloride	ND	ug/L	100	100		02/05/20 13:54	75-01-4	
Surrogates								
Dibromofluoromethane (S)	95	%.	72-126	100		02/05/20 13:54	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	68-124	100		02/05/20 13:54	460-00-4	
Toluene-d8 (S)	96	%.	79-119	100		02/05/20 13:54	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-156 **Lab ID: 20139691031** Collected: 01/20/20 16:20 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/30/20 11:32	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/30/20 11:32	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/30/20 11:32	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/30/20 11:32	75-34-3	
1,1-Dichloroethene	**1.5**	ug/L	1.0	1		01/30/20 11:32	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/30/20 11:32	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/30/20 11:32	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/30/20 11:32	127-18-4	
Trichloroethene	**119**	ug/L	1.0	1		01/30/20 11:32	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/30/20 11:32	75-01-4	
Surrogates								
Dibromofluoromethane (S)	94	%.	72-126	1		01/30/20 11:32	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	68-124	1		01/30/20 11:32	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/30/20 11:32	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-156 1 VOL **Lab ID: 20139691032** Collected: 01/20/20 14:40 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/30/20 11:50	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/30/20 11:50	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/30/20 11:50	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/30/20 11:50	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/30/20 11:50	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/30/20 11:50	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/30/20 11:50	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/30/20 11:50	127-18-4	
Trichloroethene	**56.2**	ug/L	1.0	1		01/30/20 11:50	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/30/20 11:50	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	1		01/30/20 11:50	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	1		01/30/20 11:50	460-00-4	
Toluene-d8 (S)	97	%.	79-119	1		01/30/20 11:50	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-259 **Lab ID: 20139691033** Collected: 01/20/20 13:10 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/30/20 12:08	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/30/20 12:08	75-00-3	
Chloroform	**1.3**	ug/L	1.0	1		01/30/20 12:08	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/30/20 12:08	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/30/20 12:08	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/30/20 12:08	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/30/20 12:08	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/30/20 12:08	127-18-4	
Trichloroethene	**3.9**	ug/L	1.0	1		01/30/20 12:08	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/30/20 12:08	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	1		01/30/20 12:08	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	68-124	1		01/30/20 12:08	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/30/20 12:08	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-106 **Lab ID: 20139691034** Collected: 01/20/20 09:54 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	10.0	10		01/30/20 12:25	56-23-5	D4
Chloroethane	ND	ug/L	10.0	10		01/30/20 12:25	75-00-3	
Chloroform	ND	ug/L	10.0	10		01/30/20 12:25	67-66-3	
1,1-Dichloroethane	ND	ug/L	10.0	10		01/30/20 12:25	75-34-3	
1,1-Dichloroethene	ND	ug/L	10.0	10		01/30/20 12:25	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	10.0	10		01/30/20 12:25	156-59-2	
Methylene Chloride	ND	ug/L	10.0	10		01/30/20 12:25	75-09-2	
Tetrachloroethene	ND	ug/L	10.0	10		01/30/20 12:25	127-18-4	
Trichloroethene	**888**	ug/L	10.0	10		01/30/20 12:25	79-01-6	
Vinyl chloride	ND	ug/L	10.0	10		01/30/20 12:25	75-01-4	
Surrogates								
Dibromofluoromethane (S)	97	%.	72-126	10		01/30/20 12:25	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	68-124	10		01/30/20 12:25	460-00-4	
Toluene-d8 (S)	98	%.	79-119	10		01/30/20 12:25	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-206 **Lab ID: 20139691035** Collected: 01/20/20 10:15 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/30/20 12:43	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/30/20 12:43	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/30/20 12:43	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/30/20 12:43	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/30/20 12:43	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/30/20 12:43	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/30/20 12:43	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/30/20 12:43	127-18-4	
Trichloroethene	**45.9**	ug/L	1.0	1		01/30/20 12:43	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/30/20 12:43	75-01-4	
Surrogates								
Dibromofluoromethane (S)	98	%.	72-126	1		01/30/20 12:43	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	68-124	1		01/30/20 12:43	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		01/30/20 12:43	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-206 DUP **Lab ID: 20139691036** Collected: 01/20/20 10:15 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/29/20 23:46	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/29/20 23:46	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/29/20 23:46	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/29/20 23:46	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/29/20 23:46	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/29/20 23:46	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/29/20 23:46	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/29/20 23:46	127-18-4	
Trichloroethene	**45.1**	ug/L	1.0	1		01/29/20 23:46	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/29/20 23:46	75-01-4	
Surrogates								
Dibromofluoromethane (S)	94	%.	72-126	1		01/29/20 23:46	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	1		01/29/20 23:46	460-00-4	
Toluene-d8 (S)	100	%.	79-119	1		01/29/20 23:46	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-129 **Lab ID: 20139691037** Collected: 01/20/20 12:23 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/30/20 00:04	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/30/20 00:04	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/30/20 00:04	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/30/20 00:04	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/30/20 00:04	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/30/20 00:04	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/30/20 00:04	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/30/20 00:04	127-18-4	
Trichloroethene	**48.3**	ug/L	1.0	1		01/30/20 00:04	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/30/20 00:04	75-01-4	
Surrogates								
Dibromofluoromethane (S)	96	%.	72-126	1		01/30/20 00:04	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	68-124	1		01/30/20 00:04	460-00-4	
Toluene-d8 (S)	98	%.	79-119	1		01/30/20 00:04	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-216 **Lab ID: 20139691038** Collected: 01/20/20 14:31 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/30/20 00:22	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/30/20 00:22	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/30/20 00:22	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/30/20 00:22	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/30/20 00:22	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/30/20 00:22	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/30/20 00:22	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/30/20 00:22	127-18-4	
Trichloroethene	**10.0**	ug/L	1.0	1		01/30/20 00:22	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/30/20 00:22	75-01-4	
Surrogates								
Dibromofluoromethane (S)	96	%.	72-126	1		01/30/20 00:22	1868-53-7	
4-Bromofluorobenzene (S)	104	%.	68-124	1		01/30/20 00:22	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		01/30/20 00:22	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-216 1 VOL **Lab ID: 20139691039** Collected: 01/20/20 13:51 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/30/20 00:40	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/30/20 00:40	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/30/20 00:40	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/30/20 00:40	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/30/20 00:40	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/30/20 00:40	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/30/20 00:40	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/30/20 00:40	127-18-4	
Trichloroethene	**10.3**	ug/L	1.0	1		01/30/20 00:40	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/30/20 00:40	75-01-4	
Surrogates								
Dibromofluoromethane (S)	95	%.	72-126	1		01/30/20 00:40	1868-53-7	
4-Bromofluorobenzene (S)	103	%.	68-124	1		01/30/20 00:40	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		01/30/20 00:40	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-229 **Lab ID: 20139691040** Collected: 01/20/20 12:30 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/30/20 00:57	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/30/20 00:57	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/30/20 00:57	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/30/20 00:57	75-34-3	
1,1-Dichloroethene	**1.1**	ug/L	1.0	1		01/30/20 00:57	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/30/20 00:57	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/30/20 00:57	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/30/20 00:57	127-18-4	
Trichloroethene	**171**	ug/L	5.0	5		01/30/20 13:01	79-01-6	D4
Vinyl chloride	ND	ug/L	1.0	1		01/30/20 00:57	75-01-4	
Surrogates								
Dibromofluoromethane (S)	95	%.	72-126	1		01/30/20 00:57	1868-53-7	
Dibromofluoromethane (S)	95	%.	72-126	5		01/30/20 13:01	1868-53-7	
4-Bromofluorobenzene (S)	105	%.	68-124	1		01/30/20 00:57	460-00-4	
4-Bromofluorobenzene (S)	104	%.	68-124	5		01/30/20 13:01	460-00-4	
Toluene-d8 (S)	99	%.	79-119	1		01/30/20 00:57	2037-26-5	
Toluene-d8 (S)	99	%.	79-119	5		01/30/20 13:01	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-155 **Lab ID: 20139691041** Collected: 01/21/20 09:40 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	1.0	1		01/31/20 15:42	56-23-5	
Chloroethane	ND	ug/L	1.0	1		01/31/20 15:42	75-00-3	
Chloroform	ND	ug/L	1.0	1		01/31/20 15:42	67-66-3	
1,1-Dichloroethane	ND	ug/L	1.0	1		01/31/20 15:42	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		01/31/20 15:42	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		01/31/20 15:42	156-59-2	
Methylene Chloride	ND	ug/L	1.0	1		01/31/20 15:42	75-09-2	
Tetrachloroethene	ND	ug/L	1.0	1		01/31/20 15:42	127-18-4	
Trichloroethene	ND	ug/L	1.0	1		01/31/20 15:42	79-01-6	
Vinyl chloride	ND	ug/L	1.0	1		01/31/20 15:42	75-01-4	
Surrogates								
Dibromofluoromethane (S)	99	%.	72-126	1		01/31/20 15:42	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	1		01/31/20 15:42	460-00-4	
Toluene-d8 (S)	96	%.	79-119	1		01/31/20 15:42	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-135A DUO 1 VOL **Lab ID: 20139691042** Collected: 01/23/20 09:40 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	5.0	5		02/06/20 15:02	56-23-5	D4
Chloroethane	ND	ug/L	5.0	5		02/06/20 15:02	75-00-3	
Chloroform	ND	ug/L	5.0	5		02/06/20 15:02	67-66-3	
1,1-Dichloroethane	ND	ug/L	5.0	5		02/06/20 15:02	75-34-3	
1,1-Dichloroethene	**6.1**	ug/L	5.0	5		02/06/20 15:02	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	5		02/06/20 15:02	156-59-2	
Methylene Chloride	ND	ug/L	5.0	5		02/06/20 15:02	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	5		02/06/20 15:02	127-18-4	
Trichloroethene	**666**	ug/L	5.0	5		02/06/20 15:02	79-01-6	
Vinyl chloride	ND	ug/L	5.0	5		02/06/20 15:02	75-01-4	
Surrogates								
Dibromofluoromethane (S)	104	%.	72-126	5		02/06/20 15:02	1868-53-7	
4-Bromofluorobenzene (S)	100	%.	68-124	5		02/06/20 15:02	460-00-4	
Toluene-d8 (S)	96	%.	79-119	5		02/06/20 15:02	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-153 1 VOL **Lab ID: 20139691043** Collected: 01/21/20 11:15 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	5.0	5		01/31/20 14:48	56-23-5	D4
Chloroethane	ND	ug/L	5.0	5		01/31/20 14:48	75-00-3	
Chloroform	ND	ug/L	5.0	5		01/31/20 14:48	67-66-3	
1,1-Dichloroethane	ND	ug/L	5.0	5		01/31/20 14:48	75-34-3	
1,1-Dichloroethene	ND	ug/L	5.0	5		01/31/20 14:48	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	5		01/31/20 14:48	156-59-2	
Methylene Chloride	ND	ug/L	5.0	5		01/31/20 14:48	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	5		01/31/20 14:48	127-18-4	
Trichloroethene	**358**	ug/L	5.0	5		01/31/20 14:48	79-01-6	
Vinyl chloride	ND	ug/L	5.0	5		01/31/20 14:48	75-01-4	
Surrogates								
Dibromofluoromethane (S)	100	%.	72-126	5		01/31/20 14:48	1868-53-7	
4-Bromofluorobenzene (S)	106	%.	68-124	5		01/31/20 14:48	460-00-4	
Toluene-d8 (S)	98	%.	79-119	5		01/31/20 14:48	2037-26-5	

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ANALYTICAL RESULTS

Project: CBP/ C06-401
Pace Project No.: 20139691

Sample: MW-153 **Lab ID: 20139691044** Collected: 01/21/20 13:05 Received: 01/24/20 11:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 5030B/8260							
Carbon tetrachloride	ND	ug/L	5.0	5		01/31/20 16:37	56-23-5	D4
Chloroethane	ND	ug/L	5.0	5		01/31/20 16:37	75-00-3	
Chloroform	ND	ug/L	5.0	5		01/31/20 16:37	67-66-3	
1,1-Dichloroethane	ND	ug/L	5.0	5		01/31/20 16:37	75-34-3	
1,1-Dichloroethene	ND	ug/L	5.0	5		01/31/20 16:37	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	5		01/31/20 16:37	156-59-2	
Methylene Chloride	ND	ug/L	5.0	5		01/31/20 16:37	75-09-2	
Tetrachloroethene	ND	ug/L	5.0	5		01/31/20 16:37	127-18-4	
Trichloroethene	**331**	ug/L	5.0	5		01/31/20 16:37	79-01-6	
Vinyl chloride	ND	ug/L	5.0	5		01/31/20 16:37	75-01-4	
Surrogates								
Dibromofluoromethane (S)	96	%.	72-126	5		01/31/20 16:37	1868-53-7	
4-Bromofluorobenzene (S)	101	%.	68-124	5		01/31/20 16:37	460-00-4	
Toluene-d8 (S)	97	%.	79-119	5		01/31/20 16:37	2037-26-5	

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

QC Batch: 173517 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20139691031, 20139691032, 20139691033, 20139691034, 20139691035, 20139691036, 20139691037, 20139691038, 20139691039, 20139691040

METHOD BLANK: 789015 Matrix: Water
Associated Lab Samples: 20139691031, 20139691032, 20139691033, 20139691034, 20139691035, 20139691036, 20139691037, 20139691038, 20139691039, 20139691040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/29/20 19:39	
1,1-Dichloroethene	ug/L	ND	1.0	01/29/20 19:39	
Carbon tetrachloride	ug/L	ND	1.0	01/29/20 19:39	
Chloroethane	ug/L	ND	1.0	01/29/20 19:39	
Chloroform	ug/L	ND	1.0	01/29/20 19:39	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/29/20 19:39	
Methylene Chloride	ug/L	ND	1.0	01/29/20 19:39	
Tetrachloroethene	ug/L	ND	1.0	01/29/20 19:39	
Trichloroethene	ug/L	ND	1.0	01/29/20 19:39	
Vinyl chloride	ug/L	ND	1.0	01/29/20 19:39	
4-Bromofluorobenzene (S)	%.	103	68-124	01/29/20 19:39	
Dibromofluoromethane (S)	%.	95	72-126	01/29/20 19:39	
Toluene-d8 (S)	%.	100	79-119	01/29/20 19:39	

METHOD BLANK: 789295 Matrix: Water
Associated Lab Samples: 20139691031, 20139691032, 20139691033, 20139691034, 20139691035, 20139691036, 20139691037, 20139691038, 20139691039, 20139691040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/30/20 09:47	
1,1-Dichloroethene	ug/L	ND	1.0	01/30/20 09:47	
Carbon tetrachloride	ug/L	ND	1.0	01/30/20 09:47	
Chloroethane	ug/L	ND	1.0	01/30/20 09:47	
Chloroform	ug/L	ND	1.0	01/30/20 09:47	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/30/20 09:47	
Methylene Chloride	ug/L	ND	1.0	01/30/20 09:47	
Tetrachloroethene	ug/L	ND	1.0	01/30/20 09:47	
Trichloroethene	ug/L	ND	1.0	01/30/20 09:47	
Vinyl chloride	ug/L	ND	1.0	01/30/20 09:47	
4-Bromofluorobenzene (S)	%.	106	68-124	01/30/20 09:47	
Dibromofluoromethane (S)	%.	96	72-126	01/30/20 09:47	
Toluene-d8 (S)	%.	99	79-119	01/30/20 09:47	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

METHOD BLANK: 789847 Matrix: Water

Associated Lab Samples: 20139691031, 20139691032, 20139691033, 20139691034, 20139691035, 20139691036, 20139691037, 20139691038, 20139691039, 20139691040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/31/20 10:12	
1,1-Dichloroethene	ug/L	ND	1.0	01/31/20 10:12	
Carbon tetrachloride	ug/L	ND	1.0	01/31/20 10:12	
Chloroethane	ug/L	ND	1.0	01/31/20 10:12	
Chloroform	ug/L	ND	1.0	01/31/20 10:12	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/31/20 10:12	
Methylene Chloride	ug/L	ND	1.0	01/31/20 10:12	
Tetrachloroethene	ug/L	ND	1.0	01/31/20 10:12	
Trichloroethene	ug/L	ND	1.0	01/31/20 10:12	
Vinyl chloride	ug/L	ND	1.0	01/31/20 10:12	
4-Bromofluorobenzene (S)	%.	102	68-124	01/31/20 10:12	
Dibromofluoromethane (S)	%.	94	72-126	01/31/20 10:12	
Toluene-d8 (S)	%.	98	79-119	01/31/20 10:12	

LABORATORY CONTROL SAMPLE: 789016

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	45.6	91	63-129	
1,1-Dichloroethene	ug/L	50	48.0	96	51-139	
Carbon tetrachloride	ug/L	50	49.9	100	54-144	
Chloroethane	ug/L	50	40.6	81	17-195	
Chloroform	ug/L	50	47.1	94	73-134	
cis-1,2-Dichloroethene	ug/L	50	49.6	99	68-129	
Methylene Chloride	ug/L	50	47.2	94	46-168	
Tetrachloroethene	ug/L	50	51.7	103	46-157	
Trichloroethene	ug/L	50	50.8	102	67-132	
Vinyl chloride	ug/L	50	41.4	83	27-149	
4-Bromofluorobenzene (S)	%.			105	68-124	
Dibromofluoromethane (S)	%.			94	72-126	
Toluene-d8 (S)	%.			100	79-119	

LABORATORY CONTROL SAMPLE: 789296

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	47.4	95	63-129	
1,1-Dichloroethene	ug/L	50	50.2	100	51-139	
Carbon tetrachloride	ug/L	50	54.0	108	54-144	
Chloroethane	ug/L	50	41.5	83	17-195	
Chloroform	ug/L	50	48.5	97	73-134	
cis-1,2-Dichloroethene	ug/L	50	50.7	101	68-129	
Methylene Chloride	ug/L	50	47.6	95	46-168	
Tetrachloroethene	ug/L	50	54.0	108	46-157	

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

LABORATORY CONTROL SAMPLE: 789296

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Trichloroethene	ug/L	50	52.2	104	67-132	
Vinyl chloride	ug/L	50	42.8	86	27-149	
4-Bromofluorobenzene (S)	%.			104	68-124	
Dibromofluoromethane (S)	%.			96	72-126	
Toluene-d8 (S)	%.			99	79-119	

LABORATORY CONTROL SAMPLE: 789848

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	44.3	89	63-129	
1,1-Dichloroethene	ug/L	50	48.0	96	51-139	
Carbon tetrachloride	ug/L	50	53.9	108	54-144	
Chloroethane	ug/L	50	39.3	79	17-195	
Chloroform	ug/L	50	46.8	94	73-134	
cis-1,2-Dichloroethene	ug/L	50	47.4	95	68-129	
Methylene Chloride	ug/L	50	43.3	87	46-168	
Tetrachloroethene	ug/L	50	53.8	108	46-157	
Trichloroethene	ug/L	50	52.1	104	67-132	
Vinyl chloride	ug/L	50	38.7	77	27-149	
4-Bromofluorobenzene (S)	%.			104	68-124	
Dibromofluoromethane (S)	%.			94	72-126	
Toluene-d8 (S)	%.			97	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 789293 789294

Parameter	Units	20139761004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	51.5	51.3	103	103	59-133	0	20	
1,1-Dichloroethene	ug/L	ND	50	50	56.9	55.5	114	111	44-146	2	20	
Carbon tetrachloride	ug/L	ND	50	50	61.3	60.4	123	121	48-146	2	20	
Chloroethane	ug/L	ND	50	50	45.5	44.9	91	90	12-192	1	20	
Chloroform	ug/L	ND	50	50	53.3	52.1	107	104	66-143	2	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	55.5	54.6	111	109	56-141	2	20	
Methylene Chloride	ug/L	ND	50	50	50.7	49.9	101	100	45-166	2	20	
Tetrachloroethene	ug/L	ND	50	50	59.5	58.7	119	117	48-143	1	20	
Trichloroethene	ug/L	ND	50	50	59.2	55.7	118	111	58-140	6	20	
Vinyl chloride	ug/L	ND	50	50	49.1	47.8	98	96	21-150	3	20	
4-Bromofluorobenzene (S)	%.						104	108	68-124			
Dibromofluoromethane (S)	%.						98	99	72-126			
Toluene-d8 (S)	%.						98	99	79-119			

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

QC Batch: 173729 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20139691012, 20139691013, 20139691014, 20139691015, 20139691016, 20139691017, 20139691018, 20139691019, 20139691020, 20139691041, 20139691043, 20139691044

METHOD BLANK: 790025 Matrix: Water
Associated Lab Samples: 20139691012, 20139691013, 20139691014, 20139691015, 20139691016, 20139691017, 20139691018, 20139691019, 20139691020, 20139691041, 20139691043, 20139691044

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	01/31/20 10:33	
1,1-Dichloroethene	ug/L	ND	1.0	01/31/20 10:33	
Carbon tetrachloride	ug/L	ND	1.0	01/31/20 10:33	
Chloroethane	ug/L	ND	1.0	01/31/20 10:33	
Chloroform	ug/L	ND	1.0	01/31/20 10:33	
cis-1,2-Dichloroethene	ug/L	ND	1.0	01/31/20 10:33	
Methylene Chloride	ug/L	ND	1.0	01/31/20 10:33	
Tetrachloroethene	ug/L	ND	1.0	01/31/20 10:33	
Trichloroethene	ug/L	ND	1.0	01/31/20 10:33	
Vinyl chloride	ug/L	ND	1.0	01/31/20 10:33	
4-Bromofluorobenzene (S)	%.	103	68-124	01/31/20 10:33	
Dibromofluoromethane (S)	%.	95	72-126	01/31/20 10:33	
Toluene-d8 (S)	%.	96	79-119	01/31/20 10:33	

LABORATORY CONTROL SAMPLE: 790026

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	40.9	82	63-129	
1,1-Dichloroethene	ug/L	50	51.5	103	51-139	
Carbon tetrachloride	ug/L	50	56.3	113	54-144	
Chloroethane	ug/L	50	47.9	96	17-195	
Chloroform	ug/L	50	45.3	91	73-134	
cis-1,2-Dichloroethene	ug/L	50	43.9	88	68-129	
Methylene Chloride	ug/L	50	48.5	97	46-168	
Tetrachloroethene	ug/L	50	58.0	116	46-157	
Trichloroethene	ug/L	50	51.6	103	67-132	
Vinyl chloride	ug/L	50	42.9	86	27-149	
4-Bromofluorobenzene (S)	%.			104	68-124	
Dibromofluoromethane (S)	%.			95	72-126	
Toluene-d8 (S)	%.			97	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 790027 790028

Parameter	Units	20139691012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	42.7	45.1	85	90	59-133	5	20	
1,1-Dichloroethene	ug/L	ND	50	50	53.7	57.6	107	115	44-146	7	20	

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 790027 790028

Parameter	Units	20139691012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Carbon tetrachloride	ug/L	ND	50	50	58.3	60.6	117	121	48-146	4	20	
Chloroethane	ug/L	ND	50	50	52.4	54.0	105	108	12-192	3	20	
Chloroform	ug/L	ND	50	50	46.3	48.6	93	97	66-143	5	20	
cis-1,2-Dichloroethene	ug/L	7.5	50	50	52.0	56.5	89	98	56-141	8	20	
Methylene Chloride	ug/L	ND	50	50	48.4	52.3	97	105	45-166	8	20	
Tetrachloroethene	ug/L	ND	50	50	58.5	59.8	117	120	48-143	2	20	
Trichloroethene	ug/L	ND	50	50	52.3	55.1	105	110	58-140	5	20	
Vinyl chloride	ug/L	ND	50	50	48.5	48.4	96	96	21-150	0	20	
4-Bromofluorobenzene (S)	%.						101	104	68-124			
Dibromofluoromethane (S)	%.						95	96	72-126			
Toluene-d8 (S)	%.						97	96	79-119			

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

QC Batch: 173941 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20139691011, 20139691022

METHOD BLANK: 790987 Matrix: Water
Associated Lab Samples: 20139691011, 20139691022

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	02/03/20 15:15	
1,1-Dichloroethene	ug/L	ND	1.0	02/03/20 15:15	
Carbon tetrachloride	ug/L	ND	1.0	02/03/20 15:15	
Chloroethane	ug/L	ND	1.0	02/03/20 15:15	
Chloroform	ug/L	ND	1.0	02/03/20 15:15	
cis-1,2-Dichloroethene	ug/L	ND	1.0	02/03/20 15:15	
Methylene Chloride	ug/L	ND	1.0	02/03/20 15:15	
Tetrachloroethene	ug/L	ND	1.0	02/03/20 15:15	
Trichloroethene	ug/L	ND	1.0	02/03/20 15:15	
Vinyl chloride	ug/L	ND	1.0	02/03/20 15:15	
4-Bromofluorobenzene (S)	%.	102	68-124	02/03/20 15:15	
Dibromofluoromethane (S)	%.	104	72-126	02/03/20 15:15	
Toluene-d8 (S)	%.	100	79-119	02/03/20 15:15	

LABORATORY CONTROL SAMPLE: 790988

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	47.5	95	63-129	
1,1-Dichloroethene	ug/L	50	59.6	119	51-139	
Carbon tetrachloride	ug/L	50	60.4	121	54-144	
Chloroethane	ug/L	50	53.9	108	17-195	
Chloroform	ug/L	50	49.8	100	73-134	
cis-1,2-Dichloroethene	ug/L	50	48.3	97	68-129	
Methylene Chloride	ug/L	50	54.3	109	46-168	
Tetrachloroethene	ug/L	50	57.1	114	46-157	
Trichloroethene	ug/L	50	54.9	110	67-132	
Vinyl chloride	ug/L	50	48.2	96	27-149	
4-Bromofluorobenzene (S)	%.			101	68-124	
Dibromofluoromethane (S)	%.			100	72-126	
Toluene-d8 (S)	%.			99	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 790989 790990

Parameter	Units	20139691011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	49.7	48.8	99	98	59-133	2	20	
1,1-Dichloroethene	ug/L	ND	50	50	62.1	59.7	124	119	44-146	4	20	
Carbon tetrachloride	ug/L	ND	50	50	62.6	61.3	125	123	48-146	2	20	

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 790989 790990

Parameter	Units	20139691011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloroethane	ug/L	ND	50	50	59.6	56.3	119	113	12-192	6	20	
Chloroform	ug/L	ND	50	50	51.9	50.9	104	102	66-143	2	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	51.1	50.8	102	102	56-141	1	20	
Methylene Chloride	ug/L	ND	50	50	60.6	63.2	121	126	45-166	4	20	
Tetrachloroethene	ug/L	ND	50	50	58.0	60.9	116	122	48-143	5	20	
Trichloroethene	ug/L	ND	50	50	56.8	54.4	114	109	58-140	4	20	
Vinyl chloride	ug/L	ND	50	50	53.7	51.5	107	103	21-150	4	20	
4-Bromofluorobenzene (S)	%.						104	103	68-124			
Dibromofluoromethane (S)	%.						101	102	72-126			
Toluene-d8 (S)	%.						100	98	79-119			

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

QC Batch: 174098 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20139691023, 20139691024, 20139691025, 20139691026, 20139691027, 20139691028

METHOD BLANK: 791824 Matrix: Water
Associated Lab Samples: 20139691023, 20139691024, 20139691025, 20139691026, 20139691027, 20139691028

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	02/04/20 19:28	
1,1-Dichloroethene	ug/L	ND	1.0	02/04/20 19:28	
Carbon tetrachloride	ug/L	ND	1.0	02/04/20 19:28	
Chloroethane	ug/L	ND	1.0	02/04/20 19:28	
Chloroform	ug/L	ND	1.0	02/04/20 19:28	
cis-1,2-Dichloroethene	ug/L	ND	1.0	02/04/20 19:28	
Methylene Chloride	ug/L	ND	1.0	02/04/20 19:28	
Tetrachloroethene	ug/L	ND	1.0	02/04/20 19:28	
Trichloroethene	ug/L	ND	1.0	02/04/20 19:28	
Vinyl chloride	ug/L	ND	1.0	02/04/20 19:28	
4-Bromofluorobenzene (S)	%.	105	68-124	02/04/20 19:28	
Dibromofluoromethane (S)	%.	98	72-126	02/04/20 19:28	
Toluene-d8 (S)	%.	98	79-119	02/04/20 19:28	

LABORATORY CONTROL SAMPLE: 791825

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	46.1	92	63-129	
1,1-Dichloroethene	ug/L	50	56.0	112	51-139	
Carbon tetrachloride	ug/L	50	58.3	117	54-144	
Chloroethane	ug/L	50	51.9	104	17-195	
Chloroform	ug/L	50	48.2	96	73-134	
cis-1,2-Dichloroethene	ug/L	50	46.0	92	68-129	
Methylene Chloride	ug/L	50	52.8	106	46-168	
Tetrachloroethene	ug/L	50	55.7	111	46-157	
Trichloroethene	ug/L	50	52.5	105	67-132	
Vinyl chloride	ug/L	50	46.4	93	27-149	
4-Bromofluorobenzene (S)	%.			102	68-124	
Dibromofluoromethane (S)	%.			95	72-126	
Toluene-d8 (S)	%.			98	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 791826 791827

Parameter	Units	20139691023 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	47.9	46.1	96	92	59-133	4	20	
1,1-Dichloroethene	ug/L	ND	50	50	60.8	58.4	122	117	44-146	4	20	
Carbon tetrachloride	ug/L	ND	50	50	60.3	58.2	121	116	48-146	4	20	

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 791826 791827

Parameter	Units	20139691023 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloroethane	ug/L	ND	50	50	55.2	52.3	110	105	12-192	5	20	
Chloroform	ug/L	ND	50	50	49.9	48.2	100	96	66-143	3	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	50.4	47.8	101	96	56-141	5	20	
Methylene Chloride	ug/L	ND	50	50	54.6	53.9	109	108	45-166	1	20	
Tetrachloroethene	ug/L	ND	50	50	57.7	57.5	115	115	48-143	0	20	
Trichloroethene	ug/L	ND	50	50	54.6	52.7	109	105	58-140	3	20	
Vinyl chloride	ug/L	ND	50	50	50.5	48.1	101	96	21-150	5	20	
4-Bromofluorobenzene (S)	%.						100	102	68-124			
Dibromofluoromethane (S)	%.						99	94	72-126			
Toluene-d8 (S)	%.						98	96	79-119			

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

QC Batch: 174224 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20139691029, 20139691030

METHOD BLANK: 792661 Matrix: Water
Associated Lab Samples: 20139691029, 20139691030

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	02/05/20 11:11	
1,1-Dichloroethene	ug/L	ND	1.0	02/05/20 11:11	
Carbon tetrachloride	ug/L	ND	1.0	02/05/20 11:11	
Chloroethane	ug/L	ND	1.0	02/05/20 11:11	
Chloroform	ug/L	ND	1.0	02/05/20 11:11	
cis-1,2-Dichloroethene	ug/L	ND	1.0	02/05/20 11:11	
Methylene Chloride	ug/L	ND	1.0	02/05/20 11:11	
Tetrachloroethene	ug/L	ND	1.0	02/05/20 11:11	
Trichloroethene	ug/L	ND	1.0	02/05/20 11:11	
Vinyl chloride	ug/L	ND	1.0	02/05/20 11:11	
4-Bromofluorobenzene (S)	%.	101	68-124	02/05/20 11:11	
Dibromofluoromethane (S)	%.	99	72-126	02/05/20 11:11	
Toluene-d8 (S)	%.	96	79-119	02/05/20 11:11	

LABORATORY CONTROL SAMPLE: 792662

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	43.7	87	63-129	
1,1-Dichloroethene	ug/L	50	51.7	103	51-139	
Carbon tetrachloride	ug/L	50	55.6	111	54-144	
Chloroethane	ug/L	50	50.0	100	17-195	
Chloroform	ug/L	50	45.4	91	73-134	
cis-1,2-Dichloroethene	ug/L	50	43.4	87	68-129	
Methylene Chloride	ug/L	50	49.5	99	46-168	
Tetrachloroethene	ug/L	50	54.4	109	46-157	
Trichloroethene	ug/L	50	50.9	102	67-132	
Vinyl chloride	ug/L	50	42.4	85	27-149	
4-Bromofluorobenzene (S)	%.			103	68-124	
Dibromofluoromethane (S)	%.			93	72-126	
Toluene-d8 (S)	%.			97	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 792663 792664

Parameter	Units	20139655003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	44.5	48.1	89	96	59-133	8	20	
1,1-Dichloroethene	ug/L	ND	50	50	55.7	57.4	111	115	44-146	3	20	
Carbon tetrachloride	ug/L	ND	50	50	57.7	62.1	115	124	48-146	7	20	

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251-344-9106

QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 792663 792664

Parameter	Units	20139655003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloroethane	ug/L	ND	50	50	50.4	56.1	101	112	12-192	11	20	
Chloroform	ug/L	ND	50	50	46.1	50.2	92	100	66-143	9	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	46.7	50.4	93	101	56-141	8	20	
Methylene Chloride	ug/L	ND	50	50	51.1	56.1	102	112	45-166	9	20	
Tetrachloroethene	ug/L	ND	50	50	52.9	63.4	106	127	48-143	18	20	
Trichloroethene	ug/L	ND	50	50	50.7	55.4	101	111	58-140	9	20	
Vinyl chloride	ug/L	ND	50	50	43.4	46.6	87	93	21-150	7	20	
4-Bromofluorobenzene (S)	%.						100	105	68-124			
Dibromofluoromethane (S)	%.						99	97	72-126			
Toluene-d8 (S)	%.						99	98	79-119			

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

QC Batch: 174266 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20139691003, 20139691004, 20139691005, 20139691006, 20139691007, 20139691008, 20139691009, 20139691010, 20139691021

METHOD BLANK: 792879 Matrix: Water
Associated Lab Samples: 20139691003, 20139691004, 20139691005, 20139691006, 20139691007, 20139691008, 20139691009, 20139691010, 20139691021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	02/05/20 17:15	
1,1-Dichloroethene	ug/L	ND	1.0	02/05/20 17:15	
Carbon tetrachloride	ug/L	ND	1.0	02/05/20 17:15	
Chloroethane	ug/L	ND	1.0	02/05/20 17:15	
Chloroform	ug/L	ND	1.0	02/05/20 17:15	
cis-1,2-Dichloroethene	ug/L	ND	1.0	02/05/20 17:15	
Methylene Chloride	ug/L	ND	1.0	02/05/20 17:15	
Tetrachloroethene	ug/L	ND	1.0	02/05/20 17:15	
Trichloroethene	ug/L	ND	1.0	02/05/20 17:15	
Vinyl chloride	ug/L	ND	1.0	02/05/20 17:15	
4-Bromofluorobenzene (S)	%.	102	68-124	02/05/20 17:15	
Dibromofluoromethane (S)	%.	102	72-126	02/05/20 17:15	
Toluene-d8 (S)	%.	96	79-119	02/05/20 17:15	

LABORATORY CONTROL SAMPLE: 792880

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	45.8	92	63-129	
1,1-Dichloroethene	ug/L	50	57.9	116	51-139	
Carbon tetrachloride	ug/L	50	56.0	112	54-144	
Chloroethane	ug/L	50	56.5	113	17-195	
Chloroform	ug/L	50	49.2	98	73-134	
cis-1,2-Dichloroethene	ug/L	50	47.2	94	68-129	
Methylene Chloride	ug/L	50	54.0	108	46-168	
Tetrachloroethene	ug/L	50	53.2	106	46-157	
Trichloroethene	ug/L	50	51.2	102	67-132	
Vinyl chloride	ug/L	50	50.9	102	27-149	
4-Bromofluorobenzene (S)	%.			100	68-124	
Dibromofluoromethane (S)	%.			101	72-126	
Toluene-d8 (S)	%.			99	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 792881 792882

Parameter	Units	20140307001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	46.3	50.6	93	101	59-133	9	20	
1,1-Dichloroethene	ug/L	ND	50	50	59.5	65.4	119	131	44-146	9	20	

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 792881 792882

Parameter	Units	20140307001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Carbon tetrachloride	ug/L	ND	50	50	59.9	63.8	120	128	48-146	6	20	
Chloroethane	ug/L	ND	50	50	55.7	63.6	111	127	12-192	13	20	
Chloroform	ug/L	ND	50	50	48.6	53.1	97	106	66-143	9	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	47.7	51.5	95	103	56-141	8	20	
Methylene Chloride	ug/L	ND	50	50	53.1	65.4	106	131	45-166	21	20	R1
Tetrachloroethene	ug/L	ND	50	50	55.7	58.8	111	118	48-143	5	20	
Trichloroethene	ug/L	ND	50	50	53.4	56.1	107	112	58-140	5	20	
Vinyl chloride	ug/L	ND	50	50	51.6	56.0	103	112	21-150	8	20	
4-Bromofluorobenzene (S)	%.						100	102	68-124			
Dibromofluoromethane (S)	%.						97	101	72-126			
Toluene-d8 (S)	%.						97	98	79-119			

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

QC Batch: 174397 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 20139691001, 20139691002, 20139691042

METHOD BLANK: 793735 Matrix: Water
Associated Lab Samples: 20139691001, 20139691002, 20139691042

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethane	ug/L	ND	1.0	02/06/20 14:25	
1,1-Dichloroethene	ug/L	ND	1.0	02/06/20 14:25	
Carbon tetrachloride	ug/L	ND	1.0	02/06/20 14:25	
Chloroethane	ug/L	ND	1.0	02/06/20 14:25	
Chloroform	ug/L	ND	1.0	02/06/20 14:25	
cis-1,2-Dichloroethene	ug/L	ND	1.0	02/06/20 14:25	
Methylene Chloride	ug/L	ND	1.0	02/06/20 14:25	
Tetrachloroethene	ug/L	ND	1.0	02/06/20 14:25	
Trichloroethene	ug/L	ND	1.0	02/06/20 14:25	
Vinyl chloride	ug/L	ND	1.0	02/06/20 14:25	
4-Bromofluorobenzene (S)	%.	105	68-124	02/06/20 14:25	
Dibromofluoromethane (S)	%.	101	72-126	02/06/20 14:25	
Toluene-d8 (S)	%.	98	79-119	02/06/20 14:25	

LABORATORY CONTROL SAMPLE: 793736

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethane	ug/L	50	47.7	95	63-129	
1,1-Dichloroethene	ug/L	50	57.9	116	51-139	
Carbon tetrachloride	ug/L	50	57.5	115	54-144	
Chloroethane	ug/L	50	59.9	120	17-195	
Chloroform	ug/L	50	49.7	99	73-134	
cis-1,2-Dichloroethene	ug/L	50	49.3	99	68-129	
Methylene Chloride	ug/L	50	55.9	112	46-168	
Tetrachloroethene	ug/L	50	55.7	111	46-157	
Trichloroethene	ug/L	50	52.5	105	67-132	
Vinyl chloride	ug/L	50	51.5	103	27-149	
4-Bromofluorobenzene (S)	%.			99	68-124	
Dibromofluoromethane (S)	%.			98	72-126	
Toluene-d8 (S)	%.			98	79-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 793737 793738

Parameter	Units	20140460001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethane	ug/L	ND	50	50	48.0	48.8	96	98	59-133	2	20	
1,1-Dichloroethene	ug/L	ND	50	50	60.4	62.5	121	125	44-146	3	20	
Carbon tetrachloride	ug/L	ND	50	50	59.2	58.6	118	117	48-146	1	20	

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QUALITY CONTROL DATA

Project: CBP/ C06-401
Pace Project No.: 20139691

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 793737 793738

Parameter	Units	20140460001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloroethane	ug/L	ND	50	50	60.9	61.0	122	122	12-192	0	20	
Chloroform	ug/L	ND	50	50	48.8	50.7	98	101	66-143	4	20	
cis-1,2-Dichloroethene	ug/L	ND	50	50	48.1	49.2	96	98	56-141	2	20	
Methylene Chloride	ug/L	ND	50	50	55.8	56.6	112	113	45-166	2	20	
Tetrachloroethene	ug/L	ND	50	50	54.4	56.0	109	112	48-143	3	20	
Trichloroethene	ug/L	0.00024J mg/L	50	50	54.9	52.6	109	105	58-140	4	20	
Vinyl chloride	ug/L	ND	50	50	55.9	55.5	112	111	21-150	1	20	
4-Bromofluorobenzene (S)	%.						99	102	68-124			
Dibromofluoromethane (S)	%.						100	99	72-126			
Toluene-d8 (S)	%.						98	94	79-119			

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QUALIFIERS

Project: CBP/ C06-401
Pace Project No.: 20139691

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

ANALYTE QUALIFIERS

D4	Sample was diluted due to the presence of high levels of target analytes.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CBP/ C06-401
Pace Project No.: 20139691

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
20139691001	TRIP	EPA 5030B/8260	174397		
20139691002	PURGEWATER	EPA 5030B/8260	174397		
20139691003	MW-135A	EPA 5030B/8260	174266		
20139691004	MW-135A 1 VOL	EPA 5030B/8260	174266		
20139691005	MW-135A DUP	EPA 5030B/8260	174266		
20139691006	MW-235B	EPA 5030B/8260	174266		
20139691007	MW-235B 1 VOL	EPA 5030B/8260	174266		
20139691008	MW-235C 1 VOL	EPA 5030B/8260	174266		
20139691009	MW-235C	EPA 5030B/8260	174266		
20139691010	MW-342	EPA 5030B/8260	174266		
20139691011	MW-340	EPA 5030B/8260	173941		
20139691012	MW-210	EPA 5030B/8260	173729		
20139691013	MW-210 DUP	EPA 5030B/8260	173729		
20139691014	MW-219	EPA 5030B/8260	173729		
20139691015	MW-223	EPA 5030B/8260	173729		
20139691016	MW-223 1 VOL	EPA 5030B/8260	173729		
20139691017	MW-232	EPA 5030B/8260	173729		
20139691018	MW-232 1 VOL	EPA 5030B/8260	173729		
20139691019	MW-109	EPA 5030B/8260	173729		
20139691020	MW-209	EPA 5030B/8260	173729		
20139691021	MW-339	EPA 5030B/8260	174266		
20139691022	MW-357	EPA 5030B/8260	173941		
20139691023	MW-457	EPA 5030B/8260	174098		
20139691024	MW-5A	EPA 5030B/8260	174098		
20139691025	MW-137A 1 VOL	EPA 5030B/8260	174098		
20139691026	MW-137A	EPA 5030B/8260	174098		
20139691027	MW-237 B 1 VOL	EPA 5030B/8260	174098		
20139691028	MW-237B	EPA 5030B/8260	174098		
20139691029	MW-237C 1 VOL	EPA 5030B/8260	174224		
20139691030	MW-237C	EPA 5030B/8260	174224		
20139691031	MW-156	EPA 5030B/8260	173517		
20139691032	MW-156 1 VOL	EPA 5030B/8260	173517		
20139691033	MW-259	EPA 5030B/8260	173517		
20139691034	MW-106	EPA 5030B/8260	173517		
20139691035	MW-206	EPA 5030B/8260	173517		
20139691036	MW-206 DUP	EPA 5030B/8260	173517		
20139691037	MW-129	EPA 5030B/8260	173517		
20139691038	MW-216	EPA 5030B/8260	173517		
20139691039	MW-216 1 VOL	EPA 5030B/8260	173517		
20139691040	MW-229	EPA 5030B/8260	173517		
20139691041	MW-155	EPA 5030B/8260	173729		
20139691042	MW-135A DUO 1 VOL	EPA 5030B/8260	174397		
20139691043	MW-153 1 VOL	EPA 5030B/8260	173729		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CBP/ C06-401
Pace Project No.: 20139691

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
20139691044	**MW-153**	EPA 5030B/8260	173729		

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CHAIN-OF-CUSTODY Analytical Request Document

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LAB USE ONLY- Affix Workorder/Login Label Here

WO# : 20139691

20139691

Company: SOUTHERN EARTH SCIENCES, INC.	Billing Information: SESI PO BOX 160745 MOBILE, AL 36616
Address: 5460 RANGELINE ROAD MOBILE, AL 36619	
Report To: ERIC GUARINO	Email To: EGUARINO@SOEARTH.COM
Copy To:	Site Collection Info/Address: CBP
Customer Project Name/Number: CBP/C06-401	State: AL / County/City: MONTGOMERY Time Zone Collected: [ ]PT [ ]MT [X]CT [ ]ET
Phone: 251-344-7711 Email:EGUARINO@SOEARTH.COM	Site/Facility ID #: Compliance Monitoring? [X] Yes [ ] No
Collected By (print): EAG/SK	Purchase Order # : Quote #: DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required: STANDARD Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [ ] Yes [X] No Analysis: _____

Container Preserva: 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: 8260 HALOGENATED
TRIP	GW	G	1/24/2020	700					2
PURGEWATER	GW	G	1/24/2020	630					3
MW-135A	GW	G	1/23/2020	1007					3
MW-135A 1 VOL	GW	G	1/23/2020	940					3
MW-135A DUP	GW	G	1/23/2020	1007					3
MW-235B	GW	G	1/23/2020	950					3
MW-235B 1 VOL	GW	G	1/23/2020	912					3
MW-235C 1 VOL	GW	G	1/23/2020	921					3
MW-235C	GW	G	1/23/2020	1015					3
MW-342	GW	G	1/23/2020	715					3

Lab Profile/Line:

Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N (NA)
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA
Residual Chlorine Present Y N NA
Cl Strips: _____
Sample pH Acceptable Y N NA
pH Strips: _____
Sulfide Present Y N NA
Lead Acetate Strips: _____

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y (N) N/A

Lab Tracking #:

Samples received via: FEDEX UPS (Client) Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y (N) NA
Therm ID#: IR-001
Cooler 1 Temp Upon Receipt: 1.8 oC
Cooler 1 Therm Corr. Factor: 0.0 oC
Cooler 1 Corrected Temp: 1.8 oC
Comments:

Relinquished by/Company: (Signature) CSESI	Date/Time: 1/24/20 1135	Received by/Company: (Signature) Molly SUN	Date/Time: 1/24/20 1135
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y (N) NA
HCL MeOH TSP Other

Non Conformance(s): YES / (NO)

Page: 1 of: 5

CHAIN-OF-CUSTODY Analytical Request Document

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LAB USE ONLY- Affi ... Lab Pace Workorder Number or

WO#: 20139691

PM: SLW Due Date: 02/07/20

CLIENT: MO-SES

ALL S

Company: SOUTHERN EARTH SCIENCES, INC.	Billing Information: SESI PO BOX 160745 MOBILE, AL 36616
Address: 5460 RANGELINE ROAD MOBILE, AL 36619	
Report To: ERIC GUARINO	Email To: EGUARINO@SOEARTH.COM
Copy To:	Site Collection Info/Address: CBP
Customer Project Name/Number: CBP/C06-401	State: AL / County/City: MONTGOMERY Time Zone Collected: [ ]PT [ ]MT [X]CT [ ]ET
Phone: 251-344-7711 Email:EGUARINO@SOEARTH.COM	Site/Facility ID #:
Collected By (print): EAG/SK	Purchase Order # : Quote #:
Collected By (signature):	Turnaround Date Required: STANDARD
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Compliance Monitoring? [X] Yes [ ] No

DW PWS ID #:

DW Location Code:

Immediately Packed on Ice: [X] Yes [ ] No

Field Filtered (if applicable): [ ] Yes [X] No

Analysis: _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Prese

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: 8260 HALOGENATED
MW-340	GW	G	1/22/2020	1035					3
MW-210	GW	G	1/21/2020	1540					3
MW-210 DUP	GW	G	1/21/2020	1540					3
MW-219	GW	G	1/21/2020	1500					3
MW-223	GW	G	1/21/2020	1100					3
MW-223 1 VOL	GW	G	1/21/2020	955					3
MW-232	GW	G	1/21/2020	1232					3
MW-232 1 VOL	GW	G	1/21/2020	1154					3
MW-109	GW	G	1/21/2020	1415					3
MW-209	GW	G	1/21/2020	1500					3

Lab Profile/Line:

Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N (NA)
Custody Signatures Present (Y) N NA
Collector Signature Present (Y) N NA
Bottles Intact (Y) N NA
Correct Bottles (Y) N NA
Sufficient Volume (Y) N NA
Samples Received on Ice (Y) N NA
VOA - Headspace Acceptable (Y) N NA
USDA Regulated Soils Y N (NA)
Samples in Holding Time (Y) N NA
Residual Chlorine Present Y N (NA)
Cl Strips: _____
Sample pH Acceptable Y N (NA)
pH Strips: _____
Sulfide Present Y N (NA)
Lead Acetate Strips: _____

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y (N) N/A

Lab Tracking #:

Samples received via: FEDEX UPS (Client) Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y (N) NA
Therm ID#: IR-001
Cooler 1 Temp Upon Receipt: 1.8 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 1.8 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time: 1/24/20 1135	Received by/Company: (Signature)	Date/Time: 1/24/20 1135
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y (N) NA
HCL MeOH TSP Other

Non Conformance(s): YES / (NO)

Page: 12 of: 15

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WO# : 20139691

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CLIENT: MO-SES

Company: SOUTHERN EARTH SCIENCES, INC.	Billing Information: SESI PO BOX 160745 MOBILE, AL 36616
Address: 5460 RANGELINE ROAD MOBILE, AL 36619	
Report To: ERIC GUARINO	Email To: EGUARINO@SOEARTH.COM
Copy To:	Site Collection Info/Address: CBP
Customer Project Name/Number: CBP/C06-401	State: AL / County/City: MONTGOMERY Time Zone Collected: [ ]PT [ ]MT [X]CT [ ]ET
Phone: 251-344-7711 Email:EGUARINO@SOEARTH.COM	Site/Facility ID #:
Collected By (print): EAG/SK	Purchase Order # : Quote #:
Collected By (signature):	Turnaround Date Required: STANDARD
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Compliance Monitoring? [X] Yes [ ] No

DW PWS ID #:

DW Location Code:

Immediately Packed on Ice: [X] Yes [ ] No

Field Filtered (if applicable): [ ] Yes [X] No

Analysis: _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Container Preserv **	Analyses: 8260 HALOGENATED
MW-339	GW	G	1/23/2020	700					3	3
MW-357	GW	G	1/22/2020	1115					3	3
MW-457	GW	G	1/22/2020	1215					3	3
MW-5A	GW	G	1/22/2020	805					3	3
MW-137A 1 VOL	GW	G	1/22/2020	1358					3	3
MW-137A	GW	G	1/22/2020	1440					3	3
MW-237B 1 VOL	GW	G	1/22/2020	1330					3	3
MW-237B	GW	G	1/22/2020	1415					3	3
MW-237C 1 VOL	GW	G	1/22/2020	1340					3	3
MW-237C	GW	G	1/22/2020	1455					3	3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y	N	NA
Custody Signatures Present	Y	N	NA
Collector Signature Present	Y	N	NA
Bottles Intact	Y	N	NA
Correct Bottles	Y	N	NA
Sufficient Volume	Y	N	NA
Samples Received on Ice	Y	N	NA
VOA - Headspace Acceptable	Y	N	NA
USDA Regulated Soils	Y	N	NA
Samples in Holding Time	Y	N	NA
Residual Chlorine Present	Y	N	NA
Cl Strips: _____			
Sample pH Acceptable	Y	N	NA
pH Strips: _____			
Sulfide Present	Y	N	NA
Lead Acetate Strips: _____			

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #:

Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: IR-001
Cooler 1 Temp Upon Receipt: 1.8 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 1.8 oC
Comments:

Relinquished by/Company: (Signature) EST	Date/Time: 1/24/20 1135	Received by/Company: (Signature)	Date/Time: 1/24/20 1135	MTJL LAB USE ONLY Table #:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Acctnum: Template: Prelogin:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	PM: PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 13 of: 15

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LAB USE ONLY- Affix ... Label Here or List Pace Workorder Number or

WO# : 20139691

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CLIENT: MO-SES

Company: SOUTHERN EARTH SCIENCES, INC.	Billing Information: SESI PO BOX 160745 MOBILE, AL 36616
Address: 5460 RANGELINE ROAD MOBILE, AL 36619	
Report To: ERIC GUARINO	Email To: EGUARINO@SOEARTH.COM
Copy To:	Site Collection Info/Address: CBP
Customer Project Name/Number: CBP/C06-401	State: AL / County/City: MONTGOMERY Time Zone Collected: [ ]PT [ ]MT [X]CT [ ]ET
Phone: 251-344-7711 Email:EGUARINO@SOEARTH.COM	Site/Facility ID #: Compliance Monitoring? [X] Yes [ ] No
Collected By (print): EAG/SK	Purchase Order # : Quote #: DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required: STANDARD Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [ ] Yes [X] No Analysis: _____

Container Preser: 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: 8260 HALOGENATED
MW-156	GW	G	1/20/2020	1620					3
MW-156 1 VOL	GW	G	1/20/2020	1440					3
MW-259	GW	G	1/20/2020	1310					3
MW-106	GW	G	1/20/2020	954					3
MW-206	GW	G	1/20/2020	1015					3
MW-206 DUP	GW	G	1/20/2020	1015					3
MW-129	GW	G	1/20/2020	1223					3
MW-216	GW	G	1/20/2020	1431					3
MW-216 1 VOL	GW	G	1/20/2020	1351					3
MW-229	GW	G	1/20/2020	1230					3

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y	N	NA
Custody Signatures Present	Y	N	NA
Collector Signature Present	Y	N	NA
Bottles Intact	Y	N	NA
Correct Bottles	Y	N	NA
Sufficient Volume	Y	N	NA
Samples Received on Ice	Y	N	NA
VOA - Headspace Acceptable	Y	N	NA
USDA Regulated Soils	Y	N	NA
Samples in Holding Time	Y	N	NA
Residual Chlorine Present	Y	N	NA
Cl Strips: _____			
Sample pH Acceptable	Y	N	NA
pH Strips: _____			
Sulfide Present	Y	N	NA
Lead Acetate Strips: _____			

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y NO N/A

Lab Tracking #:

Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: IR-0016
Cooler 1 Temp Upon Receipt: 1.8 oC
Cooler 1 Therm Corr. Factor: 0.0 oC
Cooler 1 Corrected Temp: 1.8 oC
Comments:

Relinquished by/Company: (Signature) SESI	Date/Time: 1/24/20 1135	Received by/Company: (Signature)	Date/Time: 1/24/20 1135	MTJL LAB USE ONLY Table #:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Acctnum: Template: Prelogin:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	PM: PB:

Trip Blank Received: Y NO NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 4 of: 5

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LAB USE ONLY- A

WO# : 20139691

PM: SLW Due Date: 02/07/20

CLIENT: MO-SES

ALL

Company: SOUTHERN EARTH SCIENCES, INC.	Billing Information: SESI PO BOX 160745 MOBILE, AL 36616
Address: 5460 RANGELINE ROAD MOBILE, AL 36619	
Report To: ERIC GUARINO	Email To: EGUARINO@SOEARTH.COM
Copy To:	Site Collection Info/Address: CBP
Customer Project Name/Number: CBP/C06-401	State: AL / County/City: MONTGOMERY Time Zone Collected: [ ]PT [ ]MT [X]CT [ ]ET
Phone: 251-344-7711 Email:EGUARINO@SOEARTH.COM	Site/Facility ID #: Compliance Monitoring? [X] Yes [ ] No
Collected By (print): EAG/SK	Purchase Order # : Quote #: DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required: STANDARD Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [ ] Yes [X] No Analysis:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Analyses: 8260 HALOGENATED
MW-155	GW	G	1/21/2020	940					3
MW-135A DUO 1 VOL	GW	G	1/23/2020	940					3
MW-153 1 VOL	GW	G	1/21/2020	1115					3
MW-153 1 ~~VOL~~	GW	G	1/21/2020	1305					3
									3
									3
									3
									3
									3
									3
									3

Container Pres: 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y	N	NA
Custody Signatures Present	Y	N	NA
Collector Signature Present	Y	N	NA
Bottles Intact	Y	N	NA
Correct Bottles	Y	N	NA
Sufficient Volume	Y	N	NA
Samples Received on Ice	Y	N	NA
VOA - Headspace Acceptable	Y	N	NA
USDA Regulated Soils	Y	N	NA
Samples in Holding Time	Y	N	NA
Residual Chlorine Present	Y	N	NA
Cl Strips:			
Sample pH Acceptable	Y	N	NA
pH Strips:			
Sulfide Present	Y	N	NA
Lead Acetate Strips:			

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #:

Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: IR-001
Cooler 1 Temp Upon Receipt: 1.8 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 1.8 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
SESI	1/24/20 1135		1/24/20 1135	Table #:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Acctnum: Template: Prelogin:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	PM: PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 1 of: 1

APPENDIX B
CBP Groundwater Sampling Procedure

INTRODUCTION AND SCOPE

These Standard Operating Procedures are to be followed when collecting groundwater samples from monitoring wells associated with the Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP) Project. The procedures follow the Alabama Environmental Investigation and Remediation Guidance (ADEM February 2017). These procedures are designed to ensure that the collected samples will be representative of the aquifer or target area and that the samples have not been altered or compromised by improper techniques or procedures. All monitoring wells that are sampled as part of the Long-Term Monitoring Agreement have dedicated and permanently installed variable speed bladder pumps. The variable speed bladder pump is the preferred sampling technology. It should be noted that there are exceptions to this technology that are acceptable for certain wells where use of a bladder pump is not possible because of the hydraulic conditions. The exception is a peristaltic pump.

The topics in this SOP include equipment and supply selection, decontamination procedures for field equipment, purging and sampling techniques, quality control requirements and sampling schedule.

The scope of this procedure includes sampling of monitoring wells for the following constituents: Trichloroethylene; 1,1-dichloroethane; 1,1-dichloroethene; carbon tetrachloride; chloroethane; chloroform; cis-1,2-dichloroethene; methylene chloride; tetrachloroethylene; and vinyl chloride. The monitoring wells should be sampled from low to high concentrations based on the historic analytical data.

ATTACHMENTS

Groundwater Field Sampling Data Form

HEALTH AND SAFETY CONSIDERATIONS

Refer to the “Southern Earth Sciences Health and Safety Plan”.

EQUIPMENT AND SUPPLIES

A check list of sampling supplies is provided as an attachment to this SOP.

Containers

All sample containers will be obtained from the analytical laboratory and consist of new, pre-cleaned and pre-preserved (if required) containers. No containers are to be reused. A list of appropriate containers, hold times, and preservatives is provided as an attachment to this SOP.

Analyte-free Water

Analyte-free water (de-ionized) should be used to rinse cleaned equipment and prepare any required blanks with the exception of trip blanks. Trip blanks shall be obtained directly from the analytical laboratory.

Liquinox® or Alconox®

Equipment should be cleaned using a laboratory detergent such as Liquinox® or Alconox®.

Field Equipment

Field meters shall be capable of measuring pH, Temperature, Dissolved Oxygen (DO), Specific Conductance, Temperature, Oxidation Reduction Potential (ORP), Turbidity and water level.

Manufacturer's instructions should be followed for the calibration and use of all field equipment.

Flow-through Cell

A flow-through cell or container shall be used when collecting measurements for purging stabilization. The flow-through cell operation will ensure that fresh formation water continuously contacts the measuring devices and does not aerate the sample or otherwise affect the groundwater properties.

Purging and Pumps

Dedicated variable speed positive displacement bladder pumps (no-gas contact) shall be used to purge and sample monitoring wells and/or piezometers for the CBP project. All monitoring wells that are part of the Long-Term Monitoring Agreement have dedicated bladder pumps installed. If the hydraulic conditions in a monitoring well preclude the use of the bladder pump, a peristaltic pump shall be used.

DECONTAMINATION OF SAMPLING EQUIPMENT

The cleaning/decontamination procedures must ensure that all equipment that contacts groundwater during sample collection is free from the analytes of interest and constituents that would interfere with the analysis. All such equipment should be washed thoroughly with Alconox/Liquinox (or equivalent) and water, followed by a triple rinse with analyte-free water. The amount of equipment to be decontaminated is minimal due to the dedicated variable speed bladder pumps installed in monitoring wells as part of the Long Term Monitoring Agreement. Should a peristalitic pump be utilized, new disposable tubing shall be used for each well sampled via this method. All meters shall be decontaminated.

ALL DECON WATER SHOULD BE CONTAINERIZED AND DISPOSED OF IN THE ON-SITE TREATMENT SYSTEM.

GENERAL MONITOR WELL PURGING PROCEDURES EFFECTIVENESS AND BACKGROUND WELLS (100-series; 200-series) PIEZOMETERS)

Verify the identification of the monitoring well by examining markings, sign plates, placards, GPS coordinates or other designations. If monitoring well markings are worn off or faded, immediately remark the well when the correct designation is determined.

- Remove the well cover and remove all standing water around the top of the well casing (manhole) before opening the well cap.

- Inspect the exterior protective casing of the monitoring well for damage and document the results of the inspection if there is a problem.

- Place a protective cover around the well head. Replace the covering if it becomes soiled or ripped.

- Inspect the well lock and determine whether the cap fits tightly. Replace the cap if necessary.

All monitoring wells on the CBP project that are part of the Long-Term Monitoring Agreement have dedicated bladder pumps installed in the well within the middle of the screened interval to allow for representative sampling.

Purging consists of the removal of stagnant water from the well or piezometer. The removal of the stagnant water will ensure the collected sample is representative of aquifer conditions. All monitoring wells that are to be sampled shall be purged prior to the collection of the sample with any exceptions to this noted within this procedure. The primary exception will be excessive drawdown of the water column at the lowest pumping rate. Per guidance, excessive drawdown is a maximum of 1/10th of a meter or approximately 4 inches. **For the wells specified in the table below, adequate purging techniques require the removal of a minimum of one (1) calculated well volume of water and the combination of the volume of water from the sampling equipment. All other wells unless specified below, require the removal of a minimum of three (3) calculated well volumes and the combination of the volume of water from the sampling equipment.**

Wells Sampled via Single Volume Purge Method

MW-137A	MW-134	MW-244C
MW-237B	MW-234	MW-154
MW-237C	MW-153	MW-155
MW-123	MW-210	MW-156
MW-223	MW-117	MW-115
MW-135A	MW-217	MW-215
MW-235B	MW-221	MW-116
MW-235C	MW-221C	MW-216
MW-132	MW-133	MW-118
MW-232	MW-233	MW-218
MW-128	MW-144A	MW-112
MW-228	MW-244B	MW-212

Stabilization of indicator parameters should also occur. Indicator parameters should be collected at approximately each one-quarter (1/4) calculated well volume. The well volume is to be calculated using the below equation:

Volume = Total Well Depth (in feet) – Measured Depth to Water (in feet)* Water Volume per Casing Diameter (gallons/foot)

Well Casing Diameter (Inches)	Well Volume (gallons/foot)
1	0.041
2	0.163
3	0.367
4	0.653
5	1.02
6	1.469

All calculations and measurements should be written on the field sampling sheet.

Purging is complete is achieved after removal of the specified well and equipment volume(s) and the stabilization of groundwater chemistry parameters (pH, specific conductance, and temperature) and turbidity has stabilized or is below 10 NTUs. The groundwater chemistry parameters are considered stable when the pH measurement does not vary by more than 0.1 su between readings, specific conductance does not vary by more than 10 percent and the temperature is constant for a minimum of three readings. The procedure shall be to collect an initial reading of the groundwater chemistry parameters and the turbidity with at least one reading collected after each one-quarter (1/4) volume is removed. Additional field parameters to be collected include Dissolved Oxygen and Redox. Although not specifically required by Alabama Department of Environmental Management or Environmental Protection Agency guidance, the Dissolved Oxygen and Redox should be stable. It should be noted that depth to groundwater measurements should be collected several times during the initial five minutes of purging to determine if excessive drawdown (>0.1 meter) is occurring.

Based on the detailed equipment, the maximum purge volume is no more than one (1) liter per minute (l/m). The monitoring wells of the CBP shall be pumped at a rate not to exceed one-half (0.5) l/m while limiting drawdown.

Drawdown is determined by measuring the depth to water with the sampling equipment in the well prior to turning on the pump and subtracting the depth to water during purging. During pump start-up, the pump discharge may need to be adjusted more frequently to ensure minimal drawdown in the well. Discharge will be measured using a graduated container or cylinder and recording the volume discharged per one (1) minute (e.g., milliliters/minute). The cylinder or container will be graduated at 100 milliliter (ml) intervals or less.

Historical data will be utilized to determine the total depth of the monitoring well for calculation of the purge volume. The total depth of the well will not be determined by lowering the probe to the bottom of the well before purging and sampling. Prior to sounding the well, the pump must be removed, and purging and sampling activities will be delayed for at least 24 hours after the well was sounded or for a time sufficient to meet the purge stabilization criterion for turbidity.

BOUNDARY WELLS, 300- AND 400 SERIES GROUNDWATER MONITORING WELL PURGING AND SAMPLING PROCEDURES-EPA LOW FLOW PROCEDURES, LESS THAN 100 MILLILITERS PER MINUTE

Boundary Well Sampling

The purging and sampling protocol shall mimic the generalized procedure with the exception of flow rate and total volume. Due to the aquifer and confining unit relationship, the lowest possible usable flow rate and minimal (essentially zero) drawdown should occur. Water level measurements shall be recorded at 5 minute intervals throughout the purging process. Care should be taken during water level measurements to avoid mixing of stagnant water above the screened interval with fresh water from the screened interval. Potentially, excessive flow rate and drawdown could cause impacts to the aquifer due to lowering of the potentiometric surface and mobilization of groundwater from impacted aquifers to lower intervals. Based on this potential, the boundary monitoring wells should be sampled with flow rates not to exceed 100 milliliters per minute (ml/m) or 0.1 l/m. Additionally, the purge volume should not be less than one screened interval volume (~2 gallons per 10 feet of screen in a 2 inch diameter well). Following the purging of one screened interval volume, field parameters should be collected at five minute intervals and the sample collected following the stabilization of groundwater chemistry parameters for three readings.

300 and 400 Series Wells

For the 300 and 400 series wells, the purging and sampling protocol shall mimic the generalized procedure with the exception of flow rate and total volume. Due to the aquifer and confining unit relationship, the lowest usable flow rate and minimal (essentially zero) drawdown should be occur. Water level measurements shall be recorded at 5 minute intervals throughout the purging process. Care should be taken during water level measurements to avoid mixing of stagnant water above the screened interval with fresh water from the screened interval. Potentially, excessive flow rate and drawdown could cause impacts to the screened aquifer due to lowering of the potentiometric surface and pulling groundwater from impacted aquifers to lower intervals. Based on this potential, the 300 and 400 series monitoring wells should be sampled with flow rates not to exceed 100 milliliters per minute (ml/m) or 0.1 l/m. Additionally, the purge volume should not be less than one screened interval volume (~2 gallons per 10 feet of screen in a 2 inch diameter well). Following the purging of one screened interval volume, field parameters should be collected at five minute intervals and the sample collected following the stabilization of groundwater chemistry parameters for three readings.

Sampling

Groundwater samples will be collected into laboratory supplied 40 milliliter vials. Three vials are required for each sample collected. Samples should be collected to minimize the potential for air allowing bubbles to form within the vials. Small bubbles less than a pea (1/4 inch) are the maximum allowable size. Should a bubble larger exist within the vial, efforts should be made to eliminate the bubble or discard the vial and collect an additional sample container.

All samples will be put into a cooler with ice immediately after collection. Samples will not be exposed to sunlight after collection. Sampling teams will assure that the samples are cooled to at least 4 ^{o}C and maintained at those temperatures for delivery to the laboratory.

In order to avoid contaminating the sample or loss of analytes from the sample:

Intermediate containers will not be used.

The sampling equipment will be handled as little as possible.

Exposure of equipment to the sample will be minimized.

Aeration of samples collected for VOC analysis will be minimized.

Flow rate will reduced to ≤ 100 mL/minute when collecting VOC samples.

Volatile containers will be filled first, then followed by inorganics, if applicable.

DEDICATED PUMP MAINTENANCE

Any damage or operational issues with the pumps should be corrected if noted during the scheduled sampling event. At a minimum, dedicated pumps shall be removed and inspected every other year during odd numbered years. The removal and inspection shall not occur within 30 days of a sampling event for the respective monitoring well. During the removal, the monitoring wells shall be sounded for the verification of total depth and the pump interval verified by measurement of the tie off and tubing length.

USE OF PERISTALTIC PUMPS

Some monitoring wells exhibit immediate excessive drawdown using the bladder pumps and require the use of a peristaltic pump. The procedure for purging should mimic the procedures using the bladder pump. The following is the procedure for usage of a peristaltic pump:

Place a Teflon® transfer cap assembly onto the neck of a clean standard 4-liter (1-gallon) glass container. Connect Teflon® tubing (1/4-inch outside diameter) from the glass container to both the pump and the sample source. The pump creates the vacuum in the container, thereby drawing the sample into the container without it coming in contact with the pump tubing. Collect samples for VOC analysis using a bailer or by filling the Teflon® tube and allow it to drain into the sample vials. The tubing is momentarily attached to the pump to fill the tube with water. After the water is discharged through the pump head, quickly remove the tubing from the pump and place a gloved thumb on the tubing to prevent the water from draining. Remove the tubing from the well and allow the water to drain into the sample vials. The sample for VOC analysis must not be collected from the content of any other previously filled container. New tubing will be used for each monitoring well sampled using a peristaltic pump.

FIELD QUALITY CONTROL

Utilize Quality Assurance/Quality Control (QA/QC) procedures and EPA-required decontamination procedures to ensure sample quality. For additional information, see the USEPA's Field Branches QSTPs. These documents are dynamic and are periodically reviewed and updated. The user must ensure that the most current version is followed. It is the responsibility of the field sampling staff to ensure that the samples collected arrive at the laboratory in the appropriate container, with the appropriate preservative, and within the holding times for each analysis.

The following additional samples will be collected to measure the effectiveness of sample handling techniques:

Trip Blanks

One trip blank per sampling team per week will be submitted to the laboratory. These blanks should be supplied by the laboratory. The blanks will be labeled and stored as if it was a collected sample and be analyzed via the laboratory.

Duplicate Samples

Duplicate samples will be collected by taking separate samples as close to each other in time and space as practical. Duplicate results provide an indication of the precision of the sampling and analytical methods. Duplicates will be collected for 10% of samples collected. The duplicates will be analyzed for all laboratory analysis ordered. A random number generator will be utilized to determine which locations should be duplicated.

SUBMITTAL OF SAMPLES TO LABORATORY

Samples submitted to the laboratory for analysis will be accompanied by a completed Chain of Custody (COC). A COC will be completed for each sampling team each day of sampling. Samples will be listed on the COC in the order collected by the team. All information requested on the COC will be provided by the sampling team.

Sample coolers will be delivered to analytical laboratory via delivery or a common carrier.

PURGE WATER HANDLING AND PROCESSING

All purge water shall be containerized at the point of generation. Purge water shall be stored in the aboveground tank located at the dewatering pond at the Southwest Treatment Area. Following the completion of groundwater sampling activities, the purge water within the tank shall be sampled for volatile organics. Following receipt of the laboratory analytical report and a favorable evaluation, the purge water shall be directly discharged into the dewatering pond for discharging through the permitted Southwest Treatment system.

APPENDIX C
Johnson and Ettinger Screening Level Calculations

Table C-1
Commercial Johnson and Ettinger Model for Groundwater at MW-104
ALDOT Colisuem Boulevard Plume

Model Input **Site Name/Run Number:** MW-104

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	6.1		NA			
Depth below grade to water table	(m)	Ls	9.45		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	782					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Chloroform					
CAS No.		CAS	67-66-3					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.30E-05	2.30E-05	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	9.80E-02	9.80E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	7.95E+03	7.95E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm-m^3/mol)	Hc	3.67E-03	3.67E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.50E-01	1.50E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.28E-01	1.52E-01				
Diffusivity in air	(cm2/s)	Dair	7.69E-02	7.69E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.09E-05	1.09E-05	NA	NA		

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Table C-1
Commercial Johnson and Ettinger Model for Groundwater at MW-104
ALDOT Colisuem Boulevard Plume

Building setting		Bldg_Setting	Commercial	Commercial			
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade			
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA	
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA	
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00	
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA	
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA	
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24	
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30	
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA	

Model Input **Site Name/Run Number:** MW-104

Chemical Name: Chloroform CAS No. 67-66-3

Depth below grade to water table: 9.45 meters

Vadose zone characteristics:	**Units**	**Symbol**	**Value**	**Default**	**Potential Span**	**CV**	**Flag**	**Comment**
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Clay					
Stratum A thickness (from surface)	(m)	hSA	2.90					
Stratum A total porosity	(-)	nSA	0.459	0.459	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215	0.098 - 0.33	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.430	1.430	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Sandy Clay					
Stratum B thickness	(m)	hSB	0.76					
Stratum B total porosity	(-)	nSB	0.385	0.385	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.197	0.197	0.117 - 0.28	0.25		
Stratum B bulk density	(g/cm^3)	rhoSB	1.630	1.630	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Sand					
Stratum C thickness	(m)	hSC	5.79					
Stratum C total porosity	(-)	nSC	0.375	0.375	NA	0.20		
Stratum C water-filled porosity	(-)	nwSC	0.054	0.054	0.053 - 0.055	0.25		
Stratum C bulk density	(g/cm^3)	rhoSC	1.660	1.660	NA	0.05		

Table C-1
Commercial Johnson and Ettinger Model for Groundwater at MW-104
ALDOT Colisuem Boulevard Plume

Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum C					
Height of capillary fringe	(m)	hcz	0.170	0.170	NA	NA		
Capillary zone total porosity	(-)	ncz	0.375	0.375	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.253	0.253	NA	0.14		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-06	NA	NA	Target risk set at ADEM (2017) target risk level.	
Target hazard quotient for non-carcinogens	(-)	Target_HQ	**1**	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		

Model Output

Site Name/Run Number: MW-104

Chemical Name: Chloroform CAS No. 67-66-3

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**4.1E-05**	2.9E-05 - 4.1E-05	**5.3E-05**	3.5E-05 - 5.4E-05	
Predicted Indoor Air Concentration	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**3.2E-02**	2.3E-02 - 3.2E-02	**4.1E-02**	2.7E-02 - 4.2E-02	
	(ppbv)		**6.5E-03**	4.7E-03 - 6.6E-03	**8.5E-03**	5.6E-03 - 8.6E-03	
Predicted Vapor Conc. Beneath Foundation	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**
Subslab vapor concentration	(ug/m3)	**Css**	**1.1E+01**	6.4E-01 - 2.3E+02	**1.4E+01**	2.7E+02 - 4.2E+02	
	(ppbv)		**2.2E+00**	1.3E-01 - 4.7E+01	**2.8E+00**	5.6E+01 - 8.6E+01	
Diffusive Transport Upward Through Vadose Zone	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	3.3E-03	-	3.3E-03	-	
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB	2.0E-03	-	2.0E-03	-	
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC	1.2E-02	-	1.2E-02	-	
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	5.0E-04	-	5.0E-04	-	
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	4.7E-03	-	6.1E-03	-	
Critical Parameters		**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	4.1E-05	-	5.4E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	2.2E+03	7.4E+01 - 3.7E+04	2.2E+03	7.4E+01 - 3.7E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Table C-1
Commercial Johnson and Ettinger Model for Groundwater at MW-104
ALDOT Colisuem Boulevard Plume

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

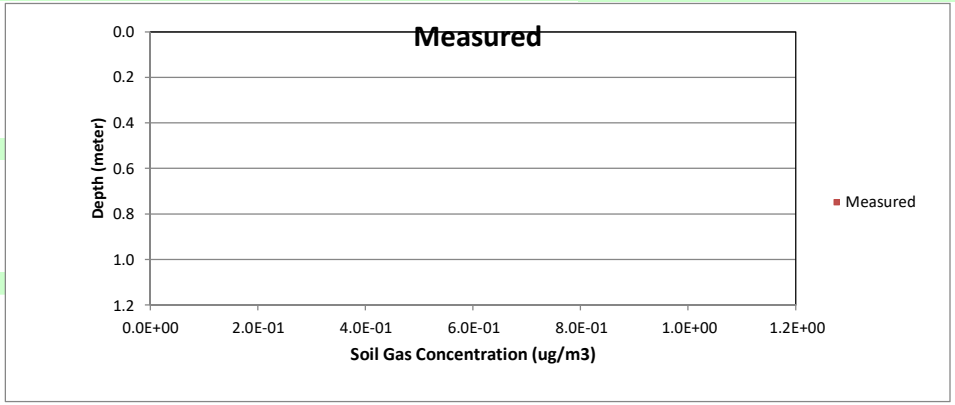
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Model Output

Site Name/Run Number: MW-104

Chemical Name: Chloroform CAS No. 67-66-3

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag
Risk-Based Target Screening Levels	Scenario: Commercial						
Target risk for carcinogens	(-)	Target_CR	1E-05	-	1E-06	-	
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-	
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**5.33E+00**	-	**5.33E-01**	-	Target indoor air concentration based on cancer risk (unit risk factor)
	(ppbv)		**1.09E+00**	-	**1.09E-01**	-	
Target groundwater concentration	**(ug/L)**	**Target_GW**	**1.03E+03**	**1.0E+03 - 1.4E+03**	**6.65E+01**	**7.8E+01 - 1.2E+02**	
Incremental Risk Estimates							
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**5.9E-08**	**4.3E-08 - 6.0E-08**	**7.74E-08**	**5.1E-08 - 7.9E-08**	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**7.4E-05**	**5.3E-05 - 7.5E-05**	**9.61E-05**	**6.4E-05 - 9.8E-05**	

Table C-2
Commercial Johnson and Ettinger Model for Groundwater at Location MW-106
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Carbon Tetrachloride	Dichloroethylene, 1,1-	Dichloroethylene, 1,2-cis-	Methylene Chloride	Trichloroethylene
Source Characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**	**Value**	**Value**
Source medium		Source	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Groundwater concentration	(ug/L)	Cmedium	5.4	8.8	7.5	5.1	947
Depth below grade to water table	(m)	Ls	7.85	7.85	7.85	7.85	7.85
Average groundwater temperature	(°C)	Ts	21	21	21	21	21
Calc: Source vapor concentration	(ug/m3)	Cs	5171	8234	1066	586	318657
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.001%	0.000%	0.000%	0.000%	0.065%
Chemical:	**Units**	**Symbol**	**Value**	**Value**	**Value**	**Value**	**Value**
Chemical Name		Chem	Carbon Tetrachloride	Dichloroethylene, 1,1-	Dichloroethylene, 1,2-cis-	Methylene Chloride	Trichloroethylene
CAS No.		CAS	56-23-5	75-35-4	156-59-2	75-09-2	79-01-6
Toxicity Factors							
Unit risk factor	$(ug/m^3)^{-1}$	IUR	6.00E-06	Not Available	Not Available	1.00E-08	see note
Mutagenic compound		Mut	No	No	No	Yes	Yes
Reference concentration	(ug/m^3)	RfC	1.00E-01	2.00E-01	Not Available	6.00E-01	2.00E-03
Chemical Properties:	**Units**	**Symbol**	**Value**	**Value**	**Value**	**Value**	**Value**
Pure component water solubility	(mg/L)	S	7.93E+02	2.42E+03	6.41E+03	1.30E+04	1.28E+03
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	2.76E-02	2.61E-02	4.08E-03	3.25E-03	9.85E-03
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.13E+00	1.07E+00	1.67E-01	1.33E-01	4.03E-01
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	9.58E-01	9.36E-01	1.42E-01	1.15E-01	3.36E-01
Diffusivity in air	(cm2/s)	Dair	5.71E-02	8.63E-02	8.84E-02	9.99E-02	6.87E-02
Diffusivity in water	(cm2/s)	Dwater	9.78E-06	1.10E-05	1.13E-05	1.25E-05	1.02E-05
Building Characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**	**Value**	**Value**
Building setting		Bldg_Setting	Commercial	Commercial	Commercial	Commercial	Commercial
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade	Slab-on-grade	Slab-on-grade	Slab-on-grade
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.20	0.20	0.20
Foundation thickness	(m)	Lf	0.20	0.20	0.20	0.20	0.20
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.001	0.001	0.001
Enclosed space floor area	(m2)	Ab	1500.00	1500.00	1500.00	1500.00	1500.00
Enclosed space mixing height	(m)	Hb	3.00	3.00	3.00	3.00	3.00
Indoor air exchange rate	(1/hr)	ach	1.50	1.50	1.50	1.50	1.50
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0030	0.0030	0.0030
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	6750.00	6750.00	6750.00
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	20.25	20.25	20.25

Table C-2
Commercial Johnson and Ettinger Model for Groundwater at Location MW-106
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Carbon Tetrachloride	Dichloroethylene, 1,1-	Dichloroethylene, 1,2-cis-	Methylene Chloride	Trichloroethylene
Vadose zone characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**	**Value**	**Value**
Stratum A (Top of soil profile):							
Stratum A SCS soil type		SCS_A	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay
Stratum A thickness (from surface)	(m)	hSA	0.61	0.61	0.61	0.61	0.61
Stratum A total porosity	(-)	nSA	0.385	0.385	0.385	0.385	0.385
Stratum A water-filled porosity	(-)	nwSA	0.197	0.197	0.197	0.197	0.197
Stratum A bulk density	(g/cm^3)	rhoSA	1.630	1.630	1.630	1.630	1.630
Stratum B (Soil layer below Stratum A):							
Stratum B SCS soil type		SCS_B	Clay	Clay	Clay	Clay	Clay
Stratum B thickness	(m)	hSB	4.57	4.57	4.57	4.57	4.57
Stratum B total porosity	(-)	nSB	0.459	0.459	0.459	0.459	0.459
Stratum B water-filled porosity	(-)	nwSB	0.215	0.215	0.215	0.215	0.215
Stratum B bulk density	(g/cm^3)	rhoSB	1.430	1.430	1.430	1.430	1.430
Stratum C (Soil layer below Stratum B):							
Stratum C SCS soil type		SCS_C	Sand	Sand	Sand	Sand	Sand
Stratum C thickness	(m)	hSC	2.67	2.67	2.67	2.67	2.67
Stratum C total porosity	(-)	nSC	0.375	0.375	0.375	0.375	0.375
Stratum C water-filled porosity	(-)	nwSC	0.054	0.054	0.054	0.054	0.054
Stratum C bulk density	(g/cm^3)	rhoSC	1.660	1.660	1.660	1.660	1.660
Stratum directly above the water table							
Stratum A, B, or C		src_soil	Stratum C	Stratum C	Stratum C	Stratum C	Stratum C
Height of capillary fringe	(m)	hcz	0.170	0.170	0.170	0.170	0.170
Capillary zone total porosity	(-)	ncz	0.375	0.375	0.375	0.375	0.375
Capillary zone water filled porosity	(-)	nwcz	0.253	0.253	0.253	0.253	0.253
Exposure Parameters:	**Units**	**Symbol**	**Value**	**Value**	**Value**	**Value**	**Value**
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	1	1	1
Exposure Scenario		Scenario	Commercial	Commercial	Commercial	Commercial	Commercial
Averaging time for carcinogens	(yrs)	ATc	70	70	70	70	70
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	25	25	25
Exposure duration	(yrs)	ED	25	25	25	25	25
Exposure frequency	(days/yr)	EF	250	250	250	250	250
Exposure time	(hrs/24 hrs)	ET	8	8	8	8	8
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	72	72	72
Source to Indoor Air Attenuation Factor	**Units**	**Symbol**	**Value**	**Value**	**Value**	**Value**	**Value**
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.8E-05**	**4.3E-05**	**4.4E-05**	**4.9E-05**	**3.4E-05**
		Range	2.2E-05 - 2.9E-05	3.0E-05 - 4.3E-05	3.1E-05 - 4.4E-05	3.3E-05 - 5.0E-05	2.6E-05 - 3.4E-05
Predicted Indoor Air Concentration			**Value**	**Value**	**Value**	**Value**	**Value**
Indoor air concentration due to vapor intrusion	**(ug/m3)**	**Cia**	**1.5E-01**	**3.5E-01**	**4.6E-02**	**2.9E-02**	**1.1E+01**
		Range	1.1E-01 - 1.5E-01	2.5E-01 - 3.5E-01	3.3E-02 - 4.7E-02	2.0E-02 - 2.9E-02	8.1E+00 - 1.1E+01
	(ppbv)	**Cia**	**2.3E-02**	**8.8E-02**	**1.2E-02**	**8.3E-03**	**2.0E+00**
		Range	1.8E-02 - 2.3E-02	6.3E-02 - 8.9E-02	8.3E-03 - 1.2E-02	5.6E-03 - 8.4E-03	1.5E+00 - 2.0E+00

Table C-2
Commercial Johnson and Ettinger Model for Groundwater at Location MW-106
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Carbon Tetrachloride	Dichloroethylene, 1,1-	Dichloroethylene, 1,2-cis-	Methylene Chloride	Trichloroethylene
Predicted Vapor Concentration Beneath the Foundation			**Value**	**Value**	**Value**	**Value**	**Value**
Subslab vapor concentration	**(ug/m3)**	**Css**	**4.9E+01**	**1.2E+02**	**1.5E+01**	**9.6E+00**	**3.6E+03**
		Range	3.0E+00 - 1.1E+03	7.1E+00 - 2.5E+03	9.4E-01 - 3.3E+02	5.9E-01 - 2.0E+02	2.2E+02 - 8.1E+04
	(ppbv)	**Css**	**7.7E+00**	**2.9E+01**	**3.9E+00**	**2.8E+00**	**6.7E+02**
		Range	4.7E-01 - 1.8E+02	1.8E+00 - 6.3E+02	2.4E-01 - 8.3E+01	1.7E-01 - 5.6E+01	4.1E+01 - 1.5E+04
Diffusive Transport Upward Through Vadose Zone			**Value**	**Value**	**Value**	**Value**	**Value**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	1.5E-03	2.2E-03	2.3E-03	2.6E-03	1.8E-03
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB	2.5E-03	3.7E-03	3.8E-03	4.3E-03	3.0E-03
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC	9.2E-03	1.4E-02	1.4E-02	1.6E-02	1.1E-02
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	3.7E-04	5.5E-04	5.7E-04	6.5E-04	4.4E-04
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	2.7E-03	4.0E-03	4.1E-03	4.7E-03	3.2E-03
Critical Parameters			**Value**	**Value**	**Value**	**Value**	**Value**
α for diffusive transport from source to building with	(-)	A_Param	2.9E-05	4.3E-05	4.4E-05	5.0E-05	3.4E-05
Pe (Peclet Number) for transport through the foundation	(-)	B_Param	5.0E+03	3.3E+03	3.2E+03	2.8E+03	4.1E+03
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	3.0E-03	3.0E-03	3.0E-03	3.0E-03
Interpretation							
				Advection is the dominant mechanism across the foundation. Diffusion through soil is the overall rate limiting process.			
Critical Parameters							
			Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach
Non-Critical Parameters							
			Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta
Risk Calculations	**Units**	**Symbol**	**Value**	**Value**	**Value**	**Value**	**Value**
Risk-Based Target Screening Levels							
Target risk for carcinogens	(-)	Target_CR	1E-05	1E-05	1E-05	1E-05	1E-05
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1	1	1	1
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**2.04E+01**	**8.76E+02**	**No tox data available**	**4.26E+03**	**2.05E+01**
	(ppbv)	**Target_IA**	**3.25E+00**	**2.21E+02**	**No tox data available**	**1.23E+03**	**3.82E+00**
Target groundwater concentration	**(ug/L)**	**Target_GW**	**7.55E+02**	**2.20E+04**	**No tox data available**	**7.53E+05**	**1.80E+03**
Incremental Risk Estimates							
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**7.15E-08**	**No IUR**	**No IUR**	**6.77E-11**	**1.40E-05**
		Range	5.6E-08 - 7.2E-08	-	-	4.6E-11 - 6.9E-11	1.1E-05 - 1.4E-05
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.000333809**	**0.000399487**	**No RfC Available**	**1.09747E-05**	**1.234360029**
		Range	2.6E-04 - 3.4E-04	2.8E-04 - 4.0E-04	RfC Available - No RfC Avail	7.4E-06 - 1.1E-05	9.3E-01 - 1.2E+00
		Total Risk	**1.4E-05**				
		Total Hazard	**1.2**				

Table C-3
Commercial Johnson and Ettinger Model for Groundwater at Location MW-108 Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Dichloroethylene, 1,2-cis-	Trichloroethylene
Source Characteristics:	**Units**	**Symbol**	**Value**	**Value**
Source medium		Source	Groundwater	Groundwater
Groundwater concentration	(ug/L)	Cmedium	1.2	77.9
Depth below grade to water table	(m)	Ls	4.94	4.94
Average groundwater temperature	(^{o}C)	Ts	21	21
Calc: Source vapor concentration	(ug/m3)	Cs	171	26213
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%	0.005%
Chemical:	**Units**	**Symbol**	**Value**	**Value**
Chemical Name		Chem	Dichloroethylene, 1,2-cis-	Trichloroethylene
CAS No.		CAS	156-59-2	79-01-6
Toxicity Factors				
Unit risk factor	$(ug/m^3)^{-1}$	IUR	Not Available	see note
Mutagenic compound		Mut	No	Yes
Reference concentration	(ug/m^3)	RfC	Not Available	2.00E-03
Chemical Properties:	**Units**	**Symbol**	**Value**	**Value**
Pure component water solubility	(mg/L)	S	6.41E+03	1.28E+03
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	4.08E-03	9.85E-03
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	1.67E-01	4.03E-01
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.42E-01	3.36E-01
Diffusivity in air	(cm2/s)	Dair	8.84E-02	6.87E-02
Diffusivity in water	(cm2/s)	Dwater	1.13E-05	1.02E-05
Building Characteristics:	**Units**	**Symbol**	**Value**	**Value**
Building setting		Bldg_Setting	Commercial	Commercial
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade
Depth below grade to base of foundation	(m)	Lb	0.20	0.20
Foundation thickness	(m)	Lf	0.20	0.20
Fraction of foundation area with cracks	(-)	eta	0.001	0.001
Enclosed space floor area	(m2)	Ab	1500.00	1500.00
Enclosed space mixing height	(m)	Hb	3.00	3.00
Indoor air exchange rate	(1/hr)	ach	1.50	1.50
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25

Table C-3
Commercial Johnson and Ettinger Model for Groundwater at Location MW-108 Alabama
Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

Vadose zone characteristics:	Units	Symbol	Dichloroethylene, 1,2-cis- Value	Trichloroethylene Value
Stratum A (Top of soil profile):				
Stratum A SCS soil type		SCS_A	Clay	Clay
Stratum A thickness (from surface)	(m)	hSA	2.90	2.90
Stratum A total porosity	(-)	nSA	0.459	0.459
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215
Stratum A bulk density	(g/cm^3)	rhoSA	1.430	1.430
Stratum B (Soil layer below Stratum A):				
Stratum B SCS soil type		SCS_B	Sandy Clay	Sandy Clay
Stratum B thickness	(m)	hSB	0.76	0.76
Stratum B total porosity	(-)	nSB	0.385	0.385
Stratum B water-filled porosity	(-)	nwSB	0.197	0.197
Stratum B bulk density	(g/cm^3)	rhoSB	1.630	1.630
Stratum C (Soil layer below Stratum B):				
Stratum C SCS soil type		SCS_C	Sand	Sand
Stratum C thickness	(m)	hSC	1.28	1.28
Stratum C total porosity	(-)	nSC	0.375	0.375
Stratum C water-filled porosity	(-)	nwSC	0.054	0.054
Stratum C bulk density	(g/cm^3)	rhoSC	1.660	1.660
Stratum directly above the water table				
Stratum A, B, or C		src_soil	Stratum C	Stratum C
Height of capillary fringe	(m)	hcz	0.170	0.170
Capillary zone total porosity	(-)	ncz	0.375	0.375
Capillary zone water filled porosity	(-)	nwcz	0.253	0.253

Table C-3
Commercial Johnson and Ettinger Model for Groundwater at Location MW-108 Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

Exposure Parameters:	Units	Symbol	Dichloroethylene, 1,2-cis- Value	Trichloroethylene Value
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-05
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1
Exposure Scenario		Scenario	Commercial	Commercial
Averaging time for carcinogens	(yrs)	ATc	70	70
Averaging time for non-carcinogens	(yrs)	ATnc	25	25
Exposure duration	(yrs)	ED	25	25
Exposure frequency	(days/yr)	EF	250	250
Exposure time	(hrs/24 hrs)	ET	8	8
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Value
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**5.7E-05**	**4.4E-05**
		Range	3.7E-05 - 5.8E-05	3.1E-05 - 4.5E-05
Predicted Indoor Air Concentration			**Value**	**Value**
Indoor air concentration due to vapor intrusion	**(ug/m3)**	**Cia**	**9.7E-03**	**1.2E+00**
		Range	6.2E-03 - 9.8E-03	8.1E-01 - 1.2E+00
	(ppbv)	**Cia**	**2.4E-03**	**2.2E-01**
		Range	1.6E-03 - 2.5E-03	1.5E-01 - 2.2E-01
Predicted Vapor Concentration Beneath the Foundation			**Value**	**Value**
Subslab vapor concentration	**(ug/m3)**	**Css**	**3.2E+00**	**3.9E+02**
		Range	2.0E-01 - 6.2E+01	2.3E+01 - 8.1E+03
	(ppbv)	**Css**	**8.1E-01**	**7.2E+01**
		Range	5.0E-02 - 1.6E+01	4.4E+00 - 1.5E+03
Diffusive Transport Upward Through Vadose Zone			**Value**	**Value**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	3.8E-03	3.0E-03
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB	2.3E-03	1.8E-03
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC	1.4E-02	1.1E-02
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	5.7E-04	4.4E-04
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	3.4E-03	2.6E-03
Critical Parameters			**Value**	**Value**
α for diffusive transport from source to building with	(-)	A_Param	5.8E-05	4.5E-05
Pe (Peclet Number) for transport through the foundation	(-)	B_Param	1.9E+03	2.5E+03
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	3.0E-03

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Table C-3
Commercial Johnson and Ettinger Model for Groundwater at Location MW-108 Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Dichloroethylene, 1,2-cis-	Trichloroethylene
Critical Parameters				
			Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach
Non-Critical Parameters				
			Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta

Risk Calculations	Units	Symbol	Value	Value
Risk-Based Target Screening Levels				
Target risk for carcinogens	(-)	Target_CR	1E-05	1E-05
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**No tox data available**	**2.05E+01**
	(ppbv)	**Target_IA**	**No tox data available**	**3.82E+00**
Target groundwater concentration	**(ug/L)**	**Target_GW**	**No tox data available**	**1.38E+03**
Incremental Risk Estimates				
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**No IUR**	**1.50E-06**
		Range	-	1.1E-06 - 1.5E-06
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**No RfC Available**	**0.132113432**
		Range	No RfC Available - No RfC Available	9.3E-02 - 1.3E-01
		Total Risk	**1.5E-06**	
		Total Hazard	**0.13**	

Table C-4
Commercial Johnson and Ettinger Model for Groundwater at Location MW-111
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
Source Characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Source medium		Source	Groundwater	Groundwater	Groundwater
Groundwater concentration	(ug/L)	Cmedium	17.3	3.2	18.6
Depth below grade to water table	(m)	Ls	14.02	14.02	14.02
Average groundwater temperature	(°C)	Ts	21	21	21
Calc: Source vapor concentration	(ug/m3)	Cs	2218	2994	6259
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%	0.000%	0.001%
Chemical:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Chemical Name		Chem	Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
CAS No.		CAS	67-66-3	75-35-4	79-01-6
Toxicity Factors					
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.30E-05	Not Available	see note
Mutagenic compound		Mut	No	No	Yes
Reference concentration	(ug/m^3)	RfC	9.80E-02	2.00E-01	2.00E-03
Chemical Properties:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Pure component water solubility	(mg/L)	S	7.95E+03	2.42E+03	1.28E+03
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	3.67E-03	2.61E-02	9.85E-03
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.50E-01	1.07E+00	4.03E-01
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.28E-01	9.36E-01	3.36E-01
Diffusivity in air	(cm2/s)	Dair	7.69E-02	8.63E-02	6.87E-02
Diffusivity in water	(cm2/s)	Dwater	1.09E-05	1.10E-05	1.02E-05
Building Characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Building setting		Bldg_Setting	Commercial	Commercial	Commercial
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade	Slab-on-grade
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.20

Table C-4
Commercial Johnson and Ettinger Model for Groundwater at Location MW-111
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
Foundation thickness	(m)	Lf	0.20	0.20	0.20
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.001
Enclosed space floor area	(m2)	Ab	1500.00	1500.00	1500.00
Enclosed space mixing height	(m)	Hb	3.00	3.00	3.00
Indoor air exchange rate	(1/hr)	ach	1.50	1.50	1.50
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0030
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	6750.00
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	20.25

Vadose zone characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Stratum A (Top of soil profile):					
Stratum A SCS soil type		SCS_A	Loamy Sand	Loamy Sand	Loamy Sand
Stratum A thickness (from surface)	(m)	hSA	1.22	1.22	1.22
Stratum A total porosity	(-)	nSA	0.390	0.390	0.390
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.076
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	1.620
Stratum B (Soil layer below Stratum A):					
Stratum B SCS soil type		SCS_B	Clay	Clay	Clay
Stratum B thickness	(m)	hSB	2.74	2.74	2.74
Stratum B total porosity	(-)	nSB	0.459	0.459	0.459
Stratum B water-filled porosity	(-)	nwSB	0.215	0.215	0.215
Stratum B bulk density	(g/cm^3)	rhoSB	1.430	1.430	1.430
Stratum C (Soil layer below Stratum B):					
Stratum C SCS soil type		SCS_C	Sand	Sand	Sand
Stratum C thickness	(m)	hSC	10.06	10.06	10.06
Stratum C total porosity	(-)	nSC	0.375	0.375	0.375
Stratum C water-filled porosity	(-)	nwSC	0.054	0.054	0.054
Stratum C bulk density	(g/cm^3)	rhoSC	1.660	1.660	1.660
Stratum directly above the water table					
Stratum A, B, or C		src_soil	Stratum C	Stratum C	Stratum C
Height of capillary fringe	(m)	hcz	0.170	0.170	0.170
Capillary zone total porosity	(-)	ncz	0.375	0.375	0.375
Capillary zone water filled porosity	(-)	nwcz	0.253	0.253	0.253

Table C-4
Commercial Johnson and Ettinger Model for Groundwater at Location MW-111
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
Exposure Parameters:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-05	1.00E-05
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	1
Exposure Scenario		Scenario	Commercial	Commercial	Commercial
Averaging time for carcinogens	(yrs)	ATc	70	70	70
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	25
Exposure duration	(yrs)	ED	25	25	25
Exposure frequency	(days/yr)	EF	250	250	250
Exposure time	(hrs/24 hrs)	ET	8	8	8
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	72

Source to Indoor Air Attenuation Factor	**Units**	**Symbol**	**Value**	**Value**	**Value**
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**3.9E-05**	**4.4E-05**	**3.5E-05**
		Range	2.8E-05 - 4.0E-05	3.1E-05 - 4.4E-05	2.6E-05 - 3.5E-05
Predicted Indoor Air Concentration			**Value**	**Value**	**Value**
Indoor air concentration due to vapor intrusion	**(ug/m3)**	**Cia**	**8.7E-02**	**1.3E-01**	**2.2E-01**
		Range	6.3E-02 - 8.8E-02	9.2E-02 - 1.3E-01	1.6E-01 - 2.2E-01
	(ppbv)	**Cia**	**1.8E-02**	**3.3E-02**	**4.1E-02**
		Range	1.3E-02 - 1.8E-02	2.3E-02 - 3.4E-02	3.0E-02 - 4.1E-02
Predicted Vapor Concentration Beneath the Foundation			**Value**	**Value**	**Value**
Subslab vapor concentration	**(ug/m3)**	**Css**	**2.9E+01**	**4.4E+01**	**7.3E+01**
		Range	1.8E+00 - 6.3E+02	2.7E+00 - 9.2E+02	4.4E+00 - 1.6E+03
	(ppbv)	**Css**	**5.9E+00**	**1.1E+01**	**1.4E+01**
		Range	3.6E-01 - 1.3E+02	6.7E-01 - 2.3E+02	8.2E-01 - 3.0E+02
Diffusive Transport Upward Through Vadose Zone			**Value**	**Value**	**Value**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	1.1E-02	1.2E-02	9.5E-03
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB	3.3E-03	3.7E-03	3.0E-03
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC	1.2E-02	1.4E-02	1.1E-02
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	5.0E-04	5.5E-04	4.4E-04
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	6.7E-03	7.5E-03	6.0E-03

Table C-4
Commercial Johnson and Ettinger Model for Groundwater at Location MW-111
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
Critical Parameters			**Value**	**Value**	**Value**
α for diffusive transport from source to building with	(-)	A_Param	4.0E-05	4.4E-05	3.5E-05
Pe (Peclet Number) for transport through the foundation	(-)	B_Param	6.9E+02	6.1E+02	7.7E+02
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	3.0E-03	3.0E-03
Interpretation					
			Advection is the dominant mechanism across the foundation. Diffusion through soil is the overall rate limiting process.		
Critical Parameters					
			Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach
Non-Critical Parameters					
			Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta
Risk Calculations	**Units**	**Symbol**	**Value**	**Value**	**Value**
Risk-Based Target Screening Levels					
Target risk for carcinogens	(-)	Target_CR	1E-05	1E-05	1E-05
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1	1
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**5.33E+00**	**8.76E+02**	**2.05E+01**
	(ppbv)	**Target_IA**	**1.09E+00**	**2.21E+02**	**3.82E+00**
Target groundwater concentration	**(ug/L)**	**Target_GW**	**1.06E+03**	**2.14E+04**	**1.74E+03**
Incremental Risk Estimates					
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**1.63E-07**	**No IUR**	**2.84E-07**
		Range	1.2E-07 - 1.7E-07	-	2.1E-07 - 2.9E-07
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.000202688**	**0.000149865**	**0.025011844**
		Range	1.5E-04 - 2.1E-04	1.1E-04 - 1.5E-04	1.9E-02 - 2.5E-02
		Total ELCR	**4.5E-07**		
		Total HI	**0.025**		

Table C-5
Residential Johnson and Ettinger Model for Groundwater at Location MW-115
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Model Input **Site Name/Run Number:** MW-115

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	9.8		NA			
Depth below grade to water table	(m)	Ls	7.62		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	1257					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Chloroform					
CAS No.		CAS	67-66-3					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.30E-05	2.30E-05	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	9.80E-02	9.80E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	7.95E+03	7.95E+03	NA	NA		
Henry's Law Constant @ 25°C	(atm-m^3/mol)	Hc	3.67E-03	3.67E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.50E-01	1.50E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.28E-01	1.52E-01				
Diffusivity in air	(cm2/s)	Dair	7.69E-02	7.69E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.09E-05	1.09E-05	NA	NA		

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment

Table C-5
Residential Johnson and Ettinger Model for Groundwater at Location MW-115
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Building setting		Bldg_Setting	Residential	Residential			
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade			
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA	
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA	
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00	
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA	
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA	
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA	
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24	
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30	
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA	

Model Input **Site Name/Run Number:** MW-115

Chemical Name: Chloroform CAS No. 67-66-3

Depth below grade to water table: 7.62 meters

Vadose zone characteristics:	**Units**	**Symbol**	**Value**	**Default**	**Potential Span**	**CV**	**Flag**	**Comment**
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Sand					
Stratum B thickness	(m)	hSB	5.18					
Stratum B total porosity	(-)	nSB	0.375	0.375	NA	0.20		
Stratum B water-filled porosity	(-)	nwSB	0.054	0.054	0.053 - 0.055	0.25		
Stratum B bulk density	(g/cm^3)	rhoSB	1.660	1.660	NA	0.05		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C						
Stratum C thickness	(m)	hSC						
Stratum C total porosity	(-)	nSC	0.482	0.482	NA	NA		
Stratum C water-filled porosity	(-)	nwSC	0.198	0.198	NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC	1.370	1.370	NA	NA		

Table C-5
Residential Johnson and Ettinger Model for Groundwater at Location MW-115
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Stratum directly above the water table							
Stratum A, B, or C		src_soil	Stratum B				
Height of capillary fringe	(m)	hcz	0.170	0.170	NA	NA	
Capillary zone total porosity	(-)	ncz	0.375	0.375	NA	0.20	
Capillary zone water filled porosity	(-)	nwcz	0.253	0.253	NA	0.14	

Exposure Parameters:	**Units**	**Symbol**	**Value**	**Default**	**Potential Span**	**CV**	**Flag**	**Comment**
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-06	NA	NA	Target risk set at ADEM (2017) target risk level.	
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		

Model Output

Site Name/Run Number: MW-115

Chemical Name: Chloroform CAS No. 67-66-3

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**3.1E-04**	8.2E-05 - 3.5E-04	**3.1E-04**	8.2E-05 - 3.5E-04	

Predicted Indoor Air Concentration	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**4.0E-01**	1.0E-01 - 4.4E-01	**4.0E-01**	1.0E-01 - 4.4E-01	
	(ppbv)		**8.1E-02**	2.1E-02 - 9.0E-02	**8.1E-02**	2.1E-02 - 9.0E-02	

Predicted Vapor Conc. Beneath Foundation	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**
Subslab vapor concentration	(ug/m3)	**Css**	**1.3E+02**	8.8E+00 - 1.0E+03	**1.3E+02**	1.0E+03 - 4.4E+03	
	(ppbv)		**2.7E+01**	1.8E+00 - 2.1E+02	**2.7E+01**	2.1E+02 - 9.0E+02	

Diffusive Transport Upward Through Vadose Zone	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	1.1E-02	-	1.1E-02	-	
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB	1.2E-02	-	1.2E-02	-	
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-	
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	5.0E-04	-	5.0E-04	-	
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	7.8E-03	-	7.8E-03	-	

Critical Parameters		**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	3.5E-04	-	3.5E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	8.3E+01	2.8E+00 - 1.4E+03	8.3E+01	2.8E+00 - 1.4E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Table C-5
Residential Johnson and Ettinger Model for Groundwater at Location MW-115
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil and advection through foundation both control intrusio

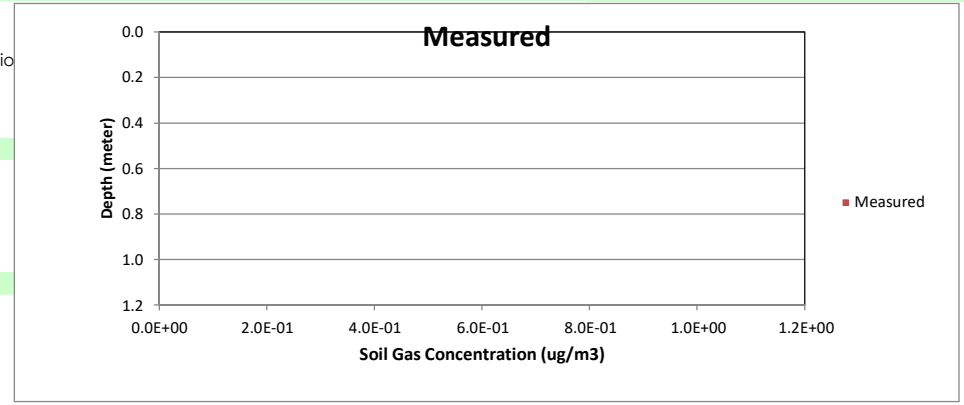
Critical Parameters

Hb, Ls, DeffT, ach, Qsoil_Qb

Non-Critical Parameters

Lf, DeffA, eta

Concentration versus Depth Profile



Model Output Site Name/Run Number: MW-115
Chemical Name: Chloroform CAS No. 67-66-3

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag
Risk-Based Target Screening Levels Scenario: Residential							
Target risk for carcinogens	(-)	Target_CR	1E-05	-	1E-06	-	
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-	
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.22E+00**	-	**1.22E-01**	-	Target indoor air concentration based on cancer risk (unit risk factor)
	(ppbv)		**2.50E-01**	-	**2.50E-02**	-	
Target groundwater concentration	**(ug/L)**	**Target_GW**	**3.03E+01**	**2.7E+01 - 1.2E+02**	**2.55E+00**	**2.7E+00 - 1.2E+01**	
Incremental Risk Estimates							
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**3.2E-06**	**8.4E-07 - 3.6E-06**	**3.24E-06**	**8.4E-07 - 3.6E-06**	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**3.9E-03**	**1.0E-03 - 4.3E-03**	**3.86E-03**	**1.0E-03 - 4.3E-03**	

Table C-6
Residential Johnson and Ettinger Model for Groundwater at Location MW-17
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
Source Characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Source medium		Source	Groundwater	Groundwater	Groundwater
Groundwater concentration	(ug/L)	Cmedium	1.3	2.6	18.8
Depth below grade to water table	(m)	Ls	13.41	13.41	13.41
Average groundwater temperature	(°C)	Ts	21	21	21
Calc: Source vapor concentration	(ug/m3)	Cs	167	2433	6326
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%	0.000%	0.001%
Chemical:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Chemical Name		Chem	Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
CAS No.		CAS	67-66-3	75-35-4	79-01-6
Toxicity Factors					
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.30E-05	Not Available	see note
Mutagenic compound		Mut	No	No	Yes
Reference concentration	(ug/m^3)	RfC	9.80E-02	2.00E-01	2.00E-03
Chemical Properties:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Pure component water solubility	(mg/L)	S	7.95E+03	2.42E+03	1.28E+03
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	3.67E-03	2.61E-02	9.85E-03
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.50E-01	1.07E+00	4.03E-01
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.28E-01	9.36E-01	3.36E-01
Diffusivity in air	(cm2/s)	Dair	7.69E-02	8.63E-02	6.87E-02
Diffusivity in water	(cm2/s)	Dwater	1.09E-05	1.10E-05	1.02E-05
Building Characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Building setting		Bldg_Setting	Residential	Residential	Residential
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade	Slab-on-grade
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.10
Foundation thickness	(m)	Lf	0.10	0.10	0.10
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.001

Table C-6
Residential Johnson and Ettinger Model for Groundwater at Location MW-117
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
Enclosed space floor area	(m2)	Ab	150.00	150.00	150.00
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.44
Indoor air exchange rate	(1/hr)	ach	0.45	0.45	0.45
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0030
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	164.70
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	0.49

Vadose zone characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Stratum A (Top of soil profile):					
Stratum A SCS soil type		SCS_A	Clay	Clay	Clay
Stratum A thickness (from surface)	(m)	hSA	3.96	3.96	3.96
Stratum A total porosity	(-)	nSA	0.459	0.459	0.459
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215	0.215
Stratum A bulk density	(g/cm^3)	rhoSA	1.430	1.430	1.430
Stratum B (Soil layer below Stratum A):					
Stratum B SCS soil type		SCS_B	Loam	Loam	Loam
Stratum B thickness	(m)	hSB	0.91	0.91	0.91
Stratum B total porosity	(-)	nSB	0.399	0.399	0.399
Stratum B water-filled porosity	(-)	nwSB	0.148	0.148	0.148
Stratum B bulk density	(g/cm^3)	rhoSB	1.590	1.590	1.590
Stratum C (Soil layer below Stratum B):					
Stratum C SCS soil type		SCS_C	Sand	Sand	Sand
Stratum C thickness	(m)	hSC	8.54	8.54	8.54
Stratum C total porosity	(-)	nSC	0.375	0.375	0.375
Stratum C water-filled porosity	(-)	nwSC	0.054	0.054	0.054
Stratum C bulk density	(g/cm^3)	rhoSC	1.660	1.660	1.660
Stratum directly above the water table					
Stratum A, B, or C		src_soil	Stratum C	Stratum C	Stratum C
Height of capillary fringe	(m)	hcz	0.170	0.170	0.170
Capillary zone total porosity	(-)	ncz	0.375	0.375	0.375
Capillary zone water filled porosity	(-)	nwcz	0.253	0.253	0.253

Table C-6
Residential Johnson and Ettinger Model for Groundwater at Location MW-17
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

Exposure Parameters:	Units	Symbol	Chloroform Value	Dichloroethylene, 1,1- Value	Trichloroethylene Value
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-05	1.00E-05
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	1
Exposure Scenario		Scenario	Residential	Residential	Residential
Averaging time for carcinogens	(yrs)	ATc	70	70	70
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	26
Exposure duration	(yrs)	ED	26	26	26
Exposure frequency	(days/yr)	EF	350	350	350
Exposure time	(hrs/24 hrs)	ET	24	24	24
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	72

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Value	Value
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**1.4E-04**	**1.5E-04**	**1.2E-04**
		Range	5.9E-05 - 1.4E-04	6.2E-05 - 1.6E-04	5.6E-05 - 1.3E-04
Predicted Indoor Air Concentration			**Value**	**Value**	**Value**
Indoor air concentration due to vapor intrusion	**(ug/m3)**	**Cia**	**2.3E-02**	**3.7E-01**	**7.8E-01**
		Range	9.8E-03 - 2.4E-02	1.5E-01 - 3.9E-01	3.5E-01 - 8.1E-01
	(ppbv)	**Cia**	**4.7E-03**	**9.4E-02**	**1.4E-01**
		Range	2.0E-03 - 4.9E-03	3.8E-02 - 9.8E-02	6.6E-02 - 1.5E-01
Predicted Vapor Concentration Beneath the Foundation			**Value**	**Value**	**Value**
Subslab vapor concentration	**(ug/m3)**	**Css**	**7.6E+00**	**1.2E+02**	**2.6E+02**
		Range	4.8E-01 - 9.8E+01	7.8E+00 - 1.5E+03	1.6E+01 - 3.5E+03
	(ppbv)	**Css**	**1.6E+00**	**3.1E+01**	**4.8E+01**
		Range	9.8E-02 - 2.0E+01	2.0E+00 - 3.8E+02	3.0E+00 - 6.6E+02
Diffusive Transport Upward Through Vadose Zone			**Value**	**Value**	**Value**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	3.3E-03	3.7E-03	3.0E-03
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB	4.8E-03	5.4E-03	4.3E-03
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC	1.2E-02	1.4E-02	1.1E-02
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	5.0E-04	5.5E-04	4.4E-04
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	5.6E-03	6.3E-03	5.0E-03
Critical Parameters			**Value**	**Value**	**Value**
α for diffusive transport from source to building with	(-)	A_Param	1.4E-04	1.6E-04	1.3E-04
Pe (Peclet Number) for transport through the foundation	(-)	B_Param	2.7E+02	2.4E+02	3.0E+02
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	3.0E-03	3.0E-03

Table C-6
Residential Johnson and Ettinger Model for Groundwater at Location MW-17
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
Interpretation					
			Advection is the dominant mechanism across the foundation. Diffusion through soil is the overall rate limiting process.		
Critical Parameters					
			Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach
Non-Critical Parameters					
			Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta
Risk Calculations	**Units**	**Symbol**	**Value**	**Value**	**Value**
Risk-Based Target Screening Levels					
Target risk for carcinogens	(-)	Target_CR	1E-05	1E-05	1E-05
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1	1
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.22E+00**	**2.09E+02**	**4.78E+00**
	(ppbv)	**Target_IA**	**2.50E-01**	**5.26E+01**	**8.91E-01**
Target groundwater concentration	**(ug/L)**	**Target_GW**	**6.96E+01**	**1.46E+03**	**1.16E+02**
Incremental Risk Estimates					
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**1.9E-07**	**No IUR**	**1.6E-06**
		Range	8.0E-08 - 2.0E-07	-	7.4E-07 - 1.7E-06
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00022323**	**0.001778005**	**0.371883078**
		Range	9.6E-05 - 2.3E-04	7.2E-04 - 1.9E-03	1.7E-01 - 3.9E-01
		Total ELCR	**1.8E-06**		
		Total HI	**0.37**		

Table C-7
Residential Johnson and Ettinger Model for Groundwater at Location MW-125
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Trichloroethylene
Source Characteristics:	**Units**	**Symbol**	**Value**	**Value**
Source medium		Source	Groundwater	Groundwater
Groundwater concentration	(ug/L)	Cmedium	1.5	120
Depth below grade to water table	(m)	Ls	5.40	5.40
Average groundwater temperature	(°C)	Ts	21	21
Calc: Source vapor concentration	(ug/m3)	Cs	192	40379
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%	0.008%
Chemical:	**Units**	**Symbol**	**Value**	**Value**
Chemical Name		Chem	Chloroform	Trichloroethylene
CAS No.		CAS	67-66-3	79-01-6
Toxicity Factors				
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.30E-05	see note
Mutagenic compound		Mut	No	Yes
Reference concentration	(ug/m^3)	RfC	9.80E-02	2.00E-03
Chemical Properties:	**Units**	**Symbol**	**Value**	**Value**
Pure component water solubility	(mg/L)	S	7.95E+03	1.28E+03
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	3.67E-03	9.85E-03
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.50E-01	4.03E-01
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.28E-01	3.36E-01
Diffusivity in air	(cm2/s)	Dair	7.69E-02	6.87E-02
Diffusivity in water	(cm2/s)	Dwater	1.09E-05	1.02E-05
Building Characteristics:	**Units**	**Symbol**	**Value**	**Value**
Building setting		Bldg_Setting	Residential	Residential
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade
Depth below grade to base of foundation	(m)	Lb	0.10	0.10
Foundation thickness	(m)	Lf	0.10	0.10

Table C-7
Residential Johnson and Ettinger Model for Groundwater at Location MW-125
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Trichloroethylene
Fraction of foundation area with cracks	(-)	eta	0.001	0.001
Enclosed space floor area	(m2)	Ab	150.00	150.00
Enclosed space mixing height	(m)	Hb	2.44	2.44
Indoor air exchange rate	(1/hr)	ach	0.45	0.45
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49

Vadose zone characteristics:	**Units**	**Symbol**	**Value**	**Value**
Stratum A (Top of soil profile):				
Stratum A SCS soil type		SCS_A	Clay	Clay
Stratum A thickness (from surface)	(m)	hSA	1.22	1.22
Stratum A total porosity	(-)	nSA	0.459	0.459
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215
Stratum A bulk density	(g/cm^3)	rhoSA	1.430	1.430
Stratum B (Soil layer below Stratum A):				
Stratum B SCS soil type		SCS_B	Sandy Clay	Sandy Clay
Stratum B thickness	(m)	hSB	2.44	2.44
Stratum B total porosity	(-)	nSB	0.385	0.385
Stratum B water-filled porosity	(-)	nwSB	0.197	0.197
Stratum B bulk density	(g/cm^3)	rhoSB	1.630	1.630
Stratum C (Soil layer below Stratum B):				
Stratum C SCS soil type		SCS_C	Sand	Sand
Stratum C thickness	(m)	hSC	1.74	1.74
Stratum C total porosity	(-)	nSC	0.375	0.375
Stratum C water-filled porosity	(-)	nwSC	0.054	0.054
Stratum C bulk density	(g/cm^3)	rhoSC	1.660	1.660
Stratum directly above the water table				
Stratum A, B, or C		src_soil	Stratum C	Stratum C
Height of capillary fringe	(m)	hcz	0.170	0.170
Capillary zone total porosity	(-)	ncz	0.375	0.375
Capillary zone water filled porosity	(-)	nwcz	0.253	0.253

Table C-7
Residential Johnson and Ettinger Model for Groundwater at Location MW-125
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Trichloroethylene
Exposure Parameters:	**Units**	**Symbol**	**Value**	**Value**
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-05
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1
Exposure Scenario		Scenario	Residential	Residential
Averaging time for carcinogens	(yrs)	ATc	70	70
Averaging time for non-carcinogens	(yrs)	ATnc	26	26
Exposure duration	(yrs)	ED	26	26
Exposure frequency	(days/yr)	EF	350	350
Exposure time	(hrs/24 hrs)	ET	24	24
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72
Source to Indoor Air Attenuation Factor	**Units**	**Symbol**	**Value**	**Value**
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**1.6E-04**	**1.4E-04**
		Range	6.3E-05 - 1.7E-04	6.0E-05 - 1.5E-04
Predicted Indoor Air Concentration			**Value**	**Value**
Indoor air concentration due to vapor intrusion	**(ug/m3)**	**Cia**	**3.0E-02**	**5.7E+00**
		Range	1.2E-02 - 3.2E-02	2.4E+00 - 6.0E+00
	(ppbv)	**Cia**	**6.2E-03**	**1.1E+00**
		Range	2.5E-03 - 6.6E-03	4.5E-01 - 1.1E+00
Predicted Vapor Concentration Beneath the Foundation			**Value**	**Value**
Subslab vapor concentration	**(ug/m3)**	**Css**	**1.0E+01**	**1.9E+03**
		Range	6.4E-01 - 1.2E+02	1.2E+02 - 2.4E+04
	(ppbv)	**Css**	**2.1E+00**	**3.5E+02**
		Range	1.3E-01 - 2.5E+01	2.2E+01 - 4.5E+03
Diffusive Transport Upward Through Vadose Zone			**Value**	**Value**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	3.3E-03	3.0E-03
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB	2.0E-03	1.8E-03
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC	1.2E-02	1.1E-02
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	5.0E-04	4.4E-04
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	2.6E-03	2.3E-03
Critical Parameters			**Value**	**Value**
α for diffusive transport from source to building with	(-)	A_Param	1.7E-04	1.5E-04
Pe (Peclet Number) for transport through the foundation	(-)	B_Param	2.7E+02	3.0E+02
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	3.0E-03

Table C-7
Residential Johnson and Ettinger Model for Groundwater at Location MW-125
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Trichloroethylene
Interpretation				
			Advection is the dominant mechanism across the foundation. Diffusion through soil is the overall rate limiting process.	
Critical Parameters				
			Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach
Non-Critical Parameters				
			Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta

Risk Calculations	Units	Symbol	Value	Value
Risk-Based Target Screening Levels				
Target risk for carcinogens	(-)	Target_CR	1E-05	1E-05
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.22E+00**	**4.78E+00**
	(ppbv)	**Target_IA**	**2.50E-01**	**8.91E-01**
Target groundwater concentration	**(ug/L)**	**Target_GW**	**6.02E+01**	**1.00E+02**
Incremental Risk Estimates				
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**2.49E-07**	**1.20E-05**
		Range	9.9E-08 - 2.6E-07	5.0E-06 - 1.3E-05
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.000297375**	**2.741348469**
		Range	1.2E-04 - 3.1E-04	1.2E+00 - 2.9E+00
		Total Risk	**1.2E-05**	
		Total Hazard	**2.7**	

Table C-8
Residential Johnson and Ettinger Model for Groundwater at Location MW-128
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Trichloroethylene
Source Characteristics:	**Units**	**Symbol**	**Value**	**Value**
Source medium		Source	Groundwater	Groundwater
Groundwater concentration	(ug/L)	Cmedium	5.2	3.4
Depth below grade to water table	(m)	Ls	8.08	8.08
Average groundwater temperature	(°C)	Ts	21	21
Calc: Source vapor concentration	(ug/m3)	Cs	667	1144
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%	0.000%
Chemical:	**Units**	**Symbol**	**Value**	**Value**
Chemical Name		Chem	Chloroform	Trichloroethylene
CAS No.		CAS	67-66-3	79-01-6
Toxicity Factors				
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.30E-05	see note
Mutagenic compound		Mut	No	Yes
Reference concentration	(ug/m^3)	RfC	9.80E-02	2.00E-03
Chemical Properties:	**Units**	**Symbol**	**Value**	**Value**
Pure component water solubility	(mg/L)	S	7.95E+03	1.28E+03
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	3.67E-03	9.85E-03
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.50E-01	4.03E-01
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.28E-01	3.36E-01
Diffusivity in air	(cm2/s)	Dair	7.69E-02	6.87E-02
Diffusivity in water	(cm2/s)	Dwater	1.09E-05	1.02E-05
Building Characteristics:	**Units**	**Symbol**	**Value**	**Value**
Building setting		Bldg_Setting	Residential	Residential
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade
Depth below grade to base of foundation	(m)	Lb	0.10	0.10
Foundation thickness	(m)	Lf	0.10	0.10
Fraction of foundation area with cracks	(-)	eta	0.001	0.001
Enclosed space floor area	(m2)	Ab	150.00	150.00
Enclosed space mixing height	(m)	Hb	2.44	2.44
Indoor air exchange rate	(1/hr)	ach	0.45	0.45
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49

Vadose zone characteristics:	**Units**	**Symbol**	**Value**	**Value**
Stratum A (Top of soil profile):				
Stratum A SCS soil type		SCS_A	Clay	Clay
Stratum A thickness (from surface)	(m)	hSA	3.05	3.05
Stratum A total porosity	(-)	nSA	0.459	0.459
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215
Stratum A bulk density	(g/cm^3)	rhoSA	1.430	1.430

Table C-8
Residential Johnson and Ettinger Model for Groundwater at Location MW-128
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Trichloroethylene
Stratum B (Soil layer below Stratum A):				
Stratum B SCS soil type		SCS_B	Sand	Sand
Stratum B thickness	(m)	hSB	5.03	5.03
Stratum B total porosity	(-)	nSB	0.375	0.375
Stratum B water-filled porosity	(-)	nwSB	0.054	0.054
Stratum B bulk density	(g/cm^3)	rhoSB	1.660	1.660
Stratum C (Soil layer below Stratum B):				
Stratum C SCS soil type		SCS_C		
Stratum C thickness	(m)	hSC		
Stratum C total porosity	(-)	nSC	0.482	0.482
Stratum C water-filled porosity	(-)	nwSC	0.198	0.198
Stratum C bulk density	(g/cm^3)	rhoSC	1.370	1.370
Stratum directly above the water table				
Stratum A, B, or C		src_soil	Stratum B	Stratum B
Height of capillary fringe	(m)	hcz	0.170	0.170
Capillary zone total porosity	(-)	ncz	0.375	0.375
Capillary zone water filled porosity	(-)	nwcz	0.253	0.253
Exposure Parameters:	**Units**	**Symbol**	**Value**	**Value**
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-05
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1
Exposure Scenario		Scenario	Residential	Residential
Averaging time for carcinogens	(yrs)	ATc	70	70
Averaging time for non-carcinogens	(yrs)	ATnc	26	26
Exposure duration	(yrs)	ED	26	26
Exposure frequency	(days/yr)	EF	350	350
Exposure time	(hrs/24 hrs)	ET	24	24
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72

Source to Indoor Air Attenuation Factor	**Units**	**Symbol**	**Value**	**Value**
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.0E-04**	**1.8E-04**
		Range	6.8E-05 - 2.1E-04	6.5E-05 - 1.9E-04
Predicted Indoor Air Concentration			**Value**	**Value**
Indoor air concentration due to vapor intrusion	**(ug/m3)**	**Cia**	**1.3E-01**	**2.0E-01**
		Range	4.5E-02 - 1.4E-01	7.4E-02 - 2.1E-01
	(ppbv)	**Cia**	**2.7E-02**	**3.7E-02**
		Range	9.2E-03 - 2.8E-02	1.4E-02 - 4.0E-02
Predicted Vapor Concentration Beneath the Foundation			**Value**	**Value**
Subslab vapor concentration	**(ug/m3)**	**Css**	**4.3E+01**	**6.7E+01**
		Range	2.8E+00 - 4.5E+02	4.3E+00 - 7.4E+02
	(ppbv)	**Css**	**8.9E+00**	**1.2E+01**
		Range	5.7E-01 - 9.2E+01	7.9E-01 - 1.4E+02
Diffusive Transport Upward Through Vadose Zone			**Value**	**Value**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	3.3E-03	3.0E-03
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB	1.2E-02	1.1E-02
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	5.0E-04	4.4E-04
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	4.9E-03	4.4E-03
Critical Parameters			**Value**	**Value**
α for diffusive transport from source to building with	(-)	A_Param	2.1E-04	1.9E-04
Pe (Peclet Number) for transport through the foundation	(-)	B_Param	2.7E+02	3.0E+02
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	3.0E-03

Table C-8
Residential Johnson and Ettinger Model for Groundwater at Location MW-128
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.	Chloroform	Trichloroethylene
Interpretation		
	Advection is the dominant mechanism across the foundation. Diffusion through soil is the overall rate limiting process.	
Critical Parameters		
	Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach
Non-Critical Parameters		
	Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta

Risk Calculations	Units	Symbol	Value	Value
Risk-Based Target Screening Levels				
Target risk for carcinogens	(-)	Target_CR	1E-05	1E-05
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.22E+00**	**4.78E+00**
	(ppbv)	**Target_IA**	**2.50E-01**	**8.91E-01**
Target groundwater concentration	**(ug/L)**	**Target_GW**	**4.87E+01**	**8.10E+01**
Incremental Risk Estimates				
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**1.07E-06**	**4.20E-07**
		Range	3.7E-07 - 1.1E-06	1.6E-07 - 4.4E-07
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.001276405**	**0.096298901**
		Range	4.4E-04 - 1.4E-03	3.6E-02 - 1.0E-01
		Total ELCR	**1.5E-06**	
		Total HI	**0.098**	

Table C-9
Residential Johnson and Ettinger Model for Groundwater at Location MW-130
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
Source Characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Source medium		Source	Groundwater	Groundwater	Groundwater
Groundwater concentration	(ug/L)	Cmedium	1.9	4.6	73.6
Depth below grade to water table	(m)	Ls	8.53	8.53	8.53
Average groundwater temperature	(^{o}C)	Ts	21	21	21
Calc: Source vapor concentration	(ug/m3)	Cs	244	4304	24766
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%	0.000%	0.005%
Chemical:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Chemical Name		Chem	Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
CAS No.		CAS	67-66-3	75-35-4	79-01-6
Toxicity Factors					
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.30E-05	Not Available	see note
Mutagenic compound		Mut	No	No	Yes
Reference concentration	(ug/m^3)	RfC	9.80E-02	2.00E-01	2.00E-03
Chemical Properties:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Pure component water solubility	(mg/L)	S	7.95E+03	2.42E+03	1.28E+03
Henry's Law Constant @ 25^{o}C	($atm\text{-}m^3/mol$)	Hc	3.67E-03	2.61E-02	9.85E-03
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	1.50E-01	1.07E+00	4.03E-01
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.28E-01	9.36E-01	3.36E-01
Diffusivity in air	(cm2/s)	Dair	7.69E-02	8.63E-02	6.87E-02
Diffusivity in water	(cm2/s)	Dwater	1.09E-05	1.10E-05	1.02E-05
Building Characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Building setting		Bldg_Setting	Residential	Residential	Residential
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade	Slab-on-grade
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.10
Foundation thickness	(m)	Lf	0.10	0.10	0.10

Table C-9
Residential Johnson and Ettinger Model for Groundwater at Location MW-130
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.001
Enclosed space floor area	(m2)	Ab	150.00	150.00	150.00
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.44
Indoor air exchange rate	(1/hr)	ach	0.45	0.45	0.45
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0030
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	164.70
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	0.49

Vadose zone characteristics:	**Units**	**Symbol**	**Value**	**Value**	**Value**
Stratum A (Top of soil profile):					
Stratum A SCS soil type		SCS_A	Clay	Clay	Clay
Stratum A thickness (from surface)	(m)	hSA	2.74	2.74	2.74
Stratum A total porosity	(-)	nSA	0.459	0.459	0.459
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215	0.215
Stratum A bulk density	(g/cm^3)	rhoSA	1.430	1.430	1.430
Stratum B (Soil layer below Stratum A):					
Stratum B SCS soil type		SCS_B	Sand	Sand	Sand
Stratum B thickness	(m)	hSB	5.79	5.79	5.79
Stratum B total porosity	(-)	nSB	0.375	0.375	0.375
Stratum B water-filled porosity	(-)	nwSB	0.054	0.054	0.054
Stratum B bulk density	(g/cm^3)	rhoSB	1.660	1.660	1.660
Stratum C (Soil layer below Stratum B):					
Stratum C SCS soil type		SCS_C	Not Present	Not Present	Not Present
Stratum C thickness	(m)	hSC			
Stratum C total porosity	(-)	nSC			
Stratum C water-filled porosity	(-)	nwSC			
Stratum C bulk density	(g/cm^3)	rhoSC			
Stratum directly above the water table					
Stratum A, B, or C		src_soil	Stratum B	Stratum B	Stratum B
Height of capillary fringe	(m)	hcz	0.170	0.170	0.170
Capillary zone total porosity	(-)	ncz	0.375	0.375	0.375
Capillary zone water filled porosity	(-)	nwcz	0.253	0.253	0.253

Table C-9
Residential Johnson and Ettinger Model for Groundwater at Location MW-130
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

Exposure Parameters:	Units	Symbol	Chloroform Value	Dichloroethylene, 1,1- Value	Trichloroethylene Value
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-05	1.00E-05
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	1
Exposure Scenario		Scenario	Residential	Residential	Residential
Averaging time for carcinogens	(yrs)	ATc	70	70	70
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	26
Exposure duration	(yrs)	ED	26	26	26
Exposure frequency	(days/yr)	EF	350	350	350
Exposure time	(hrs/24 hrs)	ET	24	24	24
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	72

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Value	Value
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.0E-04**	**2.2E-04**	**1.8E-04**
		Range	6.8E-05 - 2.1E-04	7.1E-05 - 2.4E-04	6.6E-05 - 1.9E-04
Predicted Indoor Air Concentration			**Value**	**Value**	**Value**
Indoor air concentration due to vapor intrusion	**(ug/m3)**	**Cia**	**4.9E-02**	**9.5E-01**	**4.4E+00**
		Range	1.7E-02 - 5.2E-02	3.0E-01 - 1.0E+00	1.6E+00 - 4.7E+00
	(ppbv)	**Cia**	**9.9E-03**	**2.4E-01**	**8.2E-01**
		Range	3.4E-03 - 1.1E-02	7.7E-02 - 2.6E-01	3.0E-01 - 8.7E-01
Predicted Vapor Concentration Beneath the Foundation			**Value**	**Value**	**Value**
Subslab vapor concentration	**(ug/m3)**	**Css**	**1.6E+01**	**3.2E+02**	**1.5E+03**
		Range	1.0E+00 - 1.7E+02	2.0E+01 - 3.0E+03	9.4E+01 - 1.6E+04
	(ppbv)	**Css**	**3.3E+00**	**8.0E+01**	**2.7E+02**
		Range	2.1E-01 - 3.4E+01	5.2E+00 - 7.7E+02	1.7E+01 - 3.0E+03
Diffusive Transport Upward Through Vadose Zone			**Value**	**Value**	**Value**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	3.3E-03	3.7E-03	3.0E-03
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB	1.2E-02	1.4E-02	1.1E-02
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC			
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	5.0E-04	5.5E-04	4.4E-04
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	5.3E-03	5.9E-03	4.7E-03
Critical Parameters			**Value**	**Value**	**Value**
α for diffusive transport from source to building with	(-)	A_Param	2.1E-04	2.4E-04	1.9E-04
Pe (Peclet Number) for transport through the foundation	(-)	B_Param	2.7E+02	2.4E+02	3.0E+02
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	3.0E-03	3.0E-03

Table C-9
Residential Johnson and Ettinger Model for Groundwater at Location MW-130
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

	Chloroform	Dichloroethylene, 1,1-	Trichloroethylene
Interpretation			
	Advection is the dominant mechanism across the foundation. Diffusion through soil is the overall rate limiting process.		
Critical Parameters			
	Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach	Hb, Ls, DeffT, ach
Non-Critical Parameters			
	Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta

Risk Calculations	Units	Symbol	Value	Value	Value
Risk-Based Target Screening Levels					
Target risk for carcinogens	(-)	Target_CR	1E-05	1E-05	1E-05
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1	1
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.22E+00**	**2.09E+02**	**4.78E+00**
	(ppbv)	**Target_IA**	**2.50E-01**	**5.26E+01**	**8.91E-01**
Target groundwater concentration	**(ug/L)**	**Target_GW**	**4.78E+01**	**1.01E+03**	**7.95E+01**
Incremental Risk Estimates					
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**4.0E-07**	**No IUR**	**9.3E-06**
		Range	1.4E-07 - 4.2E-07	-	3.4E-06 - 9.8E-06
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00047514**	**0.004566546**	**2.124010767**
		Range	1.6E-04 - 5.1E-04	1.5E-03 - 4.9E-03	7.8E-01 - 2.3E+00
		Total ELCR	**9.7E-06**		
		Total HI	**2.1**		

Table C-10
Residential Johnson and Ettinger Model for Groundwater at Location MW-150
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Trichloroethylene
Source Characteristics:	**Units**	**Symbol**	**Value**	**Value**
Source medium		Source	Groundwater	Groundwater
Groundwater concentration	(ug/L)	Cmedium	1.5	91.4
Depth below grade to water table	(m)	Ls	3.66	3.66
Average groundwater temperature	(°C)	Ts	21	21
Calc: Source vapor concentration	(ug/m3)	Cs	192	30755
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%	0.006%
Chemical:	**Units**	**Symbol**	**Value**	**Value**
Chemical Name		Chem	Chloroform	Trichloroethylene
CAS No.		CAS	67-66-3	79-01-6
Toxicity Factors				
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.30E-05	see note
Mutagenic compound		Mut	No	Yes
Reference concentration	(ug/m^3)	RfC	9.80E-02	2.00E-03
Chemical Properties:	**Units**	**Symbol**	**Value**	**Value**
Pure component water solubility	(mg/L)	S	7.95E+03	1.28E+03
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	3.67E-03	9.85E-03
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	1.50E-01	4.03E-01
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.28E-01	3.36E-01
Diffusivity in air	(cm2/s)	Dair	7.69E-02	6.87E-02
Diffusivity in water	(cm2/s)	Dwater	1.09E-05	1.02E-05
Building Characteristics:	**Units**	**Symbol**	**Value**	**Value**
Building setting		Bldg_Setting	Residential	Residential
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade
Depth below grade to base of foundation	(m)	Lb	0.10	0.10
Foundation thickness	(m)	Lf	0.10	0.10

Table C-10
Residential Johnson and Ettinger Model for Groundwater at Location MW-150
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Trichloroethylene
Fraction of foundation area with cracks	(-)	eta	0.001	0.001
Enclosed space floor area	(m2)	Ab	150.00	150.00
Enclosed space mixing height	(m)	Hb	2.44	2.44
Indoor air exchange rate	(1/hr)	ach	0.45	0.45
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49

Vadose zone characteristics:	**Units**	**Symbol**	**Value**	**Value**
Stratum A (Top of soil profile):				
Stratum A SCS soil type		SCS_A	Clay	Clay
Stratum A thickness (from surface)	(m)	hSA	2.44	2.44
Stratum A total porosity	(-)	nSA	0.459	0.459
Stratum A water-filled porosity	(-)	nwSA	0.215	0.215
Stratum A bulk density	(g/cm^3)	rhoSA	1.430	1.430
Stratum B (Soil layer below Stratum A):				
Stratum B SCS soil type		SCS_B	Sand	Sand
Stratum B thickness	(m)	hSB	1.22	1.22
Stratum B total porosity	(-)	nSB	0.375	0.375
Stratum B water-filled porosity	(-)	nwSB	0.054	0.054
Stratum B bulk density	(g/cm^3)	rhoSB	1.660	1.660
Stratum C (Soil layer below Stratum B):				
Stratum C SCS soil type		SCS_C	Not Present	Not Present
Stratum C thickness	(m)	hSC		
Stratum C total porosity	(-)	nSC		
Stratum C water-filled porosity	(-)	nwSC		
Stratum C bulk density	(g/cm^3)	rhoSC		
Stratum directly above the water table				
Stratum A, B, or C		src_soil	Stratum B	Stratum B
Height of capillary fringe	(m)	hcz	0.170	0.170
Capillary zone total porosity	(-)	ncz	0.375	0.375
Capillary zone water filled porosity	(-)	nwcz	0.253	0.253

Table C-10
Residential Johnson and Ettinger Model for Groundwater at Location MW-150
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

			Chloroform	Trichloroethylene
Exposure Parameters:	**Units**	**Symbol**	**Value**	**Value**
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-05
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1
Exposure Scenario		Scenario	Residential	Residential
Averaging time for carcinogens	(yrs)	ATc	70	70
Averaging time for non-carcinogens	(yrs)	ATnc	26	26
Exposure duration	(yrs)	ED	26	26
Exposure frequency	(days/yr)	EF	350	350
Exposure time	(hrs/24 hrs)	ET	24	24
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72
Source to Indoor Air Attenuation Factor	**Units**	**Symbol**	**Value**	**Value**
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.7E-04**	**2.5E-04**
		Range	7.5E-05 - 3.0E-04	7.3E-05 - 2.7E-04
Predicted Indoor Air Concentration			**Value**	**Value**
Indoor air concentration due to vapor intrusion	**(ug/m3)**	**Cia**	**5.2E-02**	**7.5E+00**
		Range	1.4E-02 - 5.7E-02	2.2E+00 - 8.2E+00
	(ppbv)	**Cia**	**1.1E-02**	**1.4E+00**
		Range	3.0E-03 - 1.2E-02	4.2E-01 - 1.5E+00
Predicted Vapor Concentration Beneath the Foundation			**Value**	**Value**
Subslab vapor concentration	**(ug/m3)**	**Css**	**1.7E+01**	**2.5E+03**
		Range	1.1E+00 - 1.4E+02	1.6E+02 - 2.2E+04
	(ppbv)	**Css**	**3.6E+00**	**4.7E+02**
		Range	2.4E-01 - 3.0E+01	3.0E+01 - 4.2E+03
Diffusive Transport Upward Through Vadose Zone			**Value**	**Value**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	3.3E-03	3.0E-03
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB	1.2E-02	1.1E-02
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	5.0E-04	4.4E-04
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	3.2E-03	2.8E-03
Critical Parameters			**Value**	**Value**
α for diffusive transport from source to building with	(-)	A_Param	3.0E-04	2.7E-04
Pe (Peclet Number) for transport through the foundation	(-)	B_Param	2.7E+02	3.0E+02
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	3.0E-03

Table C-10
Residential Johnson and Ettinger Model for Groundwater at Location MW-150
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Table of Inputs and Outputs for Multiple Chemicals

Note: Parameters other than the chemical concentration must be entered in the MODEL sheet and must be the same for all chemicals. Warnings and errors are displayed in only on the MODEL sheet.

	Chloroform	Trichloroethylene
Interpretation		
	Advection is the dominant mechanism across the foundation. Diffusion through soil and advection through foundation both control intrusion.	
Critical Parameters		
	Hb, Ls, DeffT, ach, Qsoil_Qb	Hb, Ls, DeffT, ach
Non-Critical Parameters		
	Lf, DeffA, eta	Qsoil_Qb, Lf, DeffA, eta

Risk Calculations	Units	Symbol	Value	Value
Risk-Based Target Screening Levels				
Target risk for carcinogens	(-)	Target_CR	1E-05	1E-05
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	1
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.22E+00**	**4.78E+00**
	(ppbv)	**Target_IA**	**2.50E-01**	**8.91E-01**
Target groundwater concentration	**(ug/L)**	**Target_GW**	**3.49E+01**	**5.79E+01**
Incremental Risk Estimates				
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**4.30E-07**	**1.58E-05**
		Range	1.2E-07 - 4.7E-07	4.7E-06 - 1.7E-05
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.000513614**	**3.619006526**
		Range	1.4E-04 - 5.6E-04	1.1E+00 - 3.9E+00
		Total Risk	**1.6E-05**	
		Total Hazard	**3.6**	

Table C-11
Commercial Johnson and Ettinger Model for Soil Gas at Location SVP-01 Alabama
Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Model Input **Site Name/Run Number:** SVP-01

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Exterior Soil Gas					
Soil gas concentration	(ug/m3)	Cmedium	30,000		NA			
Depth below grade to soil gas sample	(m)	Ls	0.76		Vary - 50	NA		
Average vadose zone temperature	(°C)	Ts	21	25	3-30			
Calc: Source vapor concentration	(ug/m3)	Cs	30000					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.006%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	see note	see note	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Building Characteristics:

Select Building Assumptions

◉ Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)

○ Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA		
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table C-11
mercial Johnson and Ettinger Model for Soil Gas at Location SVP-01
ama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
:gomery, Alabama

Model Input **Site Name/Run Number:** SVP-01

Chemical Name: Trichloroethylene CAS No. 79-01-6

Depth below grade to soil gas sample: 0.76 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Sandy Clay					
Stratum A thickness (from surface)	(m)	hSA	0.76					
Stratum A total porosity	(-)	nSA	0.385	0.385	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.197	0.197	0.117 - 0.28	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.630	1.630	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B						
Stratum B thickness	(m)	hSB						
Stratum B total porosity	(-)	nSB	0.482	0.482	NA	NA		
Stratum B water-filled porosity	(-)	nwSB	0.198	0.198	NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB	1.370	1.370	NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C						
Stratum C thickness	(m)	hSC						
Stratum C total porosity	(-)	nSC	0.482	0.482	NA	NA		
Stratum C water-filled porosity	(-)	nwSC	0.198	0.198	NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC	1.370	1.370	NA	NA		
Stratum containing soil gas sample								
Stratum A, B, or C		src_soil	Stratum A					
					NA	NA		
					NA			
					NA			

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-06	NA	NA	Target risk set at ADEM (2017) target risk level.	
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		

Table C-11
Commercial Johnson and Ettinger Model for Soil Gas at Location SVP-01
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Model Output **Site Name/Run Number:** SVP-01

Chemical Name: Trichloroethylene CAS No. 79-01-6

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Soil gas to indoor air attenuation coefficient	(-)	alpha	2.4E-04	7.2E-05 - 2.6E-04	2.4E-04	7.2E-05 - 2.6E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	7.1E+00	2.2E+00 - 7.7E+00	7.1E+00	2.2E+00 - 7.7E+00		
	(ppbv)		1.3E+00	4.0E-01 - 1.4E+00	1.3E+00	4.0E-01 - 1.4E+00		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	Css	2.4E+03	1.5E+02 - 2.2E+04	2.4E+03	2.2E+04 - 7.7E+04		
	(ppbv)		4.4E+02	2.9E+01 - 4.0E+03	4.4E+02	4.0E+03 - 1.4E+04		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	1.8E-03	-	1.8E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
				-		-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.8E-03	-	1.8E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.6E-04	-	2.6E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	4.1E+03	1.4E+02 - 6.9E+04	4.1E+03	1.4E+02 - 6.9E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

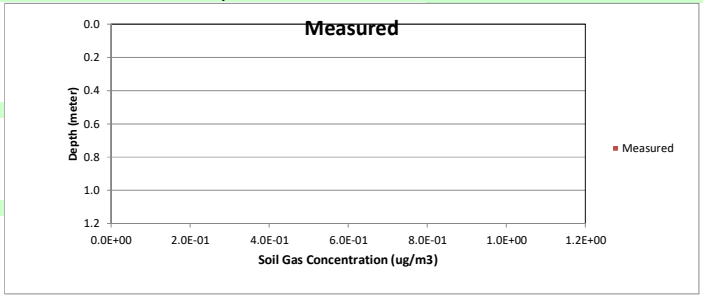


Table C-11
Commercial Johnson and Ettinger Model for Soil Gas at Location SVP-01
Alabama Department of Transportation (ALDOT) – Coliseum Boulevard Plume (CBP)
Montgomery, Alabama

Model Output **Site Name/Run Number:** SVP-01
Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels	**Scenario: Commercial**							
Target risk for carcinogens	(-)	Target_CR	1E-05	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**2.05E+01**	-	**2.05E+00**	-		Target indoor air concentration based on both cancer risk and non-cancer toxicity
	(ppbv)		**3.82E+00**	-	**3.82E-01**	-		
Target soil gas concentration	**(ug/m3)**	**Target_SV**	**8.61E+04**	**8.0E+04 - 2.8E+05**	**8.61E+03**	**8.0E+03 - 2.8E+04**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**9.27E-06**	**2.8E-06 - 1.0E-05**	**9.27E-06**	**2.8E-06 - 1.0E-05**		
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**8.16E-01**	**2.5E-01 - 8.8E-01**	**8.15E-01**	**2.5E-01 - 8.8E-01**		

APPENDIX D
Boring and Well Construction Logs

TTL, Inc.

PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

COLISEUM BLVD. PLUME

LOG OF BORING MW 104 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	C. Krafcheck
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	11/20/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	217.68 Ft. AMSL
REMARKS	*ALDOT Parking Lot/Location "S"	**GROUND ELEVATION**	218.20 Ft. AMSL
		DEPTH TO WATER	22.93 Ft. BMP
		WATER ELEVATION	194.75 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE	WELL DIAGRAM
0					0	Clay, yellowish-brown (10YR 5/8), sandy		Well Cover
					0			
					0			
					0			
					0	Red (2.5YR 4/8)		
					0			
5		CL			0			
					0			
					0			
					0			
					0			
					0			Cement/bentonite grout
10		SC			0	Sand, yellowish-red (5YR 5/4), fine-grained, clayey w/mica		
					0			
					0			
					0	Sand, brownish-yellow (10YR 6/8), fine to very coarse gravel, approx. 30% fine to coarse gravel		
					0			
					0			
15					0			
					0			
					0			
					0			
					0	Fine to very coarse grained w/approx. 5% gravel w/mica & glauconite		Bentonite pellets
20					0			Sand filter pack
		SW SM			0			
						19-29 ft. interval; approx. 50% recovery		
							12/27/01	
25								9 ft. 0.010-in. slotted screen
30		SC				Sand, pale yellow (2.5YR 6/4), fine to very coarse grained, w/approx. 5% fine to very coarse gravel w/mica & glauconite		Well tip
						Sand, pale yellow & brownish-yellow (10YR 6/8), fine to med. grained, clayey w/mica & glauconite		
						BORING TERMINATED AT 31 FEET.		

Coliseum Blvd. Plume
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TTL, Inc.

PRACTICING IN THE GEOSCIENCES
Tuscaloosa - Montgomery - Florence

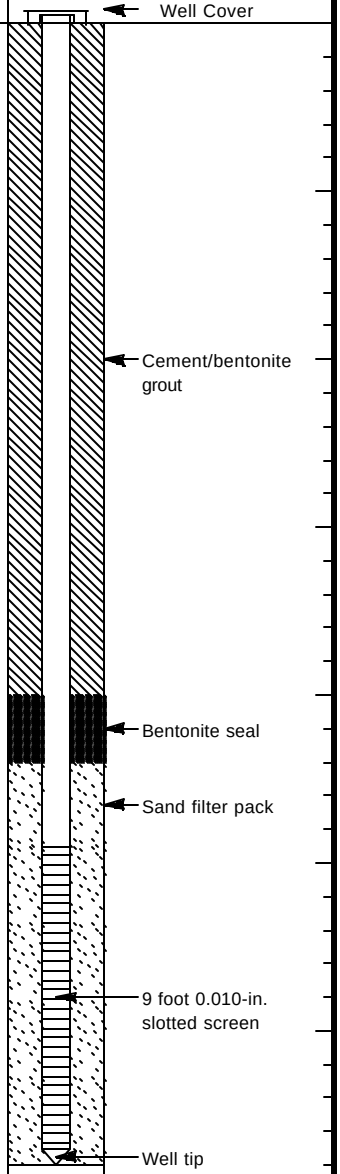
MAYNARD, COOPER & GALE
COLISEUM BLVD. PLUME

LOG OF BORING
MW 106
& WELL
CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	C. Krafcheck
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	11/05/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	222.24 Ft. AMSL
REMARKS	*ALDOT Facility/Location "N"	**GROUND ELEVATION**	222.50 Ft. AMSL
		DEPTH TO WATER	26.60 Ft. BMP
		WATER ELEVATION	195.64 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
		SM			0	Sand, reddish-yellow (7.5YR 6/8), fine to coarse grained w/gravel	
					0		
					0	Clay, dark reddish-brown (2.5Y 3/3), fine grained sand	
					0	Red (2.5YR 5/6)	
					0		
5					0	Strong brown (7.5YR 5/8), pale yellow (5Y 8/3) & light gray (10YR 7/1), fine grained, micaceous	
					0		
					0		
					0		
					0	(0-9 ft. interval; 75% recovery)	
10		CL			0		
					0		
					0		
					0		
					0		
					0		
15					0		
					0		
					0	Clay, strong brown (7.5YR 5/8), light gray (10YR 7/1), & very pale brown (10YR 7/4), sandy, micaceous	
					0		
		SM			0	Sand, strong brown (7.5YR 5/6), fine to coarse grained, w/mica & glauconite	
					0		
20					0	Sand, dark yellowish-brown (10YR 4/8), fine to coarse grained, w/approx. 15% fine to very coarse gravel	
					0	Sand, brownish-yellow (10YR 6/8), fine to coarse grained w/mica & glauconite	
						Sand, brownish-yellow (10YR 6/8), fine to coarse grained w/approx. 15% fine to very coarse gravel, w/mica & glauconite	
25		SP SM					11/13/01
						(19-29 ft. interval; 50% recovery)	
30						Sand, brownish-yellow, fine to very coarse grained, w/mica & glauconite	
		SM					
						BORING TERMINATED AT 34 FEET.	

WELL DIAGRAM



Coliseum Blvd. Plume
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TTL, Inc.

PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

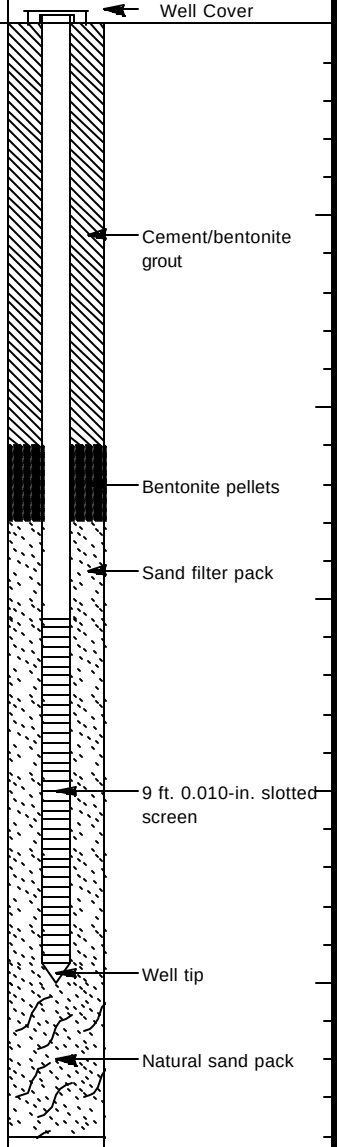
COLISEUM BLVD. PLUME

LOG OF BORING MW 108 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	11/02/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	212.59 Ft. AMSL
REMARKS	*ALDOT Facility/Location "R"	**GROUND ELEVATION**	212.80 Ft. AMSL
		DEPTH TO WATER	17.25 Ft. BMP
		WATER ELEVATION	195.34 Ft. AMSL

DEPTH (feet)	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
0	SM			0	SAND, fine grained, strong brown (7.5YR 4/6), clayey	
				0	CLAY, strong brown & reddish-yellow (7.5YR 6/3), sandy	
				0		
				0		
				0		
5				0		
				0		
				0		
	CL			0		
				0		
10				0		
				0		
				0		
				0		
				0		
15				0	Light gray (5Y 7/1) & brownish-yellow (10YR 6/8), silty	
				0		
	SM			0	SAND, brownish-yellow (10YR 6/8), fine grained, silty	11/15/01
				0		
20				0	SAND, brownish-yellow (10YR 6/6), fine to very coarse grained w/approx. 30% fine to very coarse gravel	
	SW SP			0		
					SAND, pale yellow (5Y 8/2) & light olive brown (2.5Y 5/3), fine to coarse grained, w/mica	
					Yellow (10YR 7/8) & white (5Y 8/1), fine to med. grained, clayey & silty w/mica & glauconite	
25	SM				Brownish-yellow (10YR 6/8) & pale yellow (5Y 8/2), fine grained w/mica & glauconite, silty	
					BORING TERMINATED AT 29 FEET.	

WELL DIAGRAM



Coliseum Blvd. Plume

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TTL, Inc.

PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

COLISEUM BLVD. PLUME

LOG OF BORING MW 109 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	10/29/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	220.91 Ft. AMSL
REMARKS	*ALDOT Facility/Location "T"	**GROUND ELEVATION**	221.00 Ft. AMSL
		DEPTH TO WATER	25.37 Ft. BMP
		WATER ELEVATION	195.54 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
0		ML			0	SILT, strong brown (7.5YR 4/6), sandy	
					0	CLAY, red (2.5YR 4/6), sandy	
					0		
					0		
					0		
5		CL			0		
					0		
					0		
					0		
					0	SILT, red (2.5YR 4/8) & brownish-yellow (10YR 6/8), sandy, w/mica	
					0		
10		ML			0		
					0		
					0		
					0		
					0		
15					0		
					0		
					0		
					0	SAND, reddish-yellow (7.5YR 6/8), fine to med. grained, w/mica	
					0		
					0		
20		SM			0		
						SAND, strong brown (7.5YR 5/8), fine to very coarse grained, w/approx. 5% fine to coarse gravel	
25						Yellow (10YR 7/6), fine to med. grained, w/mica & glauconite	11/20/01
						SAND, pale yellow (5Y 8/2), fine to very coarse grained w/approx. 40% fine to coarse gravel	
30		SP SW					
						SAND, pale yellow (5Y 8/2) & brownish-yellow (10YR 6/8), fine to med. grained, slightly clayey	
		SC					

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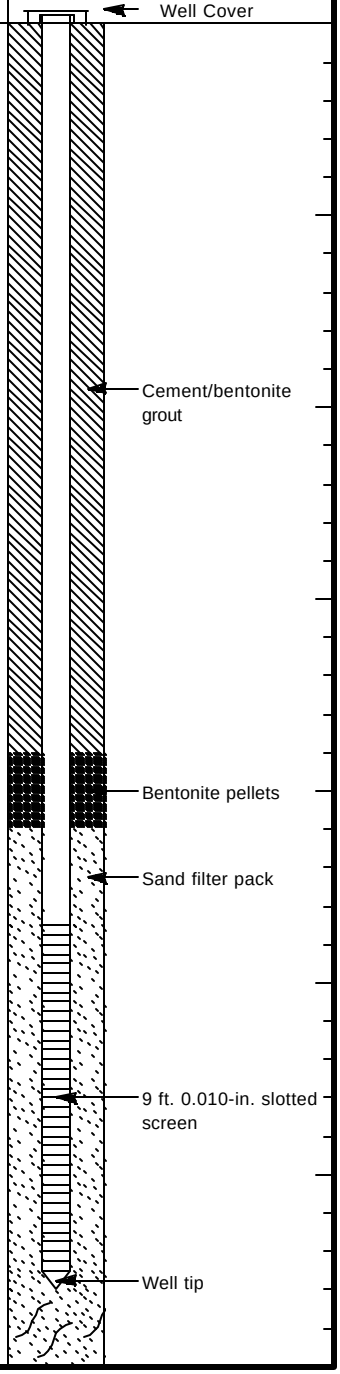
WELL DIAGRAM



Coliseum Blvd. Plume

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TTL, Inc.

PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

COLISEUM BLVD. PLUME

LOG OF BORING MW 109 & WELL CONSTRUCTION

PROJECT NUMBER 0700-024 **GEOLOGIST** S. Grammas

LOCATION Montgomery, AL* **DATE(S) DRILLED** 10/29/2001

Continued from Previous Page

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE: INTERVAL (feet)	SAMPLE: % RECOVERY	SAMPLE: PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE	WELL DIAGRAM
		SM				SAND, pale yellow & brownish-yellow, fine to med. grained, w/mica & glauconite		Natural sand pack
						BORING TERMINATED AT 39 FEET.		

Coliseum Blvd. Plume

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Tuscaloosa - Montgomery - Florence

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LOG OF BORING MW 111 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	C. Krafcheck
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	11/06/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	201.52 Ft. AMSL
REMARKS	*Christian Laboratory/Location "H"	**GROUND ELEVATION**	201.70 Ft. AMSL
		DEPTH TO WATER	37.28 Ft. BMP
		WATER ELEVATION	164.24 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE	WELL DIAGRAM
					0	Sand, reddish-brown (5YR 4/4), fine grained, silty w/gravel		Well Cover
		SM			0			
					0			
					0			
					0			
5					0	Clay, red (2.5YR 4/8), sandy, fine grained w/mica		
		CL			0			
					0			
					0			
					0			
					0			
		SM			0	Sand, very dark grayish-brown (10YR 3/2), fine to coarse grained		
10					0			
		CL			0	Clay, yellowish-red (5YR 5/8) & light gray (2.5Y 7/2), sandy w/mica, stiff		
					0			
					0	Sand, strong brown (7.5YR 5/8), reddish-yellow (7.5YR 6/8), pink (7.5YR 7/4) & reddish-yellow (7.5YR 7/6), fine to very coarse grained, w/approx. 50% fine to very coarse gravel		
					0			
15					0			Cement/bentonite grout
					0			
					0			
					0	(19-29 ft. interval; 25% recovery)		
20		SP SW			0			
					0			
					0			
					0			
					0			
					0			
25					0			
					0			
					0			
					0			
					0			
30		GP GW			0	Gravel, fine to very coarse, w/fine to very coarse sand, clayey		
					0			
					0			
					0	Sand, pale yellow (2.5Y 8/2) & yellow (2.5Y 7/8), fine to med. grained, silty w/mica		Bentonite seal
					0			
					0			

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Coliseum Blvd. Plume
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TTL, Inc.

PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

COLISEUM BLVD. PLUME

LOG OF BORING MW 111 & WELL CONSTRUCTION

PROJECT NUMBER 0700-024

LOCATION Montgomery, AL*

GEOLOGIST C. Krafcheck

DATE(S) DRILLED 11/06/2001

Continued from Previous Page

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE: INTERVAL (feet)	SAMPLE: % RECOVERY	SAMPLE: PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE	WELL DIAGRAM
					0		11/13/01	Sand filter pack
40		SM						9 foot 0.010-in. slotted screen
45								Well tip
						BORING TERMINATED AT 46 FEET.		

Coliseum Blvd. Plume

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PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

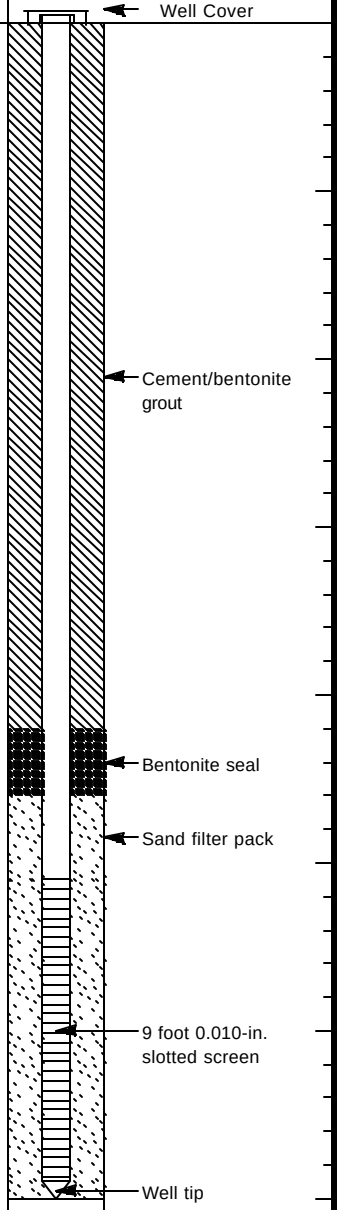
COLISEUM BLVD. PLUME

LOG OF BORING MW 112 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	C. Krafcheck
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	11/13/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	220.34 Ft. AMSL
REMARKS	*Newell Parkway/Location "AD"	**GROUND ELEVATION**	220.60 Ft. AMSL
		DEPTH TO WATER	28.56 Ft. BMP
		WATER ELEVATION	191.78 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
0		CL	0 - 9	67	0	Clay, red (2.5YR 4/8), fine grained, sandy	
5		ML			0	Silt, red, sandy	
10		SM	9 - 19	60	0	Sand, yellow (10YR 5/8) & brownish-yellow (10YR 6/8), fine to coarse grained, w/approx. 5% fine to coarse gravel	
15					0		
20			19 - 29	50	0	Sand, dark-yellowish brown (10YR 4/6), pale yellow (2.5Y 8/13) & brownish-yellow (10YR 6/8), fine to very coarse w/approx. 5% fine to very coarse gravel	
25					0		
30							12/6/01
35						Sand, brownish-yellow (10YR 6/8), fine to coarse grained, w/approx. 5% fine to coarse gravel	
						BORING TERMINATED AT 35 FEET.	

WELL DIAGRAM



Coliseum Blvd. Plume

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TTL, Inc.

PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

COLISEUM BLVD. PLUME

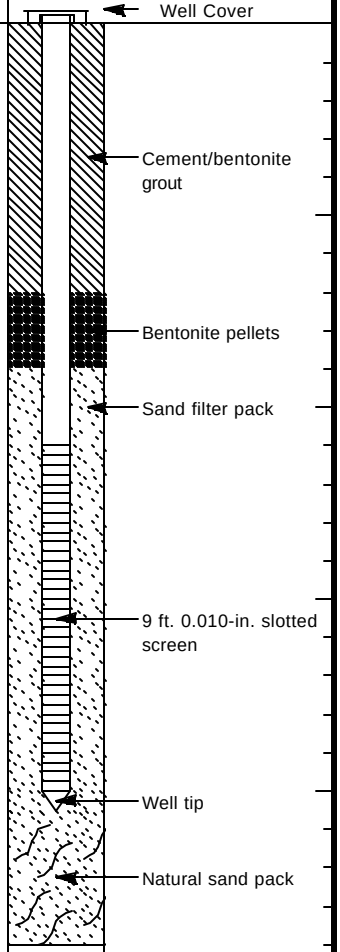
LOG OF BORING MW 113 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	11/09/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	207.37 Ft. AMSL
REMARKS	*Montgomery Zoo/Location "L"	**GROUND ELEVATION**	207.40 Ft. AMSL
		DEPTH TO WATER	12.38 Ft. BMP
		WATER ELEVATION	194.99 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
		ML			0	Silt, light yellowish-brown (10YR 4/6), sandy	
		SC			0	Sand, yellowish red, fine to coarse grained, clayey, w/gravel	
					0	Clay, yellowish-red, sandy, w/gravel	
					0	Dark brown (7.5YR 3/2), sandy w/organics	
					0	Olive yellow (2.5Y 6/6), sandy	
5					0		
		CL			0	Yellowish-brown (10YR 5/6) & light gray (10YR 7/1), silty, slightly sandy	
					0		
					0		
10					0		
					0		
		SC				Sand, brownish-yellow & light gray, fine to med. grained, silty & clayey	11/16/01
15		SP SW				Sand, brownish-yellow & pale yellow (2.5Y 7/4), fine to very coarse grained w/approx. 15% fine to coarse gravel	
						Pale yellow, fine to very coarse grained w/approx. 30% fine to coarse gravel	
		GP				Gravel, fine to very coarse, w/fine to very coarse sand	
20						Sand, pale yellow (2.5Y 8/2), fine to very coarse grained, w/approx. 25% fine to very coarse gravel, w/glauconite	
		SP SW				Brownish-yellow (10Yr 6/8), fine to very coarse, w/occ. (<5%), gravel, w/glauconite	

BORING TERMINATED AT 24 FEET.

WELL DIAGRAM



Coliseum Blvd. Plume
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TTL, Inc.

PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

COLISEUM BLVD. PLUME

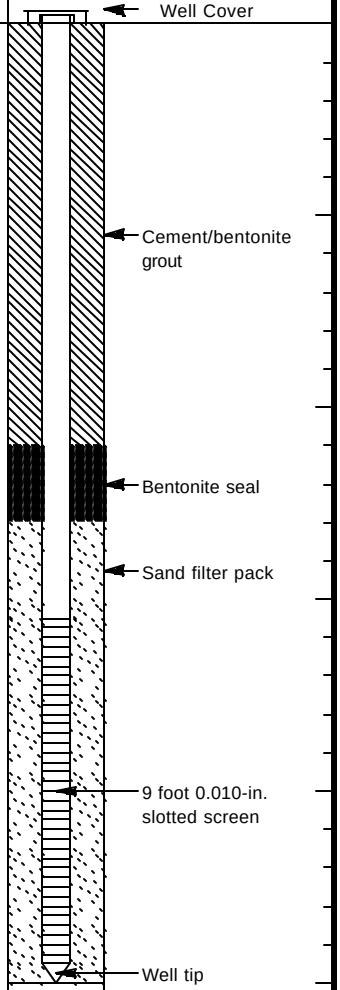
LOG OF BORING MW 115 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	C. Krafcheck
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	11/13/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	212.06 Ft. AMSL
REMARKS	*Broadway Dr./Location "J"	**GROUND ELEVATION**	212.30 Ft. AMSL
		DEPTH TO WATER	17.82 Ft. BMP
		WATER ELEVATION	194.24 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION
			0 - 9	67	0	Asphalt
					0	Sand, red (2.5YR 4/8), fine to med. grained, slightly clayey
					0	
					0	
					0	
		SC			0	
5					0	
					0	
					0	
					0	Sand, reddish-yellow (7.5YR 6/8) & yellowish-red (5YR 5/8), fine to very coarse grained w/approx. 15% fine to very coarse gravel
			9 - 19	70	0	
10					0	
					0	W/approx. 40% gravel
					0	
					0	
					0	
		SP SW			0	
15					0	
					0	
					0	
						Sand, brownish-yellow (10YR 6/8) & yellow (2.5Y 8/8), fine to coarse grained w/approx. 20% fine to coarse gravel
20						
25						BORING TERMINATED AT 25 FEET.

WATER LEVEL & DATE: 12/6/01

WELL DIAGRAM



Coliseum Blvd. Plume

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PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

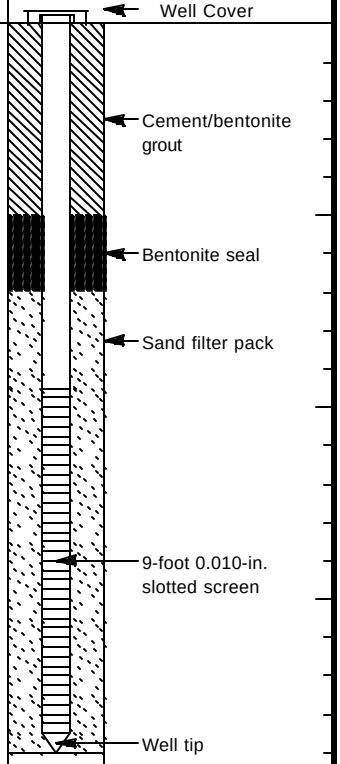
COLISEUM BLVD. PLUME

LOG OF BORING MW 116 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	C. Krafcheck
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	11/20/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	194.02 Ft. AMSL
REMARKS	Emory Folmar Blvd./Location "Z"	**GROUND ELEVATION**	194.10 Ft. AMSL
		DEPTH TO WATER	8.53 Ft. BMP
		WATER ELEVATION	185.49 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE: INTERVAL (feet)	SAMPLE: % RECOVERY	SAMPLE: PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
		SM			0	Sand, yellowish-red (5YR 5/8), fine to med. grained, silty	
		CL			0	Clay, yellowish-red, light gray (5Y 7/1), & red (2.5YR 4/8), mottled w/mica, sandy	
					0	Sand, yellowish-red, w/mica, sandy	
5		SC			0		
					0		
					0		
					0		
					0	(0-9 ft. interval; approx. 50% recovery)	12/7/01
10		CL				Clay, yellowish-red (5YR 5/6), sandy w/approx. 5% fine to coarse gravel	
						Very dark grayish-brown (10YR 3/2), sandy	
						Sand, gray (5YR 6/1), fine to very coarse w/approx. 30% fine to very coarse gravel	
15		SP SM				Sand, light gray (5YR 7/1), fine to med. grained w/approx. 5% gravel	
						BORING TERMINATED AT 19 FEET.	

WELL DIAGRAM



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PRACTICING IN THE GEOSCIENCES

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COLISEUM BLVD. PLUME

LOG OF BORING MW 117 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	C. Krafcheck
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	11/19/2001 - 12/12/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	218.90 Ft. AMSL
REMARKS	Location "G"/Broadway Street	**GROUND ELEVATION**	219.20 Ft. AMSL
	**Damaged after initial installation on 11/19/01; redrilled & installed on	**DEPTH TO WATER**	36.33 Ft. BMP
	12/12/01	**WATER ELEVATION**	182.57 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
0		CL			0	Clay, red (2.5YR 4/8), sandy, w/mica	
5					0		
10					0		
15		ML			0	Silt, red, sandy	
		SP SM			0	Sand, brownish-yellow (10YR 6/8) & yellow (10YR 7/6), fine to coarse grained w/pprox. 20% fine to very coarse gravel	
20		CL			0	Clay, strong brown (7.5YR 5/8) & light gray (5Y 7/1), very sand w/mica	
		SM			0	Sand, strong brown & yellow (2.5Y 7/6), fine to med. grained w/mica, silty	
25					0		
30		SP SM			0	Sand, pale yellow (2.5Y 7/3), fine to very coarse grained w/approx. 30% fine to very coarse gravel (29-39' interval-approx. 50% recovery) Black Strong brown & yellow, fine to very coarse grained w/approx. 20% fine to very coarse gravel	

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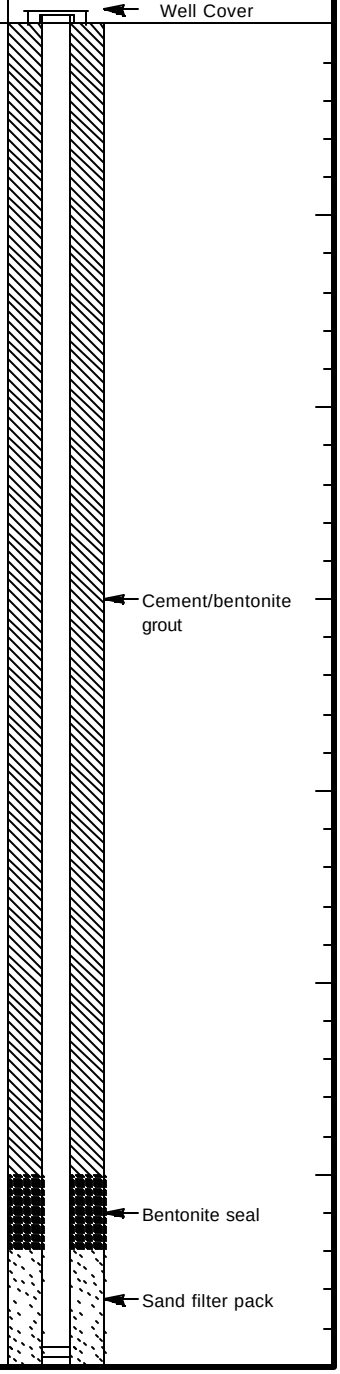
WELL DIAGRAM



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LOG OF BORING MW 117 & WELL CONSTRUCTION

PROJECT NUMBER 0700-024

LOCATION Montgomery, AL*

GEOLOGIST C. Krafcheck

DATE(S) DRILLED 11/19/2001 - 12/12/2001

Continued from Previous Page

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE: INTERVAL (feet)	SAMPLE: % RECOVERY	SAMPLE: PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE	WELL DIAGRAM
40		SM				Sand, pale yellow (2.5Y 7/3), fine to very coarse grained w/mica Yellowish-brown (10YR 5/8) BORING TERMINATED AT 44 FEET.	12/27/01	9 foot 0.010-in. slotted screen Well tip

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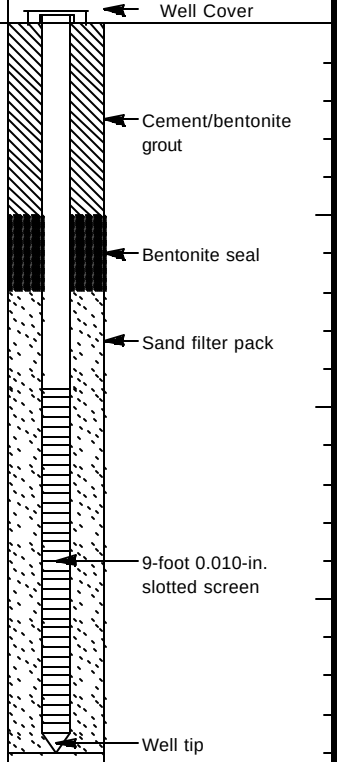
LOG OF BORING MW 118 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	C. Krafcheck
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	11/20/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	203.18 Ft. AMSL
REMARKS	Kiwanis St./Location "I"	**GROUND ELEVATION**	203.40 Ft. AMSL
		DEPTH TO WATER	11.82 Ft. BMP
		WATER ELEVATION	191.36 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
0					0	Clay, yellowish-brown (10YR 5/6) & gray (10YR 6/1), sandy w/mica	
					0		
					0	Yellowish-brown, gray & red (2.5YR 4/8)	
					0		
					0		
5		CL			0		
					0		
					0		
					0		
					0		
10		SC			0	Sand, light gray (10YR 7/1) & brownish-yellow (10YR 6/8), fine to med. grained, clayey	
					0		
					0		
						Sand, very pale brown (10YR 8/4), fine to very coarse gained w/approx. 5% fine to very coarse gravel	12/11/01
		SP SW					
15						Sand, yellow (10YR 8/8), light yellowish-brown (10YR 6/4), & yellow (10YR 7/8), fine to very coarse grained w/approx. 40% fine to very coarse gravel	
		SC					
		SP				Sand, reddish-yellow (7.5YR 6/8), fine to med. grained w/mica & glauconite, clayey	
		SW					
		SM				Sand, reddish-yellow (7.5YR 6/8), fine to very coarse grained w/fine to very coarse gravel ~50%	
						Sand, light gray (2.5Y 7/2) & reddish-yellow (7.5YR 6/8), fine to med. grained w/mica & glauconite	
						BORING TERMINATED AT 19 FEET.	

WELL DIAGRAM



Coliseum Blvd. Plume

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PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

COLISEUM BLVD. PLUME

LOG OF BORING MW 123 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	D. Carroll
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	11/28/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	216.44 Ft. AMSL
REMARKS	Harris St./Location "Q"	**GROUND ELEVATION**	216.60 Ft. AMSL
		DEPTH TO WATER	22.16 Ft. BMP
		WATER ELEVATION	194.28 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE	WELL DIAGRAM
		SC			0	Sand, red (7.5YR 4/8), fine to coarse grained w/fine to coarse gravel (approx. 5-10%) clayey		Well Cover
					0	Clay, very dark grayish-brown (10YR 3/2), sandy		
					0	Gray (10YR 6/1), sandy		
					0			
					0			
5					0	Less sandy, more silty		
		CL			0			Cement/bentonite grout
					0			
					0			
					0	Gray (10YR 6/1), sandy		
10					0			
					0			
					0	Sand, dark yellowish-brown (10YR 4/6), fine to coarse grained, clayey, gray		
					0	Pale yellow (2.5YR 8/3), fine to very coarse grained, w~<5% fine to coarse gravel, occ. clayey		Bentonite seal
15		SC			0			Sand filter pack
					0			
					0			
					0	Pale yellow (2.5Y 8/3), fine to med. grained, silty w/mica & glauconite		
20								
		SM						9 foot 0.010-in. slotted screen
							12/28/01	
						Pale yellow (2.5Y 8/3), brownish-yellow (5YR 5/6), fine to med. grained w/mica & glauconite, silty		
25								
		CL				Clay, light olive gray (~5" thick) (5Y 6/2), silty & sandy		Well tip
		SC				Sand, brownish-yellow & pale yellow, fine to med. grained, clayey w/mica & glauconite		Bentonite pellets
						BORING TERMINATED AT 27 FEET.		

Coliseum Blvd. Plume
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PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

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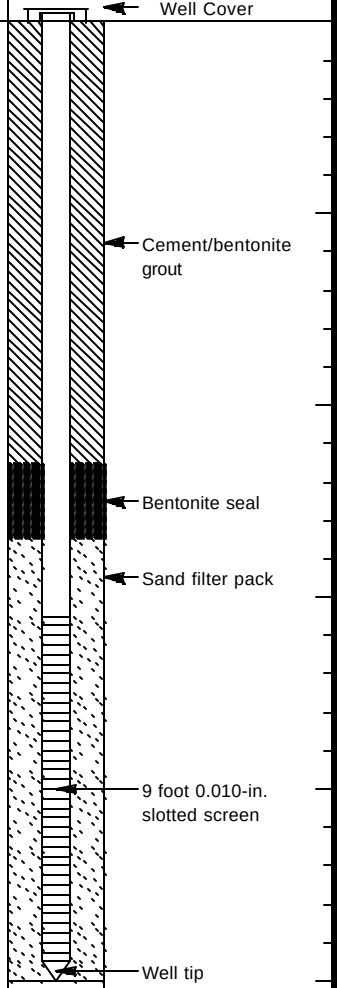
LOG OF BORING MW 125 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	D. Carroll
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	11/30/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	206.43 Ft. AMSL
REMARKS	Cruz St./Location "W"	**GROUND ELEVATION**	206.60 Ft. AMSL
		DEPTH TO WATER	17.72 Ft. BMP
		WATER ELEVATION	188.71 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
0		CL			0	Clay, dark yellowish-brown (10YR 4/4), sandy	
5		SC			0	Sand, yellowish-red (5YR 4/6), fine to coarse grained, silty, slightly clayey	
10		SM			0	Strong brown (5YR 4/6), yellowish-red (5YR 4/6), fine to very coarse grained w/approx. 10% fine to coarse gravel, silty Strong brown & yellowish-red, fine to very coarse grained w/approx. 5% fine to coarse gravel, silty	
15		SM			0	Olive yellow (2.5Y 6/6) & yellowish-red (5YR 4/6), fine to very coarse grained w/approx. 5-10% fine to coarse gravel	12/28/01
20		SW			0	Olive yellow & pale yellow (5Y 4/4), fine to very coarse grained w/approx. 20-30% fine to very coarse gravel	
		SM			0	Sand, olive yellow & pale yellow, very pale brown (10YR 8/4), fine to med. grained, silty, clayey w/mica & glauconite	
25						BORING TERMINATED AT 25 FEET.	

WELL DIAGRAM



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Tuscaloosa - Montgomery - Florence

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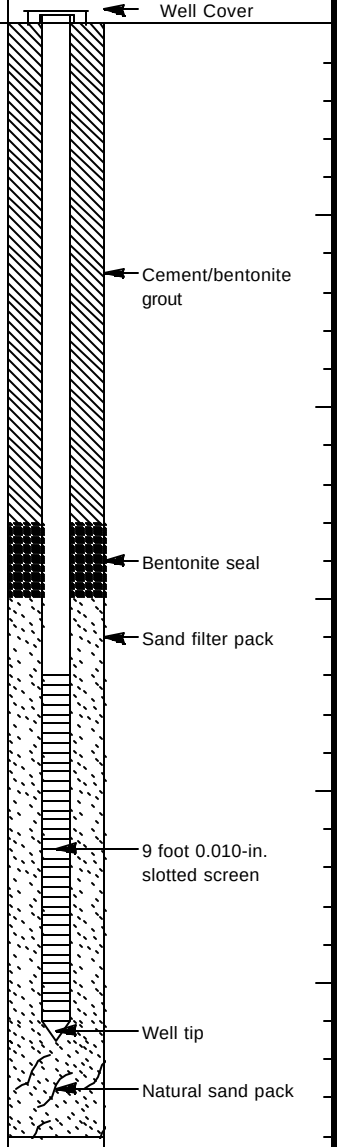
COLISEUM BLVD. PLUME

LOG OF BORING MW 128 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	12/06/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	212.11 Ft. AMSL
REMARKS	Gardendale Dr./Location "F"	**GROUND ELEVATION**	212.40 Ft. AMSL
		DEPTH TO WATER	20.70 Ft. BMP
		WATER ELEVATION	191.41 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE: INTERVAL (feet)	SAMPLE: % RECOVERY	SAMPLE: PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
0					0	Clay, red (2.5YR 4/6), sandy	
5		CL			0		
10		SP SM			0	Sand, yellowish-red (5YR 5/6) & reddish-yellow (7.5YR 6/3), fine to very coarse grained w/approx. 15% fine to very coarse gravel	
		SC SM			0	Sand, reddish-yellow, fine to coarse grained, silty & clayey	
15					0		
		GW GM			0	Sand, reddish-yellow, fine to very coarse grained w/approx. 50% fine to coarse gravel, clayey	
20					0	Reddish-yellow w/approx. 40% fine to very coarse gravel, w/occ. light gray clay lenses, very clayey	12/28/01
						Gravel, pea-size w/fine to coarse grained sand	
25		SM				Sand, pale yellow (5Y 3/3), pale olive (5Y 6/3), & brownish-yellow, fine to med. grained, w/glauconite & mica, silty	
29						BORING TERMINATED AT 29 FEET.	

WELL DIAGRAM



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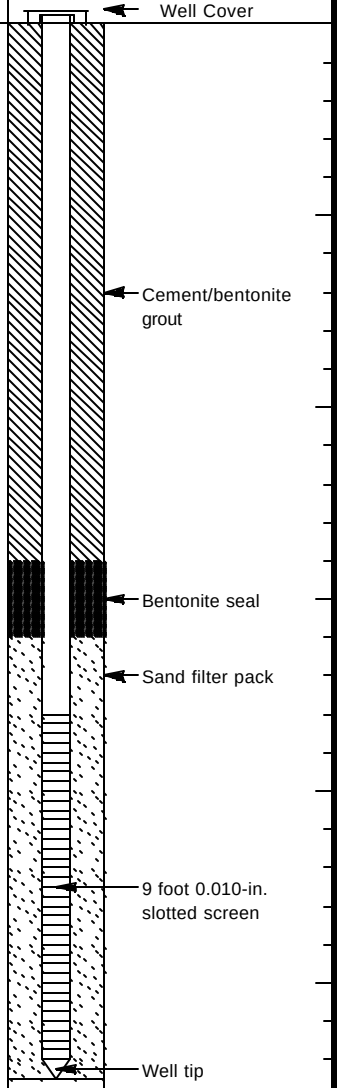
LOG OF BORING MW 129 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	12/06/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	214.62 Ft. AMSL
REMARKS	Vista View Entrance/Location "U"	**GROUND ELEVATION**	214.80 Ft. AMSL
		DEPTH TO WATER	20.04 Ft. BMP
		WATER ELEVATION	194.58 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
0					0	Clay, strong brown (7.5YR 5/8) & pale yellow (5Y 7/3), sandy	
					0	Yellowish-brown (10YR 5/6), sandy	
					0		
5		CL			0		
					0		
					0	Red (2.5Y 4/6), yellowish-brown (10YR 5/6) & pale yellow, sandy	
					0		
10					0		
		SC			0	Sand, red, yellowish-brown & pale yellow, fine to med. grained, clayey & silty	
					0		
					0		
15		SM			0	Sand, brownish-yellow (10YR 5/8) & yellow (10YR 7/3), fine to med. grained, silty w/mica	
					0		
					0	Brownish-yellow & yellow, fine to med. grained, w/less than 5% fine to coarse gravel	
20					0		
		SP SM			0	Sand, pale yellow (2.5YR 7/3), fine to very coarse grained w/approx. 25% fine to very coarse gravel	12/27/01
25							
		SM				Sand, brownish-yellow & light gray (2.5Y 7/2), fine to med. grained w/mica & glauconite	
		SC				Sand, brownish-yellow & light gray, fine to med. grained, clayey w/mica & glauconite	
						BORING TERMINATED AT 29 FEET.	

WELL DIAGRAM



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PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

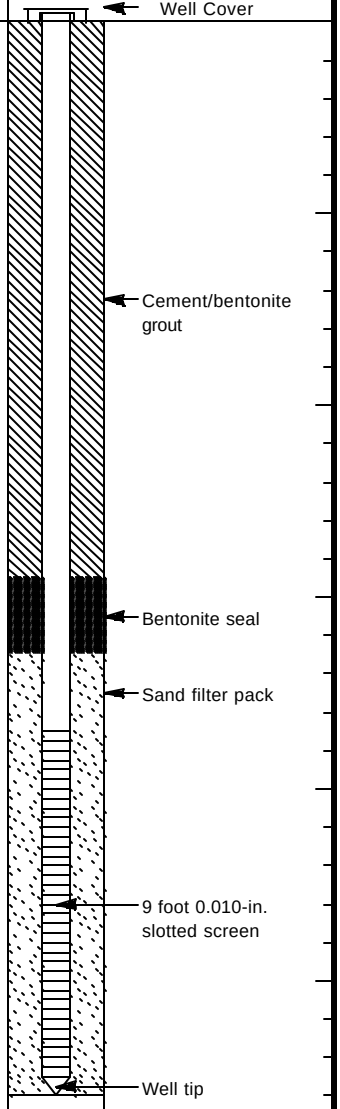
COLISEUM BLVD. PLUME

LOG OF BORING MW 130 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	12/06/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	215.71 Ft. AMSL
REMARKS	Gardendale Dr./Location "E"	**GROUND ELEVATION**	216.00 Ft. AMSL
		DEPTH TO WATER	21.34 Ft. BMP
		WATER ELEVATION	194.37 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
0					0	Clay, red (2.5YR 4/6), sandy	
5		CL			0		
10		SM			0	Sand, yellow (2.5Y 5/8) & brownish-yellow (10YR 6/8), fine to coarse grained, w/mica	
15					0		
20		SP SM			0	Sand, pale yellow (5Y 8/3) & strong brown (7.5YR 5/3), fine to very coarse gravel w/approx. 30% fine to very coarse gravel	
							12/28/01
25		SC				Sand, pale yellow & light gray, fine to very coarse grained, w/approx. 50% fine to very coarse gravel, clayey	
						Sand, pale yellow & light gray, fine to very coarse grained w/approx. 30% gravel, clayey	
		SM				Sand, yellow (2.5Y 7/6) & light gray, fine to med. grained w/mica & glauconite	
						BORING TERMINATED AT 29 FEET.	

WELL DIAGRAM



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PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

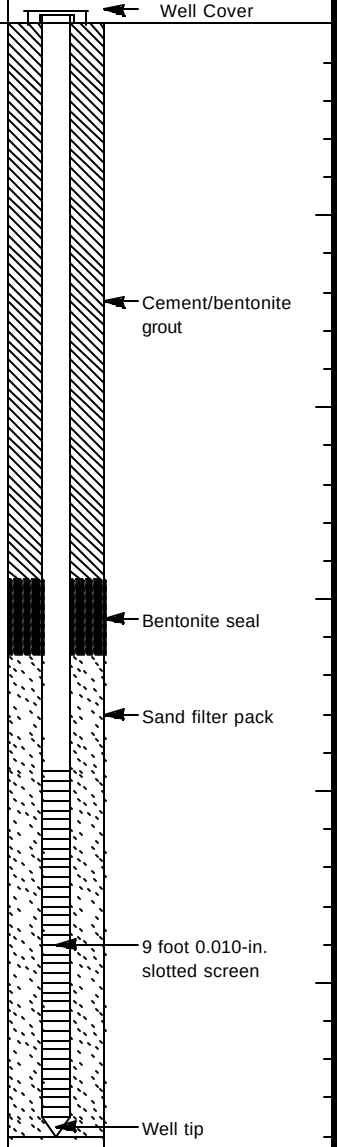
COLISEUM BLVD. PLUME

LOG OF BORING MW 132 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	12/10/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	215.20 Ft. AMSL
REMARKS	Broadway St./Location "P"	**GROUND ELEVATION**	215.60 Ft. AMSL
		DEPTH TO WATER	22.20 Ft. BMP
		WATER ELEVATION	193.00 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
		CL			0	Clay, red (2.5YR 4/8), sandy	
					0		
					0		
					0		
					0		
5		ML			0	Silt, reddish-yellow (7.5YR 6/8), sandy	
					0		
					0		
					0		
					0		
		SC			0	Sand, reddish-yellow w/pale olive clay lenses	
10		CL			0	Clay, red, brownish-yellow & light gray (5Y 7/1), sandy	
					0		
					0		
					0		
					0		
15					0		
		SP			0	Sand, yellowish-red (5YR 5/8), fine to coarse grained w/approx. 30% fine to coarse gravel	
		SM			0	Sand, brownish-yellow & yellow (10YR 7/8), fine to coarse grained, silty	
		SM			0		
					0		
20		SC			0	Sand, brownish-yellow & light gray, fine to very coarse grained w/approx. 5% fine to coarse gravel, clayey	
							12/27/01
		SM				Sand, yellow (10YR 7/8) & pale yellow (5Y 8/2), fine to med. grained w/mica & glauconite, silty	
25							
						BORING TERMINATED AT 29 FEET.	

WELL DIAGRAM



Coliseum Blvd. Plume
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TTL, Inc.

PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

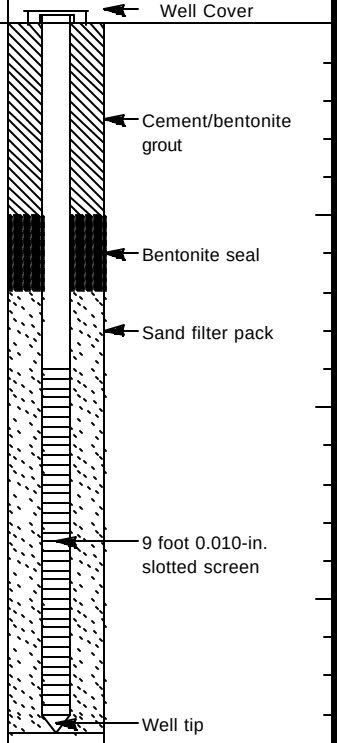
COLISEUM BLVD. PLUME

LOG OF BORING MW 133 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	12/11/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	205.04 Ft. AMSL
REMARKS	Coliseum Parkway/Location "C"	**GROUND ELEVATION**	205.30 Ft. AMSL
		DEPTH TO WATER	10.62 Ft. BMP
		WATER ELEVATION	194.42 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
		CL			0	Clay, red (2.5YR 5/8) & brownish-yellow (10YR 6/8), sandy	
5		SC			0	Sand, brownish-yellow, fine to med. grained, clayey	
		SP SM			0	Sand, brownish-yellow & strong brown (7.5YR 5/6), fine to coarse grained w/approx. 30% fine to very coarse gravel W/approx. 5% fine to coarse gravel	
10					0	Fine to very coarse grained w/approx. 20% fine to very coarse gravel	12/28/01
15					0	W/approx. 40% fine to coarse gravel	
					0	W/approx. 10% fine to coarse gravel	
						BORING TERMINATED AT 19 FEET.	

WELL DIAGRAM



Coliseum Blvd. Plume

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TTL, Inc.

PRACTICING IN THE GEOSCIENCES

Tuscaloosa - Montgomery - Florence

MAYNARD, COOPER & GALE

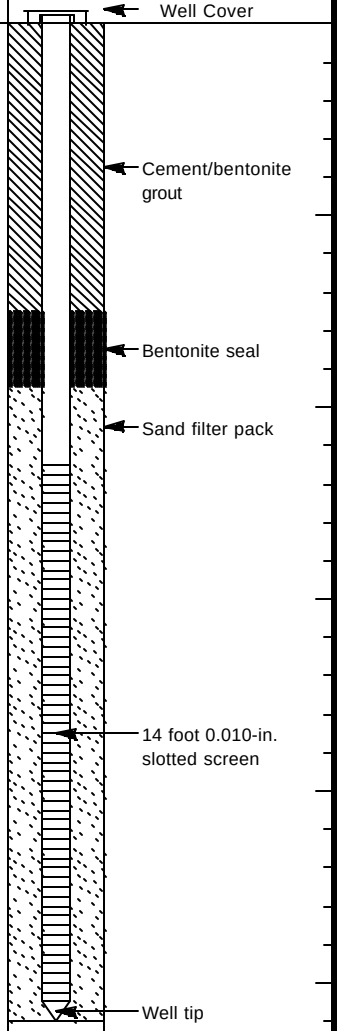
COLISEUM BLVD. PLUME

LOG OF BORING MW 134 & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	12/12/2001
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2"/PVC
DRILLER	R. Stiles	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4" & 6" ID Coring Rods	**FILTER PACK TYPE**	20-40 Graded Sand
		TOP OF CASING	209.33 Ft. AMSL
REMARKS	Brockway Dr./Location "K"	**GROUND ELEVATION**	209.70 Ft. AMSL
		DEPTH TO WATER	15.26 Ft. BMP
		WATER ELEVATION	194.07 Ft. AMSL

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
0					0	Asphalt	
					0	Clay, red (2.5YR 4/6), sandy	
					0		
					0		
		CL			0		
5					0		
					0		
					0	Sand, brownish-yellow (10YR 6/8), fine to very coarse grained w/approx. 15% fine to coarse gravel, clayey	
		SC			0		
					0	Sand, brownish-yellow, fine to very coarse grained, w/approx. 25% fine to coarse gravel	
10					0		
					0		
					0		
					0	W/approx. 5% fine to coarse gravel	
15					0		12/27/01
		SP SM					
20							
25						Brownish-yellow, fine to very coarse grained, w/approx. 30% fine to very coarse gravel	
						BORING TERMINATED AT 26 FEET.	

WELL DIAGRAM



Coliseum Blvd. Plume

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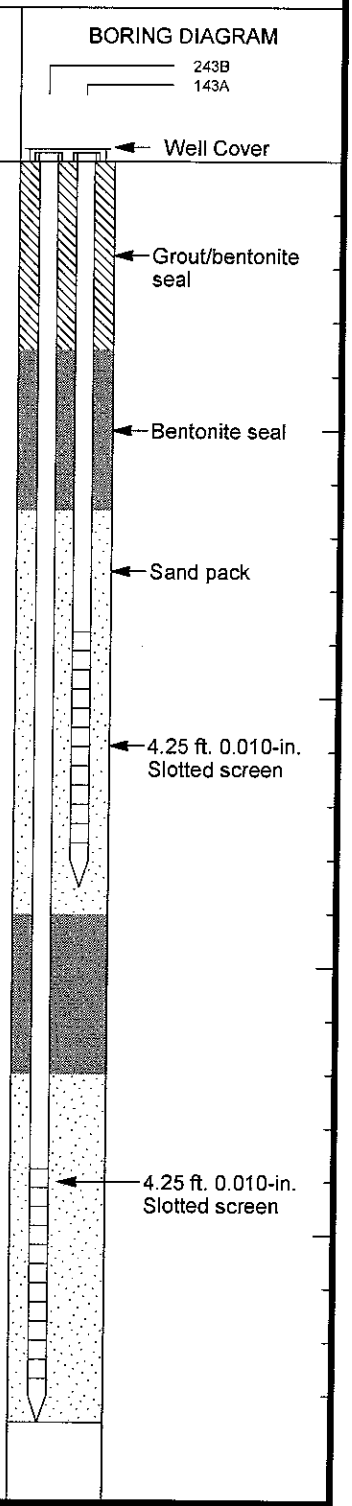
ALABAMA DEPT. OF TRANSPORTATION
COLISEUM BLVD. PLUME

LOG OF BORING 143A/243B & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	GEOLOGIST	S. Grammas
LOCATION	Montgomery, AL*	DATE(S) DRILLED	12/6/2004 - 12/7/2004
DRILLING COMPANY	Miller Drilling Co., Inc.	CASING DIA./TYPE	2" PVC
DRILLER	T. Thatcher	SCREEN SLOT/TYPE	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4", 6", 8" & 10" ID Casing	FILTER PACK TYPE	16-40 Sand
		TOP OF CASING	
REMARKS	Kilby Ditch*	GROUND ELEVATION	
		DEPTH TO WATER	
		WATER ELEVATION	

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
		CL				CLAY, brown (7.5YR 4/4), with fine to coarse sand (sandy)	
		CL				Strong brown (7.5YR 5/6), sandy	
5		SC				SAND, yellowish-red (5Y 5/6), fine to coarse grained w/clay lenses	
		SP				SAND, strong brown (7.5YR 5/8), fine to very coarse grained, w/approx. 40% fine to very coarse gravel	
		SC				SAND, strong brown, fine to coarse grained, w/<5% fine to coarse gravel, clayey	
		SC				With light gray clay lenses	
10		SC				SAND, brownish-yellow, fine to coarse grained, slightly clayey w/<5% fine to coarse gravel	
		SC				SAND, brownish-yellow, fine to very coarse grained, w/approx. 30% fine to coarse gravel, clayey	
		GC SP				GRAVEL/SAND, w/approx. 45% fine to coarse gravel	
15		SP				SAND, yellow (10YR 7/6), fine to very coarse grained, w/<5% fine to coarse gravel	
		SM				SAND, brown & light olive gray, fine to med. grained, w/mica & glauconite	
20		SM				SAND, pale yellow (5Y 8/2), fine to coarse grained, w/<5% fine to coarse gravel	
		CL				CLAY, brownish-yellow (10YR 6/8) & light gray (10YR 7/1), slightly sandy	
						BORING TERMINATED AT 23.5 FEET.	

BORING DIAGRAM



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ALABAMA DEPT. OF TRANSPORTATION
COLISEUM BLVD. PLUME

LOG OF BORING 144A/244B/244C & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	1/4/2005
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2" PVC
DRILLER	T. Thatcher	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4", 6", 8" & 10" ID Casing	**FILTER PACK TYPE**	16-40 Sand
		TOP OF CASING	Ft. MSL
REMARKS	Flintstone St.*	**GROUND ELEVATION**	214.51 Ft. MSL
		DEPTH TO WATER	16.03 / 16.22 / 15.93 Ft. AMSL
		WATER ELEVATION	

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE: INTERVAL (feet)	SAMPLE: % RECOVERY	SAMPLE: PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
		SP SM				Asphalt SAND, red (2.5YR 4/8), fine to coarse grained, w/occ. gravel	
						CLAY, grayish-brown (2.5Y 5/2) & brown (10YR 4/3), sandy w/<5% fine to coarse gravel, sandy	
5		CL				Gray (10YR 6/1) & brownish-yellow (10YR 6/8), sandy	
		SC				SAND, light gray (2.5Y 7/1), fine grained, clayey	
10						Brownish-yellow (10YR 6/6), fine to coarse grained, clayey	
		SP SM				SAND, yellow (2.5Y 7/6), light yellowish-brown (2.5Y 6/3) & white (2.5Y 8/1), fine to very coarse grained, w/<5% fine to coarse gravel	
						Strong brown, (7.5YR 5/8), fine to very coarse grained w/<5% fine to med. gravel	
		SM				SAND, brown (10YR 5/3), fine to med. grained, silty	
						SAND, yellow & brown, fine to very coarse grained w/approx. 10% fine to coarse gravel	
15		SP SM				Yellow, fine to coarse grained w/5% fine to med. gravel	
		SM				SAND, pale yellow & brownish-yellow, fine grained, silty, w/mica & glauconite	
						SAND, pale yellow & brownish-yellow, fine grained, silty, w/intermittent thin clay lenses, glauconitic, micaceous	
20		SC SM					
		SM				SAND, pale yellow & brownish-yellow, fine to med. grained, silty, w/mica & glauconite	

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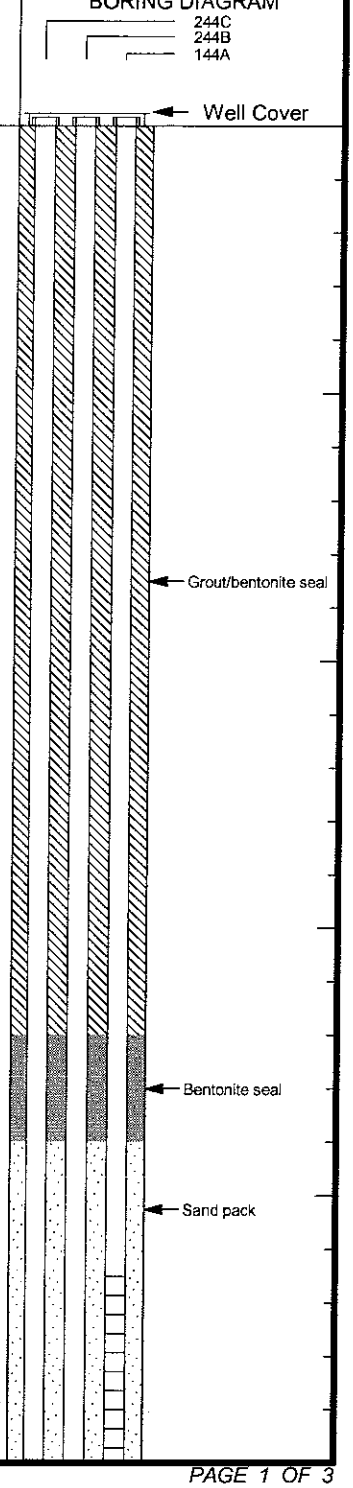
BORING DIAGRAM



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ALABAMA DEPT. OF TRANSPORTATION
COLISEUM BLVD. PLUME

LOG OF BORING 144A/244B/244C & WELL CONSTRUCTION

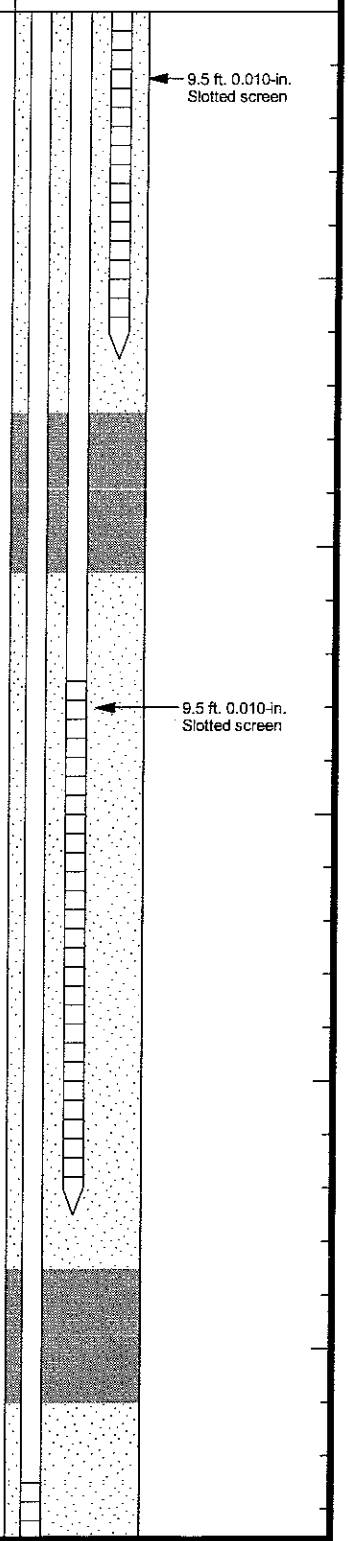
PROJECT NUMBER 0700-024 **GEOLOGIST** S. Grammas

LOCATION Montgomery, AL* **DATE(S) DRILLED** 1/4/2005

Continued from Previous Page

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE: INTERVAL (feet)	SAMPLE: % RECOVERY	SAMPLE: PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
		CL				CLAY, light gray (2.5Y 7/2) & brownish-yellow, sandy, micaceous	
						SAND, strong brown (2.5YR 5/6), fine to med. grained, w/mica & glauconite	
		SM				Yellow (2.5Y 7/6) & olive yellow (2.5Y 6/6), fine to med. grained, silty, w/mica & glauconite	
30							
		CL				CLAY, light brownish-gray & brownish-yellow (~4" thick), sandy, w/mica	
		SC SM				SAND, pale yellow & olive yellow, fine grained, silty w/intermittent 1/8" to ½" light gray clay lenses	
						SAND, pale yellow, brownish-yellow & dark brown (7.5YR 3/2), fine grained, silty, w/mica & glauconite	
35							
40						Pale yellow & yellow, fine to med. grained, silty w/mica & glauconite	
						Pale yellow, fine to med. grained, silty w/mica & glauconite	
45		SM					
						Pale yellow & yellowish-brown, silty w/mica & glauconite	
						Olive yellow (2.5Y 6/6) & strong brown, fine to med. grained, w/mica & glauconite	
50							

BORING DIAGRAM



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ALABAMA DEPT. OF TRANSPORTATION
COLISEUM BLVD. PLUME

LOG OF BORING 144A/244B/244C & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	1/4/2005

Continued from Previous Page

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE: INTERVAL (feet)	SAMPLE: % RECOVERY	SAMPLE: PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE	BORING DIAGRAM
55						SAND, strong brown (7.5YR 4/6) & yellowish-brown (10YR 5/3), fine to med. grained, w/mica & glauconite		9.5 ft. 0.010-in. Slotted screen
						Light olive brown (2.5Y 5/4) & light yellowish-brown (2.5Y 6/4), fine to med. grained, w/mica & glauconite		
						Olive yellow, fine to med. grained, w/mica & glauconite		
60		CL				CLAY, yellowish-brown & light yellowish-brown, sandy w/mica		
						Gray w/fine sand laminae		Bentonite
						BORING TERMINATED AT 64 FEET.		

BORING DIAGRAM: 244C, 244B, 144A

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ALABAMA DEPT. OF TRANSPORTATION
COLISEUM BLVD. PLUME

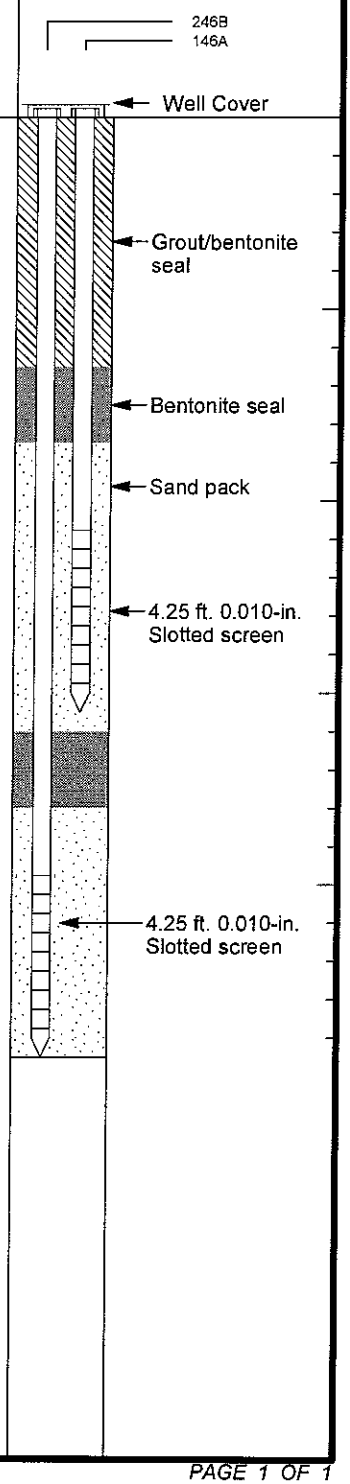
LOG OF BORING 146A/246B & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	GEOLOGIST	S. Grammas
LOCATION	Montgomery, AL*	DATE(S) DRILLED	12/13/2004
DRILLING COMPANY	Miller Drilling Co., Inc.	CASING DIA./TYPE	2" PVC
DRILLER	T. Thatcher	SCREEN SLOT/TYPE	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4", 6", 8" & 10" ID Casing	FILTER PACK TYPE	16-40 Sand
		TOP OF CASING	
REMARKS	Kilby Ditch*	GROUND ELEVATION	
		DEPTH TO WATER	
		WATER ELEVATION	

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION
		CL				CLAY, reddish-brown (5YR 4/4), very sandy w/<5% fine to coarse gravel
5						CLAY, reddish-brown, very sandy
		SC				SAND, yellowish-red (5YR 5/8), olive yellow (2.5Y 6/8) & light gray (5Y 7/1), fine to coarse grained, very clayey
						W/approx. 10% fine to coarse gravel
10						Yellow (10YR 7/8), fine to very coarse grained w/approx. 15% fine to coarse gravel, less clayey
						Pale yellow (2.5Y 7/4), w/approx. 30% fine to coarse gravel, more clayey
15						SAND, reddish-yellow (7.5YR 6/8), fine to very coarse grained w/<5% fine to coarse gravel
		GP				GRAVEL, fine to coarse w/yellow fine to very coarse sand
20		SM				SAND, olive yellow (2.5Y 6/6) & light olive brown (2.5Y 5/6), fine to med. grained, micaceous, glauconitic, silty
		SC				SAND, brownish-yellow (10YR 6/8) & light gray (2.5Y 7/1), fine grained, clayey, micaceous, glauconitic
		CL				W/light brownish-gray (2.5y 6/2) (~1/8") clay lenses
						CLAY, light gray (2.5Y 7/1) & yellowish-brown (10YR 5/8), sandy, micaceous
						BORING TERMINATED AT 24.5 FEET.

WATER LEVEL & DATE

BORING DIAGRAM



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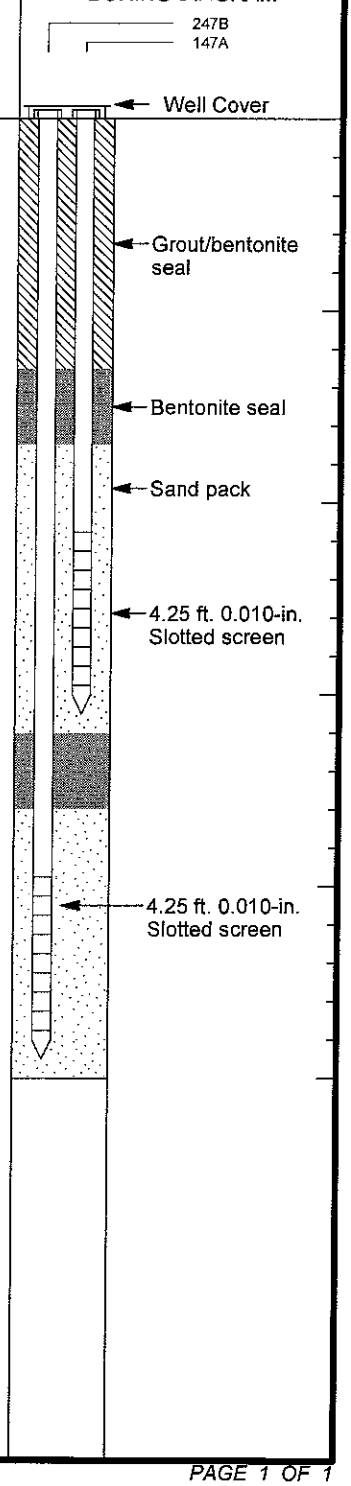
ALABAMA DEPT. OF TRANSPORTATION
COLISEUM BLVD. PLUME

LOG OF BORING 147A/247B & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	GEOLOGIST	S. Grammas
LOCATION	Montgomery, AL*	DATE(S) DRILLED	12/10/2004
DRILLING COMPANY	Miller Drilling Co., Inc.	CASING DIA./TYPE	2" PVC
DRILLER	T. Thatcher	SCREEN SLOT/TYPE	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4", 6", 8" & 10" ID Casing	FILTER PACK TYPE	16-40 Sand
		TOP OF CASING	
REMARKS	Kilby Ditch*	GROUND ELEVATION	
		DEPTH TO WATER	
		WATER ELEVATION	

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
0		CL				CLAY, reddish-brown (5YR 4/4), very sandy w/approx. 5% fine to coarse gravel	
5							
		SC				SAND, light gray (7.5YR 7/1) & reddish-yellow (7.5YR 6/8), fine to coarse grained, very clayey	
						Fine to very coarse grained w/approx. 5% fine to coarse gravel, very clayey	
10						Reddish-yellow & very pale brown (10YR 7/7), fine to very coarse grained w/approx. 5% fine to coarse gravel	
						W/approx. 40% fine to coarse gravel, less clayey	
15						Yellowish-brown, fine to very coarse grained, slightly clayey w/<5% fine to coarse gravel	
20		SC SM				SAND, olive yellow (2.5Y 6/6), pale yellow (2.5Y 8/2) & reddish-yellow (7.5YR 6/8), fine to med. grained, micaceous, glauconitic, slightly clayey & silty	
		CL				CLAY, light gray (2.5Y 7/1) & yellowish-brown (10YR 5/8), sandy, micaceous	
25						BORING TERMINATED AT 25 FEET.	

BORING DIAGRAM



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ALABAMA DEPT. OF TRANSPORTATION
COLISEUM BLVD. PLUME

LOG OF BORING 150A/250B/250C & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	12/20/2004
DRILLING COMPANY	Miller Drilling Co., Inc.	**CASING DIA./TYPE**	2" PVC
DRILLER	T. Thatcher	**SCREEN SLOT/TYPE**	0.010-in. slotted PVC
DRILLING METHOD	Versa Sonic w/4", 6", 8" & 10" ID Casing	**FILTER PACK TYPE**	16-40 Sand
		TOP OF CASING	Ft. MSL
REMARKS	Woodbury Ct.*	**GROUND ELEVATION**	207.99 Ft. MSL
		DEPTH TO WATER	12.00 / 12.08 / 9.06 Ft. AMSL
		WATER ELEVATION	

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE INTERVAL (feet)	SAMPLE % RECOVERY	SAMPLE PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE
						CLAY, strong brown (7.5YR 5/8), sandy	
		CL				Red (2.5YR 4/6) & light gray (2.5Y 7/1), sandy	
5							
		SM				SAND, yellow (2.5Y 7/8), fine grained, w/glauconite	
10						SAND, strong brown, fine to very coarse grained w/approx. 15% fine to coarse gravel	
		SM SP					
15							
						SAND, brownish-yellow (10YR 6/8) & pale yellow (2.5Y 8/2), fine grained, silty w/mica & glauconite	
20		SM					
						Fine to med. grained, silty w/mica & glauconite	

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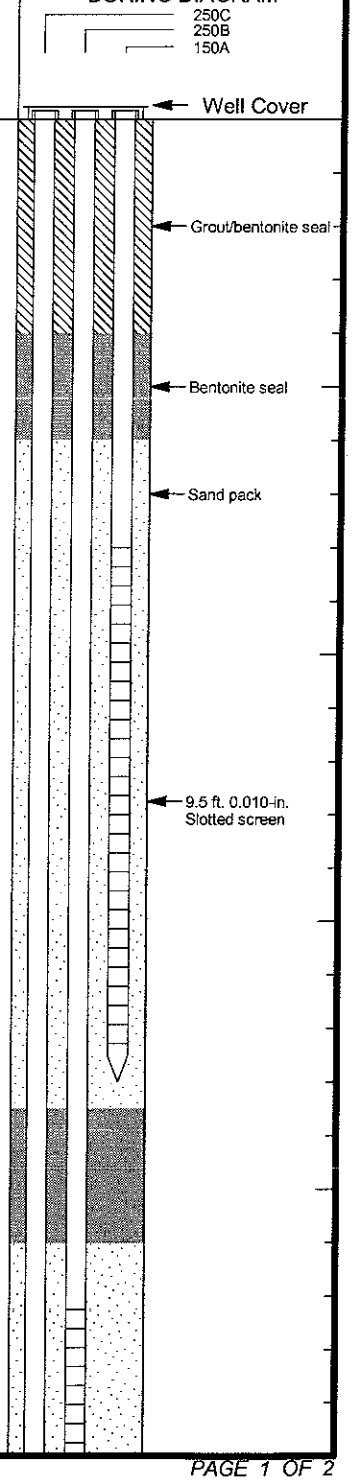
BORING DIAGRAM



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ALABAMA DEPT. OF TRANSPORTATION
COLISEUM BLVD. PLUME

LOG OF BORING 150A/250B/250C & WELL CONSTRUCTION

PROJECT NUMBER	0700-024	**GEOLOGIST**	S. Grammas
LOCATION	Montgomery, AL*	**DATE(S) DRILLED**	12/20/2004

Continued from Previous Page

DEPTH (feet)	GRAPHIC LOG	U.S.C.S.	SAMPLE: INTERVAL (feet)	SAMPLE: % RECOVERY	SAMPLE: PID (ppm)	LITHOLOGIC DESCRIPTION	WATER LEVEL & DATE	BORING DIAGRAM
30		SM				Fine to coarse grained w/mica & glauconite Fine to med. grained w/mica & glauconite Fine to coarse grained w/mica & glauconite W/thin ~¼" clay lenses Pale yellow (2.5Y 7/3), fine to coarse grained, w/mica & glauconite		250C, 250B, 150A 4.25 ft. 0.010-in. Slotted screen
35		CL				Ferruginous CLAY, brownish-yellow (10YR 6/8), micaceous BORING TERMINATED AT 36 FEET.		

F:\2000\0700\024\BORING~1\ALL WELL LOGS.GPJ 3/30/05 Report:TTL WELL TRIPLE

Long-Term Monitoring Plan

Coliseum Boulevard Plume Site
Montgomery, Alabama

Submitted By:

Alabama Department of Transportation
1409 Coliseum Boulevard
Montgomery, Alabama

September 2008
R1 – October 2011
R2 – September 2012
R3 – September 2014
R4 – June 2019 (r-7/10/2020)

Long-Term Monitoring Plan

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA

SUBMITTED BY:

ALABAMA DEPARTMENT OF TRANSPORTATION
1409 COLISEUM BOULEVARD
MONTGOMERY, ALABAMA

September 2008
R1 – October 2011
R2 – September 2012
R3 – September 2014
R4 – June 2019 (r-7/10/2020)

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LIST OF ABBREVIATIONS

ADEM	Alabama Department of Environmental Management
AEIRG	Alabama Environmental Investigation and Remediation Guidance
ALDOT	Alabama Department of Transportation
ARBCA	Alabama Risk-Based Corrective Action
BDY	Boundary (Well)
CBP	Coliseum Boulevard Plume
CME	Corrective Measures Evaluation
CMIP	Corrective Measures Implementation Plan
CP	Compliance Point
CMT	Continuous Multi-channel Tubing Well
EFF	Effectiveness (Well)
EPA	Environmental Protection Agency
GTS	Geostatistical, Temporal, and Spatial
ICB	Institutional Control Boundary
LTM	Long-term Monitoring Plan
MCL	Maximum Contaminant Level
NPDES	National Pollutant Discharge Elimination System
OS	Off Site
PH12	Probehole 12 Area
RBTL	Risk Based Target Level
RSL	Regional Screening Level
SWA	South West Treatment Area
TCE	Trichloroethylene
VIS	Vapor Intrusion Screening (Well)
VISL	Vapor Intrusion Screening Level

1. INTRODUCTION

1.1. PURPOSE

The Voluntary Settlement Agreement between the Alabama Department of Environmental Management (ADEM) and the Alabama Department of Transportation (ALDOT) for the Coliseum Boulevard Plume (CBP) was executed in December 2011. The Agreement required the submittal and approval of four (4) Corrective Measures Implementation Plans (CMIPs), as follows:

- Kilby Ditch/Low-Lying Area CMIP
- Institutional Control Plan
- Long-Term Monitoring (LTM) Plan
- Southwest Treatment Area CMIP

Each of these plans have been approved by ADEM and implemented by ALDOT. The LTM Plan provides the procedures that ALDOT will utilize to comply with the amended "Settlement Agreement for Voluntary Response ("Agreement") between ADEM and ALDOT, effective March 10, 2015.

The LTM Plan provides for monitoring in areas where corrective measures have been implemented (Kilby Ditch / Low-Lying Area, Southwest Area, Institutional Control Boundary), see Figure 1-1. The LTM monitoring will be used to:

- Evaluate the effectiveness of the corrective measures;
- Monitor TCE concentrations and trends for comparison to the site-wide groundwater model; and,
- Provide a surface water monitoring network to evaluate the effectiveness of corrective measures and determine compliance with ADEM discharge requirements.

The LTM Plan also provides for long-term monitoring of the CBP with:

- Effectiveness (EFF) monitoring wells to evaluate groundwater, plume conditions, and the potential for vapor intrusion;
- Boundary (BDY) monitoring wells to assure the CBP is bounded by the Institutional Control Boundary (ICB); and,

- Surface water compliance and effectiveness monitoring locations to determine compliance and corrective measure effectiveness.

Additionally, the LTM Plan documents the transition of the CBP monitoring network from an assessment-oriented monitoring program to a corrective measure monitoring program in accordance with the Agreement. Section 2 presents the proposed groundwater and surface water monitoring locations. Section 3 presents the monitoring and data evaluation plan.

1.2. BACKGROUND

The CBP is an area in north Montgomery, Alabama where the shallow groundwater contains trichloroethylene (TCE). Groundwater remains below the ground surface throughout the CBP except for three areas where groundwater discharges to surface water: Kilby Ditch / Low-Lying Area in the northeast part of the CBP; the ALDOT-owned former sand and gravel mine in the Southwest part of the CBP; and the Zoo pond / Zoo ditch in the northern part of the CBP. The ALDOT has accepted responsibility for monitoring and management of the CBP by remedial approaches that generally include the following:

- Manage and control groundwater at the CBP;
- Treat TCE-containing surface water prior to discharge from the CBP;
- Restrict access to groundwater via institutional controls; and,
- Restrict access to surface water via engineering controls.

ALDOT has implemented the following response actions as described in the "Site-Wide Corrective Measures Evaluation Report, July 2008" (CME):

- Cover West Kilby Ditch and stabilize Main Kilby Ditch;
- Retain or reposition security fencing along Main Kilby Ditch;
- Construct a Wetland Treatment System and perimeter security fencing in the Low-Lying Area;
- Hydraulic control in the Southwestern Area of the CBP;
- Monitor surface water and groundwater quality; and,
- Implement institutional controls to restrict access to and prevent use of groundwater.

Figures 1-2A and 1-2B present an overview of the investigations, Corrective Measures Implementation Plans, and annual reports that support the development of the LTM Plan. Reports document the nature and extent of the CBP through the soil, sediment, soil vapor, air, groundwater and surface water. Corrective Measures Implementation Plans present actions by ALDOT to prevent access to groundwater through administrative and engineering controls. Quarterly status reports were prepared to document assessment and construction activities and effectiveness of implemented corrective measures. Following completion of construction, Annual reports are submitted to document effectiveness of the corrective measures.

2. DEVELOPMENT OF THE LONG-TERM MONITORING NETWORK

2.1. ASSESSMENT MONITORING NETWORK

The monitoring well network used to assess the CBP consisted of 150 wells and 40 piezometers (Table 2-1). Effectiveness (84 wells), Boundary (14 wells), and Background wells (2 wells) are listed on Table 2-2. Surface water monitoring is performed throughout the CBP. Both groundwater and surface water results have been presented in investigation and status reports that document CBP assessment activities.

2.1.1. SHALLOW MONITORING WELLS

100-Series and 200-Series monitoring wells were constructed to determine the horizontal and vertical extents of the TCE within the shallow saturated zone. This zone, which is described in the July 2008 CME Report, is the saturated zone above the first distinct clay beneath the water table. The 100-Series wells screen the upper part of this shallow saturated zone. The 200-Series wells screen the middle and lower parts of this shallow saturated zone. Many of the shallow-zone monitoring wells are in clusters with screens that are 5 to 10 feet long and monitor the upper, middle, and lower part of the shallow saturated zone. Continuous multichannel tubing (CMT) wells were constructed to assess the vertical distribution of TCE in the area of Fairgrounds Road and Broadway Street. This is the area of higher TCE concentrations in the CBP. Pump test and observation wells were installed for aquifer testing to gather pertinent information and development of a site-specific groundwater model.

2.1.2. DEEP MONITORING WELLS

Nine (9) deep monitoring wells are within the CBP. Eight (8) 300-Series monitoring wells are screened within the deep saturated zone, which is the water-bearing unit between the first distinct clay and the top of the underlying Gordo Formation. The ninth deep monitoring well, a 400-Series well, is screened in the upper Gordo Formation. Deep monitoring well locations are as follows:

- Monitoring wells MW-339 through MW-342 are within the Fairgrounds Road and Broadway Street Area;

- Monitoring well MW-311 is within the southwest part of the CBP;
- Monitoring wells MW-357 and MW-457 are near a former production-well that was at the Montgomery Zoo;
- Monitoring well MW-304 is on ALDOT property at the main ALDOT complex and near Coliseum Boulevard, and;
- Monitoring well MW-358 is at the Bama Budweiser of Montgomery, Inc. facility (1700 Emory Folmar Boulevard) within the northeast portion of the CBP.

2.2. LONG-TERM MONITORING NETWORK DESIGN

2.2.1. MONITORING NETWORK OPTIMIZATION

In accordance with the Agreement, the monitoring network required transition from an assessment monitoring network to a corrective measures monitoring network. Spatial, trend, temporal, and qualitative analyses were used to evaluate the assessment monitoring well network and transition it to a long-term, corrective measures network.

2.2.2. SPATIAL ANALYSIS (WELL LOCATIONS)

TCE spatial analysis was performed through evaluation of TCE distributions throughout the CBP and correlation of TCE concentrations between monitoring wells. This analysis resulted in identifying the optimum number of wells and well locations for corrective measures monitoring. A quantitative analysis was conducted by using “spatial tolerance” to determine if a monitoring well should be used for long-term monitoring.

Spatial tolerance is used to associate a level of precision with spatial data and reflects the distance that two or more points can be apart and still represent the same area. The method reduces the number of monitoring wells in a point dataset but identifies the best monitoring well distribution to monitor TCE. Spatial tolerance analysis was performed separately for 100-Series and 200-Series wells, and the following steps were performed to select long-term monitoring wells:

1. Series-100 and Series-200 assessment monitoring well data were removed, one at a time, from the assessment monitoring well network. After removal of the monitoring well data, the TCE concentrations were re-contoured.

2. The interpolated (contoured) value (TCE concentration) at each eliminated monitoring well location was compared to the original TCE concentrations that were contoured with the monitoring well data not removed.

3. The monitoring well was selected for potential removal from the long-term network if the absolute difference between the interpolated TCE concentration and the original value was minimal, and the TCE contouring resolution was retained.

4. An optimized monitoring well system that horizontally and vertically defined the CBP and retained TCE contouring resolution similar to that of the original 150 well network was proposed for Long Term Monitoring. The optimized monitoring well system is referred to as the Effectiveness Monitoring Well Network (EFF monitoring well).

The following 64 of the original 150 assessment monitoring wells were removed from the EFF monitoring well network:

- 15 “100A/200B/200C-Series” monitoring wells
- 20 “100/200-Series Cluster” monitoring wells
- 9 “Pump Test” and “Observation” monitoring wells
- 13 “A-Series” monitoring wells
- 7 “CMT” Wells.

As approved by the ADEM on August 23, 2011, the seven CMT wells were permanently abandoned as described in the “Boundary Well Installation and Continuous Multichannel Tubing Well Abandonment Plan” dated June 2011.

All nine (9) “deep” wells were retained as EFF monitoring wells (eight 300-Series wells and one 400-Series well).

100-Series and 200-Series monitoring wells were analyzed separately; however, some 100-Series and 200-Series monitoring wells are nested pairs. If either one of the 100- or 200-Series well was retained as an EFF monitoring well as a result of spatial analysis, both the 100- or 200-Series monitoring wells were retained as an EFF monitoring well. Table 2-2 summarizes the EFF monitoring wells.

Figure 2-1 shows the 100-, 200-, 300-, and 400-Series wells that comprise the EFF monitoring well network.

To summarize, 84 of the 150 assessment monitoring wells were retained as EFF monitoring wells plus 2 as Background wells for long-term water quality monitoring of the CBP.

The 64 assessment monitoring wells eliminated from the EFF monitoring well network and water-quality monitoring are retained for measurements of water levels, with the exception of the seven (7) CMT Wells that were plugged and abandoned in October 2011. Additionally, piezometers used for water level measurements and groundwater elevation mapping are retained (see Table 2-1).

2.2.3. TEMPORAL ANALYSIS (OPTIMUM SAMPLE COLLECTION SCHEDULE)

The optimum sampling schedule for the EFF monitoring well network was updated in revision 4 of the LTM (June 2019) by using trend analysis of historical data. The temporal analysis included evaluating the TCE trend for all EFF monitoring wells and optimizing the sampling frequency based on the results.

2.2.4. TREND ANALYSIS

Trend analysis was used to analyze water quality data for increasing or decreasing trends and to confirm plume movement predicted by conceptual and numeric groundwater models. Trend analysis has been conducted annually for groundwater data collected from the assessment monitoring well network and submitted to ADEM (Coliseum Boulevard Plume Analysis of TCE Trends, Annual Reports). The results consistently show decreasing trends or no trends in TCE concentrations for a majority of the EFF monitoring wells.

To re-assess sampling frequency, trend analysis was completed for the 22 EFF wells that have been sampled semi-annually under revision 3 (September 2014) of the LTM Plan. Trend statistics were calculated using the Shewhart Statistic for all samples (semi-annual, first quarter and third quarter samples) and compared to the trend statistics for results from the first quarter sampling only (annual). TCE was not detected in four of the EFF wells (MW-123, MW-221, MW-262, and MW-358) plus the two background wells for the duration of

the Long Term Monitoring program (2011 through 2018) and were not included in the trend analysis. There was no change in the trend statistics for any of the remaining 18 EFF wells at the annual sampling frequency. Semi-annual sampling does not change the results or conclusions compared to annual sampling and is not needed to assess effectiveness of the remedy.

Based on the sampling frequency re-assessment, the time between sampling events can be modified to annually (first quarter only) for the EFF and Background wells. Boundary wells will continue to be monitored semi-annually. A subset of the shallow effectiveness wells is also designated as Vapor Intrusion Screening (VIS) monitoring wells. VIS wells with calculated Risk Based Target Levels (RBTLs) will be monitored semi-annually. VIS wells are described in Section 3.5.

2.3. EFFECTIVENESS WELL OPTIMIZATION

As part ALDOT's on-going monitoring program, ALDOT monitored quarterly from 2001 through 2011 and semiannually since 2011. With implementation of remedial measures, the size of the CBP decreased by 20 percent between 2009 and 2018. As expected, increases in TCE concentrations have been documented in the annual trend reports along the northeast/southwest plume axis due to the capture of TCE from the PH12 area at the SWTA. Based on the re-assessment of the trends based on annual versus semi-annual sampling frequency, a semi-annual sampling frequency for the EFF wells do not provide useful information above the annual sampling frequency. As such, and based on consultations with ADEM, ALDOT proposes a revised monitoring schedule:

First semi-annual period (First Quarter)

Well Types	Number of Wells
Background Wells	2
Boundary Wells	14
Effectiveness Wells	84[1]

Second semi-annual period (Third Quarter)

Well Types	Number of Wells
Background Wells	0
Boundary Wells	14
Effectiveness Wells	VIS wells[2]

[1] Includes Effectiveness wells that are also designated as VIS wells (see Section 3.5).

[2] Only VIS wells with established RBTLs will be sampled Third Quarter (see Section 3.5).

Specific monitoring wells to be included in the optimized monitoring program are included in Tables 2-3A and 2-3B. The semi-annual and annual sample locations are shown on Figures 2-2 and 2-3.

Based on future long-term monitoring results, the well network optimization will be continuously evaluated using the following general parameters:

- Wells with TCE groundwater concentrations below the groundwater protection standard;
- Wells with either a stable or decreasing TCE concentration trend based on the annual trend evaluation;
- Wells in an area of low advection where the groundwater is moving very slowly relative to the northeast and southwest areas of the CBP, and annual monitoring is sufficient to characterize changes in concentration, and;
- Other spatial or temporal conditions that may support modification to the sample frequency, number of monitored wells and/or well locations.

2.4. BOUNDARY WELL NETWORK

A Boundary Well (BDY) Network of 14 BDY monitoring wells was installed in October 2011 to monitor the effectiveness of corrective measures and institutional controls. The BDY Well Network design relied upon the site-wide groundwater model to identify groundwater flow paths and probable TCE migration pathways relative to the position of institutional control parcels and corrective measures. As approved by the ADEM on August 23, 2011, the BDY monitoring wells were installed and sampled as described in the "Boundary Well Installation and Continuous Multichannel Tubing Well Abandonment Plan" dated June 2011. BDY wells are shown on Figure 2-1.

2.5. SURFACE WATER MONITORING NETWORK

2.5.1. CORRECTIVE MEASURE MONITORING

Surface water monitoring will be performed to verify the effectiveness of corrective measures and to determine if surface-water quality meets compliance requirements.

2.5.1.1. COMPLIANCE SAMPLE LOCATIONS

In accordance with the Agreement, surface-water compliance points are at the:

1. confluence of the Lower Kilby Ditch with Three Mile Branch (LLCP-1); and,
2. NPDES permitted discharge in the Southwest Area (SWA DSN001)

Samples will be collected at these two (2) locations every two weeks in accordance with the National Pollutant Discharge Elimination System (NPDES) permit and the Settlement Agreement. The TCE regulatory compliance limits are stipulated in the existing NPDES permit and the Agreement (see Figures 2-4 and 2-5). On July 31, 2013, surface water compliance point DSN001 was relocated to the end of the riprap ditch, at the former location of SWA-5. The former location of DSN001 was renamed FG (Flood Gate)(R3-September 2014).

2.5.1.2. EFFECTIVENESS SAMPLE LOCATIONS

Samples will be collected quarterly at the following locations to monitor surface- water quality throughout the CBP (see Table 3-3).

WETLAND EAST OF BAMA BUDWEISER FACILITY

One surface water monitoring point will be located at the wetland located east of the Bama Budweiser facility (BB, see Figure 2-4).

LOW-LYING AREA AND THREE MILE BRANCH

This monitoring will include samples collected from LLA-1 through LLA-11 in the Lower Kilby Ditch area and the Wetland Treatment Area (see Figure 2-4). Samples will also be collected from Three Mile Branch (see Figure 2-4). Samples will be collected at the following locations:

- LLA-1 Upstream of constructed wetland;
- LLA-2 Discharge from constructed wetland;
- LLA-3 Internal constructed wetland;
- LLA-4 Small tributary south of existing wetland;
- LLA-5 Groundwater interceptor trench pond;
- LLA-6 Groundwater interceptor trench before confluence with Lower Kilby Ditch;
- LLA-7 Lower Kilby Ditch after confluence with groundwater interceptor trench;
- LLA-8 Existing wetland;

- LLA-9 Unnamed tributary immediately south of Northern Boulevard
- LLA-10 Surface water south of Northern Boulevard groundwater seeps from west of unnamed tributary
- LLA-11 Discharge from Russell Distribution facility stormwater/groundwater
- TMB-1 Three Mile Branch upstream of the confluence with Lower Kilby ditch;
- TMB-2 Three Mile Branch upstream of the confluence with Lower Kilby Ditch at North Boulevard;
- TMB-3 Three Mile Branch downstream of the confluence with the Lower Kilby Ditch.

MONTGOMERY ZOO POND AND DITCH

Surface water monitoring samples will continue to be collected from the Montgomery Zoo pond (ZP) and ditch (ZD) (see Figure 2-4).

SOUTHWEST AREA

Surface water monitoring in the Southwest Area will be conducted at the following locations (see Figure 2-5):

- SWA-1: Dewatering Pond
- SWA-2: Transfer Pond
- SWA-3: Inlet structure at Discharge Pond from Transfer Pond
- SWA-4: Outlet structure at Discharge Pond

2.5.1.3. VOLUNTARY SAMPLE LOCATIONS

ALDOT monitors surface water at locations FG and O1 (see Figure 2-5) on a voluntary basis. Both sample locations are downstream from compliance point DSN001. Samples collected at FG are used to monitoring water quality discharged to the city of Montgomery storm water conveyance to Cypress Creek. Water quality from storm water entering the natural wetlands along portions of Lower Wetumpka Road is monitored at O1. ALDOT has elected to continue voluntary monitoring at these locations; however, these sample locations may be discontinued in the future.

3. LONG-TERM MONITORING

3.1. SAMPLING PROCEDURES

Sampling during long-term monitoring will be in general accordance with the accepted procedures as outlined in the most recent guidance published by ADEM and/or the EPA (see LTM Technical Memorandum for Groundwater Sampling Methods). These documents include:

- The most recent version of the Alabama Environmental Investigation and Remediation Guidance (AEIRG);
- EPA Region 4 Science and Ecosystem Support Division (SESD) Field Branches Quality System and Technical Procedures; and,
- ALDOT Work Plans and Addendums approved previously by the ADEM.

3.2. EFFECTIVENESS MONITORING AND DATA ANALYSIS

3.2.1. EFF MONITORING WELL TREND ANALYSIS

Samples will be collected annually from the EFF monitoring wells. Time-series plots and intrawell Shewhart-Cumulative Sum (CUSUM) control charts will be used annually to evaluate trends in TCE concentrations for each EFF monitoring well. Time-series plots will also provide for visual interpretations of trends. Trends will be evaluated only for wells where TCE was detected for a sufficient number of sampling events (four consecutive events above the laboratory method detection limit) to develop valid trends.

The site-wide groundwater model was used to predict the maximum TCE concentrations at each EFF monitoring well through year 2039. Each EFF monitoring well was assigned a TCE concentration limit based on the model-predicted TCE concentration at the well through 2039 (see Table 3-1). In the event that a new EFF monitoring well is needed, a TCE concentration limit will be developed for the new EFF monitoring well based on the modeled concentration at the EFF monitoring well location.

A site-wide model verification review will be conducted every five (5) years. Data collected from annual sampling events will be used to verify the Site-wide model, evaluate effectiveness of corrective measures, and evaluate the sample collection frequency.

3.2.2. EFF MONITORING WELL CONCENTRATION LIMITS

The TCE concentration limit is the maximum concentration expected to be detected for each EFF monitoring well based on the site-wide groundwater model. TCE concentration limits have been developed for each EFF monitoring well. The TCE concentration in the groundwater sample from each EFF monitoring well will be compared to the model-predicted TCE concentration limit at the EFF monitoring well (see Table 3-1).

3.2.3. EFF MONITORING WELL DATA ANALYSIS

In accordance with the Agreement, sample results from EFF monitoring wells will be compared to the EFF concentration limit for each EFF Well (see Table 3-1 and Figure 3-1). Action items based on this comparison are:

1. Sample results below the EFF concentration limit for the monitoring well indicate that the TCE concentrations are within the site-wide groundwater model calculated values and no additional assessment or corrective measures are required. Annual sampling at the EFF monitoring well will continue.
2. If a sample result from an EFF monitoring well exceeds the TCE concentration limit for the EFF monitoring well, a verification sample will be collected from the EFF monitoring well and analyzed within 30 days of ALDOT's receipt of the final laboratory data from the annual sampling event.
3. If the TCE concentration in the verification sample is below the TCE concentration limit for the EFF monitoring well, annual monitoring will resume. ALDOT will include all verification sample results to ADEM in the Annual Report (see Section 4).
4. If the TCE concentration in the verification sample is greater than the TCE concentration limit for the EFF monitoring well, ALDOT will notify ADEM of the verified exceedance within 30 days of receipt of the final laboratory data. The ALDOT notification letter report will include results of the annual

sampling, verification sampling, and notification that ALDOT will begin quarterly sampling at the EFF monitoring well.

5. ALDOT will collect samples for four (4) consecutive quarters from the EFF monitoring well showing a verified exceedance. If TCE concentrations remain below the TCE concentration limit in the EFF monitoring well during the four consecutive quarterly sampling events, quarterly monitoring will cease and the sample collection schedule at the EFF monitoring well will return to annual. An assessment of an exceedance will be performed concurrently with quarterly monitoring.

The data analysis process and methodology for the EFF monitoring well network are presented in Figure 3-1. Table 3-1 provides the EFF monitoring well designation and TCE concentration limits.

3.3. BDY MONITORING WELL DATA ANALYSIS

BDY monitoring wells were sampled quarterly for the first year following installation, then semiannually. In accordance with the Agreement, the following criteria will be used to evaluate data collected from each BDY well:

1. The concentration limit for the CBP constituents of concern will be the Alabama Drinking Water Standard maximum contaminant level (MCL) or Regional Screening Level (RSL) (Table 3-2).
2. If a BDY monitoring well sample result exceeds an MCL or RSL for a CBP constituent of concern, a verification sample will be collected and analyzed within 30 days of receipt of the final laboratory data from the semiannual sampling event.
3. Semiannual monitoring will resume if the CBP constituent of concern concentration is below the MCL or RSL in the verification sample. ALDOT will include all verification sampling results to ADEM in the Annual Report (see Section 4).
4. If the CBP constituent of concern concentration in the verification sample is greater than the MCL or RSL, ALDOT will notify ADEM of the verified exceedance within 30 days of receipt of final laboratory data. The ALDOT notification letter report will include results of the semiannual sampling,

verification sampling, and notification that ALDOT will begin quarterly sampling.

5. ALDOT will collect samples for the four consecutive quarters from the BDY monitoring well with an exceedance. If the CBP constituent of concern concentration remains below the MCL or RSL for the BDY monitoring well during the four consecutive quarterly sampling events, the BDY monitoring well will return to semiannual monitoring schedule.
6. An Assessment Plan to evaluate the groundwater within the part of the CBP where the exceedance occurred will be submitted to ADEM. The Assessment Plan will be implemented and the results reported on a mutually agreed schedule.
7. Corrective measures will be implemented if justified by the results of the Assessment. A corrective measure will be implemented to maintain control of the CBP by preventing the expansion of the CBP beyond the Institutional Control Boundary and/or include modification to the Institutional Control Program, as needed.

The data analysis process and methodology for the BDY monitoring well system are presented in Figure 3-2. Table 2-2 provides the BDY monitoring well designation. Table 3-2 provides the BDY well concentration limits (MCL or RSL) for each CBP constituent of concern.

3.4. SURFACE WATER COMPLIANCE MONITORING

Surface water samples will be collected every two weeks at the Kilby Ditch/Low-Lying Area and Southwest Area discharges. The surface water compliance monitoring schedule is provided in Table 3-3. Surface water compliance monitoring will be performed in accordance with the NPDES permit and the Agreement.

3.5. VAPOR INTRUSION EVALUATION

ALDOT has performed vapor intrusion assessment since 2002 and has provided vapor intrusion evaluation in Annual Reports, specifically Table 3-5 of each Annual Report. In 2017, ADEM in its Alabama Risk-Based Corrective Action (ARBCA) Guidance Manual (ADEM, 2017) adopted the use of the EPA Vapor Intrusion Screening Level (VISL) calculator to determine groundwater screening levels for

vapor intrusion. EPA and ADEM have made technical documents and tools available to support the ongoing development of its vapor intrusion evaluation programs (ADEM, 2017). ALDOT has incorporated the vapor intrusion evaluation procedures that are provided in the ARBCA to supplement the existing evaluation of the vapor intrusion pathway. These procedures include the following:

1. Groundwater samples will be collected routinely from 24 of the EFF monitoring wells for vapor intrusion screening. This subset of 24 EFF monitoring wells are referred to as "VIS wells". VIS wells have screen intervals within three feet of the water table for screening TCE groundwater concentrations to VISLs. Each VIS well used for the vapor intrusion evaluation is representative of an undeveloped, residential, or commercial property. VIS wells are provided in Table 3-4 and shown in Figure 3-3.
2. Groundwater concentrations during the current year will be compared to baseline TCE groundwater concentrations in the VIS wells. Baseline TCE concentrations in VIS wells were determined during previous vapor sampling and assessment completed in 2002. A summary table for comparisons of groundwater concentrations to baseline groundwater concentrations will be provided in each Annual Report.
3. A residential or commercial VISL is calculated for TCE using the most recent edition of the EPA VISL calculator. TCE concentrations in each VIS well are compared to the VISLs. A summary table for comparisons of TCE concentrations to VISLs will be provided in each Annual Report.

3.5.1. RISK-BASED TARGET LEVELS

In accordance with the ARBCA, ALDOT will establish groundwater RBTLs for TCE in VIS wells that exceed the VISL and cumulative risk. RBTLs will be established using the ARBCA benchmarks for hazard index of 1.0 and cumulative risk of $1.0x10^{-5}$.

3.5.2. RISK-BASED TARGET LEVEL EVALUATION

ALDOT will collect groundwater samples from VIS wells with calculated RBTLs on a semi-annual schedule. A summary table of groundwater concentrations and comparisons to established RBTLs will be provided with each Annual Report. Although not required by the ARBCA, ALDOT will reevaluate RBTLs every five years to

coincide with the schedule for review and verification of the site-wide groundwater model.

1. RBTLs will be developed for VIS wells that exceed the VISL and cumulative risk.
2. If a sample from a VIS monitoring well with a calculated RBTL exceeds the RBTL, a verification sample will be collected and analyzed within 30 days of receipt of the final laboratory data from the semiannual sampling event.
3. Semiannual monitoring will resume if the concentration is below the RBTL in the verification sample. ALDOT will include all verification sampling results to ADEM in the Annual Report.
4. If the concentration in the verification sample is greater than the RBTL, ALDOT will notify ADEM of the verified exceedance within 30 days of receipt of final laboratory data. The ALDOT notification letter report will include results of the semiannual sampling, verification sampling, and notification that ALDOT will begin quarterly sampling.
5. ALDOT will collect samples four consecutive quarters from the monitoring well with an exceedance. If the CBP constituent of concern concentration remains below the RBTL for the VIS monitoring well during the four consecutive quarterly sampling events, the VIS monitoring well will return to a semiannual monitoring schedule.
6. An Assessment Plan to evaluate the groundwater within the part of the CBP where the exceedance of the RBTL occurred will be submitted to ADEM. The Assessment Plan will be implemented and the results reported on a mutually agreed schedule.
7. Corrective measures will be implemented if justified by the results of the Assessment. A corrective measure will be implemented to reduce risk from VI and/or include modification to the Institutional Control Program, as needed.

The data analysis process and methodology for the VIS monitoring wells with calculated RBTLs are presented in Figure 3-4.

4. REPORTING

ALDOT will report the effectiveness of the corrective action program annually. These reports will be submitted to ADEM on April 1st of each calendar year for data collected during the prior calendar year. The reports will include data from groundwater and surface water monitoring, an analysis of the data, and any conclusions regarding the effectiveness of the monitoring program. If the analysis of the data warrants any change to the corrective action program, ALDOT will include recommendations for revisions in the annual report.

4.1. GROUNDWATER MONITORING REPORTS

Analytical reports will include the analytical method and the method reporting limit (RL) for each constituent reported. ALDOT will maintain an archive of all Reports in accordance with the Institutional Control Program. Groundwater monitoring reports will include, but not be limited to, the following information:

- Detailed site history or reference to previously submitted site history.
- Descriptions of corrective measures activities and groundwater and surface water monitoring activities,
- A map of the groundwater monitoring system,
- Potentiometric surface maps,
- Isoconcentration maps,
- Tables of EFF and BDY monitoring well depths and elevations
- Descriptions of annual activities to include:
  - Trend analysis
  - Time vs. concentration plots
  - Comparisons of TCE concentrations to concentration limits
  - Vapor Intrusion Screening Level evaluation
  - Sampling procedures and protocol
  - Investigative derived waste management

4.2. CORRECTIVE ACTION REPORTING

At least 180 days prior to each ten-year anniversary of the effective date of the Agreement, ALDOT and ADEM will conduct a comprehensive review of the Long-Term Monitoring Plan and modify, if necessary.

4.3. SURFACE WATER REPORTING

ALDOT will retain calibration and maintenance records, copies of reports, and records of data used for reports, for at least three years from the date of the sample collection, report, or application. All records will be kept at a central repository and available for public inspection.

In accordance with the NPDES permit for the Southwest Area, results of surface water monitoring every two weeks at SWA DSN001 will be presented in Discharge Monitoring Reports submitted to ADEM on or before the 28th day of January, April, July, and October.

All surface water monitoring reports will be submitted in accordance with ADEM's established rules and regulations, and in accordance with the SW CMIP, Kilby Ditch CMIP, NPDES Permit, and the Long-Term Monitoring Plan.

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Tables

Long-Term Monitoring Plan

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA

Table 2-1. Assessment Monitoring Wells and Piezometers [1], [2]

Monitoring Well Identifier	Ground Surface Elevation (feet AMSL[3])	Screen Top Interval		Screen Bottom Interval	
		(feet bgs[4])	(feet AMSL[3])	(feet bgs[4])	(feet AMSL[2])
A-Series Wells					
MW-1	215.16	14.0	201.16	63.0	152.16
MW-1A	213.99	32.8	181.19	42.8	171.19
MW-2	218.84	16.0	202.84	70.0	148.84
MW-2A	206.24	34.5	171.74	44.5	161.74
MW-3	211.23	15.0	196.23	51.5	159.73
MW-3A	209.85	30.5	179.35	40.5	169.35
MW-4	214.14	13.0	201.14	62.0	152.14
MW-4A	213.27	38.5	174.77	48.5	164.77
MW-5	218.18	14.5	203.68	53.5	164.68
MW-5A	200.26	14.2	186.06	24.2	176.06
MW-6	218.82	15.5	203.32	59.5	159.32
MW-7	218.05	20.0	198.05	64.0	154.05
MW-8	218.72	17.0	201.72	61.0	157.72
MW-9	217.20	17.0	200.20	56.0	161.20
Pumping Test Wells					
Pump Test Well	206.00	9.0	197.00	28.0	178.00
PW-1	221.61	33.5	188.11	53.0	168.61
PW-2	210.71	19.0	191.71	38.5	172.21
PW-3	200.46	16.0	184.46	26.0	174.46
PW-4	211.11	45.0	166.11	70.0	141.11
Observation Wells					
OW-1	206.01	9.0	197.01	28.0	178.01
OW-2	203.05	9.5	193.55	28.5	174.55
OW-3	203.53	8.5	195.03	29.5	174.03
OW-4	200.52	8.0	192.52	22.0	178.52
SWTA Performance Observation Wells					
P-1	130.19	9.0	121.19	12.0	118.19
P-2	128.01	9.0	119.01	12.0	116.01
P-3	130.89	9.0	121.89	12.0	118.89
P-4	123.64	8.0	115.7	11.0	112.7
PZ-26	162.93	49.0	113.93	64.0	98.93
100/200/300/400-Series Wells					
MW-101	202.67	8.0	194.67	12.0	190.67
MW-201	203.00	23.0	180.00	27.0	176.00
MW-102	200.72	9.5	191.22	13.5	187.22
MW-202	200.81	19.0	181.81	23.0	177.81
MW-103	207.10	12.0	195.10	16.0	191.10
MW-203	206.96	29.0	177.96	33.0	173.96
MW-104	217.80	21.5	196.30	30.5	187.30
MW-204	218.00	57.0	161.00	63.5	154.50
MW-304	218.00	72.0	146.00	86.0	132.00
MW-105	217.00	20.5	196.50	26.5	190.50

Table 2-1. Assessment Monitoring Wells and Piezometers [1], [2]

Monitoring Well Identifier	Ground Surface Elevation (feet AMSL[3])	Screen Top Interval		Screen Bottom Interval	
		(feet bgs[4])	(feet AMSL[3])	(feet bgs[4])	(feet AMSL[2])
MW-205	217.00	46.5	170.50	55.5	161.50
MW-106	223.00	24.5	198.50	33.5	189.50
MW-206	223.00	45.0	178.00	54.0	169.00
MW-107	223.00	25.5	197.50	34.5	188.50
MW-207	223.00	58.0	165.00	67.0	156.00
MW-108	213.00	15.5	197.50	24.5	188.50
MW-208	213.00	47.0	166.00	51.0	162.00
MW-109	221.00	23.5	197.50	32.5	188.50
MW-209	221.00	60.5	160.50	69.5	151.50
MW-210	189.00	4.5	184.50	8.5	180.50
MW-111	211.84	36.5	175.34	45.5	166.34
MW-211	212.14	71.5	140.64	80.5	131.64
MW-311	211.04	88.5	122.54	93.0	118.04
MW-112	221.00	25.5	195.50	34.5	186.50
MW-212	221.00	61.5	159.50	70.5	150.50
MW-113	207.00	11.0	196.00	20.0	187.00
MW-213	208.00	31.5	176.50	35.5	172.50
MW-214	172.00	3.0	169.00	7.0	165.00
MW-214A	172.00	9.5	162.50	18.5	153.50
MW-115	212.00	15.5	196.50	24.5	187.50
MW-215	212.00	30.0	182.00	39.0	173.00
MW-116	194.00	9.5	184.50	18.5	175.50
MW-216	194.00	31.0	163.00	40.0	154.00
MW-117	219.00	34.5	184.50	43.5	175.50
MW-217	209.00	65.0	144.00	74.0	135.00
MW-118	203.00	9.5	193.50	18.5	184.50
MW-218	204.00	35.0	169.00	39.0	165.00
MW-219	203.00	10.0	193.00	19.0	184.00
MW-220	219.00	22.0	197.00	31.0	188.00
MW-221	184.00	15.0	169.00	26.0	158.00
MW-221C	184.15	65.0	119.15	75.0	109.15
MW-122	215.00	17.5	197.50	26.5	188.50
MW-222	215.00	48.0	167.00	57.0	158.00
MW-123	217.00	16.5	200.50	25.5	191.50
MW-223	217.00	60.5	156.50	69.5	147.50
MW-124	219.00	24.5	194.50	38.5	180.50
MW-224	220.00	44.5	175.50	53.5	166.50
MW-125	207.00	15.5	191.50	24.5	182.50
MW-225	207.00	31.0	176.00	40.0	167.00
MW-226	203.60	11.3	192.35	20.5	183.10

Table 2-1. Assessment Monitoring Wells and Piezometers [1], [2]

Monitoring Well Identifier	Ground Surface Elevation (feet AMSL[3])	Screen Top Interval		Screen Bottom Interval	
		(feet bgs[4])	(feet AMSL[3])	(feet bgs[4])	(feet AMSL[2])
MW-227	206.00	18.0	188.00	27.0	179.00
MW-128	212.00	17.0	195.00	26.0	186.00
MW-228	213.00	41.0	172.00	50.0	163.00
MW-129	215.00	18.0	197.00	27.0	188.00
MW-229	215.00	30.5	184.50	39.5	175.50
MW-130	216.00	18.5	197.50	27.5	188.50
MW-230	216.00	42.0	174.00	51.0	165.00
MW-131	206.00	17.0	189.00	23.5	182.50
MW-231	206.00	28.5	177.50	32.5	173.50
MW-132	216.00	19.5	196.50	28.5	187.50
MW-232	216.00	46.0	170.00	55.0	161.00
MW-133	205.00	9.0	196.00	18.0	187.00
MW-233	205.00	26.0	179.00	30.0	175.00
MW-134	210.00	11.5	198.50	25.5	184.50
MW-234	210.00	35.0	175.00	39.0	171.00
MW-153	239.03	104.0	135.03	113.5	125.53
MW-154	245.13	95.6	149.53	105.1	140.03
MW-155	216.32	89.0	127.32	99.0	117.32
MW-156	184.96	68.0	116.96	77.5	107.46
MW-339	223.39	99.0	124.39	108.5	114.89
MW-340	215.19	81.5	133.69	91.0	124.19
MW-341	212.00	50.0	162.00	54.5	157.50
MW-342	216.00	81.5	134.50	86.0	130.00
MW-357	206.84	54.5	152.34	63.5	143.34
MW-457	207.21	122.9	84.36	147.0	60.21
MW-158	190.74	23.0	167.74	33.0	157.74
MW-258	191.10	43.0	148.10	48.0	143.10
MW-358	191.11	43.0	148.11	48.0	143.11
MW-259	181.94	56.5	125.44	66.5	115.44
MW-260	188.99	65.0	123.99	75.0	113.99
MW-261	195.35	61.0	134.35	71.0	124.35
MW-262	177.47	66.5	110.97	76.5	100.97
MW-263	182.24	58.0	124.24	68.0	114.24
MW-264	182.07	58.5	123.57	68.5	113.57
MW-265	181.44	56.0	125.44	66.0	115.44
100A/200B/200C-Series Wells					
MW-135A	217.95	31.0	186.95	35.5	182.45
MW-235B	217.73	40.0	177.73	44.5	173.23
MW-235C	217.44	50.0	167.44	54.5	162.94
MW-136A	211.37	20.0	191.37	24.5	186.87

Table 2-1. Assessment Monitoring Wells and Piezometers [1], [2

Monitoring Well Identifier	Ground Surface Elevation (feet AMSL[3])	Screen Top Interval		Screen Bottom Interval	
		(feet bgs[4])	(feet AMSL[3])	(feet bgs[4])	(feet AMSL[2])
MW-236B	211.29	27.0	184.29	31.5	179.79
MW-236C	210.98	34.0	176.98	38.5	172.48
MW-137A	213.62	32.0	181.62	36.5	177.12
MW-237B	213.74	41.0	172.74	45.5	168.24
MW-237C	213.62	48.0	165.62	52.5	161.12
MW-138A	223.64	34.0	189.64	38.5	185.14
MW-238B	223.44	44.0	179.44	48.0	175.44
MW-238C	223.55	50.0	173.55	54.5	169.05
MW-143A	201.93	8.0	193.93	13.0	188.93
MW-243B	201.93	18.0	183.93	23.0	178.93
MW-144A	214.51	21.0	193.51	31.0	183.51
MW-244B	214.51	37.0	177.51	47.0	167.51
MW-244C	214.51	52.0	162.51	62.0	152.51
MW-145A	282.74	96.0	186.74	106.0	176.74
MW-146A	200.46	10.0	190.46	15.0	185.46
MW-246B	200.46	19.0	181.46	24.0	176.46
MW-147A	201.10	10.0	191.10	15.0	186.10
MW-247B	201.10	20.0	181.10	25.0	176.10
MW-148A	210.70	36.5	174.20	82.0	128.70
MW-248B	211.28	37.5	173.78	47.0	164.28
MW-248C	211.52	61.5	150.02	71.0	140.52
MW-149A	210.58	13.0	197.58	23.0	187.58
MW-249B	210.58	32.0	178.58	37.0	173.58
MW-249C	210.58	41.0	169.58	46.0	164.58
MW-150A	207.99	8.0	199.99	18.0	189.99
MW-250B	207.99	22.0	185.99	27.0	180.99
MW-250C	207.99	31.0	176.99	36.0	171.99
MW-151A	202.04	7.0	195.04	17.0	185.04
MW-251B	202.04	23.0	179.04	28.0	174.04
MW-152A	204.99	8.0	196.99	18.0	186.99
MW-252B	204.99	23.0	181.99	33.0	171.99

NOTES:

[1] Shaded cell indicates the well is an EFF well. The well is used for collection of water quality and groundwater elevation measurements (see Table 2.2 for a list of EFF wells).

[2] Non-shaded cell indicates that only groundwater elevations will be collected from the well.

[3] Above mean sea level.

[4] Below ground surface.

**7 CMT Wells not included*

Table 2-1. Assessment Monitoring Wells and Piezometers [1]

Piezometer Location	Ground Surface Elevation (feet AMSL[2])	Screen Top Interval		Screen Bottom Interval	
		(feet bgs[3])	(feet AMSL[2])	(feet bgs[3])	(feet AMSL[2])
PZ-1	221.26	21.5	199.76	30.5	190.76
PZ-2	207.3	15.5	191.8	24.5	182.8
PZ-3	220.67	24	196.67	34	186.67
PZ-4	216.66	26.5	190.16	35.5	181.16
PZ-5	204.82	15	189.82	19.8	185.02
PZ-6	212.55	23	189.55	27.8	184.75
PZ-7	206.22	17	189.22	21.8	184.42
PZ-8	209.58	17	192.58	21.8	187.78
PZ-9	205.28	17	188.28	21.8	183.48
PZ-10	214.37	23	191.37	27.8	186.57
PZ-11	212.0	27	185.0	31.8	180.2
PZ-12	212.56	20	192.56	25	187.56
PZ-13	208.3	20	188.3	25	183.3
PZ-14	204.83	15	189.83	20	184.83
PZ-15	220.62	44	176.62	49	171.62
PZ-16	193.47	8	185.47	13	180.47
PZ-17	203.95	19	184.95	24	179.95
PZ-18	193.22	61	132.22	70	123.22
PZ-19	186.49	53	133.49	63	123.49
PZ-20	184.8	57	127.8	67	117.8
PZ-21	167.87	59	108.87	69	98.87
PZ-22	182.89	2	180.89	12	170.89
PZ-23	173.8	14	159.8	23.5	150.3
PZ-24	208.57	14	194.57	23.5	185.07
PZ-25	182.88	4	178.88	8.5	174.38
PD-1	206.33	10	196.33	19.8	186.53
PD-2	201.86	13	188.86	17.8	184.06
PD-3	202.62	15	187.62	19.8	182.82
PD-4	202.22	10	192.22	20	182.22
PD-101	200.83	12.5	188.33	16.5	184.33
PD-102	205.55	16.5	189.05	20.5	185.05
PD-103	208.55	18.5	190.05	22.5	186.05
PD-104	200.33	11	189.33	14	186.33
PD-105	199.39	12	187.39	15	184.39
PD-106	199.73	14.5	185.23	17.5	182.23
PD-107	205.87	17.5	188.37	20.5	185.37
PD-108	205.82	14.5	191.32	17.5	188.32
PD-109	204.59	7	197.59	12	192.59
FBPZ-1	215.4	19	196.4	28.5	186.9
FBPZ-2	215.93	17	198.93	26.5	189.43

NOTES:
[1] *Piezometers will be used for groundwater elevation measurements only.*
[2] *Below ground surface.*
[3] *Above mean sea level.*

Table 2-2. Effectiveness, Boundary and Background Monitoring Wells

WELL NUMBER	WELL TYPE	MONITORED ZONE
MW-104	EFF / VIS	Shallow
MW-106	EFF / VIS	Shallow
MW-108	EFF / VIS	Shallow
MW-109	EFF / VIS	Shallow
MW-111	EFF / VIS	Shallow
MW-113	EFF / VIS	Shallow
MW-115	EFF / VIS	Shallow
MW-116	EFF / VIS	Shallow
MW-117	EFF / VIS	Shallow
MW-118	EFF / VIS	Shallow
MW-123	EFF / VIS	Shallow
MW-125	EFF / VIS	Shallow
MW-128	EFF / VIS	Shallow
MW-129	EFF / VIS	Shallow
MW-130	EFF / VIS	Shallow
MW-131	EFF	Shallow
MW-132	EFF / VIS	Shallow
MW-133	EFF / VIS	Shallow
MW-134	EFF / VIS	Shallow
MW-136A	EFF	Shallow
MW-137A	EFF	Shallow
MW-143A	EFF / VIS	Shallow
MW-144A	EFF / VIS	Shallow
MW-150A	EFF / VIS	Shallow
MW-153	EFF	Shallow
MW-154	EFF	Shallow
MW-155	EFF	Shallow
MW-156	EFF	Shallow
MW-204	EFF	Shallow
MW-206	EFF	Shallow
MW-208	EFF	Shallow
MW-209	EFF	Shallow
MW-210	EFF	Shallow
MW-211	EFF	Shallow
MW-213	EFF	Shallow
MW-215	EFF	Shallow
MW-216	EFF	Shallow
MW-217	EFF	Shallow
MW-218	EFF	Shallow
MW-219	EFF	Shallow
MW-221	EFF	Shallow
MW-221C	EFF	Shallow
MW-223	EFF	Shallow
MW-225	EFF	Shallow
MW-228	EFF	Shallow
MW-229	EFF	Shallow
MW-230	EFF	Shallow
MW-231	EFF	Shallow
MW-232	EFF	Shallow
MW-233	EFF	Shallow
MW-234	EFF	Shallow
MW-235B	EFF	Shallow
MW-135A	EFF	Shallow
MW-235C	EFF	Shallow
MW-236B	EFF	Shallow
MW-236C	EFF	Shallow
MW-237B	EFF	Shallow
MW-237C	EFF	Shallow
MW-243B	EFF	Shallow
MW-244B	EFF	Shallow
MW-244C	EFF	Shallow
MW-146A	EFF / VIS	Shallow
MW-246B	EFF	Shallow
MW-147A	EFF / VIS	Shallow
MW-247B	EFF	Shallow
MW-250B	EFF	Shallow
MW-250C	EFF	Shallow
MW-259	EFF	Shallow
MW-260	EFF	Shallow
MW-261	EFF	Shallow
MW-262	EFF	Shallow
MW-263	EFF	Shallow
MW-264	EFF	Shallow
MW-265	EFF	Shallow
MW-5A	EFF	Shallow
MW-304	EFF	Deep
MW-311	EFF	Deep
MW-339	EFF	Deep
MW-340	EFF	Deep
MW-341	EFF	Deep
MW-342	EFF	Deep
MW-357	EFF	Deep
MW-358	EFF	Deep
MW-457	EFF	Deep
BDY-1	BDY	Shallow
BDY-2	BDY	Shallow
BDY-3	BDY	Shallow
BDY-4	BDY	Shallow
BDY-5	BDY	Shallow
BDY-6	BDY	Shallow
BDY-7	BDY	Shallow
BDY-8	BDY	Shallow
BDY-9	BDY	Shallow
BDY-10	BDY	Shallow
BDY-11	BDY	Shallow
BDY-12	BDY	Shallow
BDY-13	BDY	Shallow
BDY-14	BDY	Shallow
MW-112	BKG / VIS	Shallow
MW-212	BKG	Shallow

EFF – Corrective Action Effectiveness Monitoring Well
BDY – Boundary Monitoring Well
BKG – Background Well
VIS – Vapor Intrusion Screening Groundwater Monitoring Well

Table 2-3A. Semi-Annual (January & July) Boundary Monitoring Wells

WELL NUMBER	WELL TYPE	MONITORED ZONE
BDY-01R	BDY	Shallow
BDY-02	BDY	Shallow
BDY-03	BDY	Shallow
BDY-04	BDY	Shallow
BDY-05	BDY	Shallow
BDY-06	BDY	Shallow
BDY-07	BDY	Shallow
BDY-08	BDY	Shallow
BDY-09	BDY	Shallow
BDY-10	BDY	Shallow
BDY-11R	BDY	Shallow
BDY-12	BDY	Shallow
BDY-13	BDY	Shallow
BDY-14	BDY	Shallow

Table 2-3B. Annual (January-only) Sampling Program Effectiveness and Background Monitoring Wells

WELL NUMBER	WELL TYPE	MONITORED ZONE
MW-104	EFF / VIS	Shallow
MW-106	EFF / VIS	Shallow
MW-108	EFF / VIS	Shallow
MW-109	EFF / VIS	Shallow
MW-111	EFF / VIS	Shallow
MW-113	EFF / VIS	Shallow
MW-115	EFF / VIS	Shallow
MW-116	EFF / VIS	Shallow
MW-117	EFF / VIS	Shallow
MW-118	EFF / VIS	Shallow
MW-123	EFF / VIS	Shallow
MW-125	EFF / VIS	Shallow
MW-128	EFF / VIS	Shallow
MW-129	EFF / VIS	Shallow
MW-130	EFF / VIS	Shallow
MW-131	EFF	Shallow
MW-132	EFF / VIS	Shallow
MW-133	EFF / VIS	Shallow
MW-134	EFF / VIS	Shallow
MW-136A	EFF	Shallow
MW-137A	EFF	Shallow
MW-143A	EFF / VIS	Shallow
MW-144A	EFF / VIS	Shallow
MW-150A	EFF / VIS	Shallow
MW-153	EFF	Shallow
MW-154	EFF	Shallow
MW-155	EFF	Shallow
MW-156	EFF	Shallow
MW-204	EFF	Shallow
MW-206	EFF	Shallow
MW-208	EFF	Shallow
MW-209	EFF	Shallow
MW-210	EFF	Shallow
MW-211	EFF	Shallow
MW-213	EFF	Shallow
MW-215	EFF	Shallow
MW-216	EFF	Shallow
MW-217	EFF	Shallow
MW-218	EFF	Shallow
MW-219	EFF	Shallow
MW-221	EFF	Shallow
MW-221C	EFF	Shallow
MW-223	EFF	Shallow
MW-225	EFF	Shallow
MW-228	EFF	Shallow
MW-229	EFF	Shallow
MW-230	EFF	Shallow
MW-231	EFF	Shallow
MW-232	EFF	Shallow
MW-233	EFF	Shallow
MW-234	EFF	Shallow
MW-235B	EFF	Shallow
MW-135A	EFF	Shallow
MW-235C	EFF	Shallow
MW-236B	EFF	Shallow
MW-236C	EFF	Shallow
MW-237B	EFF	Shallow
MW-237C	EFF	Shallow
MW-243B	EFF	Shallow
MW-244B	EFF	Shallow
MW-244C	EFF	Shallow
MW-146A	EFF / VIS	Shallow
MW-246B	EFF	Shallow
MW-147A	EFF / VIS	Shallow
MW-247B	EFF	Shallow
MW-250B	EFF	Shallow
MW-250C	EFF	Shallow
MW-259	EFF	Shallow
MW-260	EFF	Shallow
MW-261	EFF	Shallow
MW-262	EFF	Shallow
MW-263	EFF	Shallow
MW-264	EFF	Shallow
MW-265	EFF	Shallow
MW-5A	EFF	Shallow
MW-304	EFF	Deep
MW-311	EFF	Deep
MW-339	EFF	Deep
MW-340	EFF	Deep
MW-341	EFF	Deep
MW-342	EFF	Deep
MW-357*	EFF*	Deep
MW-358	EFF	Deep
MW-457	EFF	Deep
MW-112	BKG / VIS	Shallow
MW-212	BKG	Shallow

- MW-357 to be sampled quarterly until the TCE concentration is less than the effectiveness concentration.
- Wells with RBTLs will be sampled semi-annually with the First Quarter and Third Quarter wells

(r-4/17/2020)

Table 3-1. Effectiveness Well Concentration Action Limits

WELL NUMBER	TCE CONCENTRATION LIMIT (mg/L)
MW-106	20
MW-206	20
MW-137A	20
MW-237B	20
MW-237C	20
MW-131	15
MW - 123	15
MW - 223	15
MW- 231	15
MW-135A	15
MW-235B	15
MW-235C	15
MW-136A	15
MW-236B	15
MW-236C	15
MW-150A	15
MW-250B	15
MW-250C	15
MW-108	5
MW-208	5
MW-129	5
MW-229	5
MW-130	5
MW-230	5
MW-132	5
MW-232	5
MW-143A	5
MW-243B	5
MW-146A	5
MW-246B	5
MW-147A	5
MW-247B	5
MW-128	1
MW-228	1
MW-134	1
MW-234	1
MW-153	1
MW-5A	0.5
MW-113	0.5
MW-213	0.5
MW-111	0.5
MW-211	0.5
MW-117	0.5
MW-217	0.5
MW-133	0.5
MW-233	0.5

WELL NUMBER	TCE CONCENTRATION LIMIT (mg/L)
MW-210	0.5
MW-221	0.5
MW-221C	0.5
MW-156	0.5
MW-259	0.5
MW-260	0.5
MW-263	0.5
MW-264	0.5
MW-265	0.5
MW-154	0.5
MW-155	0.5
MW-125	0.5
MW-225	0.5
MW-144A	0.5
MW-244B	0.5
MW-244C	0.5
MW-261	0.5
MW-109	0.1
MW-209	0.1
MW-115	0.1
MW-215	0.1
MW-116	0.1
MW-216	0.1
MW-118	0.1
MW-218	0.1
MW-219	0.1
MW-262	0.1
MW-311	0.005
MW-339	0.005
MW-340	0.005
MW-341	0.005
MW-342	0.005
MW-104	0.005
MW-204	0.005
MW-304	0.005
MW-112	0.005
MW-212	0.005
MW-357	0.005
MW-457	0.005
MW-358	0.005

Table 3-2. Boundary Well Concentration Action Limits

BOUNDARY WELL COCs	ACTION LIMITS (MG/L)
Chloroform	0.08**
1,1-Dichloroethene	0.007*
cis-1,2-Dichlroroethene	0.07*
Trichloroethene	0.005*
Vinyl Chloride	0.002*
1,1-Dichloroethane	0.0028**
Carbon Tetrachloride	0.005*
Chloroethane	2.1**
Tetrachloroethylene	0.005*
Methylene Chloride	0.011**

* From ADEM Alabama Drinking Water Standard Maximum Contaminant Level (MCL) ADEM Code r. 335-7
** From Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=0.1) April 2019. Note the RSLs/MCLs in effect at the time of sample collection will be used to compare to the analytical results.

Table 3-3 Surface Water Sample Locations

Low-Lying Area Compliance Point

POINT IDENTIFICATION	POINT DESCRIPTION	MONITORING SCHEDULE	NORTHING AND EASTING[2]	MONTHLY AVERAGE TCE CONCENTRATION ALLOWABLE (PPB)[1]
LLCP-1	Lower Kilby Ditch at the confluence with Three Mile Branch	Every Two Weeks	N 700218.85 E 525429.50	37.38

[1] PPB = parts per billion (micrograms per liter)
[2] State Plane, Alabama East, NAD 1983 (Feet)

Southwest Area Compliance Point

POINT IDENTIFICATION	POINT DESCRIPTION	MONITORING SCHEDULE	NORTHING AND EASTING[2]	MONTHLY AVERAGE TCE CONCENTRATION ALLOWABLE (PPB)[1]
DSN001	Southwest Area	Every Two Weeks	N 691836.91 E 513660.36	37.94/17.47

[1] PPB = parts per billion (micrograms per liter)
[2] State Plane, Alabama East, NAD 1983 (Feet)

Low-Lying Area Effectiveness Monitoring Points

POINT IDENTIFICATION	POINT DESCRIPTION	MONITORING SCHEDULE	NORTHING AND EASTING[1]
LLA-1	Low-Lying Area- upstream of constructed wetland	Quarterly	N 699878.64 E 523381.01
LLA-2	Low-Lying Area- discharge from constructed wetland	Quarterly	N 699990.71 E 523684.38
LLA-3	Low-Lying Area- internal constructed wetland	Quarterly	N 699996.83 E 523854.62
LLA-4	Low-Lying Area- small tributary south of existing wetland	Quarterly	N 699800.83 E 524107.32
LLA-5	Low-Lying Area- groundwater interceptor trench pond	Quarterly	N 700254.35 E 523639.42
LLA-6	Low-Lying Area- groundwater interceptor trench before confluence with lower Kilby Ditch	Quarterly	N 700096.52 E 524805.57
LLA-7	Low-Lying Area- lower Kilby Ditch after confluence with groundwater interceptor trench	Quarterly	N 700196.52 E 525265.81
LLA-8	Low-Lying Area- existing wetland	Quarterly	N 699976.44 E 524421.23
LLA-9	Unnamed tributary immediately south of Northern Boulevard	Quarterly	N 699482.79 E 524098.67
LLA-10	Surface water south of Northern Boulevard groundwater seeps from west of unnamed tributary	Quarterly	N 699435.54 E 523917.64
LLA-11	Discharge from Russell Distribution facility storm water/groundwater	Quarterly	N 699358.30 E 524077.62

[1] State Plane, Alabama East, NAD 1983 (Feet)

Table 3-3 Surface Water Sample Locations

Southwest Area Effectiveness Monitoring Points

POINT IDENTIFICATION	POINT DESCRIPTION	MONITORING SCHEDULE	NORTHING AND EASTING[1]
SWA-1	Dewatering Pond	Quarterly	N 693491.68 E 512941.54
SWA-2	Transfer Pond	Quarterly	N 692895.39 E 512861.25
SWA-3	Inlet structure at Discharge Pond from Transfer Pond	Quarterly	N 692992.61 E 513529.03
SWA-4	Outlet structure at Discharge Pond	Quarterly	N 692628.30 E 513642.34

[1]State Plane, Alabama East, NAD 1983 (Feet)

Southwest Area Voluntary Monitoring Points

POINT IDENTIFICATION	POINT DESCRIPTION	MONITORING SCHEDULE	NORTHING AND EASTING[1]
FG	Flood Gate	Periodic	N 690614.84 E 513480.17
O1	Lower Wetumpka Road Ditch Discharge to Wetland	Periodic	N 690784.23 E 514493.47

[1]State Plane, Alabama East, NAD 1983 (Feet)

Other Effectiveness Monitoring Points

POINT IDENTIFICATION	POINT DESCRIPTION	MONITORING SCHEDULE	NORTHING AND EASTING[1]
BB	Stream and Wetland East of Bama Budweiser Facility	Quarterly	N 698785.41 E 525518.23
ZP	Zoo Pond	Quarterly	N 699530.88 E 519019.93
ZD	Zoo Ditch	Quarterly	N 699527.48 E 519807.66

[1]State Plane, Alabama East, NAD 1983 (Feet)

Three Mile Branch Monitoring Points

POINT IDENTIFICATION	POINT DESCRIPTION	MONITORING SCHEDULE	NORTHING AND EASTING[1]
TMB-1	Upstream Point	Quarterly	N 698070.74 E 525787.38
TMB-2	Upstream at North Boulevard	Quarterly	N 699431.09 E 525939.61
TMB-3	Downstream Point	Quarterly	N 700374.82 E 525444.65

[1]State Plane, Alabama East, NAD 1983 (Feet)

Table 3-4 Vapor Intrusion Screening Groundwater Monitoring Wells

VIS Well Location
MW-104
MW-106
MW-108
MW-109
MW-111
MW-112
MW-113
MW-115
MW-116
MW-117
MW-118
MW-123
MW-125
MW-128
MW-129
MW-130
MW-132
MW-133
MW-134
MW-143A
MW-144A
MW-146A
MW-147A
MW-150A

All vapor intrusion screening wells will be sampled First Quarter Event
Wells with RBTLs will be sampled First Quarter and Third Quarter Events

Figures

Long-Term Monitoring Plan

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA

Lower Kilby Ditch
Low Lying Area
Main Kilby Ditch
West Kilby Ditch
Southwest Treatment Area
N
DYAS DR
FLAIR DR
BROOKVIEW DR
VANDY DR
MILTON RD
BRIARBROOK DR
FORBES DR
NORTHERN BLVD
CONLEY CIR
SOUTH FORBES DR
EDWARD ST
PICKETT ST
ROTARY ST
BROCKWAY DR
COLISEUM PKWY
ZOO PL
CELINA PL
COLISEUM BLVD
EMORY FOLMAR BLVD
MORGAN CT
LUCIAN LN
MICHIGAN AVE
KIWANIS ST
COX LN
EAST VANDIVER BLVD
LOWER WETUMPKA RD
CREATIVE ST
GARDEN ST
INGLE DR
SHELLY LN
CHELSEA DR
VISTA VIEW DR
PARK AVE W
PARK AVE
GARDENDALE DR E
MARIA PL
WOODBURY CT
VISTA PARK PL
DESTIN ST
PINE ST
JOHNSON ST
GARDENDALE DR
CEDAR ST
CHISHOLM ST
NORTH BLVD
FORBES DR S
JACKSON FERRY RD
BROADWAY ST
ERWIN DR
AMANDA LN
HAROLD ST
PICKENS ST
HOUSER ST
POWELL LN
TRAFFIC OPERATIONS DR
NEWELL PKWY
CONG WLM L DICKINSON DR
E P A DR
WARD ST
MORRIS AVE
SMITH ST
MARTIN ST
MANLEY DR
CHAMPION ST
CROUSON ST
BROADVIEW ST
HARRIS ST
YARBROUGH ST
EAST ST
FAIRGROUND RD
BOYD ST
RIGBY ST
CLOUD ST
COTTON ST
GIBSON ST
GEORGE B EDMONDSON DR
COTTON CT
AMOY CT
BAFFIN DR
LYERLY LN
LA RHODA ST
AUSTIN ST
TEXAS ST
WILLENA AVE
CABOT ST
ESTER ST
MIDWAY CT
ALDUC CT
PAULINE ST
MIDWAY ST
EL PASO ST
LASALLE ST
JOHNSON ST
FEDERAL DR
PARKWOOD D
TRACTION AVE
FRENCH ST
WITHERS ST
FOSTER ST
HALE ST
CHOCTAW ST
DECATUR ST N

Legend

- Institutional Control Parcels
- Kilby Ditch and Low Lying Area
- Southwest Treatment Area

Southwest Treatment Area Surface Water Features

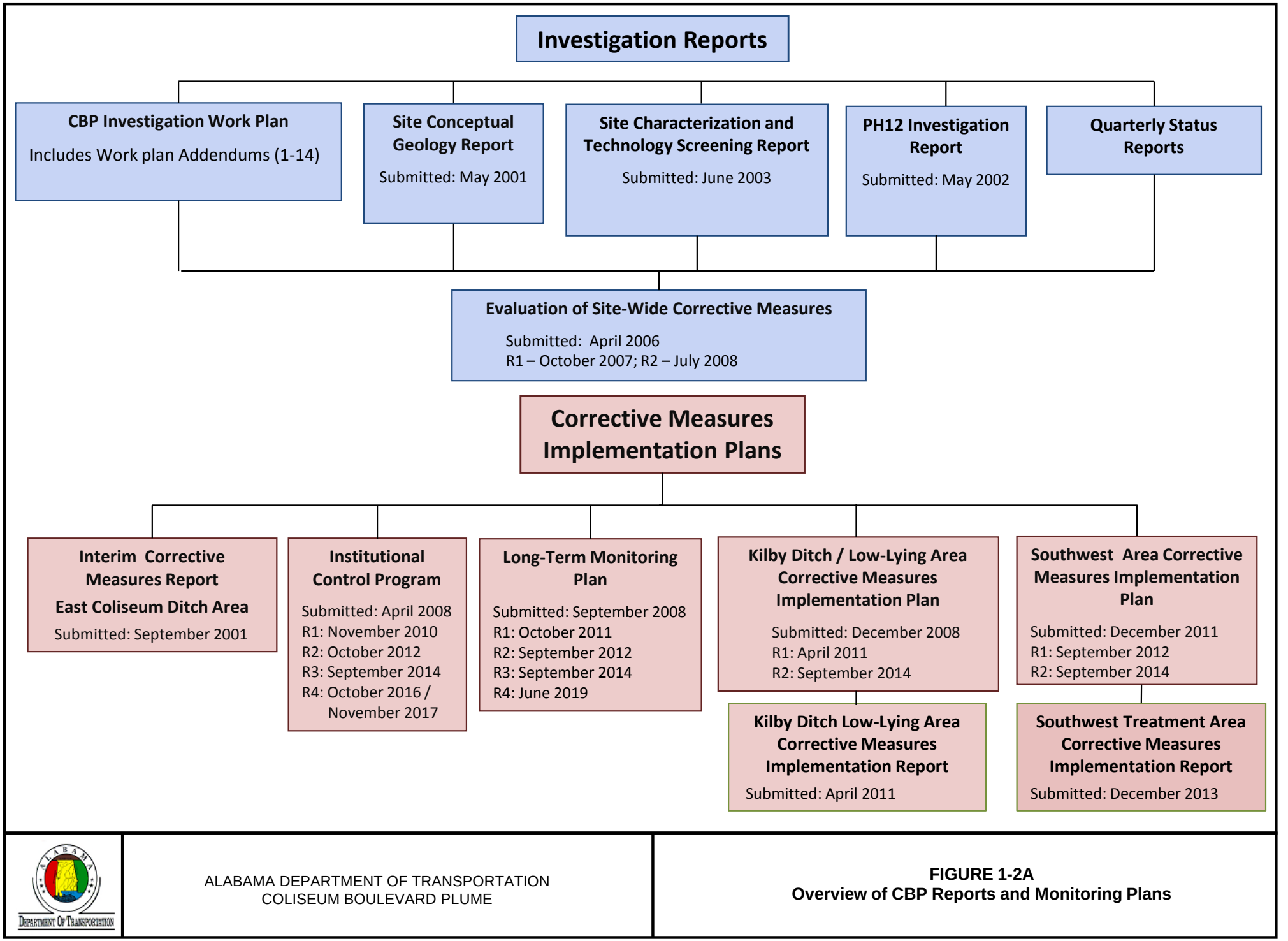
- Dewatering Pond
- Transfer Pond
- Discharge Pond
- Constructed Wetland

1,000 500 0 1,000 2,000 3,000 4,000
Feet

ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

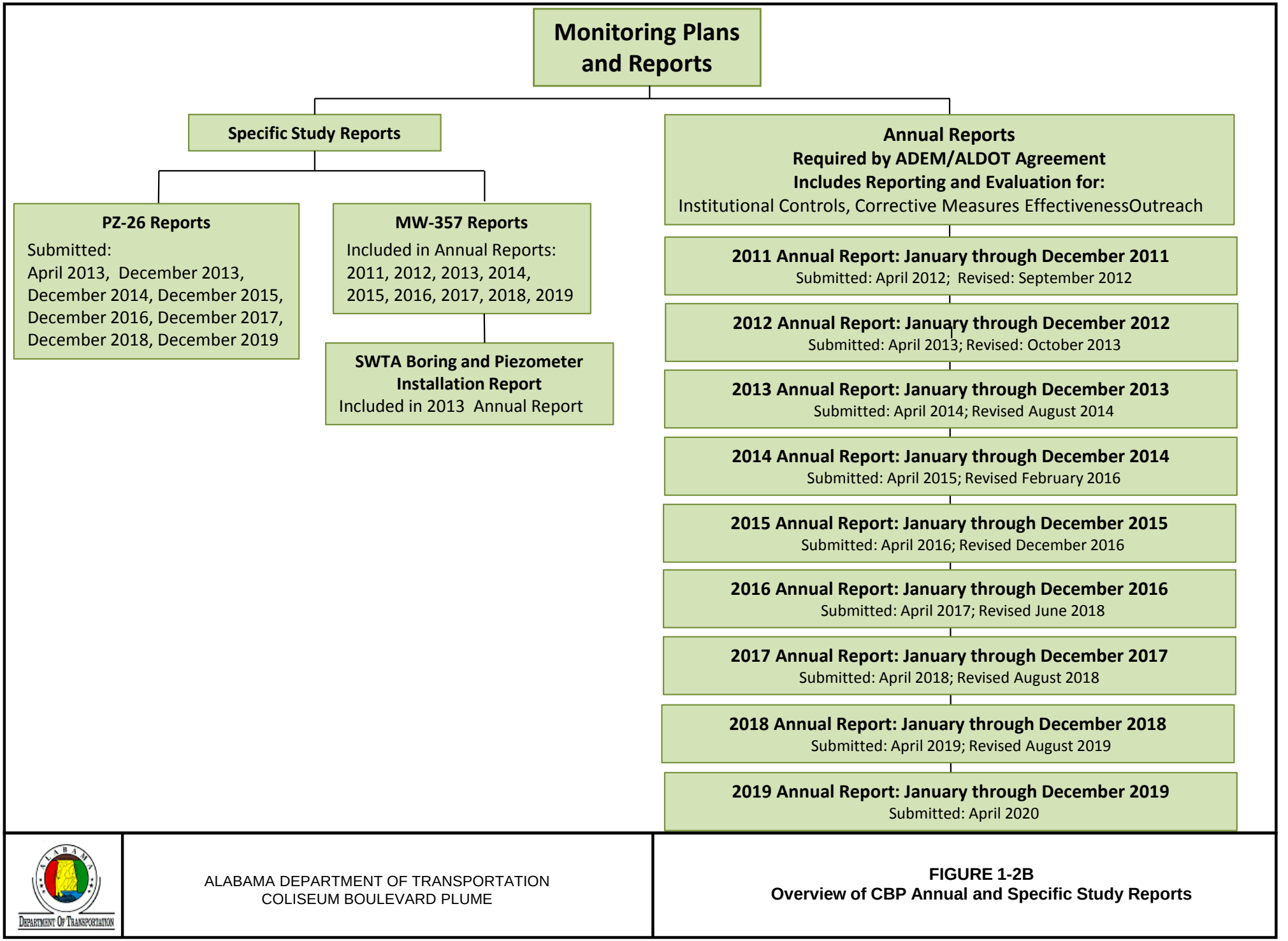
COLISEUM BOULEVARD PLUME CORRECTIVE MEASURES AREA

Figure 1-1
JUNE 2019



ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

FIGURE 1-2A
Overview of CBP Reports and Monitoring Plans



ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

FIGURE 1-2B
Overview of CBP Annual and Specific Study Reports

BDY-04
BDY-05
BDY-03
BDY-02
MW-210
MW-219
MW-5A
BDY-06
BDY-01R
MW-358
MW-115 / 215
MW-215
MW-146A / 246B
MW-143A / 243B
MW-133 / 233
MW-147A / MW-247B
MW-125 / 225
MW-116 / 216
MW-118 / 218
MW-357
MW-457
MW-134 / 234
MW-113 / 213
BDY-14
BDY-07
MW-131 / 231
MW-129 / 229
MW-136A / 236B / 236C
MW-150A / 250B / 250C
MW-341
MW-130 / 230
MW-128 / 228
MW-342
MW-108 / 208
MW-339
MW-135A / 235B / 235C
BDY-08
MW-104 / 204
MW-340
MW-106 / 206
MW-132 / 232
MW-304
MW-117 / 217
MW-137A / 237B / 237C
MW-109 / 209
BDY-13
MW-112
MW-212
MW-123 / 223
MW-111 / 211 / 311
MW-262
MW-311
BDY-09
MW-265
MW-144A / 244B / 244C
BDY-12
MW-221 / 221C
MW-264
MW-153
MW-154
MW-260
MW-156
MW-155
MW-263
MW-259
Dewatering Pond
Transfer Pond
BDY-10
MW-261
Discharge Pond
BDY-11 (abandoned)
Discharge Ditch
BDY-11R

N

Legend

- LTM Boundary Wells (BDY)
- LTM Effectivness Wells (EFF)
- LTM Background Wells (BKG)

Low Lying Area Surface Water Features

- Constructed Wetland
- Wetland Stream Channel

Southwest Treatment Area Surface Water Features

- Dewatering Pond
- Transfer Pond
- Discharge Pond
- Piping and Discharge Channels
- Southwest Treatment Area
- Kilby Ditch / Low Lying Area
- Institutional Control Parcels

1,000 500 0 1,000 2,000 3,000 4,000 Feet

ALABAMA DEPARTMENT OF TRANSPORTATION

LONG TERM GROUNDWATER MONITORING WELLS

June 2019
(rev Apr 2020)

Figure 2-1

N

Dewatering Pond

Transfer Pond

Discharge Pond

Discharge Ditch

Legend

- LTM Boundary Wells (BDY)
- LTM Effectivness Wells (EFF)
- LTM Background Wells (BKG)

Low Lying Area Surface Water Features

- Constructed Wetland
- Wetland Stream Channel

Southwest Treatment Area Surface Water Features

- Dewatering Pond
- Transfer Pond
- Discharge Pond
- Piping and Discharge Channels
- Southwest Treatment Area
- Kilby Ditch / Low Lying Area
- Institutional Control Parcels

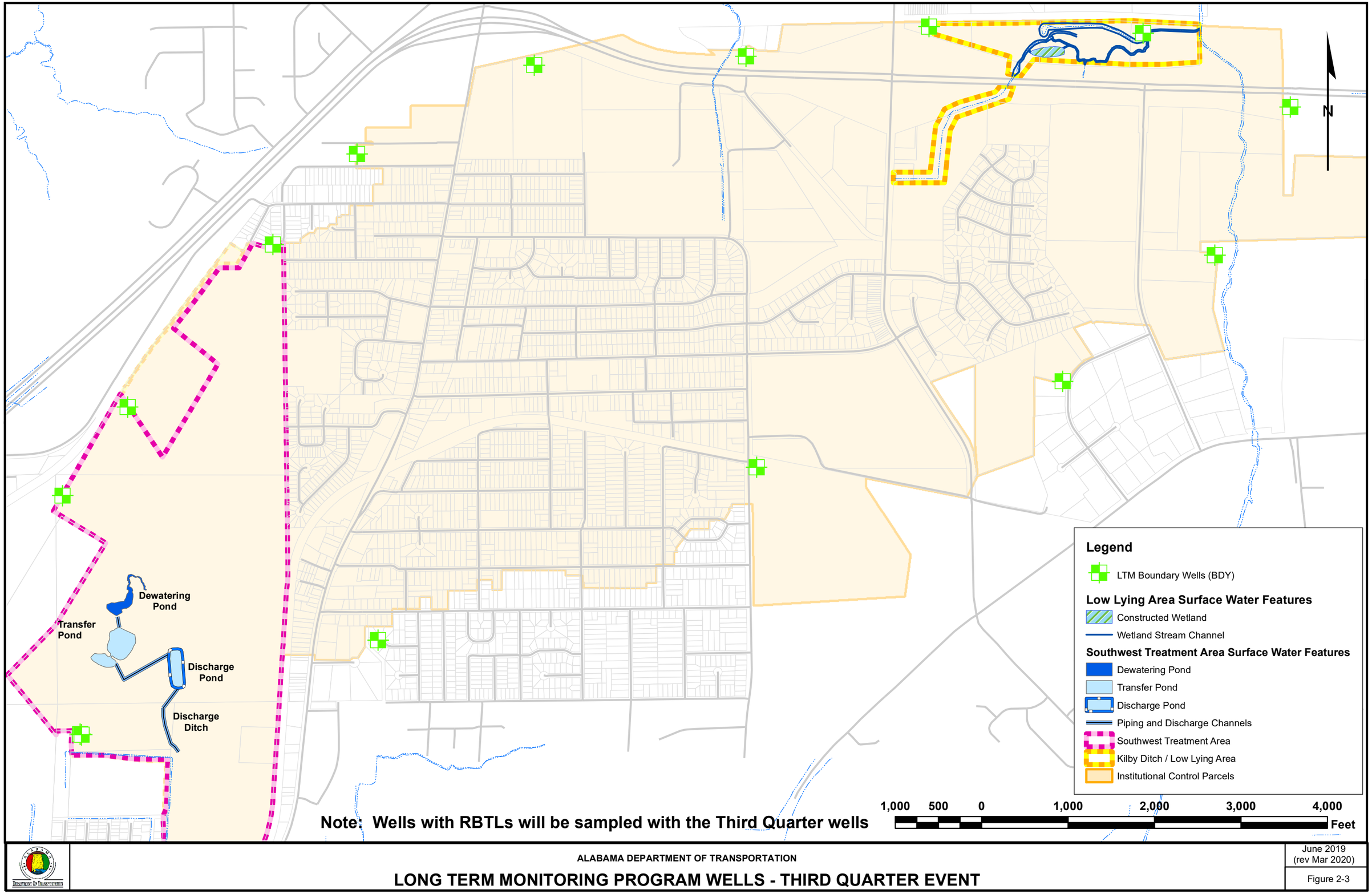
1,000 500 0 1,000 2,000 3,000 4,000 Feet

ALABAMA DEPARTMENT OF TRANSPORTATION

LONG TERM MONITORING PROGRAM WELLS - FIRST QUARTER EVENT

June 2019
(rev Apr 2020)

Figure 2-2



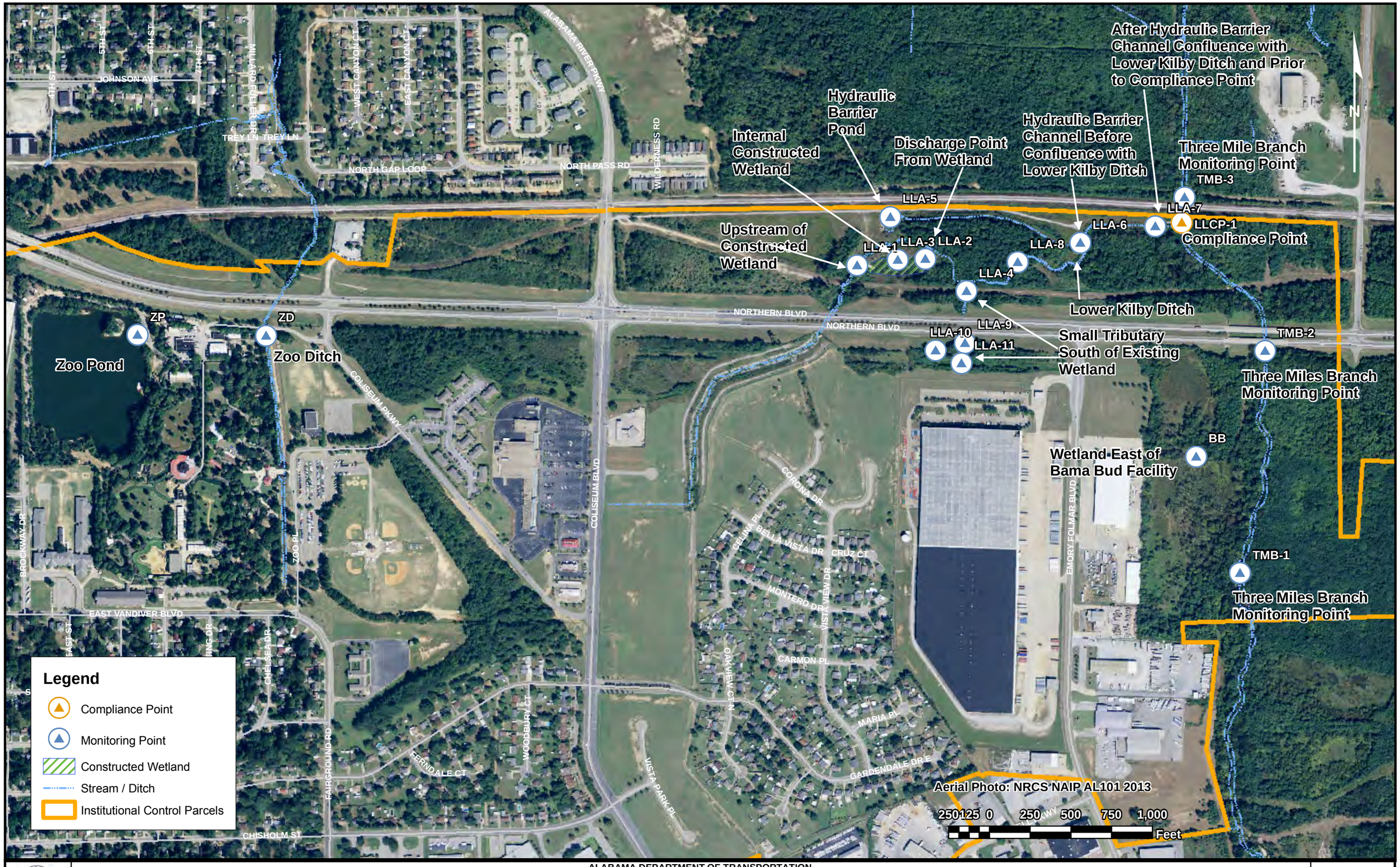
Note: Wells with RBTLs will be sampled with the Third Quarter wells

ALABAMA DEPARTMENT OF TRANSPORTATION

LONG TERM MONITORING PROGRAM WELLS - THIRD QUARTER EVENT

June 2019
(rev Mar 2020)

Figure 2-3



ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

ZP, ZD, AND LLA SURFACE WATER MONITORING LOCATIONS

June 2019

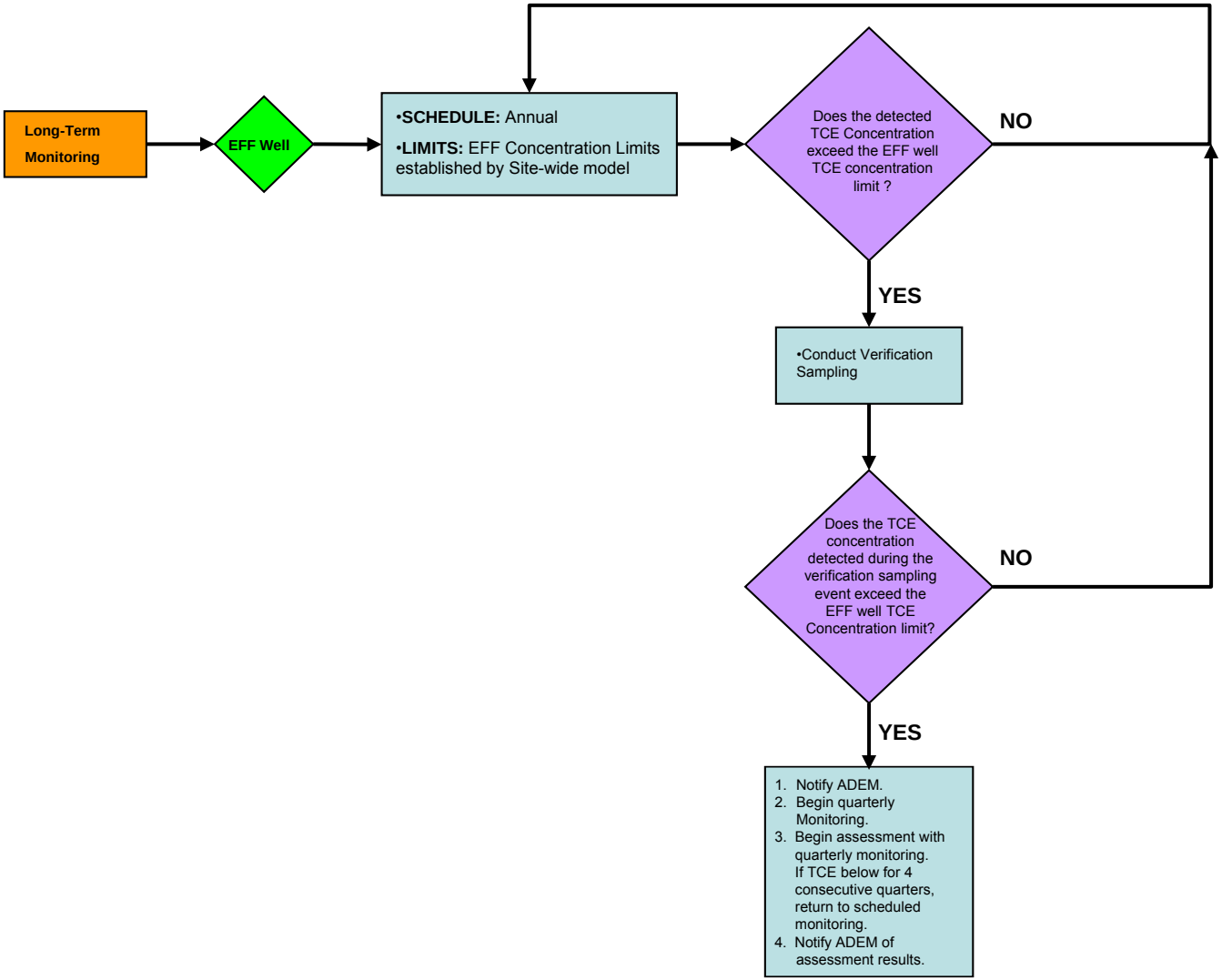
Figure 2-4

ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

June 2019

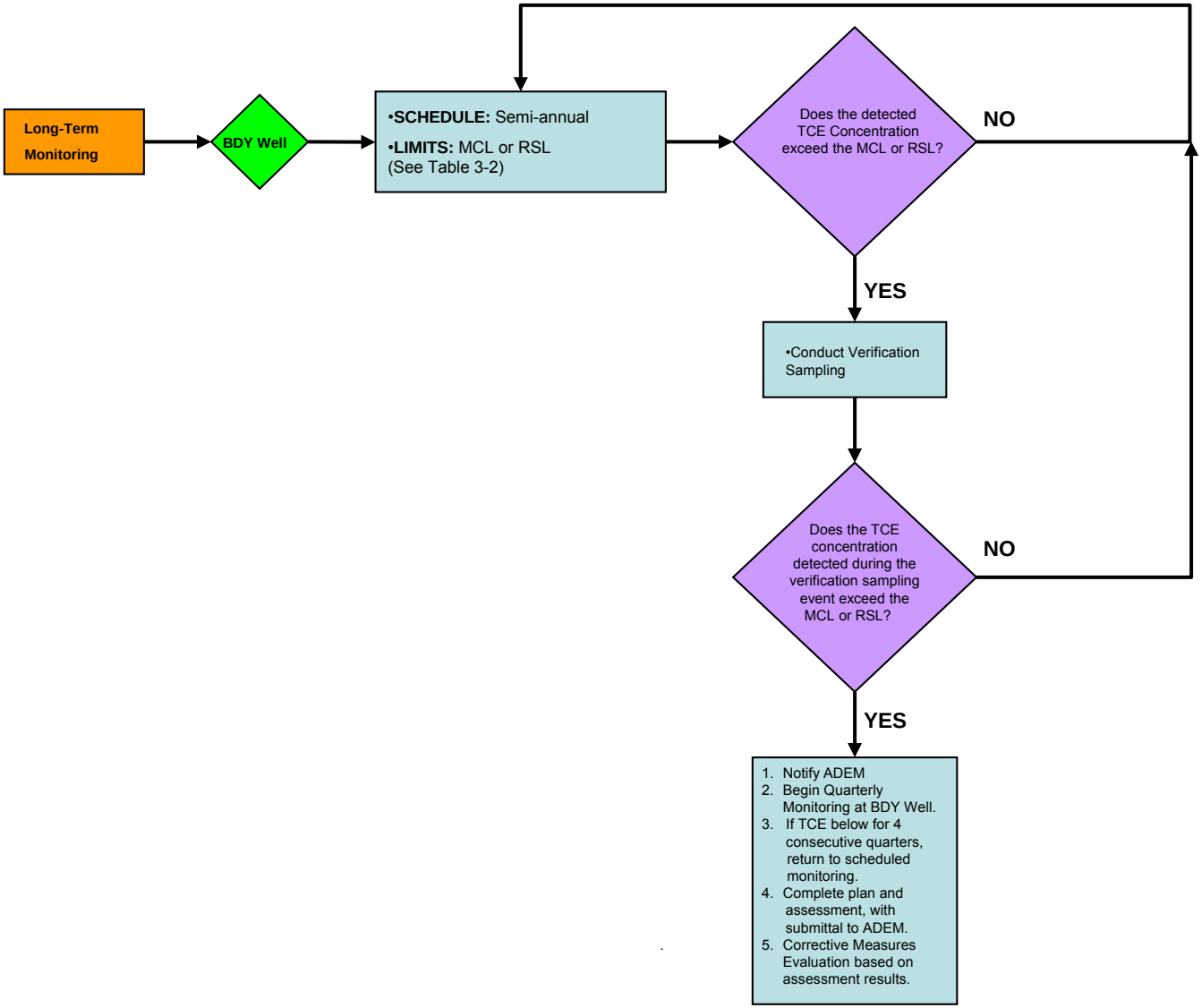
SURFACE WATER MONITORING LOCATIONS IN SOUTHWEST TREATMENT AREA

Figure 2-5



ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

FIGURE 3-1
EFFECTIVENESS MONITORING NETWORK EVALUATION
rev April 2020



ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

FIGURE 3-2
BOUNDARY WELL MONITORING NETWORK EVALUATION

rev April 2020

Legend

- Vapor Intrusion Screening Groundwater Monitoring Well
- Kilby Ditch and Low Lying Area
- Southwest Treatment Area
- Streams and Ditches
- Institutional Control Boundary

MW-115
MW-118
MW-134
MW-113
MW-133
MW-146A
MW-147A
MW-143A
MW-125
MW-116
MW-150A
MW-129
MW-128
MW-130
MW-108
MW-104
MW-117
MW-132
MW-106
MW-109
MW-112
MW-111
MW-123
MW-144A

Dewatering Pond
Transfer Pond
Discharge Pond
Discharge Ditch

N

0 500 1,000 2,000 3,000 4,000 Feet

Note: All vapor intrusion screening wells will be sampled First Quarter Event
Wells with RTBLs will be sampled First Quarter and Third Quarter Events

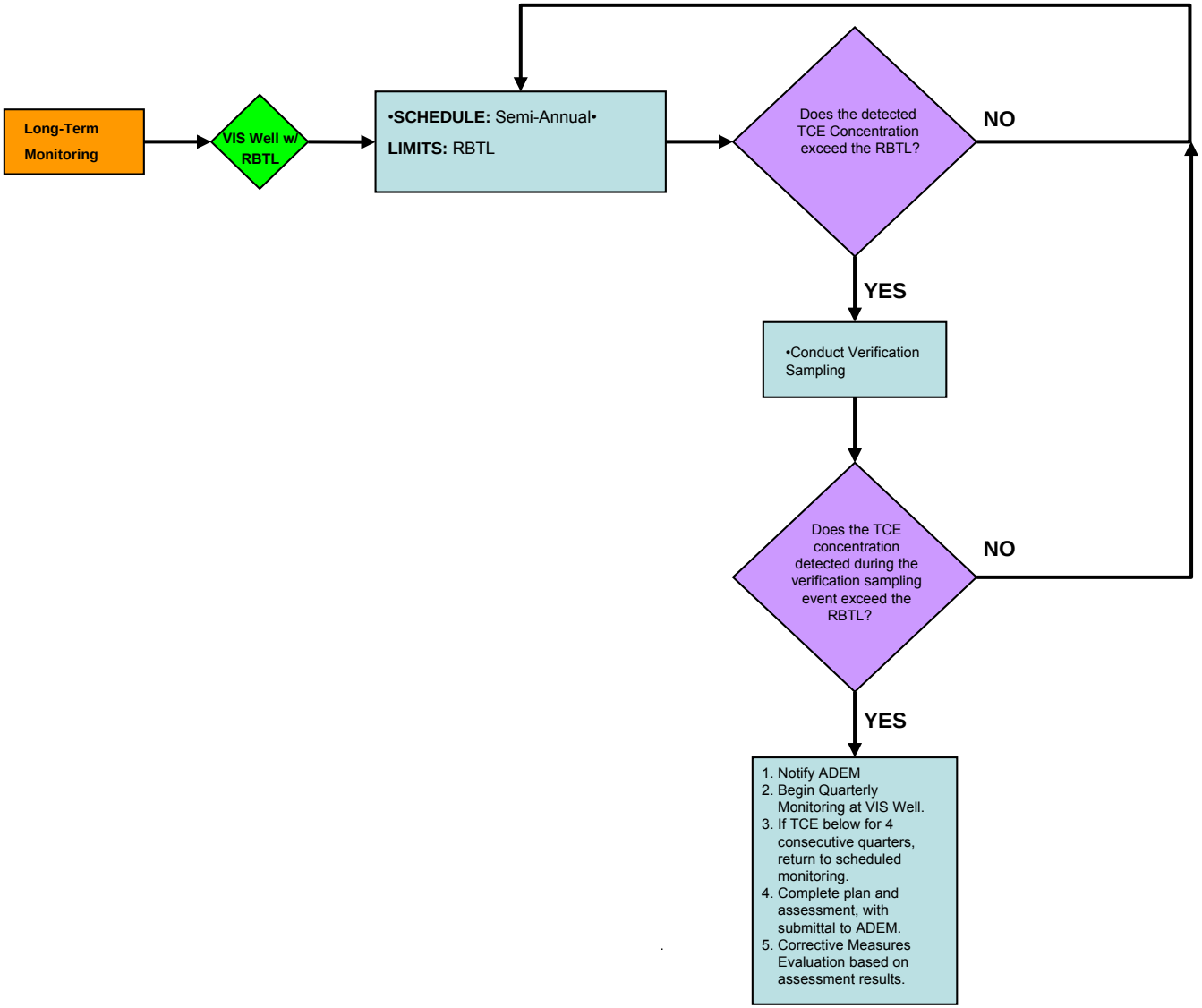
DRAFT ATTORNEY-CLIENT PRIVILEGED

ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

Vapor Intrusion Screening Groundwater Monitoring Wells

JUNE 2019
(rev Apr 2020)

FIGURE 3-3



ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

FIGURE 3-4
RBTL MONITORING NETWORK EVALUATION

rev April 2020

ALABAMA DEPARTMENT OF TRANSPORTATION

1409 Coliseum Boulevard, Montgomery, Alabama 36130-3050

Bureau of Materials and Tests
3700 Fairground Road, Montgomery, Alabama 36110
Phone (334) 206-2200 FAX (334) 264-6263

Kay Ivey
Governor

John R. Cooper
Transportation Director

November 7, 2017

Mr. Jason Wilson
Alabama Department of Environmental Management
Governmental Hazardous Waste Branch
Land Division
1400 Coliseum Boulevard
Montgomery, Alabama 36110-2059

Received
NOV 9 2017
Land Division

RE: Institutional Control Plan, 2016 Revision 4, Revised November 1, 2017
Coliseum Boulevard Plume Site
Alabama Department of Transportation
Project Fund: 348-211-9273

Dear Mr. Wilson:

Attached are one written copy and one CD of the Institutional Control Plan [Revision 4, October 2016, Revised November 1, 2017) for the Alabama Department of Transportation (ALDOT) Coliseum Boulevard Plume (CBP) Site. This document updates the current ICP (Revision 4, October 2016) to address the Alabama Department of Environmental Management (ADEM) comments provided in its letter to ALDOT dated October 2, 2017. As requested by the ADEM, revised pages, figure, and table are submitted with the revised date and code for each [e.g., r(11/1/2017)]. The complete report with revised pages is provided in the attached CD.

The revisions were completed to address the following comments offered by the ADEM in its letter dated October 2, 2017. Each ADEM comment is provided and followed by the ALDOT response in italic type.

General Comment

1. Please define the "ARARs" and "OSHA" acronyms in the document when they are first introduced.

   All acronyms have been defined in the text when first introduced and a summary of acronyms is also included after the Table of Contents.

Specific Comments

1. **Page 1-3, Section 1.1 Background Lines 15-16.** The text states that the extent of trichloroethylene (TCE) in groundwater and the associated four major study areas in the Coliseum Boulevard Plume (CBP) are shown on Figure 1. Please note that Figure 1 illustrates study areas with a yellow hatched line. Currently, there is only one such area on the figure, Probehole 12 (PHI2) Area. Please address.

The Legend on Figure 1 has been modified to rename the treatment areas as Study/Treatment Areas. The reference in the text of the document has been modified consistently.

2. **Page 3-6, Section 3.2.3 Prevent Access To and Contact With Groundwater Line 10.** The text states that the City of Montgomery requires a property owner to obtain a permit from the Plumbing, Gas, and Mechanical Department of the City prior to installation of a well. The reader is referred to Appendix A. Appendix A is split into Appendices A.1, A.2, A.3, A.4, A.5 and A.6. Please clarify in which Appendix this information is located.

   The text has been modified to reference that the City of Montgomery permit application form is included in Appendix A.3.

3. **Page 3-7, Section 3.2.3.1 State Water-Well Notification Procedure, Bullet 1.** The text states that the "Notification of Intent to Drill a Water Well" form, the "Certification of Completion" form and information related to sample collection can be found in Appendix A. It appears that this information should all be located in Appendix A.4; however, the forms mentioned above are not present in the hard copy or the electronic copy of the document. Please address. Please also clarify if both of the forms mentioned above are also known as ADEM Form 60 as described in Bullets 1 and 3.

   ADEM Form 60 was inadvertently left out of the Institutional Control Plan and has been included in Appendix A.4.

4. **Page 3-8, Section 3.2.3.2 City of Montgomery Permit Procedure, Bullet 1.** The text states that the "Application for Permit to Drill Water Wells" is located in Appendix A. Please revise the *document to state that the application is in Appendix A.3.*

   The text has been revised to indicate that the "Application for Permit to Drill Water Wells" is located in Appendix A.3.

5. **Page 3-17, Section 3.2.9 Annual Compliance Report, Bullet 1.** The text states that correspondence with stakeholders is presented in Form 8. Please revise the text to state that correspondence with stakeholders is presented in Forms 8A and 8B.

   The text has been revised to reference correspondence with stakeholders is presented in Forms 8A and 8B.

6. **Table 1.** The table lists properties without executed deed restrictions as of August 30, 2016. Line item 21 provides a parcel number, but no full property address is given. Please address.

   Table 1 has been updated to reflect the current status of properties without executed deed restrictions. A property address is included for the property on line 21.

If you have any questions or require additional information, please contact Adam Anderson at 334.206.2278.

Sincerely,

Scott W. George, P.E.
State Materials and Test Engineer

JMH:swg

Attachment

cc: Alabama Department of Public Health – Dr. John Guarisco (1-CD)
City of Montgomery - Chamberlain (1-CD)
Alabama Department of Transportation - (2-CDs)
Holtsford, Gilliland, Higgins and Hitson, P.C. - Higgins (1-Hardcopy, 2-CDs)
Arcadis - Hughes (1-Hardcopy, 3-CDs)
Montgomery Public Library - Public Repository (1-Hardcopy)
ACESS - Cousins (1-Hardcopy and 1 CD)

ALABAMA DEPARTMENT OF TRANSPORTATION

1409 Coliseum Boulevard, Montgomery, Alabama 36130-3050

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Kay Ivey
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John R. Cooper
Transportation Director

November 8, 2017

Received
NOV 9 2017
Land Division

Mr. Jason Wilson
Alabama Department of Environmental Management
Governmental Hazardous Waste Branch
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1400 Coliseum Boulevard
Montgomery, Alabama 36110-2059

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Coliseum Boulevard Plume Site
Alabama Department of Transportation
Project Fund: 348-211-9273

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The revisions were completed to address the following comments offered by the ADEM in its letter dated October 2, 2017. Each ADEM comment is provided and followed by the ALDOT response in italic type.

General Comment

1. Please define the "ARARs" and "OSHA" acronyms in the document when they are first introduced.

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The Legend on Figure 1 has been modified to rename the treatment areas as Study/Treatment Areas. The reference in the text of the document has been modified consistently.

2. **Page 3-6, Section 3.2.3 Prevent Access To and Contact With Groundwater Line 10.** The text states that the City of Montgomery requires a property owner to obtain a permit from the Plumbing, Gas, and Mechanical Department of the City prior to installation of a well. The reader is referred to Appendix A. Appendix A is split into Appendices A.1, A.2, A.3, A.4, A.5 and A.6. Please clarify in which Appendix this information is located.

   The text has been modified to reference that the City of Montgomery permit application form is included in Appendix A.3.

3. **Page 3-7, Section 3.2.3.1 State Water-Well Notification Procedure, Bullet 1.** The text states that the "Notification of Intent to Drill a Water Well" form, the "Certification of Completion" form and information related to sample collection can be found in Appendix A. It appears that this information should all be located in Appendix A.4; however, the forms mentioned above are not present in the hard copy or the electronic copy of the document. Please address. Please also clarify if both of the forms mentioned above are also known as ADEM Form 60 as described in Bullets 1 and 3.

   ADEM Form 60 was inadvertently left out of the Institutional Control Plan and has been included in Appendix A.4.

4. **Page 3-8, Section 3.2.3.2 City of Montgomery Permit Procedure, Bullet 1.** The text states that the "Application for Permit to Drill Water Wells" is located in Appendix A. Please revise the *document to state that the application is in Appendix A.3.*

   The text has been revised to indicate that the "Application for Permit to Drill Water Wells" is located in Appendix A.3.

5. **Page 3-17, Section 3.2.9 Annual Compliance Report, Bullet 1.** The text states that correspondence with stakeholders is presented in Form 8. Please revise the text to state that correspondence with stakeholders is presented in Forms 8A and 8B.

   The text has been revised to reference correspondence with stakeholders is presented in Forms 8A and 8B.

6. **Table 1.** The table lists properties without executed deed restrictions as of August 30, 2016. Line item 21 provides a parcel number, but no full property address is given. Please address.

   Table 1 has been updated to reflect the current status, as of September 30, 2017, of properties without executed deed restrictions. A property address is included for the property on line 21.

   Additionally, the reference to Table 1 on page 2-2 has been modified to reflect the September 30, 2017 date.

Mr. Wilson
November 8, 2017

Additional ALDOT modifications

The Text on Page 3-10 has been modified to reflect the current aerial photograph review procedure. Because Montgomery County does not have new aerial photography available annually, we have modified our procedure to use Google Earth for the aerial photograph review.

If you have any questions or require additional information, please contact Adam Anderson at 334.206.2278.

Sincerely,

Scott W. George, P.E.
State Materials and Test Engineer

JMH:swg

Attachment

cc: Alabama Department of Public Health – Dr. John Guarisco (1-CD)
City of Montgomery - Chamberlain (1-CD)
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ACESS - Cousins (1-Hardcopy and 1 CD)
SES-Guarino (1-Hardcopy and 1_CD)

Received
NOV 9 2017
Land Division

APPENDICES

ACRONYMS

ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
ALDOT	Alabama Department of Transportation
ARAR	Applicable or Relevant and Appropriate Requirements
BFT	Bond-for-Title
CBP	Coliseum Boulevard Plume
CME	Corrective Measure Evaluation
CMIP	Corrective Measure Implementation Plan
COG	Community Outreach Group
EPA	United States Environmental Protection Agency
GSA	Geological Survey of Alabama
IC	Institutional Control
ICP	Institutional Control Plan
ICPM	Institutional Control Project Manager
LTM	Long-Term Monitoring Plan
MCL	Maximum Contaminant Level
OSHA	Occupational Safety and Health Administration
PACER	Public Access to Court Electronic Records
PH	Probehole
PIO	Public Information Officer
UST	Underground Storage Tank
VOC	Volatile Organic Compound
TCE	Trichloroethylene

the CBP, and recommendations for corrective measures that should be implemented at the CBP.

Evaluations of potential corrective measures were based on the criteria of the U. S. Environmental Protection Agency (EPA). Those criteria are:

1. Overall protection of human health and the environment

2. Reduction of toxicity, mobility, and volume

3. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

4. Short-term effectiveness

5. Long-term effectiveness and permanence

6. Implementability

7. Cost

8. Community acceptance

9. State acceptance

Reduction of groundwater concentrations to maximum contaminant levels (MCLs) throughout the CBP was determined to be impractical because the size of the CBP and the density of structures limit the usefulness of certain corrective measures. The discharge of groundwater that contains TCE into a drainage ditch near Coliseum Boulevard was determined to be a potential exposure pathway at the CBP. Based on these determinations, two objectives were identified to prevent exposure to TCE within the CBP:

1. Restrict access to and contact with groundwater within the CBP; and

2. Restrict contact with surface water that contains TCE and treat the surface water prior to discharge from the CBP, if necessary

The CBP includes four major study areas:

1. Kilby Ditch;
2. Probehole 12 Area (PH12 Area);
3. Low-Lying Areas; and
4. Southwestern Area.

The extent of TCE in groundwater and the associated major study/treatment areas in the CBP are shown on Figure 1. Currently, the groundwater that contains TCE underlies about 780 acres. The CME provides for:

- Institutional Controls to restrict access to TCE within the groundwater;
- Covering the West Kilby Ditch and modifications to the northern section of the Main Kilby Ditch to restrict access to surface water;
- Retaining or repositioning fences along the Main Kilby Ditch and constructing a fence around the Low-Lying area to restrict access to surface water;
- Constructing a wetlands treatment system to treat surface water within the Low-Lying Areas prior to discharge;
- Monitoring of groundwater and surface water; and
- Hydraulic control of plume migration in the Southwestern Area.

The October 2007 CME report showed that the current extent of the CBP was about 780-acres where the groundwater contained TCE at a concentration of at least 0.005 milligram per Liter (5 parts per billion). A groundwater numerical model, calibrated to existing groundwater data for the CBP, was used to predict expansion (the Expansion Area) of the TCE-containing groundwater plume through the year 2036. Figure 2 also shows the geographic area where shallow groundwater was predicted to contain at least 0.001 milligram per Liter (1 part per billion) of TCE in 2036, with a 100-foot buffer added to allow for variations in the predicted extent of the dissolved TCE. Where TCE was predicted to underlie any portion of a parcel, the entire parcel was included in the Institutional Control Boundary (ICB). Restrictive covenants have been recorded and indexed to the majority of deeds of real property parcels throughout the ICB shown in Figure 2 to prohibit unauthorized access to and use of groundwater and to provide an access easement for continued investigation and remediation of the CBP.

ALDOT appointed an IC Project Manager (ICPM) who is responsible for implementing and sustaining the ICP. As an agency of the State of Alabama, ALDOT can meet the legal, administrative, technical, and financial requirements to implement, operate, maintain, and monitor the ICP.

1.3. SCHEDULE OF IMPLEMENTATION

Restrictive Covenants that contain groundwater access and use restrictions have been executed for approximately 99% parcels within the ICB. These Covenants were recorded and indexed in the land records of Montgomery County to provide notice of the restrictions to all interested parties. Additionally, in May 2016, the Montgomery City Council adopted Ordinance 22-2016, prohibiting drilling of wells in the area of the CBP. The ordinance provides a restriction on all public-use property (e.g. City Streets) and those few properties where restrictive covenants have not been recorded. Administrative

each parcel with an executed Covenant that provides that ALDOT is responsible for all costs for management and remediation of the CBP.

The parcels for which ALDOT has obtained the Restrictive Covenants within the ICB are shown on Figure 2. ALDOT maintains a database of ownership and other relevant information for the parcels that are within the ICB. As of September 30, 2017, 30 properties do not have a restrictive covenant executed. (see Table 1). The City Ordinance now covers those properties. Since ALDOT has made significant effort for many years to execute a covenant on each property, ALDOT will discontinue efforts to obtain Restritive Covenants on those specific properties. However, if an owner of a property without an executed Restritive Covenant contacts ALDOT, ALDOT will execute the Covenant and compensate the owner in the same manner as other previously executed properties. In addition, ALDOT will provide the Department of Revenue a list of unexecuted properties. If one of those properties is transferred to the Department of Revenue through a tax sale, the Department of Revenue will contact ALDOT and execute a covenant for that property.

2.2. LEGALITY OF LAND USE CONTROLS

Review of relevant Alabama statutory and case law indicates that Restrictive Covenants are enforceable and can be used as an institutional control within the ICB. Each executed Restrictive Covenant will:

- Contain a legal description of the subject parcel either expressly or by reference to other instruments recorded in the Montgomery County Office of Probate;
- Be signed by the owner of fee simple title to the parcel owner or his/her agent or attorney-in-fact;
- Be appropriately witnessed or acknowledged by an authorized officer (i.e., a notary public);
- Be recorded in the real property records of the Montgomery County Office of Probate in a manner that will provide constructive notice to interested parties including prospective purchasers, mortgagees, and/or other parties;

- Establish an access easement to allow entry to parcels for continued investigation, implementation, and maintenance of remedial measures; and
- Restrict access to and use of groundwater without ALDOT approval.

The Restrictive Covenants, when executed by the owner of fee simple title to the subject parcel of real property and recorded in the real property records of Montgomery County, will place an encumbrance on groundwater use for the subject parcel that will run with the land (that is, apply to successor owners of the parcels) and will prohibit present and future owners, occupiers, tenants, invitees, or licensees of the parcel from accessing or using groundwater without the express approval of ALDOT. The Restrictive Covenant will be enforceable in equity against all present and future owners and occupiers of the parcel unless and until terminated by ALDOT or a court of competent jurisdiction.

The Alabama Legislature has enacted the Alabama Uniform Environmental Covenants Act. This Act provides for the use of restrictive covenants as part of a remedial plan (see Appendix A.5).

In May, 2016, the City Council of the City of Montgomery adopted Ordinance 22-2016, prohibiting drilling of wells in the area of the Coliseum Boulevard Plume without express written approval of the City (see Appendix A.6). This ordinance provides a restriction on all public-use property (such as City Streets) and the properties on which restrictive covenants have not been recorded.

Flow charts are provided as Figures 3 through 7 for some elements of the ICP to depict the administrative processes. Forms referenced in the text are provided in the "Forms" section of this report. The order of presentation of the administrative and outreach components to sustain the ICP is as follows:

- Restrictive Covenants and City Ordinance to prevent access to and contact with groundwater;
- Control excavations through Alabama One-Call/Alabama 811;
- Inspections to sustain Institutional Control;
- Stakeholders;
- Stakeholder Outreach and Communications; and,
- Annual Compliance Report.

A Long-Term Monitoring (LTM) Program will also be an integral part of the management of the Coliseum Boulevard Plume. The LTM Program will be outlined in detail in a separate plan and contains proposed groundwater and surface water sampling and a contingency plan for augmenting the corrective actions if the institutional controls require modification.

3.2. ADMINISTRATIVE AND OUTREACH COMPONENTS

3.2.1. RESTRICTIVE COVENANTS

ALDOT has obtained a legally enforceable written agreement on approximately 99% of the properties within the ICB. The agreement contains restrictions that run with the land and prohibit access and use of the groundwater at the property without ALDOT approval and provides an easement for ALDOT's entry to the property, as needed, for investigation and management of the CBP (see Section 2.1). The agreements, regardless of the document title, are referred to as "Restrictive Covenant" or "Covenant." Appropriate recording, indexing and cross-indexing of the Covenants will provide notice to new parcel owners or interested parties of the Covenant terms and legal enforceability.

Interest in real property may be transferred through deeds, bond-for-title (BFT) agreements, tax sales, foreclosures or bankruptcies. Deeds, including foreclosure deeds, and sometimes

3.2.3. PREVENT ACCESS TO AND CONTACT WITH GROUNDWATER

The primary goal of the ICP is to prevent access to and contact with groundwater that contains TCE. Installation of water wells is the primary means of groundwater access/use. Thus, prohibition of new wells and closure of existing wells are important parts of the ICP. Two existing notification processes have been incorporated into the ICP. First, ADEM Administrative Code R. 335-9 requires drillers to give notice of intent to drill a water well and post-installation notice. Second, the City of Montgomery requires a property owner to obtain a permit from the Plumbing, Gas, and Mechanical Department (see Appendix A.3) of the City prior to installation of a well. The specific attributes of these procedures are described below. In addition to monitoring of the existing permit records, ALDOT observes each parcel within the ICB to identify the presence of unlisted water wells and/or the presence of other ways to access groundwater. A database is maintained by ALDOT to document property observations, identified wells or other potential exposure pathways to groundwater, and actions to abandon the wells or potential access to groundwater.

There are a number of commercial properties within the ICB that may have monitoring wells or require monitoring wells in the future. ALDOT will coordinate with those parcel owners to verify that the monitoring wells are constructed in a manner that will not breach the lower confining clay. Personnel involved in constructing and sampling the monitoring wells shall possess the proper Occupational Safety Health Administration (OSHA) training and qualifications to manage contaminated groundwater. Annually, the ALDOT will conduct a Federal and State database search of regulated sites that might have groundwater wells within the CBP.

3.2.3.1. STATE WATER-WELL NOTIFICATION PROCEDURE

The in-place notification procedure is mandated by ADEM Administrative Code R. 335-9. The requirement is for submittal of a notification of intent to drill/completion form. Code R. 335-9 requires that:

- To construct a water-supply well, a driller must be licensed by the ADEM and must:
  - Submit ADEM Form 60 "Notification of Intent to Drill a Water Well and Certification of Completion" Form to ADEM 7 days prior to constructing the well (see ADEM Form 60 in Appendix A.4);
  - Submit a "Certification of Completion" Form to ADEM within 30 days after constructing the well (see Form in Appendix A.4); and,
  - Collect samples in compliance with (see Appendix A.4) Code of Alabama 1975, §§ 22-24-8 (5) (84) if requested by the Geological Survey of Alabama (GSA).
- ADEM must notify local health authorities within 7 days of the receipt of the Certificate of Completion Form. ADEM will then:
  - File the notification and completion forms according to county and driller within the Groundwater Branch office of ADEM;
  - Make the filed forms available for review by appointment after seven 7 days from a request to review files;
  - Enter the following information into ADEM's computerized database, which is not available to the public but may be accessed by ADEM personnel during a file review:
    - Drilling company name and license number;
    - Owner of well;
    - Address of owner;
    - Address of well;
    - Depth of well;
    - Category of well (e.g. private supply or irrigation); and
    - Latitude and longitude (if provided).
- A copy of ADEM Form 60 "Notification of Intent to Drill a Water Well and Certification of Completion" Form (See Appendix A.4) historically has been submitted to the GSA Water Information office within 30 days after installation. The GSA Water Information office then:
- Files forms in the GSA Water Information office according to county and well location (by township,

section, and range if provided). Forms that do not have the township, section, and range designated are filed separately as "location unknown", and;

- Make filed forms available for view in the GSA Water Information office Monday through Friday from 8:00 am to 12:00 pm and from 1:00 pm to 5:00 pm. No notice is required but the office should be called to confirm the appropriate personnel will be present.

3.2.3.2. CITY OF MONTGOMERY PERMIT PROCEDURE

The City of Montgomery Code contains three ordinances that regulate installation of water wells within the corporate limits of the City. City Ordinances 71-67 and 72-67 require:

- Submittal of an "Application for Permit to Drill Water Wells" (see application in Appendix A.3) prior to constructing a water well. The permit must:
  - Show the latitude and longitude of the proposed well;
  - Show the physical address and Zip Code of the proposed well;
  - Be signed by a driller with a business license; and,
  - Be submitted to the Plumbing, Gas, and Mechanical Department.
  - Receive approval of the application by the City of Montgomery Chief Plumbing Inspector and the Montgomery County Health Officer.

Ordinance 22-2016 specifically makes it unlawful to dig or drill a well or otherwise access groundwater within the institutional control boundaries of the Coliseum Boulevard Plume without express, written approval of the City.

3.2.3.3. ADDITIONAL INSTITUTIONAL CONTROL TO BE IMPLEMENTED BY ALDOT

Existing State and City regulations incident to water-well installation provide helpful information and are considered an additional layer of notification and means to monitor the ICP. Figure 4 identifies the regulatory or governmental entities involved with the installation of water-wells in the City of Montgomery and the process to monitor for water-well installations.

- Utilize Google Earth to evaluate aerial photography to look for evidence of new groundwater wells by:
  - Using software to compare the most recent available aerial photographs to the historic photographs from the previous year to identify changes in land use;
  - Visually comparing the most recent available aerial photographs with historic photographs to identify significant changes in land use;
  - Within five (5) business days after analysis of aerial photographs, indicate apparent modifications of land use that could result in access of groundwater and make on-site visual inspection of target parcels; and,
  - Within 5 business days after completion of on-site visual inspections, give verbal and written notice to the ICPM of confirmed threats of groundwater access at each specific site and a plan for detailed analysis of each threat and recommended resolution.
- Will annually remind/educate well-drilling contractors of the prohibitions against unauthorized access to groundwater within the ICB (see Form 9);
- Will communicate annually with representatives of the pertinent regulatory agencies to review the status, apparent deficiencies and appropriate modification of the ICP. Representatives of the stakeholder groups will meet to modify and document the process modifications if it is determined that the procedures need to be modified; and,
- Will prepare a written report that summarizes the results of the annual review of the ICP procedures and provides recommendations regarding proposed modifications with distribution to the following:
  - Director of ADEM;
  - Chief of the City of Montgomery Plumbing, Mechanical and
  - Gas Inspector Department;
  - State Geologist (GSA); and,

- Director of ALDOT.

3.2.3.4. EXISTING AGENCY / PERSONNEL CONTACTS

The current contacts for the above agencies are provided in Appendix B.

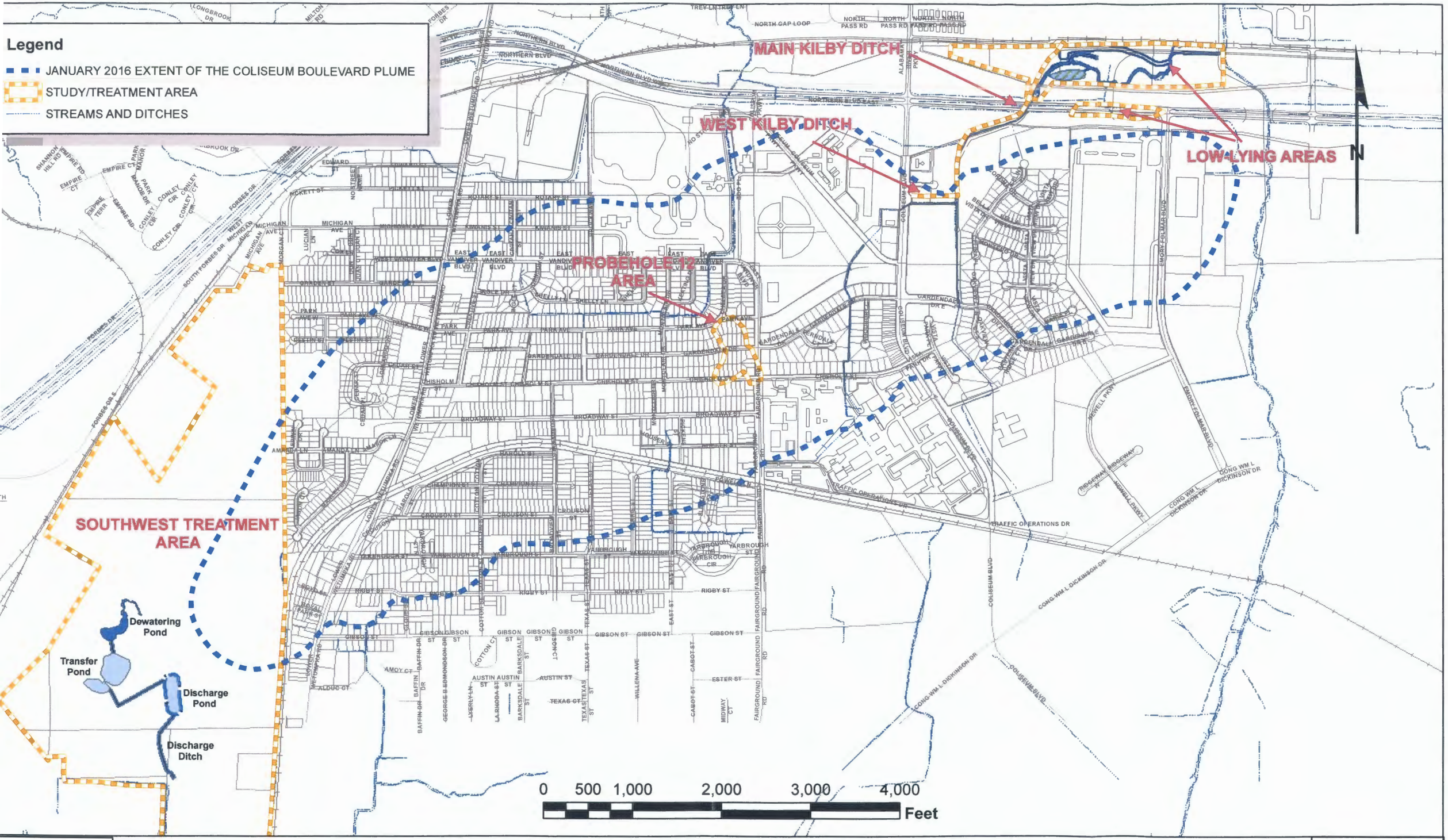
3.2.4. CONTROL EXCAVATIONS THROUGH ALABAMA/ONE-CALL811

ALDOT subscribes to Alabama One-Call/Alabama811 Service to obtain timely notification of every ticket or notice to excavate ("dig", "drill", "trench") at any location within the ICB. Through this procedure, an appropriate representative of ALDOT will be notified of requests to trench, work on utilities, install/repair Underground Storage Tanks (UST), and similar activities within the ICB. A flow chart of these actions is provided in Figure 6 of this report. To facilitate this feature of the ICP, ALDOT will:

- Maintain membership in Alabama One-Call/Alabama811. Current contacts for Alabama One Call/Alabama 811 are in Appendix B.
- Create and provide ArcView shape files of the ICB to the local One Call provider;
- Establish an e-mail account with One Call to establish prompt communications from One Call that a request has been received for excavation within the ICB, and the name and contact information for the party giving notice of a proposed excavation (the "Party");
- Upon notice from One Call that an excavation notice within the ICB has been received, ALDOT will contact the Party giving notice of the proposed excavation and ascertain the nature, schedule, proposed depth and purpose of the excavation.

If ALDOT determines there is reasonable likelihood that the proposed excavation may result in contact with the groundwater, ALDOT will notify the party that the excavation may expose contaminants of concern and advise the party to consider appropriate action to protect the health and safety of their

- Correspondence with stakeholders (See Forms 8A and 8B);
- Forms and letters completed during the previous year;
- Photographs during CBP inspections;
- Notification and related correspondence;
- List of addressees of recipients of notification and related correspondence;
- Notifications/trainings to real estate and related professionals;
- Annual notification to drillers and pool installers (See Forms 9 & 10);
- Summary of inspection and enforcement activities;
- Conclusions; and,
- Recommendations, if any, for modifications to the ICP.



ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME ANNUAL REPORT

SEPTEMBER 2016
r(11-1-17)

EXTENT OF THE COLISEUM BOULEVARD PLUME AND THE ASSOCIATED TREATMENT AND STUDY AREAS

FIGURE 1

Table 1

Coliseum Boulevard Plume - Properties Without Executed Deed Restrictions

As of 9/30/2017

Count	Parcel Number	Full Property Address	Current Property Owner Name
1	04 08 27 03 000 007.000	(S of) 0 North Blvd	Thomas Gardner Green IV
2	04 08 33 02 000 001.011	1709 Oakview Ct N	Zachary Lewis
3	04 09 29 03 007 009.000	324 Edward St	Timberline Tree Service, LLC
4	04 09 29 03 007 010.001	230 Edward St	State of Alabama 2004 Tax Sale
5	04 09 29 03 009 002.000	5 Edward St and 213 Edward St	Diane Parrish Griffin
6	04 09 29 03 009 008.000	0 Pickett St	CJ Investments, LLC
7	04 09 29 03 013 009.000	4 Kiwanis St	John Rudolph
8	04 09 29 03 014 007.000	0 Michigan Ave	Global Properties, LLC
9	04 09 29 04 003 001.000	111 Brockway Dr	John Traver
10	04 09 29 04 004 029.000	231 Vandiver E Blvd	Charles Norman & Julia Norman
11	04 09 32 01 002 004.000	4046 Keating Dr	Steven A Kagan
12	04 09 32 01 002 014.001	4012 Montclair Dr	City of Montgomery
13	04 09 32 01 015 001.000	0 Texas St	State of Alabama 1982 Tax Sale
14	04 09 32 01 015 011.000	0 Champion St	John Paul Traver
15	04 09 32 01 019 008.000	0 Houser St	City of Montgomery
16	04 09 32 02 006 019.000	41 Garden St	Jacqueline Sue Butler
17	04 09 32 02 006 097.000	219 Destin St	Steven A. Kagan
18	04 09 32 02 006 130.000	2915 Lower Wetumpka Rd	FRIS CHKN LLC
19	04 09 32 02 006 132.000	2925 Lower Wetumpka Rd	John Farrior
20	04 09 32 02 010 011.000	109 E Park Ave Chisholm	Javier Aviles Barrera
21	04 09 32 02 012 012.000	0 Chisholm St	Anne R. Adair
22	04 09 32 02 013 019.000	15 Broadway St	John Farrior
23	04 09 32 03 004 040.000	2369 Lower Wetumpka Rd	Snora Lee Jeter & Sam Jeter
24	04 09 32 03 005 002.004	3513 Jason Ct	Roberta Bell
25	04 09 32 03 009 013.000	1648 S Yarbrough Ct	Annabelle Engram & Abe Engram
26	04 09 32 03 009 015.000	1640 Yarbrough Ct	Tamedris M. Perdue
27	04 09 32 03 012 007.000	3132 Cotton St	James G. & Sandra J. Karp
28	04 09 32 03 018 008.000	1532 Gibson St	John Howard Wilson & Louise R. Wilson
29	04 09 32 03 018 011.001	2414 Lower Wetumpka Rd	Montgomery Inner City Ministry, Inc.
30	04 09 32 04 019 001.000	1982 Yarbrough St	Elba Diaz Demedina

NOTIFICATION OF INTENT TO DRILL A WATER WELL AND CERTIFICATION OF COMPLETION

DRILLING CONTRACTOR | License Number | Address | Zip Code | Date

PROPERTY OWNER | Address (mailing) | Zip Code

WELL LOCATION | County | Township | Range | Section | 1/4 Section

Distance and direction from nearest town, community, road junction or other reference point

WELL TO BE USED FOR: ❑ Private supply ❑ Public supply ❑ Industrial supply ❑ Test well ❑ Monitoring well ❑ Irrigation Other: ____________

LOCATION OF WELL: Latitude | Longitude | Diameter of well | Estimated depth

Estimated starting date

Drilling Method: ❑ Cable tool ❑ Rotary ❑ Jetted ❑ Bored ❑ Other: ____________

SIGNATURE of Drilling Contractor

Total Depth ____________ Completion Date ____________

Interval	Description of cuttings

Completion date: report depths below ground level

Pump
Type: ❑ Turb. ❑ Subm. ❑ Jet ❑ Cyl Other ______
Intake depth ______ H.P. ______ Yield ______ gpm

Capacity
Tested by: ❑ pumping ❑ air lift ❑ bailer ❑ none
Measured Static Water Level ______ ft.
Measured pumping level ______ ft. after ______ hrs. pumping ______ gpm
Development time prior to testing ______ hrs.

Finish
❑ Open hole ❑ Screened ❑ Slotted pipe ❑ Gravel pk.
Inerval(s) screened: ______ to ______ ft; ______ to ______; ______ to ______ ft.
Packer(s) set at ______ and ______ ft.
Screen: diam. ______; Size openings ______

Casing

Interval cased	Diam. (inches)	*Type pipe	*Type couplings	Interval grouted

*Couplings: Threaded & Coupled (T&C) Welded (W) Threaded & coupled & welded (TC&W)

Other: ____________

*Pipe: Black; PCV; Galv.; Other: ____________

Quality
Water analysis obtained? (check) ❑ No ❑ Bacteriological ❑ Chemical
Analysis by: ❑ Ala Geol. Surv. ❑ U.S. Geol. Surv. ❑ Ala Health Dept. ❑ Private lab.

Signed Certification:

*For deeper well please attach continuation sheet.

Send WHITE copy to:
ALABAMA GEOLOGICAL SURVEY
P.O. BOX 869999
TUSCALOOSA, AL 35486

Send YELLOW and PINK copies to:
ADEM DRINKING WATER BRANCH
P.O. BOX 301463
MONTGOMERY, AL 36130-1463

Retain GOLD copy for your Records

ADEM FORM 60 5/02

NOTIFICATION OF INTENT TO DRILL A WATER WELL

DRILLING CONTRACTOR | License Number | Address | Zip Code | Date

PROPERTY OWNER | Address (mailing) | Zip Code

WELL LOCATION | County | Township | Range | Section | 1/4 Section

Distance and direction from nearest town, community, road junction or other reference point

WELL TO BE USED FOR:

- ❑ Private supply
- ❑ Public supply
- ❑ Industrial supply
- ❑ Test well
- ❑ Monitoring well
- ❑ Irrigation
- Other: _____

LOCATION OF WELL: Latitude | Longitude | Diameter of well | Estimated depth

_____ Estimated starting date

Drilling Method:

- ❑ Cable tool
- ❑ Rotary
- ❑ Jetted
- ❑ Bored
- ❑ Other: _____

_____
SIGNATURE of Drilling Contractor

Prior to drilling, mail this page to:

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

DRINKING WATER BRANCH

PO BOX 301463

MONTGOMERY AL 36130-1463

DEPARTMENT OF TRANSPORTATION

Institutional Control Program

Coliseum Boulevard Plume Site
Montgomery, Alabama

Submitted By:

Alabama Department of Transportation
1409 Coliseum Boulevard
Montgomery, Alabama

April 2008
R1 – November 2010
R2 – October 2012
R3 – September 2014
R4 – October 2016 - r(11-1-17)

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ACRONYMS

ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
ALDOT	Alabama Department of Transportation
ARAR	Applicable or Relevant and Appropriate Requirements
BFT	Bond-for-Title
CBP	Coliseum Boulevard Plume
CME	Corrective Measure Evaluation
CMIP	Corrective Measure Implementation Plan
COG	Community Outreach Group
EPA	United States Environmental Protection Agency
GSA	Geological Survey of Alabama
IC	Institutional Control
ICP	Institutional Control Plan
ICPM	Institutional Control Project Manager
LTM	Long-Term Monitoring Plan
MCL	Maximum Contaminant Level
OSHA	Occupational Safety and Health Administration
PACER	Public Access to Court Electronic Records
PH	Probehole
PIO	Public Information Officer
UST	Underground Storage Tank
VOC	Volatile Organic Compound
TCE	Trichloroethylene

1. INTRODUCTION

The Voluntary Settlement Agreement between the Alabama Department of Environmental Management (ADEM) and the Alabama Department of Transportation (ALDOT) for the Coliseum Boulevard Plume (CBP) was executed in December 2011. The Agreement required the submittal and approval of four (4) Corrective Measures Implementation Plans (CMIPs), as follows:

- Kilby Ditch/Low-Lying Area CMIP
- Institutional Control Plan (ICP)
- Long-Term Monitoring Plan (LTM)
- Southwest Treatment Area CMIP

Each of these plans have been approved by ADEM and implemented by ALDOT. This revision is limited to certain operational and maintenance requirements that have changed (since approval of the CMIPs) as the systems have stabilized (for example, locations of monitoring points, frequency of samples, etc.).

1.1. BACKGROUND

The Alabama Department of Transportation (ALDOT) submitted a final report entitled “Site-Wide Corrective Measures Evaluation; Coliseum Boulevard Plume Site; Montgomery, Alabama; October 2007” (hereinafter “CME”) to the Alabama Department of Environmental Management (ADEM). The CME contained descriptions of the regional and local geology and hydrogeology, and the distributions of volatile organic compounds (VOCs), primarily trichloroethylene (TCE), within the surface water and groundwater within an area described as the Coliseum Boulevard Plume (CBP). The report also included descriptions of the groundwater flow and contaminant fate and transport numerical model that was used to evaluate corrective measures, evaluation of potential exposure pathways, potential corrective measures for

the CBP, and recommendations for corrective measures that should be implemented at the CBP.

Evaluations of potential corrective measures were based on the criteria of the U. S. Environmental Protection Agency (EPA). Those criteria are:

1. Overall protection of human health and the environment

2. Reduction of toxicity, mobility, and volume

3. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

4. Short-term effectiveness

5. Long-term effectiveness and permanence

6. Implementability

7. Cost

8. Community acceptance

9. State acceptance

Reduction of groundwater concentrations to maximum contaminant levels (MCLs) throughout the CBP was determined to be impractical because the size of the CBP and the density of structures limit the usefulness of certain corrective measures. The discharge of groundwater that contains TCE into a drainage ditch near Coliseum Boulevard was determined to be a potential exposure pathway at the CBP. Based on these determinations, two objectives were identified to prevent exposure to TCE within the CBP:

1. Restrict access to and contact with groundwater within the CBP; and

2. Restrict contact with surface water that contains TCE and treat the surface water prior to discharge from the CBP, if necessary

The CBP includes four major study areas:

1. Kilby Ditch;
2. Probehole 12 Area (PH12 Area);
3. Low-Lying Areas; and
4. Southwestern Area.

The extent of TCE in groundwater and the associated major study/treatment areas in the CBP are shown on Figure 1. Currently, the groundwater that contains TCE underlies about 780 acres. The CME provides for:

- Institutional Controls to restrict access to TCE within the groundwater;
- Covering the West Kilby Ditch and modifications to the northern section of the Main Kilby Ditch to restrict access to surface water;
- Retaining or repositioning fences along the Main Kilby Ditch and constructing a fence around the Low-Lying area to restrict access to surface water;
- Constructing a wetlands treatment system to treat surface water within the Low-Lying Areas prior to discharge;
- Monitoring of groundwater and surface water; and
- Hydraulic control of plume migration in the Southwestern Area.

Additional details regarding the investigations at the CBP and the characteristics of the above corrective measures are provided in the CME

1.2. PURPOSE

This report provides the details of the Institutional Control Program (ICP), which is a component of the October 2007 CME report. The United States Environmental Protection Agency (EPA) defines institutional controls as "non-engineered instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use." ADEM has adopted the EPA definition of institutional controls in ADEM Rule 335-15-1-.02(z)(2 and 3) for land-use controls to limit or control exposure to residual contamination at a property. Institutional controls may include such land or resource-use controls as restrictive covenants, deed restrictions or conservation easements.

The purpose of the ICP is to restrict access to TCE within the groundwater in the CBP. The ICP comprises legal, administrative, and outreach components. The legal component provides for agreements with owners of real property in the CBP for restrictive covenants. The covenants are executed with each owner of property at the time of execution and are filed in the probate records such that the covenants are legally enforceable in perpetuity with deed restrictions that prohibit unauthorized access to and use of groundwater and access easements for continued investigations and monitoring. The administrative component of the ICP provides procedures for ongoing oversight, monitoring and enforcement of the deed restrictions. Through the outreach component, current and future stakeholders in the CBP will continue to receive information about the institutional controls.

The October 2007 CME report showed that the current extent of the CBP was about 780-acres where the groundwater contained TCE at a concentration of at least 0.005 milligram per Liter (5 parts per billion). A groundwater numerical model, calibrated to existing groundwater data for the CBP, was used to predict expansion (the Expansion Area) of the TCE-containing groundwater plume through the year 2036. Figure 2 also shows the geographic area where shallow groundwater was predicted to contain at least 0.001 milligram per Liter (1 part per billion) of TCE in 2036, with a 100-foot buffer added to allow for variations in the predicted extent of the dissolved TCE. Where TCE was predicted to underlie any portion of a parcel, the entire parcel was included in the Institutional Control Boundary (ICB). Restrictive covenants have been recorded and indexed to the majority of deeds of real property parcels throughout the ICB shown in Figure 2 to prohibit unauthorized access to and use of groundwater and to provide an access easement for continued investigation and remediation of the CBP.

ALDOT appointed an IC Project Manager (ICPM) who is responsible for implementing and sustaining the ICP. As an agency of the State of Alabama, ALDOT can meet the legal, administrative, technical, and financial requirements to implement, operate, maintain, and monitor the ICP.

1.3. SCHEDULE OF IMPLEMENTATION

Restrictive Covenants that contain groundwater access and use restrictions have been executed for approximately 99% parcels within the ICB. These Covenants were recorded and indexed in the land records of Montgomery County to provide notice of the restrictions to all interested parties. Additionally, in May 2016, the Montgomery City Council adopted Ordinance 22-2016, prohibiting drilling of wells in the area of the CBP. The ordinance provides a restriction on all public-use property (e.g. City Streets) and those few properties where restrictive covenants have not been recorded. Administrative

and outreach procedures continue to be implemented for ongoing oversight and enforcement of the restrictions.

As of August 30, 2016, Restrictive Covenants have been executed on 99% of the parcels within the ICB. This represents approximately 99% of the total acreage within the ICB. Efforts to obtain the remaining restrictive covenants will be discontinued as those properties are now covered by City Ordinance 22-2016. Should those properties be subject to a tax sale, the Department of Revenue will execute an environmental covenant.

Administration and Outreach initiatives have been implemented to perpetuate compliance with groundwater access and use restrictions. A comprehensive plan for administration and outreach is outlined in this document and will be modified as needed throughout the project to improve communication between ALDOT and the community and to change procedures for monitoring the institutional controls as conditions warrant. An annual report will be submitted to ADEM that outlines the activities of the previous year and modifications to the ICP.

2. INSTITUTIONAL CONTROL PROGRAM – LEGAL COMPONENTS

2.1. INTRODUCTION

The initial institutional controls implemented at the CBP resulted from the 2005 settlement of a class-action lawsuit (Allen, et al. v. ALDOT, et al.) brought by owners of residential property in the CBP. By agreement of the parties, the Court entered a "Final Order to Restrict the Use of Groundwater" that restricted unauthorized access or use of groundwater within the CBP without approval of ALDOT and an access agreement that allows entry to the property for ongoing investigation and remediation activities. The Order provides that the deed restrictions and easements "run with the land" and are effective in perpetuity. As consideration, the owners of residential property within the CBP received 5.1% of their 2003 property value as established by the Montgomery County Appraiser. From a total of 1,522 parcels of real property in the CBP, owners of 1,516 parcels agreed to the settlement and recordation of the deed restriction and easement in the real property records of Montgomery County.

The *Allen* Settlement Agreement that contained the deed restriction and easement for the participating 1,516 parcels and the Court's "Order to Restrict the Use of Groundwater" were filed in the Montgomery County Office of Probate. Due to the manner in which the Order was filed, the deed restriction and easement were not readily apparent to interested parties conducting a title search on affected parcels. Prior to this discovery, approximately 300 parcels were sold to new owners. ALDOT promptly recorded a specific Restrictive Covenant against each of the *Allen* parcels still owned by an *Allen* party, along with a court-certified copy of the Court's original "Final Order to Restrict the Use of Groundwater". ALDOT has contacted each of the "new" owners of those parcels to execute a Restrictive Covenant specific to their property to be recorded in the real property records at the Montgomery County Office of Probate.

Either as part of the Restrictive Covenant or in a separate instrument, ALDOT recorded a Declaration of Responsibility for

each parcel with an executed Covenant that provides that ALDOT is responsible for all costs for management and remediation of the CBP.

The parcels for which ALDOT has obtained the Restrictive Covenants within the ICB are shown on Figure 2. ALDOT maintains a database of ownership and other relevant information for the parcels that are within the ICB. As of September 30, 2017, 30 properties do not have a restrictive covenant executed. (see Table 1). The City Ordinance now covers those properties. Since ALDOT has made significant effort for many years to execute a covenant on each property, ALDOT will discontinue efforts to obtain Restritive Covenants on those specific properties. However, if an owner of a property without an executed Restritive Covenant contacts ALDOT, ALDOT will execute the Covenant and compensate the owner in the same manner as other previously executed properties. In addition, ALDOT will provide the Department of Revenue a list of unexecuted properties. If one of those properties is transferred to the Department of Revenue through a tax sale, the Department of Revenue will contact ALDOT and execute a covenant for that property.

2.2. LEGALITY OF LAND USE CONTROLS

Review of relevant Alabama statutory and case law indicates that Restrictive Covenants are enforceable and can be used as an institutional control within the ICB. Each executed Restrictive Covenant will:

- Contain a legal description of the subject parcel either expressly or by reference to other instruments recorded in the Montgomery County Office of Probate;
- Be signed by the owner of fee simple title to the parcel owner or his/her agent or attorney-in-fact;
- Be appropriately witnessed or acknowledged by an authorized officer (i.e., a notary public);
- Be recorded in the real property records of the Montgomery County Office of Probate in a manner that will provide constructive notice to interested parties including prospective purchasers, mortgagees, and/or other parties;

- Establish an access easement to allow entry to parcels for continued investigation, implementation, and maintenance of remedial measures; and
- Restrict access to and use of groundwater without ALDOT approval.

The Restrictive Covenants, when executed by the owner of fee simple title to the subject parcel of real property and recorded in the real property records of Montgomery County, will place an encumbrance on groundwater use for the subject parcel that will run with the land (that is, apply to successor owners of the parcels) and will prohibit present and future owners, occupiers, tenants, invitees, or licensees of the parcel from accessing or using groundwater without the express approval of ALDOT. The Restrictive Covenant will be enforceable in equity against all present and future owners and occupiers of the parcel unless and until terminated by ALDOT or a court of competent jurisdiction.

The Alabama Legislature has enacted the Alabama Uniform Environmental Covenants Act. This Act provides for the use of restrictive covenants as part of a remedial plan (see Appendix A.5).

In May, 2016, the City Council of the City of Montgomery adopted Ordinance 22-2016, prohibiting drilling of wells in the area of the Coliseum Boulevard Plume without express written approval of the City (see Appendix A.6). This ordinance provides a restriction on all public-use property (such as City Streets) and the properties on which restrictive covenants have not been recorded.

3. INSTITUTIONAL CONTROL PROGRAM - ADMINISTRATIVE OUTREACH COMPONENTS

3.1. INTRODUCTION

The ICP is a dynamic program that provides for input from stakeholders. The ICP relies on various land-use controls to restrict uncontrolled access or use of groundwater. Also, the ICP provides for access to each parcel for investigation and management of the CBP. The administrative and outreach components provide:

- A defined organizational structure that provides for direct communications among the ICPM, ALDOT Director, ADEM, and Alabama Department of Public Health (ADPH);
- Reviews of real property transfers to verify the Restrictive Covenants are recorded to "run with the land" and are readily discoverable during title research;
- Maintenance of administrative/regulatory notification and permitting procedures at state and local levels through agreements to monitor and restrict access to and use of groundwater;
- Subscription to Alabama One-Call/Alabama 811 for notification of intent to drill or excavate on land within the ICB;
- Aerial photograph comparisons and vehicular reconnaissance to identify land-use changes that might affect the ICB;
- Periodic reviews to verify that stakeholders have been identified;
- Stakeholder outreach and communications; and, Annual compliance reports.

The administrative and outreach components of the ICP are presented in an action-specific format to define responsibilities. Several of the actions within the components stipulate various types of reviews of deeds, documents, agency forms, transmitting of letters, and so forth. The personnel who will be responsible for these actions will be identified by the ICPM.

Flow charts are provided as Figures 3 through 7 for some elements of the ICP to depict the administrative processes. Forms referenced in the text are provided in the "Forms" section of this report. The order of presentation of the administrative and outreach components to sustain the ICP is as follows:

- Restrictive Covenants and City Ordinance to prevent access to and contact with groundwater;
- Control excavations through Alabama One-Call/Alabama 811;
- Inspections to sustain Institutional Control;
- Stakeholders;
- Stakeholder Outreach and Communications; and,
- Annual Compliance Report.

A Long-Term Monitoring (LTM) Program will also be an integral part of the management of the Coliseum Boulevard Plume. The LTM Program will be outlined in detail in a separate plan and contains proposed groundwater and surface water sampling and a contingency plan for augmenting the corrective actions if the institutional controls require modification.

3.2. ADMINISTRATIVE AND OUTREACH COMPONENTS

3.2.1. RESTRICTIVE COVENANTS

ALDOT has obtained a legally enforceable written agreement on approximately 99% of the properties within the ICB. The agreement contains restrictions that run with the land and prohibit access and use of the groundwater at the property without ALDOT approval and provides an easement for ALDOT's entry to the property, as needed, for investigation and management of the CBP (see Section 2.1). The agreements, regardless of the document title, are referred to as "Restrictive Covenant" or "Covenant." Appropriate recording, indexing and cross-indexing of the Covenants will provide notice to new parcel owners or interested parties of the Covenant terms and legal enforceability.

Interest in real property may be transferred through deeds, bond-for-title (BFT) agreements, tax sales, foreclosures or bankruptcies. Deeds, including foreclosure deeds, and sometimes

BFT agreements are filed in Probate and can be cross-indexed to the Covenants. Periodic monitoring of the Covenants has been and will continue to be accomplished as follows (also see Figure 3):

Year 1 (2008)

- Reviewed all parcels with a Covenant filed at Probate to verify that the Covenants were properly cross-indexed to ownership instruments;

Years 2 – 30 Monitoring

- Deeds
  - Monitor changes in ownership within the ICB by conducting a review approximately twice a year of the Montgomery County Probate records and Montgomery County Online Property Tax Information;
  - Following each review provide written notice to the new owner (purchaser) of the existence, terms and conditions of the Covenant (see Forms 2A and 2B);
  - For each property with a deed filed in Probate during the preceding monitoring period, review the recorded document to determine if the newly recorded document is properly cross-indexed to the recorded Covenant. If the documents are not properly cross-indexed send a list of documents to be cross-indexed to Probate.
- Foreclosures
  - Review the *Montgomery Independent*, *Montgomery Advertiser* and Montgomery County Probate records approximately twice a year in order to monitor foreclosures within the ICB;
  - Following each review provide written notice to the foreclosing party and the foreclosing party's attorney of the existence, terms and conditions of the Covenant (see Forms 2A – 2D);
  - For each property with a foreclosure filed in Probate during the preceding monitoring period, review the recorded document to determine if the newly

recorded document is properly cross-indexed to the recorded Covenant. If the documents are not properly cross-indexed send a list of documents to be cross-indexed to Probate.

- Bankruptcies
  - Monitor active bankruptcies involving current property owners approximately twice a year by reviewing the Public Access to Court Electronic Records (PACER) database;
  - Following each review provide written notice to the bankruptcy attorney and bankruptcy trustee of the existence terms and conditions of the Covenant (see Forms 3C – 3F).
- BFT Agreements
  - In conjunction with the deed review, conduct a review of the Montgomery County Online Property Tax Information once per year until 2018 to identify any BFT agreements within the ICB;
  - Following each review provide written notice to the BFT purchasers of the existence, terms and conditions of the Covenant (see Forms 2E and 2F);
  - For each property with a BFT agreement filed in Probate during the preceding monitoring period, review the recorded document to determine if the newly recorded document is properly cross-indexed to the recorded Covenant. If the documents are not properly cross-indexed send a list of documents to be cross-indexed to Probate.
- Tax Sales
  - In conjunction with the deed and BFT reviews, review the Montgomery County Online Property Tax Information and Montgomery Independent once per year until 2018 to identify real properties with tax certificates sold via tax sale;
  - Following each review provide written notice to the tax sale purchaser of the existence, terms and conditions of the Covenant (see Forms 3A and 3B).

Years 2 – 30 Post-Review Reporting

- Annually issue a report that documents monitoring efforts completed during the preceding year using Forms 1A and 1B;
  - Provide recommendations regarding modifications, if any, to the review process;
  - Prepare report attachments for all deeds, foreclosures, bankruptcies, BFTs and/or tax sales within the ICB; and
  - Prepare a map showing the location of each parcel with a deed, foreclosure, bankruptcy, BFT and/or tax sale within the ICB.
  - Annual reviews for BFTs and tax sales will be discontinued in 2018 and will not be included in the report unless ALDOT is contacted by the Department of Revenue about a new tax sale property.
- Maintain communication with all owners of parcels within the ICB about the existence, terms and conditions of the Covenant through outreach and communications programs.

3.2.2. COMMUNICATIONS/OUTREACH

- Annually contact relevant trade groups and organizations to assist in identification of stakeholders.
- Annually disseminate current information regarding the CBP and the terms and conditions of the Restrictive Covenants for real property within the ICB to stakeholders via United States Postal Service first class mail or meetings.
- Meet with individuals when circumstances prevent individuals from attending the group meetings.
- Maintain an automated answering service for inquiries regarding the CBP, the Restrictive Covenants and the ICP. Responses to inquiries will be provided by ALDOT; and,
- Maintain public access to the CBP website.

3.2.3. PREVENT ACCESS TO AND CONTACT WITH GROUNDWATER

The primary goal of the ICP is to prevent access to and contact with groundwater that contains TCE. Installation of water wells is the primary means of groundwater access/use. Thus, prohibition of new wells and closure of existing wells are important parts of the ICP. Two existing notification processes have been incorporated into the ICP. First, ADEM Administrative Code R. 335-9 requires drillers to give notice of intent to drill a water well and post-installation notice. Second, the City of Montgomery requires a property owner to obtain a permit from the Plumbing, Gas, and Mechanical Department (see Appendix A.3) of the City prior to installation of a well. The specific attributes of these procedures are described below. In addition to monitoring of the existing permit records, ALDOT observes each parcel within the ICB to identify the presence of unlisted water wells and/or the presence of other ways to access groundwater. A database is maintained by ALDOT to document property observations, identified wells or other potential exposure pathways to groundwater, and actions to abandon the wells or potential access to groundwater.

There are a number of commercial properties within the ICB that may have monitoring wells or require monitoring wells in the future. ALDOT will coordinate with those parcel owners to verify that the monitoring wells are constructed in a manner that will not breach the lower confining clay. Personnel involved in constructing and sampling the monitoring wells shall possess the proper Occupational Safety Health Administration (OSHA) training and qualifications to manage contaminated groundwater. Annually, the ALDOT will conduct a Federal and State database search of regulated sites that might have groundwater wells within the CBP.

3.2.3.1. STATE WATER-WELL NOTIFICATION PROCEDURE

The in-place notification procedure is mandated by ADEM Administrative Code R. 335-9. The requirement is for submittal of a notification of intent to drill/completion form. Code R. 335-9 requires that:

- To construct a water-supply well, a driller must be licensed by the ADEM and must:
  - Submit ADEM Form 60 "Notification of Intent to Drill a Water Well and Certification of Completion" Form to ADEM 7 days prior to constructing the well (see ADEM Form 60 in Appendix A.4);
  - Submit a "Certification of Completion" Form to ADEM within 30 days after constructing the well (see Form in Appendix A.4); and,
  - Collect samples in compliance with (see Appendix A.4) Code of Alabama 1975, §§ 22-24-8 (5) (84) if requested by the Geological Survey of Alabama (GSA).
- ADEM must notify local health authorities within 7 days of the receipt of the Certificate of Completion Form. ADEM will then:
  - File the notification and completion forms according to county and driller within the Groundwater Branch office of ADEM;
  - Make the filed forms available for review by appointment after seven 7 days from a request to review files;
  - Enter the following information into ADEM's computerized database, which is not available to the public but may be accessed by ADEM personnel during a file review:
    - Drilling company name and license number;
    - Owner of well;
    - Address of owner;
    - Address of well;
    - Depth of well;
    - Category of well (e.g. private supply or irrigation); and
    - Latitude and longitude (if provided).
- A copy of ADEM Form 60 "Notification of Intent to Drill a Water Well and Certification of Completion" Form (See Appendix A.4) historically has been submitted to the GSA Water Information office within 30 days after installation. The GSA Water Information office then:
- Files forms in the GSA Water Information office according to county and well location (by township,

section, and range if provided). Forms that do not have the township, section, and range designated are filed separately as "location unknown", and;

- Make filed forms available for view in the GSA Water Information office Monday through Friday from 8:00 am to 12:00 pm and from 1:00 pm to 5:00 pm. No notice is required but the office should be called to confirm the appropriate personnel will be present.

3.2.3.2. CITY OF MONTGOMERY PERMIT PROCEDURE

The City of Montgomery Code contains three ordinances that regulate installation of water wells within the corporate limits of the City. City Ordinances 71-67 and 72-67 require:

- Submittal of an "Application for Permit to Drill Water Wells" (see application in Appendix A.3) prior to constructing a water well. The permit must:
  - Show the latitude and longitude of the proposed well;
  - Show the physical address and Zip Code of the proposed well;
  - Be signed by a driller with a business license; and,
  - Be submitted to the Plumbing, Gas, and Mechanical Department.
  - Receive approval of the application by the City of Montgomery Chief Plumbing Inspector and the Montgomery County Health Officer.

Ordinance 22-2016 specifically makes it unlawful to dig or drill a well or otherwise access groundwater within the institutional control boundaries of the Coliseum Boulevard Plume without express, written approval of the City.

3.2.3.3. ADDITIONAL INSTITUTIONAL CONTROL TO BE IMPLEMENTED BY ALDOT

Existing State and City regulations incident to water-well installation provide helpful information and are considered an additional layer of notification and means to monitor the ICP. Figure 4 identifies the regulatory or governmental entities involved with the installation of water-wells in the City of Montgomery and the process to monitor for water-well installations.

To increase the effectiveness of the ICP, ALDOT:

- Has established a procedure whereby ADEM will transmit a copy of the "Notification of Intent to Drill a Well" form for each well in Montgomery County to the ALDOT ICPM within three (3) days of receipt of the form by ADEM;
- Has established the procedure diagramed in Figure 5 with the City of Montgomery for notification and coordination with ALDOT when a driller files a "Notification of Intent to Drill a Well" within the ICB;
- Will coordinate with GSA and ADEM to determine if regulations should be amended to provide a requirement that GSA will provide ADEM prompt notice of the receipt of intent to drill forms so that ADEM can ascertain if the intended well location is within the ICB;
- Will increase assurance that wells have not been constructed without proper notice and controls within the ICB by conducting annual, (see Figure 4) documented reviews of:
    - "Intent to Drill a Well" and "Certificate of Completion" forms filed with ADEM;
    - Permit applications and approvals by the City of Montgomery; and,
    - "Intent to Drill a Well" and "Certificate of Completion" forms filed with GSA.
- Will provide the ICPM with a copy of completed Form 4 after completion of the annual document review at ADEM, the City and GSA;
- Will notify, via certified letter (see Form 5), the owner of a parcel that has been determined to contain an unauthorized water well that access and use of groundwater at the site is regulated by a Restrictive Covenant and that the owner must contact the ICPM within 5 business days;
- Will annually meet with representatives of ADEM, City of Montgomery, and the GSA to determine if the existing procedures for annual review of well-inventory files of ADEM, the City, and GSA should be modified;

- Utilize Google Earth to evaluate aerial photography to look for evidence of new groundwater wells by:
  - Using software to compare the most recent available aerial photographs to the historic photographs from the previous year to identify changes in land use;
  - Visually comparing the most recent available aerial photographs with historic photographs to identify significant changes in land use;
  - Within five (5) business days after analysis of aerial photographs, indicate apparent modifications of land use that could result in access of groundwater and make on-site visual inspection of target parcels; and,
  - Within 5 business days after completion of on-site visual inspections, give verbal and written notice to the ICPM of confirmed threats of groundwater access at each specific site and a plan for detailed analysis of each threat and recommended resolution.
- Will annually remind/educate well-drilling contractors of the prohibitions against unauthorized access to groundwater within the ICB (see Form 9);
- Will communicate annually with representatives of the pertinent regulatory agencies to review the status, apparent deficiencies and appropriate modification of the ICP. Representatives of the stakeholder groups will meet to modify and document the process modifications if it is determined that the procedures need to be modified; and,
- Will prepare a written report that summarizes the results of the annual review of the ICP procedures and provides recommendations regarding proposed modifications with distribution to the following:
  - Director of ADEM;
  - Chief of the City of Montgomery Plumbing, Mechanical and
  - Gas Inspector Department;
  - State Geologist (GSA); and,

- Director of ALDOT.

3.2.3.4. EXISTING AGENCY / PERSONNEL CONTACTS

The current contacts for the above agencies are provided in Appendix B.

3.2.4. CONTROL EXCAVATIONS THROUGH ALABAMA/ONE-CALL811

ALDOT subscribes to Alabama One-Call/Alabama811 Service to obtain timely notification of every ticket or notice to excavate ("dig", "drill", "trench") at any location within the ICB. Through this procedure, an appropriate representative of ALDOT will be notified of requests to trench, work on utilities, install/repair Underground Storage Tanks (UST), and similar activities within the ICB. A flow chart of these actions is provided in Figure 6 of this report. To facilitate this feature of the ICP, ALDOT will:

- Maintain membership in Alabama One-Call/Alabama811. Current contacts for Alabama One Call/Alabama 811 are in Appendix B.
- Create and provide ArcView shape files of the ICB to the local One Call provider;
- Establish an e-mail account with One Call to establish prompt communications from One Call that a request has been received for excavation within the ICB, and the name and contact information for the party giving notice of a proposed excavation (the "Party");
- Upon notice from One Call that an excavation notice within the ICB has been received, ALDOT will contact the Party giving notice of the proposed excavation and ascertain the nature, schedule, proposed depth and purpose of the excavation.

If ALDOT determines there is reasonable likelihood that the proposed excavation may result in contact with the groundwater, ALDOT will notify the party that the excavation may expose contaminants of concern and advise the party to consider appropriate action to protect the health and safety of their

employees and the public including, for example, an evaluation of available alternatives to the proposed excavation.

Post-review actions:

- Complete Form 6 for each Alabama One-Call/Alabama 811 ticket; and

- Annually summarize all requested tickets, actual digging activities, and ALDOT oversight and provide recommendations regarding modifications, if any, to the review process.

3.2.5. INSPECTIONS TO SUSTAIN INSTITUTIONAL CONTROL

The following inspections and other activities listed below (see also Figure 7) will be conducted to evaluate the effectiveness of the ICP:

- Quarterly ICB-wide Drive-by
  - Drive through the ICB area
    - At least once each quarter, perform a thorough drive- through inspection of entire ICB area to verify that conditions within the ICB are consistent with model assumptions and look for conditions that might affect the effectiveness of the ICP, including:
      - Changes in land cover;
      - Changes in land use;
      - Changes in storm water conveyances;
      - Construction;
      - Demolition;
      - Major modifications of land;
      - New subdivisions; and,
      - New commercial/industrial developments.
    - Examine wells identified during the well inventory that have not been abandoned to verify that the wells are not being used.

Post-inspection actions:

- Document the quarterly inspection on Form 7 and provide to ALDOT ICPM;
- Within 5 business days, notify ALDOT if measures are needed to prevent trespass and/or exposure to water in Kilby Ditch and the Low-Lying Area; and,
- Summarize the results of the inspections and provide recommendations for modifications to the inspection procedures.

3.2.6. STAKEHOLDERS

A stakeholder is an individual or entity who has an ownership interest in the properties in the CBP or who may live or work in the CBP area. The interactions of the primary stakeholders are shown in Figure 8. A list of current stakeholders, which will be updated as needed, follows:

- State of Alabama
  - ADEM
  - ADPH
  - Emergency Management Agency
- Alabama One Call/Alabama 811
- Utility Companies
- Montgomery Water Works and Sanitary Sewer Board
- Railroads
- City of Montgomery (appropriate Departments)
- Montgomery County (appropriate Departments)
- Real Estate Support Entities involved in CBP transactions
  - Appraisers
  - Montgomery Area Association of Realtors
  - Title Companies
  - Alabama Banks, Lenders and Mortgage Companies
  - Alabama Housing Finance Authority
  - Closing Attorneys
  - Foreclosure Attorneys
  - Bankruptcy Attorneys

3.2.7. STAKEHOLDER OUTREACH AND COMMUNICATIONS

Since the discovery of TCE in the groundwater in 1999, ALDOT continues to implement and sustain community outreach strategies regarding the CBP. ALDOT informs parcel owners/tenants, regulatory agencies, the general public, and stakeholders/interested parties about the progress of investigations, findings, and plans. Public meetings are advertised through printed and electronic media, neighborhood signage, and door hangers. ALDOT provides permanent video transcripts of public meetings to the CBP Public Repository (Coliseum Boulevard Branch of the Montgomery Public Library). A list of CBP outreach activities is provided in Appendix C. The list will be updated as additional outreach activities are completed to document actions and to provide continuity in subsequent years. These community outreach strategies will continue as part of the ICP.

The outreach and communications program is designed to be flexible to accommodate the dynamic nature of issues that can arise from transactions involving residential and commercial parcels. There will be continued Community Outreach Group (COG) involvement, and neighborhood, general public and stakeholder-specific meetings whenever necessary to inform the groups of ICP activities and developments. ALDOT will modify the various program components based on feedback from the stakeholders.

3.2.8. COMMUNICATIONS

3.2.8.1. MEETING WITH STAKEHOLDERS

ALDOT will meet with the stakeholders, as necessary. The agenda for the meeting will include an overview of the history of the CBP, the status of the project, plans for future investigations and remedial actions, and the specific elements of the ICP.

Communication of pertinent information about the CBP and the ICP is important to the long-term success of the ICP. The following procedures will be implemented to sustain the effectiveness of ICP communications:

- A project-specific Public Information Officer (PIO) will be designated to manage the communications between the project team and the ICPM. The PIO will include:
  - Updates to stakeholders and other interested parties;
  - Media contacts;
    - Media briefings and news releases to inform the participants and provide contacts for further information.
  - Governmental affairs;
    - Briefings of governmental leaders.
  - Planning and coordination of targeted outreach events;
  - Outreach activities with mortgage companies, closing attorneys, appraisers, and property managers;
  - Organize meetings and presentations to the Montgomery Area Association of Realtors to update current members and to inform new members; and,
  - Continued interactions with the Montgomery Area Association of Realtors to maintain an accurate posting of the ICB properties on the Association's website.

3.2.8.2. CBP COMMUNITY OUTREACH GROUP (COG)

The COG, volunteers nominated by the parcel owners within the CBP and selected by an independent panel, will continue as the cornerstone of community involvement. The COG will:

- Receive regular and issue-specific updates about the status of the project;
- Receive regular and issue-specific updates on the functioning of the ICP; and,
- Serve as a link between the community and ALDOT through
  - Neighborhood communications;
  - Feedback on project initiatives;
  - Availability at public meetings; and,

- Availability for personal contact by providing business cards and contact information

3.2.8.3. PUBLIC MEETINGS

ALDOT will continue public meetings, as necessary, with owners and tenants of real property within the ICB to advise the owners of ICP activities and will:

- Hold COG meetings;
- Place pertinent video and printed information for public access at the Coliseum Boulevard Branch of the Montgomery Public Library; and,
- Maintain an up-to-date map and list of ICP properties.

3.2.8.4. CBP 24-HOUR INFORMATION LINE

The ALDOT 24-hour information telephone (334-353-6635) will provide information about the CBP. The telephone service will provide a summary of current CBP activities and a voicemail feature for questions. ALDOT will:

- Monitor telephone lines regularly; and,
- Log and return all calls.

3.2.8.5. CBP WEB PAGE

ALDOT will continue to maintain the existing project website (www.coliseumboulevardplume.com) to provide:

- Project updates;
- Pictures of the project; and,
- Names and contact information of the COG members.

3.2.9. ANNUAL COMPLIANCE REPORT

ALDOT will prepare a compliance report at the end of each calendar year to document the active implementation of the ICP. Specific items that will be included within the annual report are provided below.

- Correspondence with stakeholders (See Forms 8A and 8B);
- Forms and letters completed during the previous year;
- Photographs during CBP inspections;
- Notification and related correspondence;
- List of addressees of recipients of notification and related correspondence;
- Notifications/trainings to real estate and related professionals;
- Annual notification to drillers and pool installers (See Forms 9 & 10);
- Summary of inspection and enforcement activities;
- Conclusions; and,
- Recommendations, if any, for modifications to the ICP.

Table

Institutional Control Program

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA

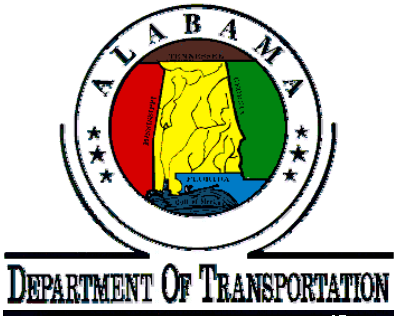


Table 1

Coliseum Boulevard Plume - Properties Without Executed Deed Restrictions

As of 9/30/2017

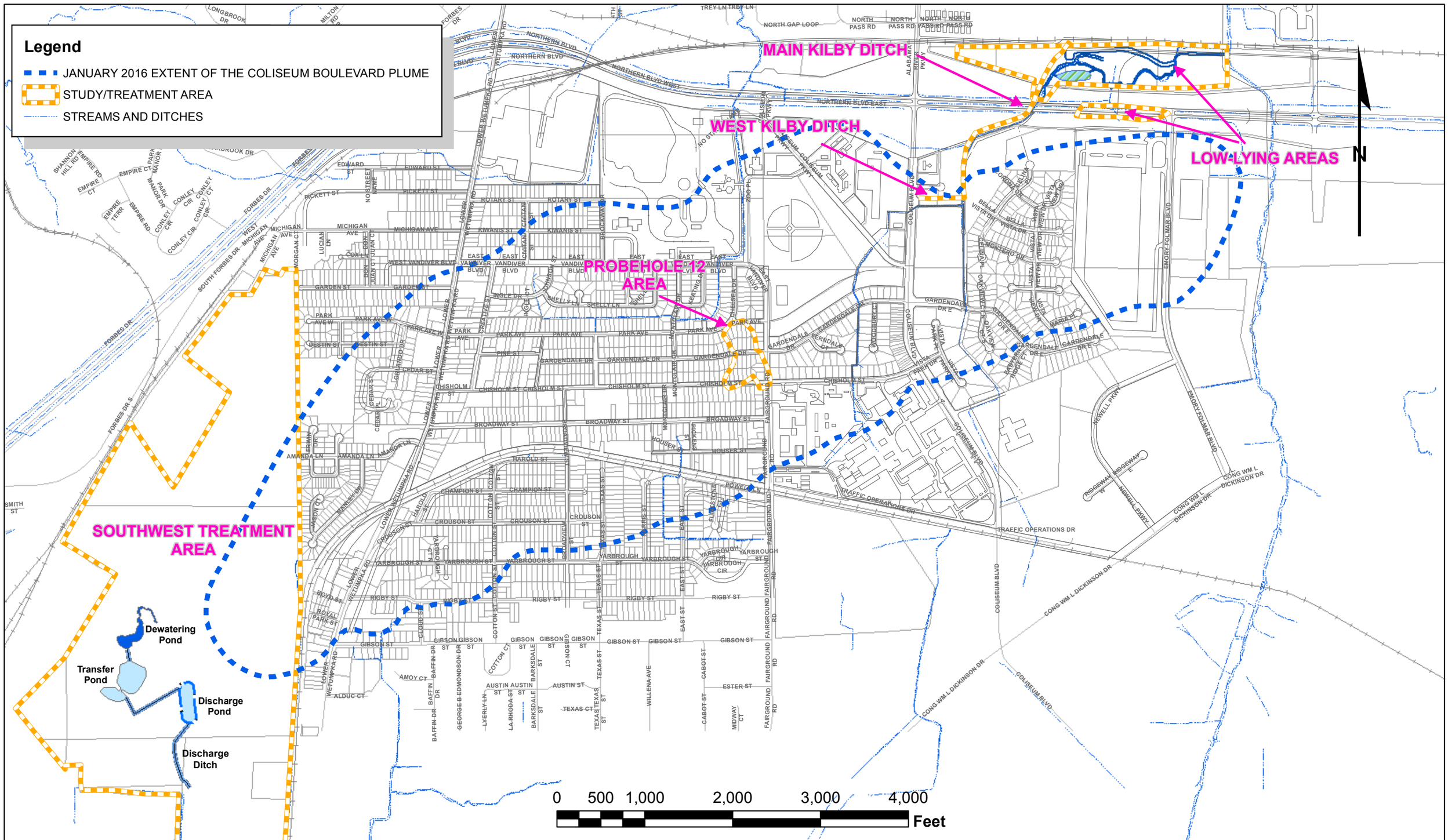
Count	Parcel Number	Full Property Address	Current Property Owner Name
1	04 08 27 03 000 007.000	(S of) 0 North Blvd	Thomas Gardner Green IV
2	04 08 33 02 000 001.011	1709 Oakview Ct N	Zachary Lewis
3	04 09 29 03 007 009.000	324 Edward St	Timberline Tree Service, LLC
4	04 09 29 03 007 010.001	230 Edward St	State of Alabama 2004 Tax Sale
5	04 09 29 03 009 002.000	5 Edward St and 213 Edward St	Diane Parrish Griffin
6	04 09 29 03 009 008.000	0 Pickett St	CJ Investments, LLC
7	04 09 29 03 013 009.000	4 Kiwanis St	John Rudolph
8	04 09 29 03 014 007.000	0 Michigan Ave	Global Properties, LLC
9	04 09 29 04 003 001.000	111 Brockway Dr	John Traver
10	04 09 29 04 004 029.000	231 Vandiver E Blvd	Charles Norman & Julia Norman
11	04 09 32 01 002 004.000	4046 Keating Dr	Steven A Kagan
12	04 09 32 01 002 014.001	4012 Montclair Dr	City of Montgomery
13	04 09 32 01 015 001.000	0 Texas St	State of Alabama 1982 Tax Sale
14	04 09 32 01 015 011.000	0 Champion St	John Paul Traver
15	04 09 32 01 019 008.000	0 Houser St	City of Montgomery
16	04 09 32 02 006 019.000	41 Garden St	Jacqueline Sue Butler
17	04 09 32 02 006 097.000	219 Destin St	Steven A. Kagan
18	04 09 32 02 006 130.000	2915 Lower Wetumpka Rd	FRIS CHKN LLC
19	04 09 32 02 006 132.000	2925 Lower Wetumpka Rd	John Farrior
20	04 09 32 02 010 011.000	109 E Park Ave Chisholm	Javier Aviles Barrera
21	04 09 32 02 012 012.000	0 Chisholm St	Anne R. Adair
22	04 09 32 02 013 019.000	15 Broadway St	John Farrior
23	04 09 32 03 004 040.000	2369 Lower Wetumpka Rd	Snora Lee Jeter & Sam Jeter
24	04 09 32 03 005 002.004	3513 Jason Ct	Roberta Bell
25	04 09 32 03 009 013.000	1648 S Yarbrough Ct	Annabelle Engram & Abe Engram
26	04 09 32 03 009 015.000	1640 Yarbrough Ct	Tamedris M. Perdue
27	04 09 32 03 012 007.000	3132 Cotton St	James G. & Sandra J. Karp
28	04 09 32 03 018 008.000	1532 Gibson St	John Howard Wilson & Louise R. Wilson
29	04 09 32 03 018 011.001	2414 Lower Wetumpka Rd	Montgomery Inner City Ministry, Inc.
30	04 09 32 04 019 001.000	1982 Yarbrough St	Elba Diaz Demedina

Figures

Institutional Control Program

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA

DEPARTMENT OF TRANSPORTATION

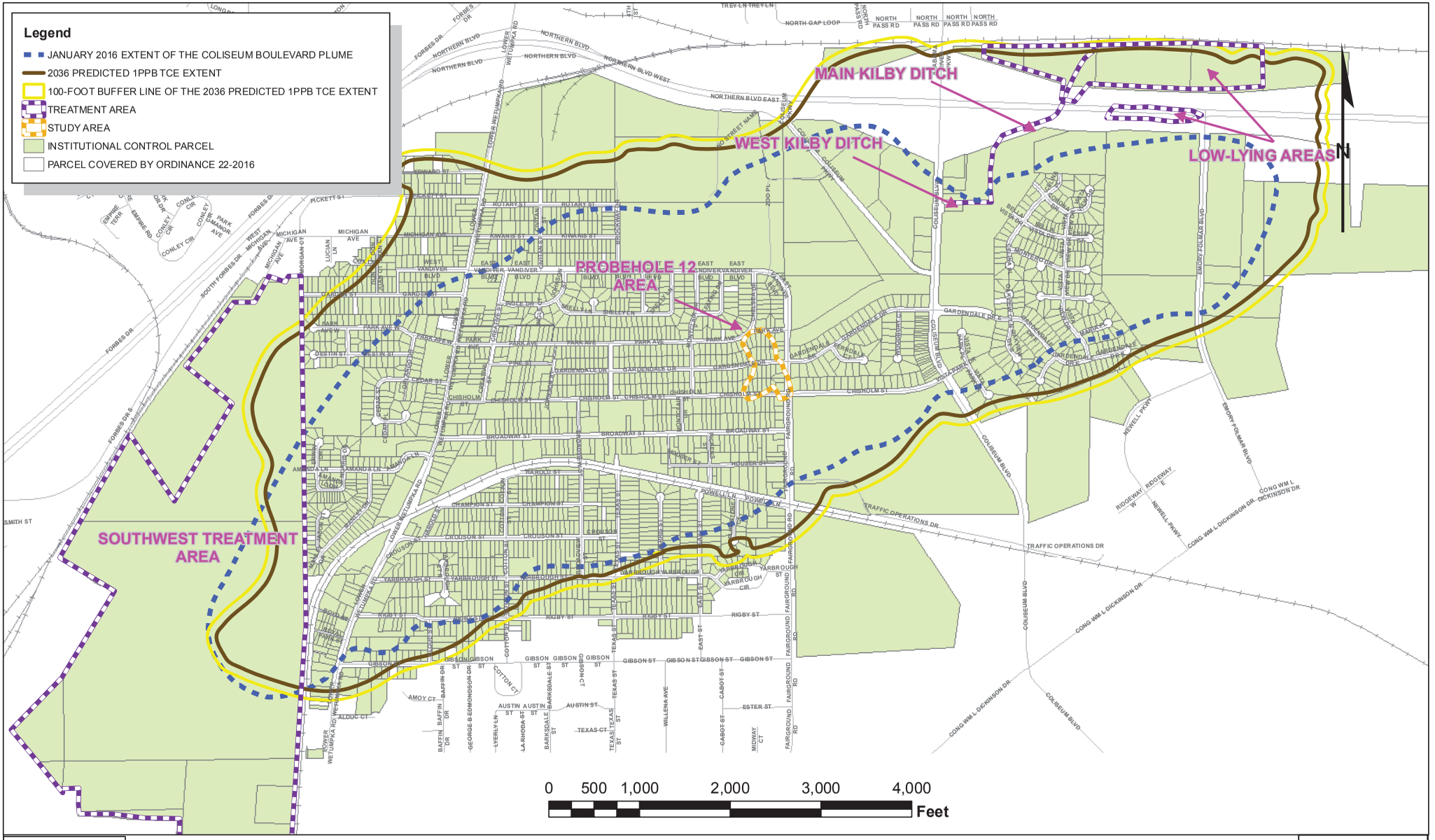


ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME ANNUAL REPORT

EXTENT OF THE COLISEUM BOULEVARD PLUME AND THE ASSOCIATED TREATMENT AND STUDY AREAS

SEPTEMBER 2016
r(11-1-17)

FIGURE 1

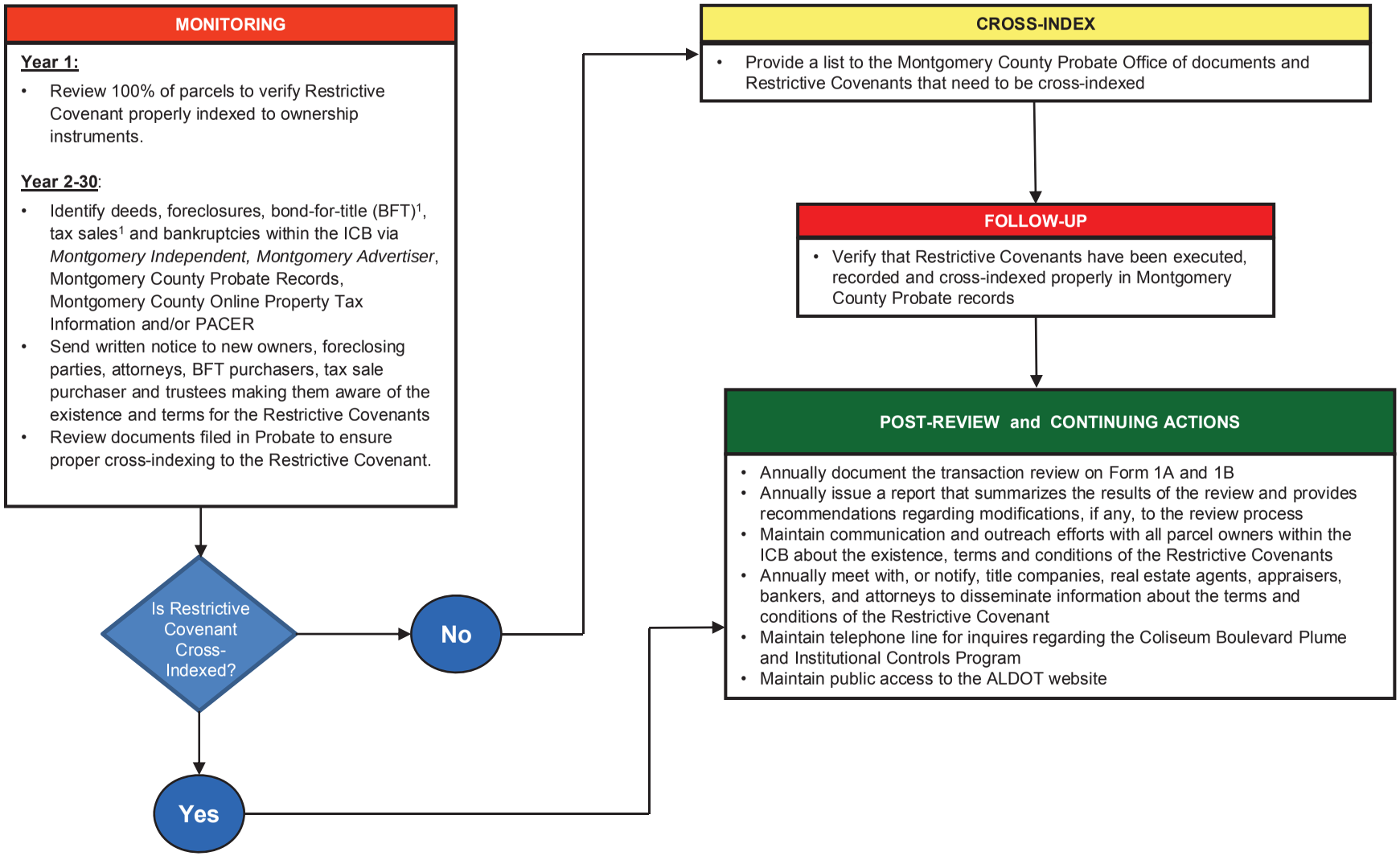


ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME ANNUAL REPORT

INSTITUTIONAL CONTROL PARCELS AND INSTITUTIONAL CONTROL BOUNDARY

SEPTEMBER 2016

FIGURE 2



1 – BFT and tax sales reviews will be discontinued in 2018

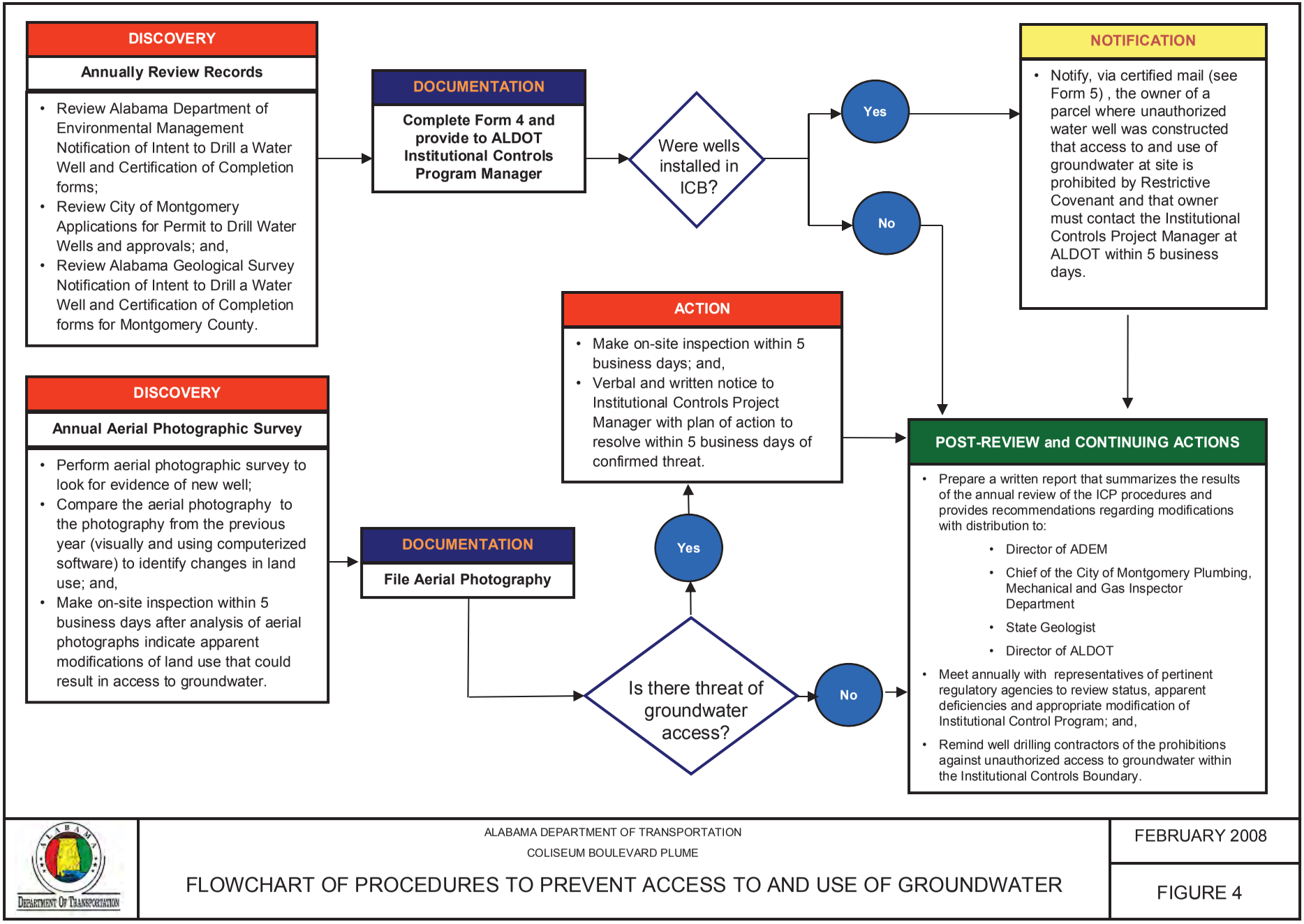
ALABAMA DEPARTMENT OF TRANSPORTATION

COLISEUM BOULEVARD PLUME

FLOWCHART OF ACTIONS TO IMPLEMENT AND SUSTAIN RESTRICTIVE COVENANTS

SEPTEMBER 2016

FIGURE 3



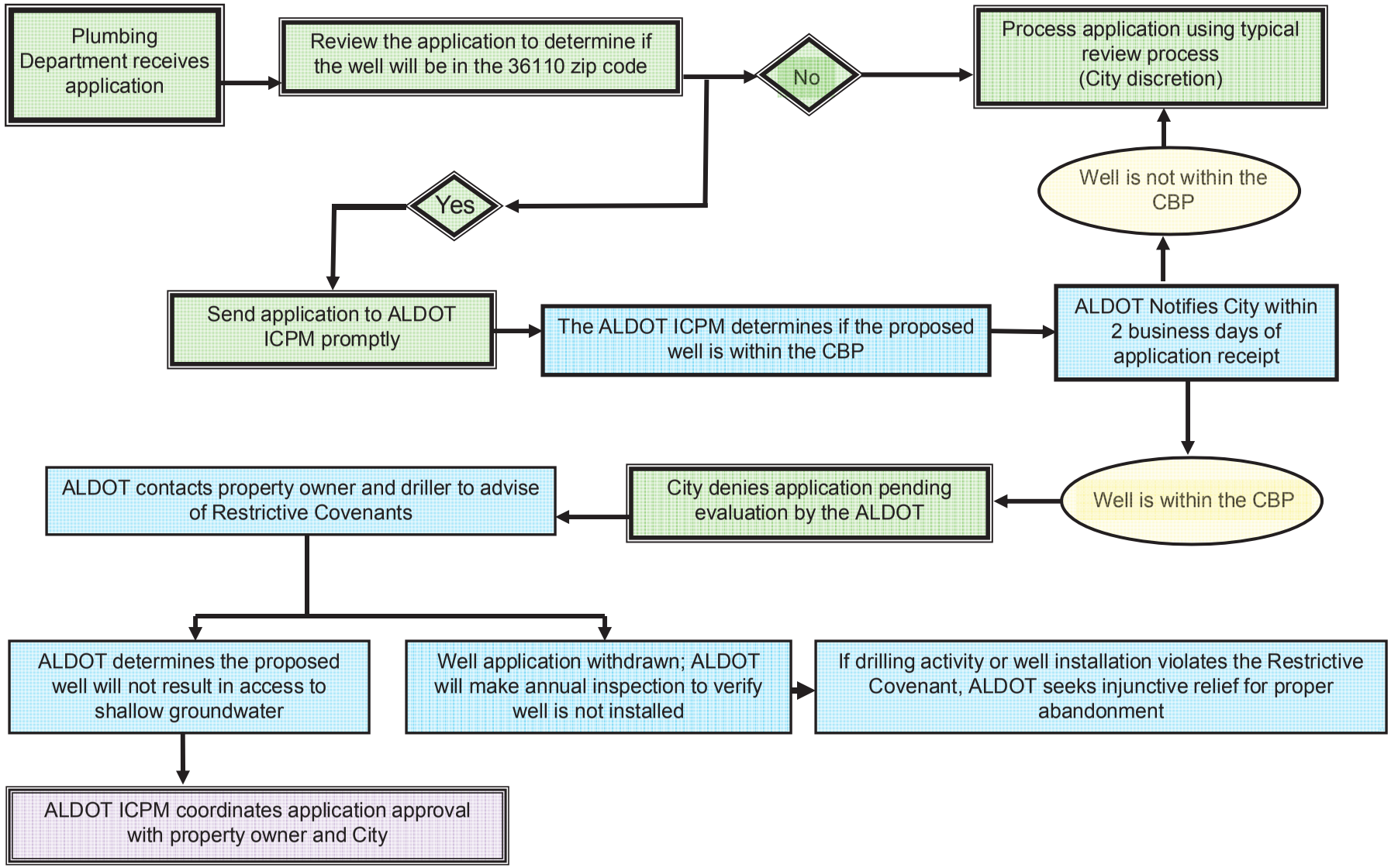
ALABAMA DEPARTMENT OF TRANSPORTATION

COLISEUM BOULEVARD PLUME

FLOWCHART OF PROCEDURES TO PREVENT ACCESS TO AND USE OF GROUNDWATER

FEBRUARY 2008

FIGURE 4



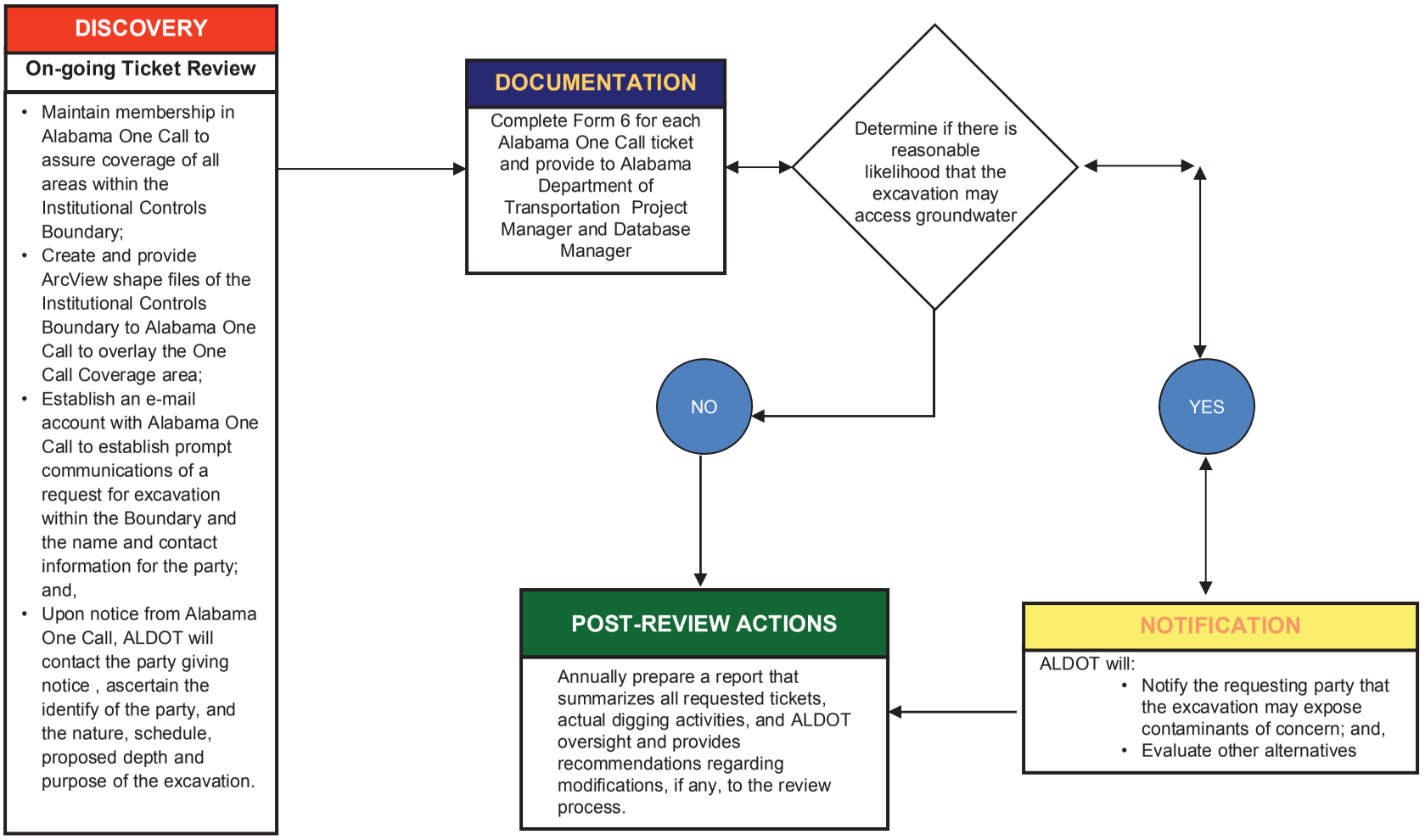
ALABAMA DEPARTMENT OF TRANSPORTATION

COLISEUM BOULEVARD PLUME

City of Montgomery Well Application Process

FEBRUARY 2008

FIGURE 5



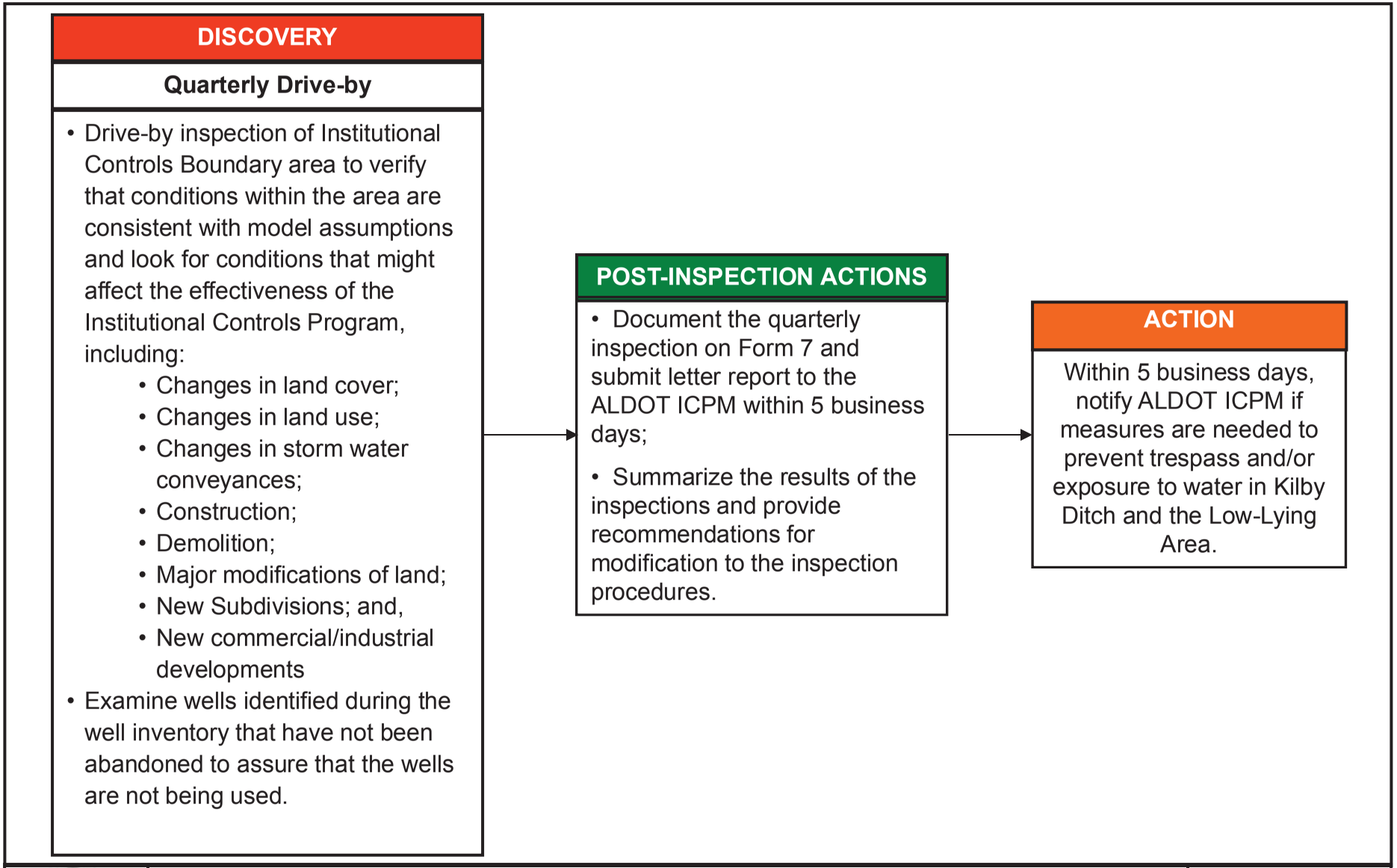
ALABAMA DEPARTMENT OF TRANSPORTATION

COLISEUM BOULEVARD PLUME

FLOWCHART OF ACTIONS TO CONTROL EXCAVATIONS THROUGH ALABAMA ONE CALL

FEBRUARY 2008

FIGURE 6



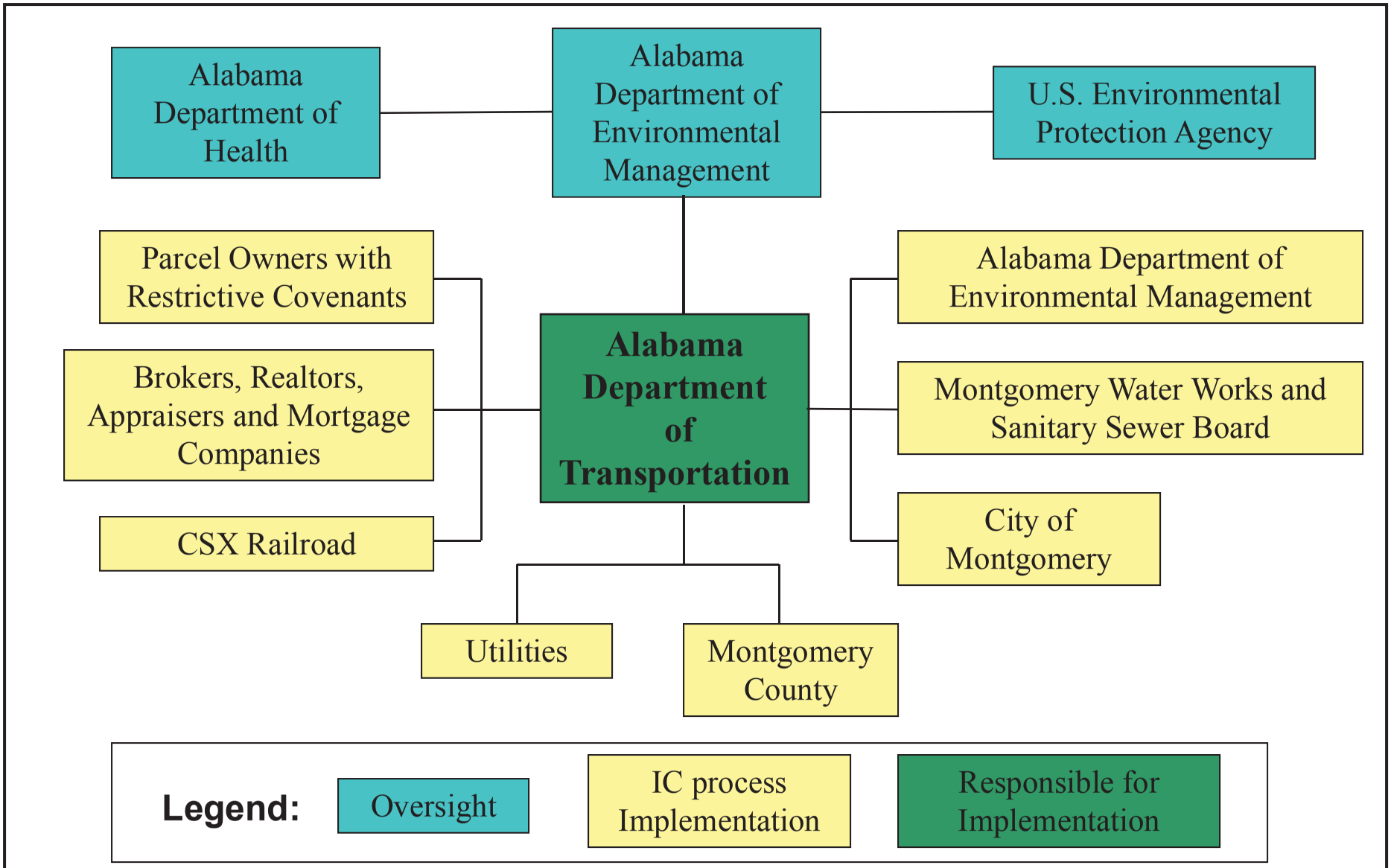
ALABAMA DEPARTMENT OF TRANSPORTATION

COLISEUM BOULEVARD PLUME

FLOWCHART OF QUARTERLY INSPECTIONS

FEBRUARY 2008

FIGURE 7



ALABAMA DEPARTMENT OF TRANSPORTATION

COLISEUM BOULEVARD PLUME

STAKEHOLDER INTERACTIONS

FEBRUARY 2008

FIGURE 8

Institutional Control Program

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA

ALABAMA
DEPARTMENT OF TRANSPORTATION

Form 1A - Transactions Review

Date of Review: (MM/DD/YYYY)	XX/XX/XX
Period Reviewed:	XX/XX/XX - XX/XX/XX
Reviewer Name:	

Total Transactions	Residential	Non-Residential	Total	Attachment
Transactions Filed in Probate (Found During [Year])	**0**	**0**	**0**	
Deeds	0	0	0	1
Dated Between XX/XX/XX - XX/XX/XX			0	
Dated Prior to XX/XX/XX			0	
Foreclosures	0	0	0	2
Dated Between XX/XX/XX - XX/XX/XX			0	
Dated Prior to XX/XX/XX			0	
Bond for Titles (BFT)	0	0	0	3
Dated Between XX/XX/XX - XX/XX/XX			0	
Dated Prior to XX/XX/XX			0	
Transactions Not Filed in Probate	**0**	**0**	**0**	
Tax Sales			0	4
Bankruptcies			0	5
Total Transactions	**0**	**0**	**0**	

Total CBP Parcels	Residential	Non-Residential	Total
Parcels with Executed Covenants	**0**	**0**	**0**
A - With Deeds, Foreclosures and/or BFTs Only			0
B - With Tax Sales and/or Bankruptcies Only			0
C - With Both A and B Transactions			0
D - Without Transactions			0
Parcels without Executed Covenants	**0**	**0**	**0**
A - With Deeds, Foreclosures and/or BFTs Only			0
B - With Tax Sales and/or Bankruptcies Only			0
C - With Both A and B Transactions			0
D - Without Transactions			0
Total CBP Parcels	**0**	**0**	**0**

Note: A map of parcels with and without executed covenants has been included as Attachment 6.

Form 1B - Cross Indexing Review

Date of Review: (MM/DD/YYYY)	XX/XX/XX
Period Reviewed:	XX/XX/XX - XX/XX/XX
Reviewer Name:	

Total CBP Parcels	Total
Executed Parcels	**0**
With Transactions Filed in Probate	0
A - With Deeds, Foreclosures and/or BFTs Only	
C - With Both A and B Transactions	
Without Transactions Filed in Probate	0
B - With Tax Sales and/or Bankruptcies Only	
D - Without Transactions	

Not Executed Parcels	**0**
A - With Deeds, Foreclosures and/or BFTs Only	
B - With Tax Sales and/or Bankruptcies Only	
C - With Both A and B Transactions	
D - Without Transactions	
Total CBP Parcels	**0**

Total Transactions Filed in Probate	Cross-Indexed	To Be Cross-Indexed (Attachment 7)	Covenant Not Yet Filed	Prior to Covenant	Total
Number of Deed Transactions	**0**	**0**	**0**	**0**	**0**
Parcels with Executed Covenants					0
Parcels without Executed Covenants					0
Number of Foreclosures	**0**	**0**	**0**	**0**	**0**
Parcels with Executed Covenants					0
Parcels without Executed Covenants					0
Number of Bond for Titles	**0**	**0**	**0**	**0**	**0**
Parcels with Executed Covenants					0
Parcels without Executed Covenants					0
Total Transactions Filed in Probate	**0**	**0**	**0**	**0**	**0**

Form 2A - Letter to New Owners and Foreclosing Parties (Executed)

COLISEUM BOULEVARD PLUME
PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201
(866) 488-1126
(334) 202-3355

[Date]

[Name of Property Owner]
[Street Address of Owner]
[City, State and Zip Code of Owner]

Re: Notice of Covenant on [Property Address], Montgomery, AL 36110

You are receiving this letter because records at the Montgomery County Probate Office and the Montgomery County Tax Assessor's office indicate that you have become an owner of the property at [Address of Property]. This property is located in an area known as the Coliseum Boulevard Plume (CBP), an area where the groundwater contains trichloroethylene (TCE), a common solvent that leaked from the sewer system into the groundwater near the Alabama Department of Transportation (ALDOT) asphalt test facility. To prevent exposure to the groundwater (the water 10-50 feet or more below land surface), ALDOT obtained a Covenant on this property that restricts access and use of the groundwater beneath the property without the express approval of ALDOT, and provides an easement for ALDOT to come onto the property for its work incident to investigation and remediation of the CBP. The Covenant is recorded and cross-indexed to the deed to this property at the Montgomery County Probate Office.

If, at any time, you wish to make an excavation on your property that may cause contact with the groundwater beneath the property, please contact the CBP Program Administrator to discuss your plans. If you sell your ownership interest in the property, please ensure that the new owner is given appropriate notice of the Covenant, and make sure that any deed to the property includes an appropriate reference to the Covenant.

The CBP website at www.coliseumboulevardplume.com provides detailed information about the CBP. If you have questions about the CBP or the Covenant, you may call the CBP 24-hour information line at (334) 353-6635, email us at cbpinfo@dot.state.al.us or contact the CBP Program Administrator at (866) 488-1126 or Brandi Little with the Alabama Department of Environmental Management at (334) 274-4226.

Very truly yours,

Program Administrator
Coliseum Boulevard Plume

Form 2B - Letter to New Owners and Foreclosing Parties (Not Executed)

COLISEUM BOULEVARD PLUME

PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201
(866) 488-1126
(334) 202-3355

[Date]

[Name of Property Owner]
[Street Address of Owner]
[City, State and Zip Code of Owner]

Re: Notice for [Property Address], Montgomery, AL 36110

You are receiving this letter because records at the Montgomery County Probate Office and the Montgomery County Tax Assessor's office indicate that you have become an owner of the property at [Address of Property]. This property is located in an area known as the Coliseum Boulevard Plume (CBP), an area where the groundwater contains trichloroethylene (TCE), a common solvent that leaked from the sewer system into the groundwater near the Alabama Department of Transportation (ALDOT) asphalt test facility. To prevent exposure to the groundwater (the water 10-50 feet or more below land surface), ALDOT is obtaining environmental covenants (Covenant) on properties in the CBP that restricts access and use of the groundwater beneath the property without the express approval of ALDOT, and provides an easement for ALDOT to come onto the property for its work incident to investigation and remediation of the CBP.

ALDOT will pay the owner of each property a fee in exchange for the Covenant. We would like to discuss the CBP and the Covenant with you. Please call the Program Administrator at (866) 488-1126 or (334) 202-3355 to schedule a time we can visit with you in person or by telephone.

The CBP website at www.coliseumboulevardplume.com provides detailed information about the CBP. If you have questions about the CBP or the Covenant, you may call the CBP 24-hour information line at (334) 353-6635, email us at cbpinfo@dot.state.al.us or contact the CBP Program Administrator at (866) 488-1126 or Brandi Little with the Alabama Department of Environmental Management at (334) 274-4226.

.

Very truly yours,

Program Administrator
Coliseum Boulevard Plume

Form 2C - Letter to Foreclosure Attorney (Executed)

COLISEUM BOULEVARD PLUME

PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201
(866) 488-1126
(334) 202-3355

[Date]

[Name of Foreclosure Attorney]
[Street Address of Foreclosure Attorney]
[City, State and Zip Code of Foreclosure Attorney]

Re: Notice of Covenant on [Property Address], Montgomery, AL 36110

You are receiving this letter because records at the Montgomery County Probate Office and the Montgomery County Tax Assessor's Office indicate that you represented a secured party in a transfer of ownership interest in the real property at [Address of Property]. This property is located in an area known as the Coliseum Boulevard Plume (CBP), an area where the groundwater contains trichloroethylene (TCE), a common solvent that leaked from the sewer system into the groundwater near the Alabama Department of Transportation (ALDOT) asphalt test facility. To prevent exposure to the groundwater (the water 10-50 feet or more below land surface), ALDOT obtained a Covenant on this property that restricts access and use of the groundwater beneath the property without the express approval of ALDOT, and provides an easement for ALDOT to come onto the property for its work incident to investigation and remediation of the CBP. The Covenant is recorded and cross-indexed to the deed to this property at the Montgomery County Probate Office.

If you represent a party in any future ownership transfers for this or other real properties in the CBP, please ensure that the new owner is given appropriate notice of the Covenant and the permanent deed restrictions, and make sure that any deed to the property includes an appropriate reference to the Covenant.

The CBP website at www.coliseumboulevardplume.com provides detailed information about the CBP. If you have questions about the CBP or the Covenant, you may call the CBP 24-hour information line at (334) 353-6635, email us at cbpinfo@dot.state.al.us or contact the CBP Program Administrator at (866) 488-1126 or Brandi Little with the Alabama Department of Environmental Management at (334) 274-4226.

Very truly yours,

Program Administrator
Coliseum Boulevard Plume

Form 2D - Letter to Foreclosure Attorney (Not Executed)

COLISEUM BOULEVARD PLUME
PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201
(866) 488-1126
(334) 202-3355

[Date]

[Name of Foreclosure Attorney]
[Street Address of Foreclosure Attorney]
[City, State and Zip Code of Foreclosure Attorney]

Re: Notice for [Property Address], Montgomery, AL 36110

You are receiving this letter because records at the County Tax Assessor's Office indicate that you represented a secured party in a transfer of ownership interest in the real property at [Address of Property]. This property is located in an area known as the Coliseum Boulevard Plume (CBP), an area where the groundwater contains trichloroethylene (TCE), a common solvent that leaked from the sewer system into the groundwater near the Alabama Department of Transportation (ALDOT) asphalt test facility. To prevent exposure to the groundwater (the water 10-50 feet or more below land surface), ALDOT is obtaining environmental covenants (Covenant) from property owners in the CBP that restricts access and use of the groundwater beneath their property without the express approval of ALDOT, and provides an easement for ALDOT to come onto the property for its work incident to investigation and remediation of the CBP.

ALDOT will pay the owner of each property or other authorized party a fee in exchange for the Covenant. If you represent an owner of property in the CBP for which a Covenant has not been executed, we would like to discuss the CBP and the Covenant terms with you and your client. Also, if you represent a party in a future transfer of ownership of a property in the CBP for which a Covenant has been executed, please ensure that the new owner is given appropriate notice of the Covenant and the permanent deed restrictions, and make sure that any deed to the property includes an appropriate reference to the Covenant.

The CBP website at www.coliseumboulevardplume.com provides detailed information about the CBP. If you have questions about the CBP or the Covenant, you may call the CBP 24-hour information line at (334) 353-6635, email us at cbpinfo@dot.state.al.us or contact the CBP Program Administrator at (866) 488-1126 or Brandi Little with the Alabama Department of Environmental Management at (334) 274-4226.

Very truly yours,

Program Administrator
Coliseum Boulevard Plume

Form 2E - Letter to BFT (Executed)

COLISEUM BOULEVARD PLUME
PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201
(866) 488-1126
(334) 202-3355

[Date]

[Name of BFT Party in the Second]
[Street Address of BFT Party in the Second]
[City, State and Zip Code of BFT Party in the Second]

Re: Notice of Covenant on [Property Address], Montgomery, AL 36110

You are receiving this letter because records at the Montgomery County Tax Assessor's Office and the Montgomery County Probate Office indicate that you may claim an interest in the real property located at [Address of Property] through a bond for title agreement executed with [seller name] on [date]. This property is located in an area known as the Coliseum Boulevard Plume (CBP), an area where the groundwater contains trichloroethylene (TCE), a common solvent that leaked from the sewer system into the groundwater near the Alabama Department of Transportation (ALDOT) asphalt test facility. To prevent exposure to the groundwater (the water 10-50 feet or more below land surface), ALDOT obtained a Covenant on this property that restricts access and use of the groundwater beneath the property without the express approval of ALDOT, and provides an easement for ALDOT to come onto the property for its work incident to investigation and remediation of the CBP. The Covenant is recorded and cross-indexed to the deed to this property at the Montgomery County Probate Office.

If, at any time, you wish to make an excavation on this property that may cause contact with the groundwater beneath the property, please contact the CBP Program Administrator to discuss your plans.

The CBP website at www.coliseumboulevardplume.com provides detailed information about the CBP. If you have questions about the CBP or the Covenant, you may call the CBP 24-hour information line at (334) 353-6635, email us at cbpinfo@dot.state.al.us or contact the CBP Program Administrator at (866) 488-1126 or Brandi Little with the Alabama Department of Environmental Management at (334) 274-4226.

Very truly yours,

Program Administrator
Coliseum Boulevard Plume

Form 2F - Letter to BFT (Not Executed)

COLISEUM BOULEVARD PLUME

PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201
(866) 488-1126
(334) 202-3355

[Date]

[Name of BFT Party in the Second]
[Street Address of BFT Party in the Second]
[City, State and Zip Code of BFT Party in the Second]

Re: Notice for [Property Address], Montgomery, AL 36110

You are receiving this letter because records at the Montgomery County Tax Assessor's Office and the Montgomery County Probate Office indicate that you may claim an interest in the real property located at [Address of Property] through a bond for title agreement executed with [seller name] on [date]. This property is located in an area known as the Coliseum Boulevard Plume (CBP), an area where the groundwater contains trichloroethylene (TCE), a common solvent that leaked from the sewer system into the groundwater near the Alabama Department of Transportation (ALDOT) asphalt test facility. To prevent exposure to the groundwater (the water 10-50 feet or more below land surface), ALDOT is obtaining environmental covenants (Covenant) on properties in the CBP that restricts access and use of the groundwater beneath the property without the express approval of ALDOT, and provides an easement for ALDOT to come onto the property for its work incident to investigation and remediation of the CBP.

ALDOT will pay the owner of each property a fee in exchange for the Covenant. We would like to discuss the CBP and the Covenant for the referenced property with the owner of the property and you. Please call the Program Administrator at (866) 488-1126 or (334) 202-3355 to schedule a time we can visit with you in person or by telephone.

The CBP website at www.coliseumboulevardplume.com provides detailed information about the CBP. If you have questions about the CBP or the Covenant, you may call the CBP 24-hour information line at (334) 353-6635, email us at cbpinfo@dot.state.al.us or contact the CBP Program Administrator at (866) 488-1126 or Brandi Little with the Alabama Department of Environmental Management at (334) 274-4226.

Very truly yours,

Program Administrator
Coliseum Boulevard Plume

Form 3A - Letter to Tax Sale Purchaser (Executed)

COLISEUM BOULEVARD PLUME

PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201
(866) 488-1126
(334) 202-3355

[Date]

[Name of Tax Sale Purchaser]
[Street Address of Tax Sale Purchaser]
[City, State and Zip Code of Tax Sale Purchaser]

Re: Notice of Covenant on [Property Address], Montgomery, AL 36110

You are receiving this letter because records at the Montgomery County Tax Assessor's Office indicate that, as the result of a tax lien, you may have assumed ownership of the property at [Address of Property]. This property is located in an area known as the Coliseum Boulevard Plume (CBP), an area where the groundwater contains trichloroethylene (TCE), a common solvent that leaked from the sewer system into the groundwater near the Alabama Department of Transportation (ALDOT) asphalt test facility. To prevent exposure to the groundwater (the water 10-50 feet or more below land surface), ALDOT obtained a Covenant on this property that restricts access and use of the groundwater beneath the property without the express approval of ALDOT, and provides an easement for ALDOT to come onto the property for its work incident to investigation and remediation of the CBP. The Covenant is recorded and cross-indexed to the deed to this property at the Montgomery County Probate Office.

If, at any time, you wish to make an excavation on this property that may cause contact with the groundwater beneath the property, please contact the CBP Program Administrator to discuss your plans. If you sell your ownership interest in the property, please ensure that the new owner is given appropriate notice of the Covenant, and make sure that any deed to the property includes an appropriate reference to the Covenant.

The CBP website at www.coliseumboulevardplume.com provides detailed information about the CBP. If you have questions about the CBP or the Covenant, you may call the CBP 24-hour information line at (334) 353-6635, email us at cbpinfo@dot.state.al.us or contact the CBP Program Administrator at (866) 488-1126 or Brandi Little with the Alabama Department of Environmental Management at (334) 274-4226.

Very truly yours,

Program Administrator
Coliseum Boulevard Plume

Form 3B - Letter to Tax Sale Purchaser (Not Executed)

COLISEUM BOULEVARD PLUME

PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201
(866) 488-1126
(334) 202-3355

[Date]

[Name of Tax Sale Purchaser]
[Street Address of Tax Sale Purchaser]
[City, State and Zip Code of Tax Sale Purchaser]

Re: Notice for [Property Address], Montgomery, AL 36110

You are receiving this letter because records at the Montgomery County Tax Assessor's Office indicate that, as the result of a tax lien, you may have assumed ownership of the property at [Address of Property]. This property is located in an area known as the Coliseum Boulevard Plume (CBP), an area where the groundwater contains trichloroethylene (TCE), a common solvent that leaked from the sewer system into the groundwater near the Alabama Department of Transportation (ALDOT) asphalt test facility. To prevent exposure to the groundwater (the water 10-50 feet or more below land surface), ALDOT is obtaining environmental covenants (Covenant) on properties in the CBP that restricts access and use of the groundwater beneath the property without the express approval of ALDOT, and provides an easement for ALDOT to come onto the property for its work incident to investigation and remediation of the CBP.

ALDOT will pay the owner of each property a fee in exchange for the Covenant. We would like to discuss the CBP and the Covenant with you. Please call the Program Administrator at (866) 488-1126 or (334) 202-3355 to schedule a time we can visit with you in person or by telephone.

The CBP website at www.coliseumboulevardplume.com provides detailed information about the CBP. If you have questions about the CBP or the Covenant, you may call the CBP 24-hour information line at (334) 353-6635, email us at cbpinfo@dot.state.al.us or contact the CBP Program Administrator at (866) 488-1126 or Brandi Little with the Alabama Department of Environmental Management at (334) 274-4226.

Very truly yours,

Program Administrator
Coliseum Boulevard Plume

Form 3C - Letter to Bankruptcy Trustee (Executed)

COLISEUM BOULEVARD PLUME
PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201
(866) 488-1126
(334) 202-3355

[Date]

[Name of Bankruptcy Trustee]
[Street Address of Bankruptcy Trustee]
[City, State and Zip Code of Bankruptcy Trustee]

Re: Notice of Covenant on [Property Address], Montgomery, AL 36110

It is my understanding that you have been appointed as Trustee in Bankruptcy Case No. [Case Number], presently pending in the U.S. Bankruptcy Court for the Middle District of Alabama. It is also my understanding that a parcel of real property located at **[**Address of Property] may be part of the bankruptcy estate. This property is located in an area known as the Coliseum Boulevard Plume (CBP), an area where the groundwater contains trichloroethylene (TCE), a common solvent that leaked from the sewer system into the groundwater near the Alabama Department of Transportation (ALDOT) asphalt test facility. To prevent exposure to the groundwater (the water 10-50 feet or more below land surface), ALDOT obtained a Covenant on this property that restricts access and use of the groundwater beneath the property without the express approval of ALDOT, and provides an easement for ALDOT to come onto the property for its work incident to investigation and remediation of the CBP. The Covenant is recorded and cross-indexed to the deed to this property at the Montgomery County Probate Office.

If the bankruptcy estate's ownership interest in the above-referenced real property is transferred to a new owner, please ensure that the new owner is given appropriate notice of the Covenant and the permanent deed restrictions, and make sure that any deed to the property includes an appropriate reference to the Covenant.

The CBP website at www.coliseumboulevardplume.com provides detailed information about the CBP. If you have questions about the CBP or the Covenant, you may call the CBP 24-hour information line at (334) 353-6635, email us at cbpinfo@dot.state.al.us or contact the CBP Program Administrator at (866) 488-1126 or Brandi Little with the Alabama Department of Environmental Management at (334) 274-4226.

Very truly yours,

Program Administrator
Coliseum Boulevard Plume

Form 3D - Letter to Bankruptcy Trustee (Not Executed)

COLISEUM BOULEVARD PLUME

PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201
(866) 488-1126
(334) 202-3355

[Date]

[Name of Bankruptcy Trustee]
[Street Address of Bankruptcy Trustee]
[City, State and Zip Code of Bankruptcy Trustee]

Re: Notice for [Property Address], Montgomery, AL 36110

It is my understanding that you have been appointed as Trustee in Bankruptcy Case No. [Case Number], presently pending in the U.S. Bankruptcy Court for the Middle District of Alabama. It is also my understanding that a parcel of real property located at [Address of Property] may be part of the bankruptcy estate. This property is located in an area known as the Coliseum Boulevard Plume (CBP), an area where the groundwater contains trichloroethylene (TCE), a common solvent that leaked from the sewer system into the groundwater near the Alabama Department of Transportation (ALDOT) asphalt test facility. To prevent exposure to the groundwater (the water 10-50 feet or more below land surface), ALDOT is obtaining environmental covenants (Covenant) on properties in the CBP that restricts access and use of the groundwater beneath the property without the express approval of ALDOT, and provides an easement for ALDOT to come onto the property for its work incident to investigation and remediation of the CBP.

ALDOT will pay the owner of each property or other authorized person a fee in exchange for the Covenant. If you would like to discuss the CBP and the Covenant, please call the Program Administrator at (866) 488-1126 or (334) 202-3355 to schedule a time to discuss these matters.

The CBP website at www.coliseumboulevardplume.com provides detailed information about the CBP. If you have questions about the CBP or the Covenant, you may call the CBP 24-hour information line at (334) 353-6635, email us at cbpinfo@dot.state.al.us or contact the CBP Program Administrator at (866) 488-1126 or Brandi Little with the Alabama Department of Environmental Management at (334) 274-4226.

Very truly yours,

Program Administrator
Coliseum Boulevard Plume

Form 3E - Letter to Bankruptcy Attorney (Executed)

COLISEUM BOULEVARD PLUME

PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201
(866) 488-1126
(334) 202-3355

[Date]

[Name of Bankruptcy Attorney]
[Street Address of Bankruptcy Attorney]
[City, State and Zip Code of Bankruptcy Attorney]

Re: Notice of Covenant on [Property Address], Montgomery, AL 36110

It is my understanding that you represent the Debtor in Bankruptcy Case No. [Case Number], presently pending in the U.S. Bankruptcy Court for the Middle District of Alabama. It is also my understanding that a parcel of real property located at [Address of Property] may be part of the bankruptcy estate. This property is located in an area known as the Coliseum Boulevard Plume (CBP), an area where the groundwater contains trichloroethylene (TCE), a common solvent that leaked from the sewer system into the groundwater near the Alabama Department of Transportation (ALDOT) asphalt test facility. To prevent exposure to the groundwater (the water 10-50 feet or more below land surface), ALDOT obtained a Covenant on this property that restricts access and use of the groundwater beneath the property without the express approval of ALDOT, and provides an easement for ALDOT to come onto the property for its work incident to investigation and remediation of the CBP. The Covenant is recorded and cross-indexed to the deed to this property at the Montgomery County Probate Office.

If the bankruptcy estate's ownership interest in the above-referenced real property is transferred to a new owner, please ensure that the new owner is given appropriate notice of the Covenant and the permanent deed restrictions, and make sure that any deed to the property includes an appropriate reference to the Covenant.

The CBP website at www.coliseumboulevardplume.com provides detailed information about the CBP. If you have questions about the CBP or the Covenant, you may call the CBP 24-hour information line at (334) 353-6635, email us at cbpinfo@dot.state.al.us or contact the CBP Program Administrator at (866) 488-1126 or Brandi Little with the Alabama Department of Environmental Management at (334) 274-4226.

Very truly yours,

Program Administrator
Coliseum Boulevard Plume

Form 3F - Letter to Bankruptcy Attorney (Not Executed)

COLISEUM BOULEVARD PLUME
PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201
(866) 488-1126
(334) 202-3355

[Date]

[Name of Bankruptcy Attorney]
[Street Address of Bankruptcy Attorney]
[City, State and Zip Code of Bankruptcy Attorney]

Re: Notice for [Property Address], Montgomery, AL 36110

It is my understanding that you represent the Debtor in Bankruptcy Case No. [Case Number], presently pending in the U.S. Bankruptcy Court for the Middle District of Alabama. It is also my understanding that a parcel of real property located at [Address of Property] may be part of the bankruptcy estate. This property is located in an area known as the Coliseum Boulevard Plume (CBP), an area where the groundwater contains trichloroethylene (TCE), a common solvent that leaked from the sewer system into the groundwater near the Alabama Department of Transportation (ALDOT) asphalt test facility. To prevent exposure to the groundwater (the water 10-50 feet or more below land surface), ALDOT is obtaining environmental covenants (Covenant) on properties in the CBP that restricts access and use of the groundwater beneath the property without the express approval of ALDOT, and provides an easement for ALDOT to come onto the property for its work incident to investigation and remediation of the CBP.

ALDOT will pay the owner of each property or other authorized person a fee in exchange for the Covenant. If your client is authorized to execute a Covenant, we would like to discuss the CBP and the Covenant terms with you and your client. Please call the Program Administrator at (866) 488-1126 or (334) 202-3355. Also, if you represent a party in a future transfer of ownership of a property in the CBP for which a Covenant has been executed, please ensure that the new owner is given appropriate notice of the Covenant and the permanent deed restrictions, and make sure that any deed to the property includes an appropriate reference to the Covenant.

The CBP website at www.coliseumboulevardplume.com provides detailed information about the CBP. If you have questions about the CBP or the Covenant, you may call the CBP 24-hour information line at (334) 353-6635, email us at cbpinfo@dot.state.al.us or contact the CBP Program Administrator at (866) 488-1126 or Brandi Little with the Alabama Department of Environmental Management at (334) 274-4226.

Very truly yours,

Program Administrator
Coliseum Boulevard Plume

FORM 4- WELL INSTALLATION / COMPLETION FILE REVIEW

PURPOSE: Review groundwater files at Alabama Department of Environmental Management, Geological Survey of Alabama, and City of Montgomery

Action upon completion of form: Transmit to ALDOT project manager and database manager within 30 days.

Department Visited (Circle One):	City of Montgomery Plumbing, Gas, and Mechanical Department	ADEM Groundwater Team	GSA Water Information
Date Visited (MM/DD/YYYY):			
Reviewer Name (Signature / Print):			
Department Contact:			
Files Viewed (Circle One Or More):	Physical; Database	Physical; Database	Physical; Database
Findings (Circle One):	Well found; No well found	Well found; No well found	Well found; No well found

Well Address:			
Owner Name:			
Owner Address:			
State Plane Coordinate; Easting/X			
State Plane Coordinate; Northing/Y			
Driller Name:			
Date Installed:			
Well Depth:			
Screen Interval:			

Form 5- LETTER TO PROPERTY OWNER TO DISCONTINUE ACCESS OR USE OF WELL

[Date]

[Name of Property Owner/Tenant]
[Street Address of Property/Well Owner]
[City, State, and Zip Code of Owner or Tenant]

Re: Water Well

Dear [Name of Well Owner/Tenant]:

The well at [Address of Well] is within the Alabama Department of Transportation Coliseum Boulevard Plume, which is an area where the access and use of groundwater is restricted. The well is on property with a Restrictive Covenant that prohibits access to groundwater.

The Alabama Department of Transportation ("ALDOT") has oversight authority regarding wells within the Coliseum Boulevard Plume. Groundwater within the Coliseum Boulevard Plume cannot be accessed without the express approval of ALDOT. **Use of your well must be discontinued immediately.**

An ALDOT representative needs to discuss the characteristics of the well with you. Please contact ALDOT by telephoning the Project Manager for the Coliseum Boulevard Plume at --- -- ----.

Very truly yours,

XXXXXXXXX
Project Manager,
Coliseum Boulevard Plume
Alabama Department of Transportation

FORM 6- ALABAMA ONE CALL TICKET REVIEW

PURPOSE: Alabama 1 CALL Ticket Review **Ticket Date:**_____

Action upon completion: Notify ALDOT project manager immediately and transmit completed checklist to ALDOT project manager and database manager within 24 hours

TICKET INFORMATION	
Alabama 1 Call Ticket Number:	
Date Ticket Received (MM/DD/YYYY):	
Reviewer Name (Signature / Print):	
LOCATION INFORMATION	
Location (Address):	
Location (Driving Directions):	
CONTACT INFORMATION	
Company Name:	
Contact Name:	
Contact Email:	
Contact Phone Number:	
Contact Address:	
Contact Alternate Phone:	
DIGGING/EXCAVATION INFORMATION (FROM TICKET OR ABOVE CONTACT)	
Person Or Company Requesting?	
Type Of Excavating (e.g., trenching, hand augering, drilling)?	
Purpose Of Excavation?	
Maximum Depth Of Excavation?	
Notes	
TICKET REVIEW (TO BE DETERMINED BY ALDOT)	
Distance From The Bottom Of The Activity (e.g., trench) To Water Table?	
Is Excavation On Right-Of-Way?	
Excavation Reviewed By ALDOT (Y/N)?	
ALDOT Reviewer (Signature / Print)	
Excavator Advised Of Potential Exposure?	
Name Of Person Advised Of Potential Exposure	
DATE AND TYPE OF CORRESPONDENCE/ACTIONS BY ALDOT	
Excavator Advised Of Potential Exposure/Alternatives?	
Notes	
OVERSIGHT OF DIGGING BY ALDOT	
Date Of Oversight/Site Visit:	
Activities Observed During Site Visit:	
Do Activities Comply With ALDOT Recommendations?	
Is Follow-Up Needed?	

FORM 7 Quarterly Institutional Controls Inspection

PURPOSE: Quarterly institutional-control inspection

Action upon completion of checklist: Transmit completed form to ALDOT project manager and database manager within 5 days

DATE OF INSPECTION (MM/DD/YYYY):
PERSON(S) PERFORMING INSPECTION: (signature / print)

INSPECTION ITEM	AREA / LOCATION	OBSERVATIONS
Changes in land cover		
Changes in land use		
Changes in storm water conveyances		
Construction		
Demolation		
Major modification of land		
New Subdivisions		
New commercial/industrial developments		

FORM 7 Quarterly Institutional Controls Inspection (Page 2 of 2)

PURPOSE: Quarterly institutional-control inspection

Action upon completion of checklist: Transmit completed form to ALDOT project manager and database manager within 5 days

DATE OF INSPECTION (MM/DD/YYYY):	
PERSON(S) PERFORMING INSPECTION: (signature / print)	

Examine Suspect Wells listed in the Well Inventory

Location (street address)	
Notes:	

ALABAMA DEPARTMENT OF TRANSPORTATION

Bureau of Materials & Tests – Geotechnical Section
3700 Fairground Road, Montgomery, Alabama 36110
Phone: 334-206-2271 FAX: 334-264-6263

Robert Bentley
Governor

John Cooper
Transportation Director

Form 8A – LETTER TO STAKEHOLDERS

Date:
Address To:
Reference: Alabama Department of Transportation
Coliseum Boulevard Plume Institutional Control Program

The shallow groundwater (the water 10-50 feet or more below land surface) in an area in north Montgomery, Alabama (see attached map) contains concentrations of trichloroethylene ("TCE"). The area is commonly referred to as the Coliseum Boulevard Plume ("CBP").

TCE is a common solvent often used in testing laboratories. Investigations of the CBP showed that waste TCE from an asphalt test facility of the Alabama Department of Transportation ("ALDOT") leaked into the groundwater after it was discarded in the sewer system and/or the ground near the facility in accordance with manufacturer's recommendations. To prevent exposure to the groundwater, ALDOT obtained from CBP property owners environmental covenants ("Covenants") that contain a permanent deed restriction that prohibits access and use of the groundwater (for example, drilling a well or installing a swimming pool) without approval of ALDOT. The Covenants are recorded at the office of the Montgomery County Judge of Probate. Pursuant to the Alabama Uniform Environmental Covenant Act (Alabama Code §35-19-1, *et seq.*), the Alabama Department of Environmental Management ("ADEM"), is also authorized to enforce the deed restrictions on groundwater access and use. (*See* ADEM Admin. Code 335-5-1, *et seq.*).

If you have a project that will require you to drill or excavate in the CBP area at depths that may result in contact with groundwater, please contact ALDOT prior to the start of the project. We will promptly respond to discuss your project. If you confirm that your project may result in contact with the groundwater, we can provide information that may help you protect your workers and others from TCE exposure and prevent TCE contamination from entering the deeper aquifers. Also, we will send you periodic updates about the CBP as part of our on-going effort to involve and inform the community.

For more information about the CBP, you may visit our website at www.coliseumboulevardplume.com. If you have any questions or comments about the CBP, call the CBP 24-Hour Information Line (334-353-6635), email us at cbpinfo@dot.state.al.us or contact Adam Anderson with ALDOT at 334-206-2278 or Brandi Little with ADEM at (334) 274-4226.

Sincerely,

Scott W. George, P.E.
Materials and Tests Engineer

Cc: Brandi Little, ADEM

COLISEUM BOULEVARD PLUME
PROGRAM ADMINISTRATOR
POST OFFICE BOX 2052
BIRMINGHAM, ALABAMA 35201

Form 8B – STAKEHOLDER ACKNOWLEDGEMENT

Acknowledgement of Receipt

[Addressee]:

Please distribute the enclosed letter within your organization to all persons who may have work responsibilities related to matters of interest to the management and remediation of the Coliseum Boulevard Plume (CBP) area.

Sign below to acknowledge receipt of the enclosed letter and return only this page to the Program Administrator at the address listed above.

If you would like future notices to be directed to a specific person, to a different person or to be sent to additional parties, please provide the information below. Monthly updates will be sent to the email addresses provided.

Call the CBP Program Administrator at (866) 488-1126 with any further questions.

Thank you,
Program Administrator
Coliseum Boulevard Plume

I have received, read and understand the enclosed letter explaining groundwater restrictions within the CBP. Prior to performing any work that might result in contact with groundwater, I understand that I should contact the Alabama Department of Transportation to discuss the project.

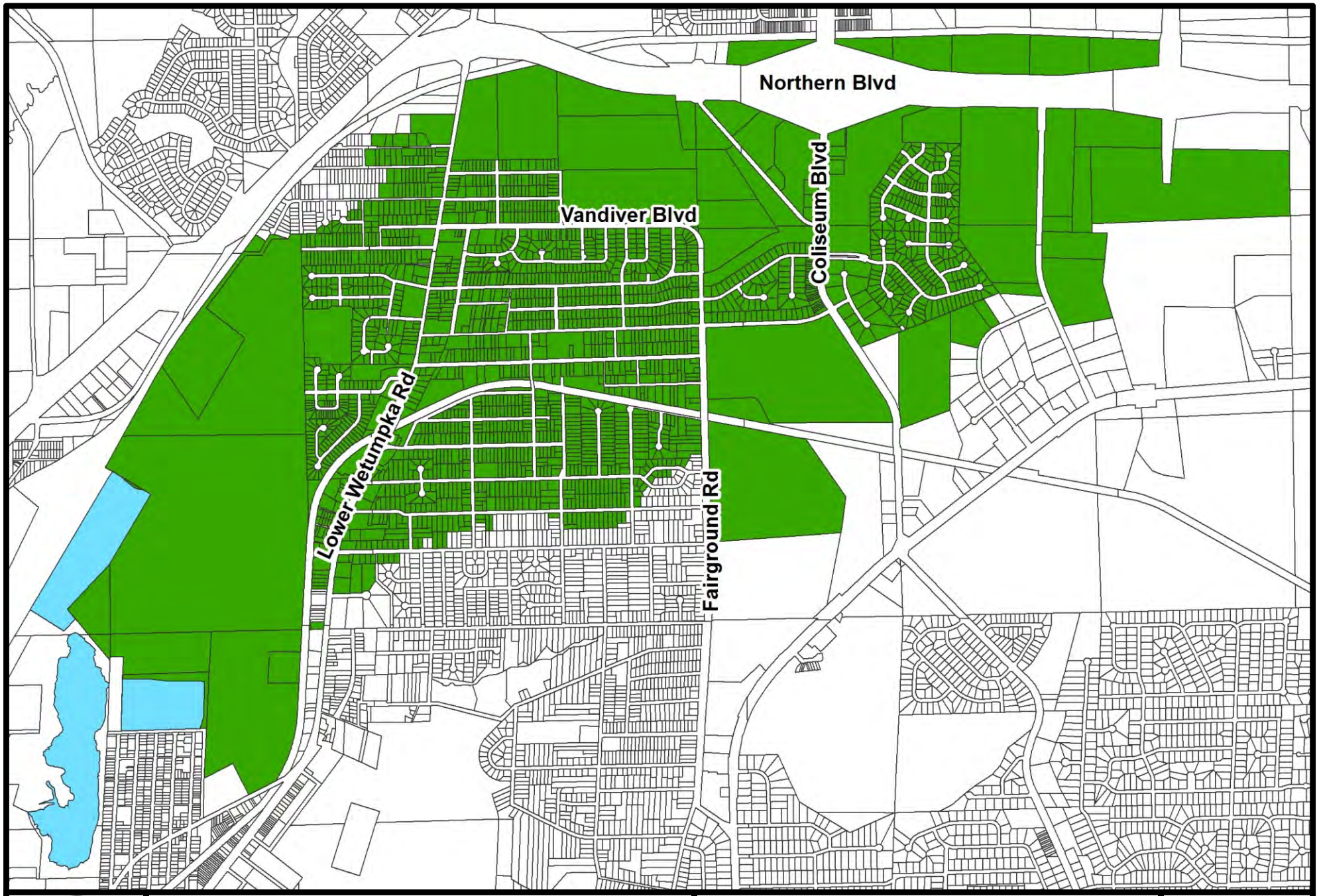
Name:_____Title:_____Date:_____

Please provide contact information below:

Primary Contact:
Name:_____Address:_____
Telephone:_____Email address:_____

Additional Contacts:
Name:_____Address:_____
Telephone:_____Email address:_____

Name:_____Address:_____
Telephone:_____Email address:_____



ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

Coliseum Boulevard Plume Parcels
Surface Water Elevation Restrictions

November 2015

ALABAMA DEPARTMENT OF TRANSPORTATION

Bureau of Materials & Tests – Geotechnical Section
3700 Fairground Road, Montgomery, Alabama 36110
Phone: 334-206-2271 FAX: 334-264-6263

Robert Bentley
Governor

John Cooper
Transportation Director

Form 9 – LETTER TO WELL DRILLERS

[Date]

[Name of Well Driller]
[Street Address of Driller]
[City, State, and Zip Code of Well Driller]

Re: Restrictions on Drilling Water Wells within the Coliseum Boulevard Plume

Shallow groundwater in an area in north Montgomery, Alabama (see attached map) contains concentrations of trichloroethylene ("TCE"). The area, commonly referred to as the Coliseum Boulevard Plume ("CBP"), lies within the SW ¼ of Section 27, South ½ of Section 28, South ½ of Section 29, East ½ of Section 31, most of Section 32, and the North ½ of Section 33 of Township 17 North, Range 18East. (See USGS Survey 7½ Minute topographic map.)

The Alabama Department of Transportation ("ALDOT"), incident to its responsibilities for investigation and remediation of the CBP, has implemented an Institutional Control Program ("ICP") to minimize exposure to the groundwater containing TCE and to prevent TCE contamination of deeper groundwater aquifers. As part of the ICP, ALDOT has obtained from property owners legally enforceable environmental covenants that include deed restrictions that prohibit access and use of groundwater beneath their property without prior approval of ALDOT. The environmental covenants are recorded at the office of the Montgomery County Judge of Probate. Pursuant to the Alabama Uniform Environmental Covenant Act (Alabama Code §35-19-1, *et seq.*), the Alabama Department of Environmental Management ("ADEM"), is also authorized to enforce the deed restrictions on groundwater access and use. (*See* ADEM Admin. Code 335-5-1, *et seq.*).

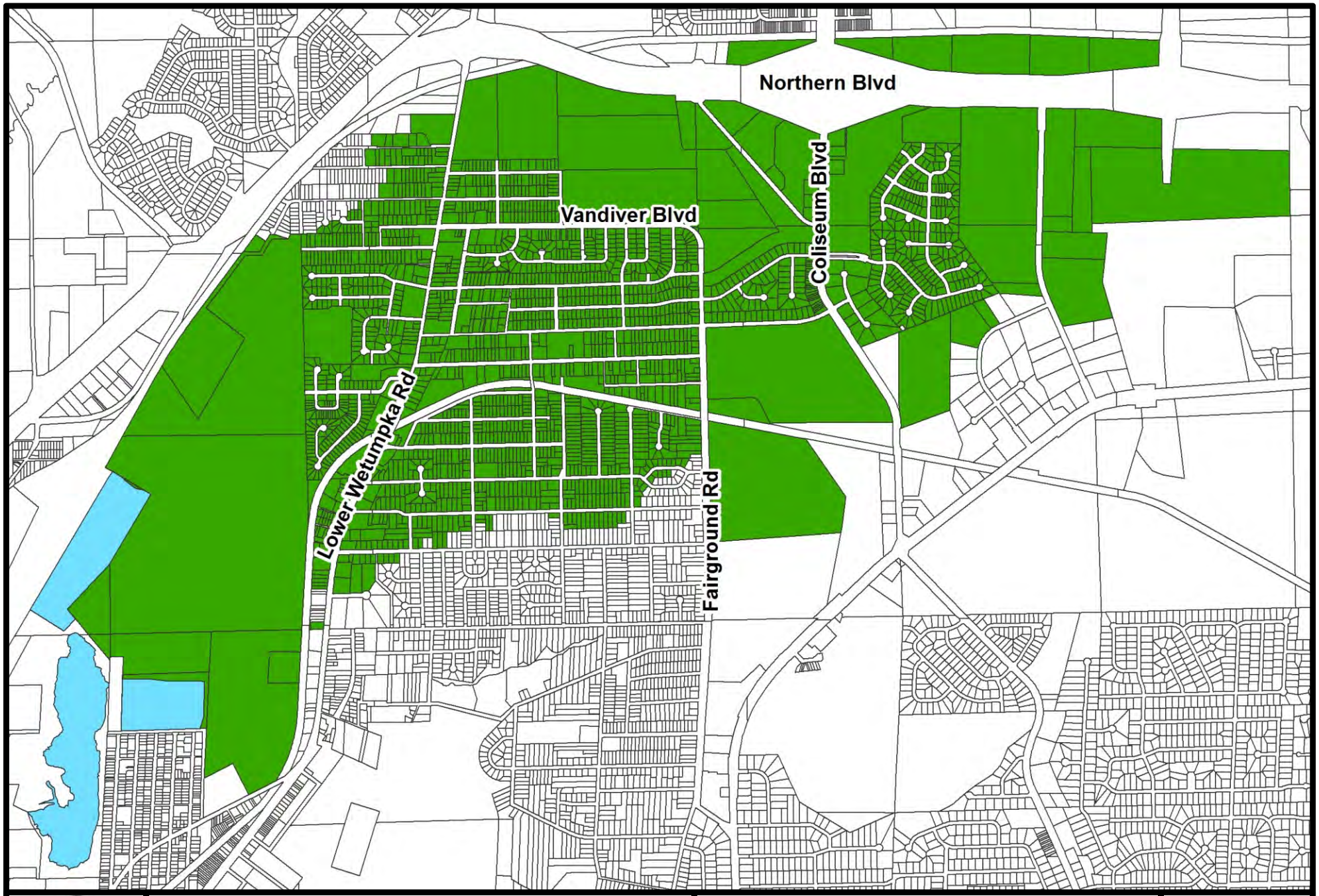
If you have a drilling project in the CBP area, you must contact ALDOT prior to drilling. We will promptly respond to discuss your project and provide you with information so that you can develop a plan to protect you and/or others from TCE exposure and/or to prevent contamination of the deeper aquifers.

For more information, you may see our website at www.coliseumboulevardplume.com, call the CBP 24-Hour Information Line (334-353-6635), email us at cbpinfo@dot.state.us.al or contact Adam Anderson of ALDOT at 334-206-2278 or Shane Brown of ADEM at 334-274-4221.

Very truly yours,

Scott W. George, P.E.
Materials and Tests Engineer

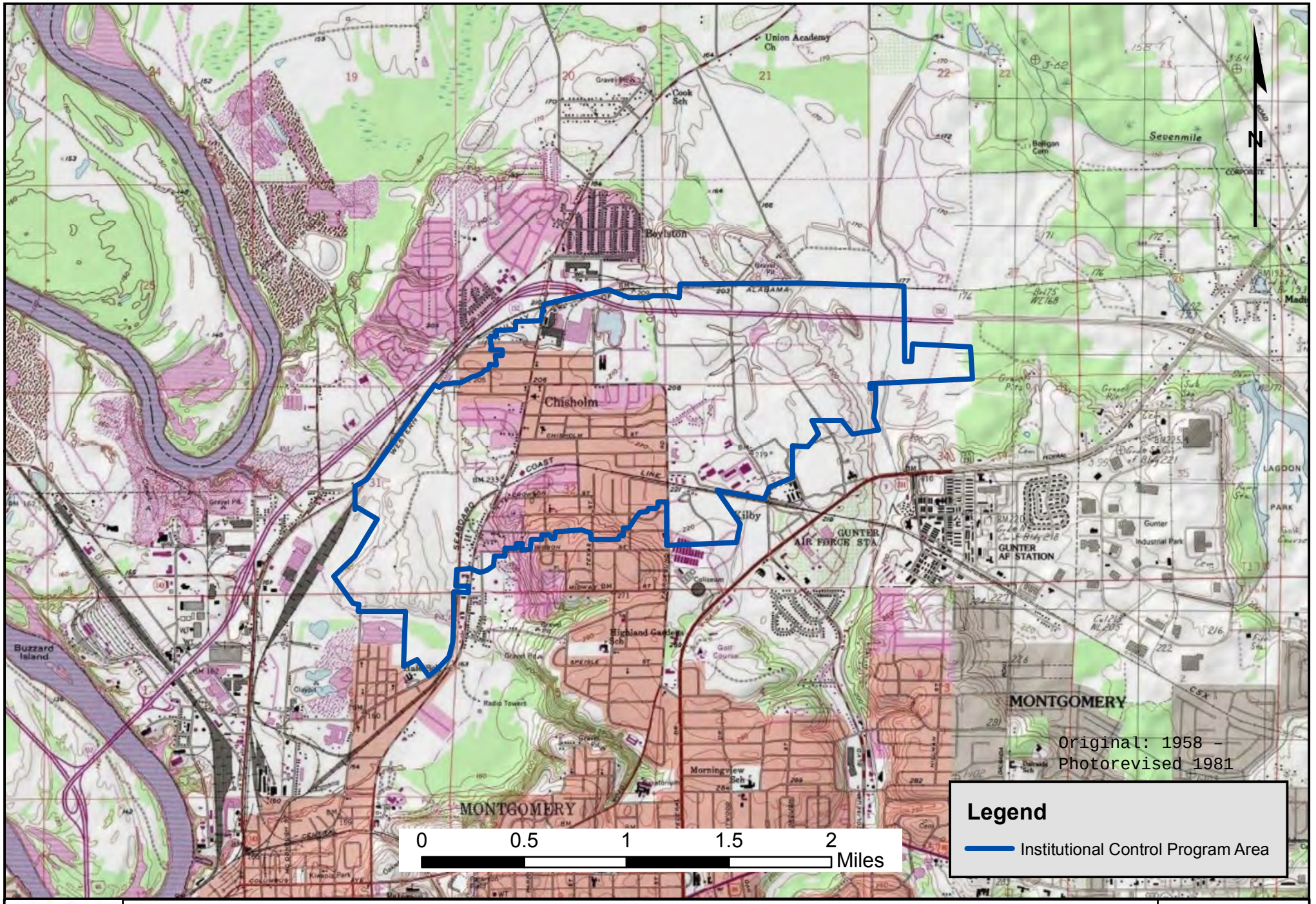
cc: Shane Brown, ADEM



ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

Coliseum Boulevard Plume Parcels
Surface Water Elevation Restrictions

November 2015



ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

AREA OF WATER WELL DRILLING RESTRICTIONS

FIGURE

NOVEMBER 2015

ALABAMA DEPARTMENT OF TRANSPORTATION

Bureau of Materials & Tests – Geotechnical Section
3700 Fairground Road, Montgomery, Alabama 36110
Phone: 334-206-2271 FAX: 334-264-6263

Robert Bentley
Governor

John Cooper
Transportation Director

Form 10 – LETTER TO POOL INSTALLERS

[Date]

[Name of Pool Installer]
[Street Address of Pool Installer]
[City, State, and Zip Code of Pool Installer]

Re: Notice of Groundwater Restriction within the Coliseum Boulevard Plume

The shallow groundwater (the water 10-50 feet or more below land surface) in an area in north Montgomery, Alabama (see attached map) contains concentrations of trichloroethylene ("TCE"). The area is commonly referred to as the Coliseum Boulevard Plume ("CBP").

TCE is a common solvent often used in testing laboratories. Investigations of the CBP showed that waste TCE from an asphalt test facility of the Alabama Department of Transportation ("ALDOT") leaked into the groundwater after it was discarded in the sewer system and/or the ground near the facility in accordance with manufacturer's recommendations. To prevent exposure to the groundwater, ALDOT obtained environmental covenants ("Covenants") from CBP property owners that contain a permanent deed restriction that prohibits access and use of the groundwater (such as, for example, drilling a well or installing an in-ground swimming pool) without approval of ALDOT. The Covenants are recorded at the office of the Montgomery County Judge of Probate. Pursuant to the Alabama Uniform Environmental Covenant Act (Alabama Code §35-19-1, *et seq.*), the Alabama Department of Environmental Management ("ADEM"), is also authorized to enforce the deed restrictions on groundwater access and use. (*See* ADEM Admin. Code 335-5-1, *et seq.*).

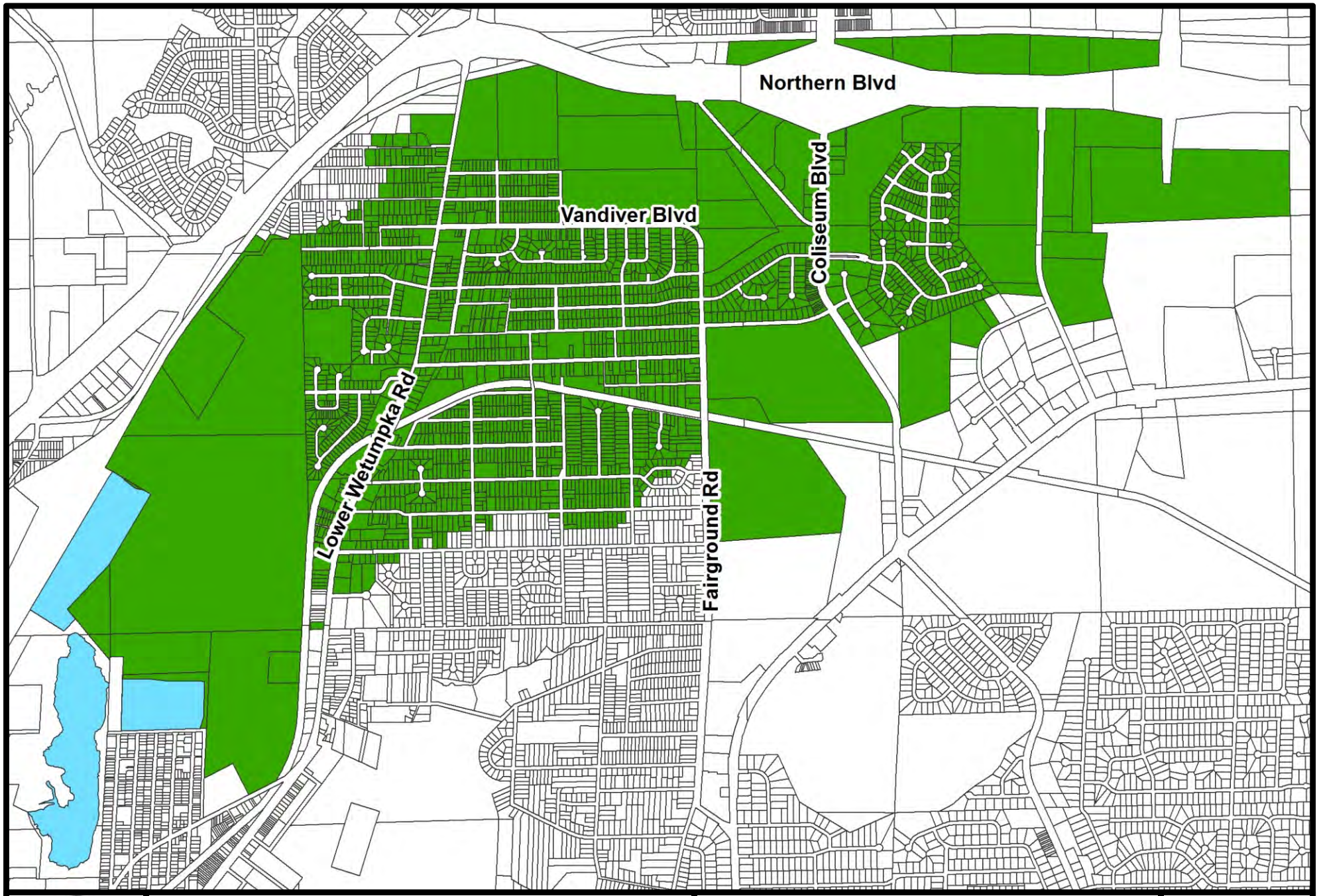
If you install a swimming pool in the CBP area that requires an excavation that may result in contact with the groundwater, please contact ALDOT prior to excavation. We will promptly respond to discuss your project. If you confirm that your project may result in contact with the groundwater, we can provide information that may help you protect your workers and others from TCE exposure and prevent TCE contamination from entering the deeper aquifers. Also, we will send you periodic updates about the CBP as part of our on-going effort to involve and inform the community.

For more information, you may see our website at www.coliseumboulevardplume.com, call the CBP 24-Hour Information Line (334-353-6635), email us at cbpinfo@dot.state.us.al or contact Adam Anderson of ALDOT at 334-206-2278 or Brandi Little of ADEM at (334) 274-4226.

Very truly yours,

Scott W. George, P.E.
Materials and Tests Engineer

cc: Brandi Little, ADEM



ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME

Coliseum Boulevard Plume Parcels
Surface Water Elevation Restrictions

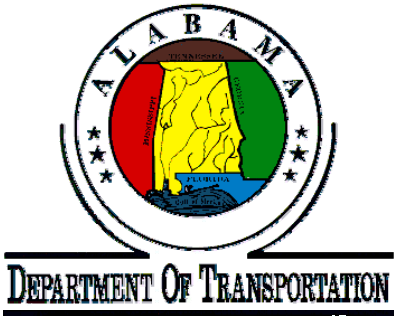
November 2015

APPENDIX A

Agency Regulations, Statutes and Forms; City of Montgomery Ordinances And Forms

Institutional Control Program

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA

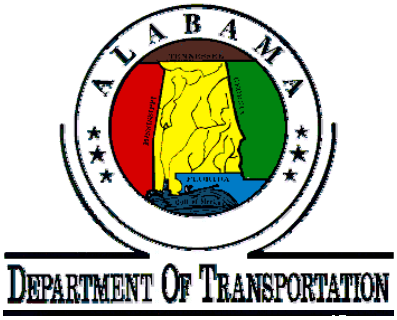


APPENDIX A.1

Alabama Department of Environmental Management Land Division – Brownfield Redevelopment and Voluntary Cleanup Program

Institutional Control Program

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA



ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
LAND DIVISION - BROWNFIELD REDEVELOPMENT AND VOLUNTARY CLEANUP PROGRAM

CHAPTER 335-15-1
GENERAL

TABLE OF CONTENTS

335-15-1-.01 Purpose. These regulations are promulgated pursuant to the Alabama Land Recycling and Redevelopment Act, Code of Alabama 1975, § 22-30E-4. The Brownfield Redevelopment and Voluntary Cleanup Program provides a mechanism for the implementation of a cleanup program that encourages applicants to voluntarily assess, remediate, and reuse rural and urban areas of actual or perceived contamination. The program is designed to expedite the voluntary cleanup process and has been designed for entry at any stage of the cleanup process as long as all applicable criteria have been achieved up to the point of entry.

Authors: Fred A. Barnes; Keith N. West; Lawrence A. Norris; Stephen A. Cobb.
Statutory Authority: Code of Alabama 1975, §§ 22-30E-1, 22-30E-2, and 22-30E-4.
History: May 16, 2002.
Amended: November 25, 2004.

335-15-1-.02 Definitions. Unless otherwise defined in ADEM Admin. Code R. 335-15-1 through 335-15-6, the following words and terms shall have the meanings given below:

(a) "Alabama Land Recycling and Economic Redevelopment Commission" is the commission as established in the Code of Alabama 1975 § 22-30E-12.

(b) "ADEM" is the Alabama Department of Environmental Management.

(c) "Applicant" the owner, operator or prospective purchaser seeking to participate in the voluntary cleanup program by submission of an application, assessment, and/or cleanup plan under 335-15-2-.02.

(d) "Application fee" means the nonrefundable review fee submitted with the Voluntary Cleanup Program application.

(e) "Aquifer" means a geologic formation, group of formations or a part of a formation capable of yielding a significant amount of groundwater to wells or springs.

(f) "Brownfield" means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant.

(g) "Carcinogen" means a chemical classification for the purpose of risk assessment as an agent that is known or suspected to cause cancer in humans, including but not limited to a known or likely human carcinogen or a probable or possible human carcinogen under an EPA weight-of-evidence classification system.

(h) "Certification of compliance" means a statement prepared by a professional engineer or geologist licensed to practice in the State of Alabama which certifies compliance with a voluntary cleanup plan required by 335-15-4-.06.

(i) "Cleanup" means, for purposes of 335-15, the remediation, mitigation, control, or removal of contaminants from the environment in accordance with an approved "Voluntary Cleanup Plan".

(j) "Cleanup Properties Inventory" means the Cleanup Properties Inventory compiled and updated as necessary by the Department pursuant to 335-15-6-.03(1) for all qualifying properties for which a property assessment plan or cleanup plan has been approved.

(k) "Commission" means the Alabama Environmental Management Commission as defined in Code of Alabama 1975 § 22-22A-3(4).

(l) "Completion" means fulfillment of the commitment agreed to by the participant as part of this program.

(m) "Contaminant" means any man-made or man-induced alteration of the chemical, physical or biological integrity of soils, sediments, air and surface water or groundwater including:

1. Solid waste (as defined in ADEM Admin. Code 335-13); or

2. Petroleum product.

(n) "Department" means the Alabama Department of Environmental Management or its successor agency.

(o) "Director" means the Director of the Alabama Department of Environmental Management or such other person to whom the director has delegated authority.

(p) "EPA" means the United States Environmental Protection Agency.

(q) "Engineer" means a person registered as a professional engineer with the State of Alabama Board of Registration for Professional Engineers and Land Surveyors and practicing under the Rules of Professional Conduct, specifically Canon II.

(r) "Environment" is defined by the federal Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C., Section 9601, et seq.

(s) "Facility" is a term synonymous with "property".

(t) "Fiduciary" means a person who acts for the benefit of another party as a bona fide trustee, executor, and administrator.

(u) "Geologist" means a person registered as a professional geologist with the State of Alabama pursuant to the Alabama Professional Geologist Licensing Act.

(v) "Hazardous constituent" as defined in ADEM Admin. Code 335-14-2-Appendix VIII and/or ADEM Admin. Code 335-14-5-Appendix IX.

(w) "Hazardous substance" means any substance included on the List of Hazardous Substances and Reportable Quantities, codified as 40 CFR Part 302, Table 302.4, in force and effect on the effective date of 335-15-1 and subsequent revisions thereof, or any substance listed on the List of Extremely Hazardous Substances and Their Threshold Planning Quantities, codified as 40 CFR Part 355, Appendix A, in force and effect on the effective date of 335-15 and subsequent revisions thereof.

(x) "Hazardous waste" means any solid waste as defined in ADEM Admin. Code 335-14.

(y) "Hazardous Waste Treatment, Storage or Disposal Facility" means any property or facility which is intended or used for the treatment, storage or disposal of hazardous waste subject to the permit requirements of ADEM Admin. Code 335-14-8.

(z) "Land Use Controls" means any restriction or control, which serves to protect human health and/or the environment, by limiting the use of and/or exposure to, any portion of a property, including water resources. These controls include but are not limited to:

1. Engineering controls remedial actions directed toward containing or controlling the migration of contaminants through the environment. These include, but are not limited to, stormwater conveyance systems, slurry walls, liner systems, caps, leachate collection systems, pump and treat systems, and groundwater recovery systems.

2. Institutional controls which are legal or contractual restrictions on property use that remain effective after remediation is completed and are used

to meet remediation levels. The term may include, but is not limited to, deed notations, deed restrictions and/or, water use restrictions, restrictive covenants, conservation easements, and limited development rights.

3. Water use restrictions which can be placed on the use of a particular water supply source that has been identified as being contaminated with hazardous substances or other contaminants in order to protect human health and the environment.

(aa) "Major Modification" means any modification that is not a minor modification.

(bb) "Minor Modification" means any administrative and or general information changes, correction of typographical errors, changes in ownership and or operational control, and changes in the frequency of, or procedures for, monitoring, reporting or sampling by the applicant to provide for more frequent monitoring, reporting or sampling.

(cc) "Mitigation" means reducing to the extent possible~~,~~ or rectifying the adverse impact by repairing, rehabilitating, restoring, or limiting exposure to the affected environment.

(dd) "Noncarcinogen" is a chemical classification for the purposes of risk assessment as an agent for which there is either inadequate toxicological data or is not likely to be a carcinogen based on an EPA weight-of-evidence classification system.

(ee) "Owner or Operator"

1. The definition includes the following:

(i) In the case of a facility, any person owning or operating such facility.

(ii) Any person who owned, operated, or otherwise controlled activities at a facility immediately prior to conveyance of title to a unit of state or local government or control of the facility due to bankruptcy, foreclosure, tax delinquency, abandonment.

2. The definition does not include the following:

(i) A person who can show evidence of ownership and acting solely in a fiduciary capacity and who did not actively participate in the management, disposal, or release of hazardous wastes, hazardous constituents, or hazardous substances from the facility.

(ii) A unit of a state or local government which acquired ownership or control involuntarily through bankruptcy, tax delinquency, abandonment, or other circumstances in which the government involuntarily acquire title by virtue of its function as sovereign. This exclusion shall not apply to any state or

local government which has caused or contributed to the release of hazardous wastes, hazardous constituents, or hazardous substances from the facility.

(ff) "Parent" has the same meaning as in 17 CFR 240.12b-2 (1 April 1996 Edition).

(gg) "Participant" means a person who has received confirmation of eligibility and has remitted payment of application fee.

(hh) "Person" means an individual, corporation, partnership, association, a governmental body, a municipal corporation or any other legal entity.

(ii) "Petroleum" means oil or petroleum of any kind and in any form, including, without limitation, crude oil or any fraction thereof, petroleum, gasoline, kerosene, fuel oil, oil sludge, used oil, substances or additives utilized in the refining or blending of crude petroleum or petroleum stock, natural gas, natural gas liquids, liquefied natural gas, synthetic gas usable for fuel, and mixtures of natural gas and synthetic gas.

(jj) "Pollutant" includes but is not limited to dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste. [Note: Some materials that meet the definition of "pollutant" may not meet the criteria to be considered a solid waste, hazardous or nonhazardous.]

(kk) "Preexisting release" means a release, as that term is defined in 335-15-1-.02, which occurred prior to an applicant's application for a limitation of liability pursuant to 335-15-4-.02.

(ll) "Property" is synonymous with "facility" and includes any or all of the following:

1. Any land, building, structure, installation, equipment, pipe or pipeline, sewer or publicly owned treatment works, pipe into a sewer or publicly owned treatment works, well, pit, pond, lagoon, impoundment, ditch, landfill, or storage container.

2. Any site or area where a hazardous waste, hazardous constituent, hazardous substance or petroleum product has been deposited, discharged, stored, disposed of, placed, or has otherwise come to be located.

3. A parcel of land defined by the boundaries in the applicable deed.

(mm) "Prospective developer" means any person who desires to buy or sell a brownfield property for the purpose of developing or redeveloping that brownfield property and who did not cause or contribute to the contamination at the brownfield property.

(nn) "Prospective purchaser" means a person who intends to purchase a qualifying property.

(oo) "Qualifying property" means a property which meets the criteria of 335-15-2-.01(1).

(pp) "Relatives" means persons who are, or formerly were, related by marriage or by consanguinity.

(qq) "Release" means any intentional or unintentional act or omission resulting in the spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, including without limitation, the abandonment or discarding of barrels, containers, and other closed receptacles, of any solid waste, hazardous waste, hazardous constituent, petroleum products, or hazardous substance.

(rr) "Remediation waste" means all solid and hazardous wastes, and all media (including groundwater, surface water, soils, and sediment) and debris that contain hazardous substances which are managed for implementation of the cleanup.

(ss) "Remediation level" means the concentration of a contaminant, and applicable control, that is protective of human health and the environment.

(tt) "Residential" means single family residences of one or more dwelling units, including accessory land, buildings or improvements incidental to such dwellings.

(uu) "Response Action" means those actions taken in the event of a release or threatened release of a hazardous waste, hazardous constituent, petroleum product, or hazardous substance into the environment to remove, or to prevent or minimize the release of hazardous waste, hazardous constituents, petroleum products, or hazardous substances so that they do not pose a threat to public health or the environment.

(vv) "Responsible person" means any person who has contributed or is contributing to a release of any hazardous waste, hazardous constituent, or hazardous substance at a property. This term specifically includes those persons described in §§107(a)(1) through 107(a)(4) of the federal Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C., Section 9601, et seq. This term specifically excludes those persons described in § 107(b) of the federal Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C., Section 9601, et seq.

(ww) "Restricted use" means any use other than unrestricted residential use.

(xx) "Risk assessment" means the process used to determine the risk posed by contaminants that have been released into the environment at a site. The process includes a written site specific evaluation, encompassing, but not

limited to, the identification of the contaminants present in the environmental media, the assessment of exposure and exposure pathways, the assessment of the toxicity of the contaminants present, the characterization of risks to humans, and the characterization of the impacts or risks to the environment.

(yy) "Site" means any property or portion thereof, as agreed to and defined by the participant and the Department, which contains or may contain contaminants being addressed under this program.

(zz) "Source" means the point of origin of a suspected contaminant.

(aaa) "Subsidiary" has the same meaning as in the 17 CFR 240.12b-2 (1 April 1996 Edition).

(bbb) "Third party" means one not a party to an agreement or to a transaction but who may have rights therein.

(ccc) "Unrestricted residential use" means the designation of acceptable future use at a site for any and all activities associated with residential use at which the remediation levels, based on either background or standard residential exposure factors, shall have been attained throughout the site in all media.

(ddd) "Used oil" means any oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use, is contaminated by physical or chemical impurities.

(eee) "Upper-bound lifetime cancer risk level" means a conservative estimate of the probability of one excess cancer occurrence in a given number of exposed individuals. For example, a risk level of 1×10^{-6} equates to the possibility of one additional cancer occurrence beyond the number of occurrences that would otherwise occur in one million exposed individuals, beyond the number of occurrences that would otherwise occur. Upper-bound lifetime cancer risk level is based on an assumption of continuous, lifetime exposure and is likely to overestimate true risk.

(fff) "Voluntary cleanup plan" means any plan approved under 335-15-4-.04 that describes in sufficient detail those actions planned to satisfy the cleanup requirements for the qualifying property.

(ggg) "Voluntary Property Assessment Plan" means a plan that has been approved by the Department under 335-15-4-.03 and describes in sufficient detail those actions planned to perform a risk assessment or identify applicable cleanup requirements for the property.

(hhh) "Well" means any shaft or pit dug or bored into the earth, generally of a cylindrical form, and often walled with bricks or tubing to prevent the earth from caving in.

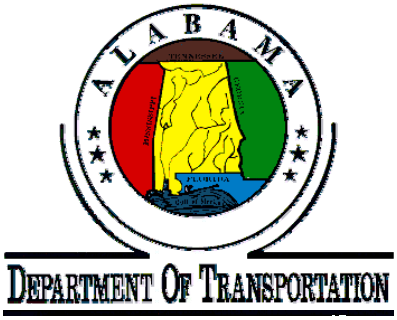
Authors: Fred A. Barnes; Keith N. West; Lawrence A. Norris; Stephen A. Cobb.
Statutory Authority: Code of Alabama 1975, § 22-30E-3.
History: May 16, 2002.
Amended: November 25, 2004.

APPENDIX A.2

Alabama Department of Environmental Management Water Division – Water Well Standards Program

Institutional Control Program

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA



ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

WATER DIVISION – WATER WELL STANDARDS PROGRAM

DIVISION 335-9

1400 Coliseum Boulevard
Montgomery, Alabama 36110
(334) 271-7700

CITE AS

ADEM Admin. Code R. 335-9-x-.xx

REVISED EFFECTIVE: MAY 1988

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
WATER DIVISION – WATER WELL STANDARDS PROGRAM

DIVISION 335-9

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Chapter 335-9-1

Licensing and Certification of Water and Water Well Construction Standards

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
WATER DIVISION – WATER WELL STANDARDS PROGRAM

LICENSING AND CERTIFICATION OF WATER AND WATER WELL CONSTRUCTION STANDARDS

TABLE OF CONTENTS

335-9-1-.01 Purpose. In order to protect the public health and general welfare of the people of the State of Alabama, the Alabama Department of Environmental Management hereby promulgates the following rules and regulations in order to ensure that a pure, sanitary and healthful water supply is provided to the people of the State of Alabama.

Statutory Authority: Code of Alabama 1975, §§ 22-22A-5, (1984) 22-22A-8, (1984) 22-24-3(d) (1984).
Effective: September 20, 1971.

335-9-1-.02 Definitions.

(a) "Board" means the Director of the Alabama Department of Environmental Management.

(b) "Director" means the Director of the Alabama Department of Environmental Management.

(c) "Drill" means to drill or redrill, bore, auger, dig or otherwise construct a water well.

(d) "Log" means a record of the type of materials or rock penetrated in the drilling of a water well.

(e) "Person" means any individual, organization, group, association, partnership, corporation, or any combination of them operating a business to drill water wells.

(f) "Sample" means cutting or other fragments or rock or soil materials removed from the well.

(g) "Well" means a hole drilled for the production of water.

(h) "Shall" means a mandatory requirement.

(i) "Capping a completed well" means the installing of a secure temporary cover sufficient to prevent contamination.

Statutory Authority: Code of Alabama 1975, §§ 22-22A-5 (1984), 22-22A-8 (1984), 22-24-3(d) (1984).
Effective: September 20, 1971.

335-9-1-.03 Rules.

(a) Application For A License To Drill A Water Well.

(1) Every person who proposes to drill a water well in the State of Alabama shall file, on or before September 30 of each year, an application for a water well driller's license, along with a payment of the annual fee of $200.00.

(b) Filing Of Pertinent Data Relating To A Water Well.

(1) Every person desiring to drill a water well shall file with the Board, on a form furnished by the Board, a Notification of Intent to drill a well. This form shall be filed prior to the commencement of work.

(2) Every person who drills a well shall file a Certification of Completion on the form furnished by the Board within 30 days after completion of work. The board shall notify the local Health authorities within 7 days of the receipt thereof.

(3) When requested by the Geological Survey of Alabama, the driller shall collect samples in compliance with Code of Alabama 1975, §§ 22-24-8 (5) (84).

(c) Examinations.

(1) Any driller applying for a license shall furnish the Board acceptable proof that he has at least two years of water well construction experience and shall make a minimum score of 70 percent on a Board authorized examination prior to being licensed.

(2) Reciprocity to drillers from out of state will be considered on an individual basis.

Statutory Authority: Code of Alabama 1975, §§ 22-22A-5 (1984), 22-22A-8 (1984), 22-24-3(d) (1984).
Effective: September 20, 1971.

335-9-1-.04 Location Standards. Every well shall be located so that it is easily accessible, free from flooding from any known source of pollution. The location of the well shall comply with local regulations. The following table is recommended:

Projections or roofs of adjacent building	2 Feet
Secondary electrical services	10 Feet
Primary electrical services	75 Feet
Cess pool or sewage lagoon	150 Feet
Septic tank or field lines	100 Feet
Barnyard	150 Feet

Statutory Authority: Code of Alabama 1975, §§ 22-22A-5 (1984), 22-22A-8 (1984), 22-24-3(d) (1984).
Effective: September 20, 1971.

335-9-1-.05 Materials. All materials used in the construction of a water well shall have the structural strength to accomplish the purpose for which they are installed.

(a) Casing and liners shall be new steel of a minimum wall thickness of Schedule 30 or thermoplastic water well casing produced in accordance with ASTM Standard F 480-76, and approved for potable water by the Nation Sanitation Foundation (NSF). Nonporous concrete pipe shall be acceptable when grouted to a depth of 20 feet below land surface, and the grout shall be introduced at the bottom until it overflows at the top or by gravity flow. The grout shall consist of 50% cement and 50% aggregate. The upper 20 feet of the hole diameter shall be at least 4-inch larger than the O.D. of the concrete casing. All steel casing is to be welded, or threaded and coupled; thermoplastic casing shall be joined in accordance with ASTM Standard F 480-76.

(b) Screen, where required, shall provide adequate open area to transmit the desired amount of water from the formation and shall be sized to retain the sand or other extraneous material that would make the completed well undesirable. It shall be constructed of a material that will not be subjected to serious attack by the chemical action of the water in the formation in which it is placed. Thermoplastic screens shall be approved by NSF for potable water uses.

(c) When required, grout shall consist of a ratio of one sack of Portland cement to a maximum of six gallons of clean water.

(d) Capping of the well shall be such that no contamination can enter the well.

(e) Disinfection of every well shall be accomplished by adding a strong chlorine solution such as HTH, Prechlorine, or Chlorox, so as to subject the entire well to a 50 ppm solution for at least 12 hours. It is strongly recommended that all drilling fluids be chlorinated with at least 50 ppm chlorine.

Gallons Water	5.25 % Chlorox	10% Sodium Hypochlorite	30% Chlorine Lime	70% HTH
50	6.5 oz	3.5 oz	1 oz	0.5 oz
100	13 oz	7 oz	2 oz	1 oz
500	63.5 oz	33 oz	11 oz	5 oz
1,000	127 oz	67 oz	22 oz	10 oz

REMEMBER - There are 16 oz/lb and 32 fl oz/qt.

(f) No materials may be used in the construction of a well that will result in the delivery of water that is toxic or has an objectionable odor or taste.

(g) Any person desiring to use materials that are not approved herein shall submit the specifications for the materials to the Board for approval before they are used in any well.

Statutory Authority: Code of Alabama 1975, §§ 22-22A-5 (1984), 22-22A-8 (1984), 22-24-3 (d) (1984).
Effective Date: September 20, 1971.

335-9-1-.06 Construction Standards.

(a) Casing.

(1) In every well, the casing shall extend from 1 foot above ground level to a suitable impervious layer where it shall be properly sealed to prevent the entrance of seep water and other extraneous material. In no case shall the length of casing be less than 20 feet. Where an impervious layer is not encountered above the water-bearing zone, the seal shall be affected by sealing 50 feet of the annulus, the upper 20 feet of which must be grouted. All well with casing greater than 8 inches in I.D. (inside diameter) shall be grouted to a depth of 20 feet or more. Wells that are to be constructed with less than 20 feet of casing must be approved by the County Environmentalist.

(2) The minimum casing size in mud rotary wells shall be 41/2 inches O.D. If a person desires to drill a well with casing of a size smaller than herein specified, permission shall be obtained from the County Environmentalist prior to commencement of work, and when approved the County Environmentalist service a single-string completion well with cemented casing and chlorination. This type well shall not be pulled or re-screened except in Choctaw County, Act 81-185, and Sumter County, Act 81-186; it shall be sealed or plugged according to Rule .06 (g).

(3) Air rotary drilling equipment used in the developing of ground water shall be equipped with a pump for the injection of a minimum of 3 gallons per minute of water. This injection equipment shall be used during the course of drilling for water.

(4) Casing may be driven, lowered, or installed in any manner which will affect a continuous watertight installation. In those wells where there is an annulus, it shall be filled with puddled clay and/or cement grout in the manner prescribed in Rule .06 (a) (1).

(b) Screens. An adequate screen shall be provided where necessary and installed in such a manner that removal and replacement can be accomplished without affecting the watertight seal around the casing.

(c) Development. The well shall be developed to its maximum practical yield of the best quality of water at the site.

(d) Testing. The contractor shall make an adequate test for yield and report the results on the Well Completion Certificate.

(e) Capping. Every well shall be left with a secure cap which will not permit the well to become contaminated during construction.

(f) Special Cases. Any person desiring to construct a well in a manner not covered above, shall submit this information to the Board for approval before the work is started on the well.

(g) Abandonment. Any well to be abandoned shall be permanently sealed in the following manner: The well will be filled with a puddled clay material containing 50 ppm of chlorine to within 20 feet of the top of the well. The top 20 feet shall be filled with cement grout or concrete.

(h) Holes. Any holes remaining after construction or testing attempts shall be properly backfilled.

Statutory Authority: Code of Alabama 1975, §§ 22-22A-5 (1984), 22-22A-8 (1984), 22-24-3 (d) (1984).
Effective Date: September 20, 1971.

APPENDIX A.3

City of Montgomery Application For Permit to Drill Water Wells and Ordance

Institutional Control Program

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA

ALABAMA
DEPARTMENT OF TRANSPORTATION

CITY OF MONTGOMERY
APPLICATION FOR PERMIT TO DRILL WATER WELLS
(An Original and Copy of this Application shall be submitted.)

( ) City ( ) Police Jurisdiction

House number_____ Street_____

Lot_____ Block_____ Plat_____

Property Owner_____ Address_____

Well Driller_____ Address_____

New Well_____ Repair old well_____

Size of Well_____ Depth_____

Estimate of well capacity_____ G.P.H.

Provide exact G.P.S. coordinates for well location on lot_____

Purpose for which well is to be used_____

Surplus of overflow is to be discharged_____

It is herby agreed if this request is approved, that the well will be constructed in accordance with the Montgomery City Ordinance number 71-67 and 72-67

Construction shall begin within_____ days after this application is submitted and completed within reasonable time

This application hereby becomes legal and binding between the well driller and the well owner, with reference to regulations and requirements of Montgomery City Ordinances 71-67 and 72-67.

Driller_____ Owner_____ Date_____
Signature Signature

This application is hereby ( ) Approved ( ) Disapproved By the Chief Plumbing Inspector, City of Montgomery

_____ _____
Signature Date

This application is hereby ( ) Approved ( ) Disapproved By the Montgomery County Health Officer

_____ _____
Signature Date

(It shall be unlawful for any person to make any false or misleading statement in this application)

DIVISION 2. PERMIT

Sec. 5-501. Required.

It shall be unlawful for any person to dig, construct or repair any well for the withdrawal of water in the city until a permit therefor has been obtained as provided in this article.

(Ord. No. 71-67, § 2; Code 1980, § 48-2)

Sec. 5-502. Application.

Any person desiring to dig, construct or repair any well for the withdrawal of water in the city shall, before commencing such work, make application for the permit required by section 5-501 to the chief plumbing inspector. The application shall be made in writing and subscribed and sworn to by the person owning the premises on which the well is located, or proposed to be located, and by the person having charge of the actual work of digging, constructing or repairing any such well. It shall be made on suchform as may be prescribed and furnished by the chief plumbing inspector and shall contain complete and accurate information with respect to the size, depth, location, approximate capacity, ownership and use of such well and any other pertinent information, including a statement of the purpose for which the supply from such well is to be used and where the surplus or overflow water is to be discharged. It shall be unlawful for any person to make any false or misleading statement in any such application. Such permits shall be approved by the chief plumbing inspector and the county health officer.

(Ord. No. 71-67, § 3; Code 1980, § 48-3)

Sec. 5-503. To specify work to be done; failure to comply with terms.

Each permit issued under this article shall specify clearly the work which is authorized to be done, and it shall be unlawful for any person to dig, construct or repair any well for the withdrawal of water contrary to or not authorized by the terms of the permit issued for the work.

(Ord. No. 71-67, § 1; Code 1980, § 48-4)

Sec. 5-504. Fee; expiration.

A fee of $50.00 shall be collected by the chief plumbing inspector for issuing each permit under the provisions of this article. All permits issued under this article will automatically expire unless work is completed within 90 days from the date of the permit.

(Ord. No. 71-67, § 5; Code 1980, § 48-5)

Sec. 5-505. Maximum depth allowable.

No permit shall be issued to dig, construct, enlarge or extend any well for the withdrawal of water other than under the following criteria:

(1) Wells with 100 gallons per minute or less capacity are acceptable in all areas with depth unlimited.

(2) Wells with 100 gallons per minute or greater capacity must be individually approved as to size and location.

In computing the depth of any well, such depth shall be measured from the ground line adjoining such well.

(Ord. No. 71-67, § 6; Code 1980, § 48-6)

Secs. 5-506--5-540. Reserved.

ARTICLE VII. BACKFLOW PREVENTION

Sec. 5-441. Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Agency means the department of the municipal government invested with the authority and responsibility for the enactment and enforcement of this article.

Air gap means the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture or other device and the flood level rim of the receptacle.

Approved means accepted by the agency as meeting an applicable specification stated or cited in this article, or as suitable for the proposed use.

Auxiliary supply means any water source or system other than the city water supply which may be available in the building or premises.

Backflow means the flow of water or other liquids, mixtures or substances into the distributing pipes of a potable supply of water from any source other than its intended source. Backsiphonage is one type of backflow.

Backflow preventer means a device or means to prevent backflow.

Backsiphonage means the flowing back of used, contaminated or polluted water from a plumbing fixture or vessel or other sources into a water supply pipe due to a negative pressure in such pipe.

Barometric loop means a loop of pipe rising approximately 35 feet, at its topmost point, above the highest fixture it supplies.

Check valve means an automatically operated device which is designed to permit the flow of fluids in one direction and to close if there is a reversal of flow.

Contamination. See *Pollution.*

Cross connection means any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other water of unknown or questionable safety, steam, gases or chemicals whereby there may be a flow from one system to the other. See *Backflow* and *Backsiphonage.*

Drain means any pipe which carries wastewater or waterborne wastes in a building drainage system.

Fixture, plumbing, means installed receptacles, devices or appliances supplied with water or which receive or discharge liquids or liquid borne wastes.

Flood level rim means the edge of the receptacle from which water overflows.

Hazard, health, means any conditions, devices or practices in the water supply system and its operation which create or, in the judgment of the chief plumbing inspector, may create a danger to the health and well-being of the water consumer. An example of a health hazard is a structural defect in the water supply system, whether of location, design or construction, which may regularly or occasionally prevent satisfactory purification of the water supply or cause it to be polluted from extraneous sources.

Hazard, plumbing, means any arrangement of plumbing including piping and fixtures whereby a cross connection is created.

Hydropneumatic tank means a pressure vessel in which air pressure acts upon the surface of the water contained within the vessel, pressurizing the water distribution piping connected to the vessel.

Inlet means the open end of the water supply pipe through which the water is discharged into the plumbing fixture.

Plumbing system means the water supply and distribution pipes, plumbing fixtures and traps; soil, waste and vent pipes; building drains and building sewers, including their respective connections, devices and appurtenances within the property lines of the premises, and water treating or water using equipment.

Pollution means the presence of any foreign substance (organic, inorganic, radiological or biological) in water which tends to degrade its quality so as to constitute a hazard or impair the usefulness of the water.

Reduced pressure principle backflow preventer means an assembly of differential valves and check valves, including an automatically opened spillage port to the atmosphere designed to prevent backflow.

Surge tank means the receiving, nonpressure vessel forming part of the air gap separation between a potable and an auxiliary supply.

Vacuum means any pressure less than that exerted by the atmosphere.

Vacuum breaker, nonpressure type, means a vacuum breaker which is designed so as not to be subjected to static line pressure.

Vacuum breaker, pressure type, means a vacuum breaker designed to operate under conditions of static line pressure.

Water, nonpotable, means water which is not safe for human consumption or which is of questionable potability.

Water, potable, means any water which, according to recognized standards, is safe for human consumption.

(Ord. No. 72-67, § 2; Code 1980, § 46-2)

Cross references: Definitions generally, § 1-2.

Sec. 5-442. Authority to inspect and right of entry of plumbing inspector.

(a) The chief plumbing inspector or designated agent shall inspect the plumbing in every building or premises in the city as frequently as in his judgment may be necessary to ensure that such plumbing has been installed in such a manner as to prevent the possibility of pollution of the water supply of the city by the plumbing. The chief plumbing inspector shall notify or cause to be notified in writing the owner or authorized agent of the owner of any such building or premises, to correct, within a reasonable time set by the chief plumbing inspector, any plumbing installed or existing contrary to or in violation of this article, and which in his judgment may therefore permit the pollution of the city water supply or otherwise adversely affect the public health.

(b) The chief plumbing inspector or designated agent shall have the right of entry into any building, during reasonable hours, for the purpose of making inspection of the plumbing systems installed in such building or premises; provided, however, that with respect to the inspection of any single-family dwelling, consent to such inspection shall first be obtained from a person of suitable age and discretion therein or in control thereof.

(Ord. No. 72-67, § 1; Code 1980, § 46-1)

Sec. 5-443. Technical requirements generally.

A potable water supply system shall be designed, installed and maintained in such manner as to prevent contamination from nonpotable liquids, solids or gases, from being introduced into the potable water supply through cross connections or any other piping connections to the system.

(Ord. No. 72-67, § 3; Code 1980, § 46-3)

Sec. 5-444. Cross connections.

Cross connections between potable water systems and other systems or equipment containing water or other substances of unknown or questionable safety are prohibited except when and where, as approved by the authority having jurisdiction, suitable protective devices such as the reduced pressure zone backflow preventer or equal are installed, tested and maintained to ensure proper operation of a continuing basis.

(Ord. No. 72-67, § 3; Code 1980, § 46-4)

Sec. 5-445. Interconnections.

Interconnection between two or more public water supplies shall be permitted only with the approval of the health authority having jurisdiction.

(Ord. No. 72-67, § 3; Code 1980, § 46-5)

Sec. 5-446. Individual water supplies.

Cross connections between an individual water supply and a potable public supply shall not be made unless specifically approved by the health authority having jurisdiction.

(Ord. No. 72-67, § 3; Code 1980, § 46-6)

Sec. 5-447. Connections to boilers.

Potable water connections to boiler feed water systems in which boiler water conditioning chemicals are introduced shall be made through an air gap or provided with an approved backflow preventer (reduced pressure principle or double-check double-gate valves) located in the potable waterline before the point where such chemicals are introduced.

(Ord. No. 72-67, § 3; Code 1980, § 46-7)

Sec. 5-448. Prohibited connections to fixtures and equipment.

Connection to the potable water supply system for the following is prohibited, unless protected against backflow in accordance with section 5-450 et seq., or as set out in this section:

(1) Bidets.

(2) Operating, dissection, embalming and mortuary tables or similar equipment; in such installation the hose used for water supply shall terminate at least 12 inches away from

every point of the table or attachments.

(3) Pumps for nonpotable water, chemicals or other substances; priming connections may be made only through an air gap.

(4) Building drainage, sewer or vent systems.

(5) Any other fixture of similar hazard.

(Ord. No. 72-67, § 3; Code 1980, § 46-8)

Sec. 5-449. Refrigerating unit condensers and cooling jackets.

Except where potable water provided for a refrigerator condenser or cooling jacket is entirely outside the piping or tank containing a toxic refrigerant, with two separate thicknesses of metal separating the refrigerant from the potable water supply, inlet connection shall be provided with an approved check valve. Also, adjacent to and at the outlet side of the check valve, an approved pressure relief valve set to relieve at five psi above the maximum water pressure at the point of installation shall be provided if the refrigeration units contain more than 20 pounds of refrigerants.

(Ord. No. 72-67, § 3; Code 1980, § 46-9)

Sec. 5-450. Protection against backflow and backsiphonage.

(a) *Water outlets.* A potable water system shall be protected against backflow and backsiphonage by providing and maintaining at each outlet:

(1) *Air gap.* An air gap as specified in subsection (b) of this section between the potable water outlet and the flood level rim of the fixture it supplies or between the outlet and any other source of contamination; or

(2) *Backflow preventer.* An approved backflow preventer device or vacuum breaker to prevent the drawing of contamination into the potable water system.

(b) *Minimum required air gap.*

(1) *How measured.* The minimum required air gap shall be measured vertically from the lowest end of a potable water outlet to the flood rim or line of the fixture or receptacle into which it discharges.

(2) *Size.* The minimum required air gap shall be twice the effective opening of a potable water outlet unless the outlet is a distance less than three times the effective opening away from a wall or similar vertical surface, in which cases the minimum required air gap shall be three times the effective opening of the outlet. In no case shall the minimum required air gap be less than shown in the table which follows, "Minimum Air Gaps for Generally Used Plumbing Fixtures":

Minimum Air Gaps for Generally Used Plumbing Fixtures

TABLE INSET:

Fixture	Minimum Air Gap	
	When not affected by near wall 1 (inches)	When affected by near wall 2 (inches)

Lavatories and other fixtures with effective openings not greater than one-half-inch diameter	1.0	1.5
Sink, laundry trays, goose-neck bath faucets and other fixtures with effective openings not greater than three-fourths-inch diameter	1.5	2.25
Over rim bath fillers and other fixtures with effective openings not greater than one-inch diameter	2.0	3.0
Drinking water fountains--single orifice 7/16 (0.437) - inch diameter or multiple orifices having a total area of 0.15 square inch (area of circle 7/16-inch diameter)	1.0	1.5
Effective openings greater than 1 inch	2 times diameter of effective opening	3 times diameter effective opening

1 Side walls, ribs, or similar obstructions do not affect air gaps when spaced from inside edge of spout opening a distance greater than three times the diameter of the effective opening for a single wall, or a distance greater than four times the diameter of the effective opening for two intersecting walls.

2 Vertical walls, ribs, or similar obstructions extending from the water surface to or above the horizontal plane of the spout opening require a greater air gap when spaced closer to the nearest inside edge of spout opening than specified in note 1 above. The effect of three or more such vertical walls or ribs has not been determined. In such cases, the air gap shall be measured from the top of the wall.

(c) *Approval of devices.* Before any device for the prevention of backflow or backsiphonage is installed, it shall have first been certified by a recognized testing laboratory acceptable to the chief plumbing inspector. Devices installed in a building potable water supply distribution system for protection against backflow shall be maintained in good working condition by the person responsible for the maintenance of the system. The chief plumbing inspector or his designee shall inspect routinely such devices and, if found to be defective or inoperative, shall require the replacement thereof.

(d) *Installation of devices.*

(1) *Vacuum breakers.* Vacuum breakers shall be installed with the critical level at least six inches above the flood level rim of the fixture they serve and on the discharge side of the last control valve to the fixture. No shutoff valve or faucet shall be installed beyond the vacuum breaker. For closed equipment or vessels such as pressure sterilizers the top of the vessel shall be treated as the flood level rim, but a check valve shall be installed on the discharge side of the vacuum breaker.

(2) *Reduced pressure principle backflow preventer.* A reduced pressure principle type backflow preventer may be installed subject to full static pressure.

(3) *Devices of all types.* Backflow and backsiphonage preventing devices shall be accessibly located preferably in the same room with the fixture they serve. Installation in utility or service spaces, provided they are readily accessible, is also permitted.

(e) *Tanks and vats below rim supply.*

(1) Where a potable water outlet terminated below the rim of a tank or vat and the tank or vat has an overflow of diameter not less than given in the following table entitled, "Sizes of Overflow Pipes for Water Supply Tanks," the overflow pipe shall be provided with an air gap as close to the tank as possible.

Sizes of Overflow Pipes for Water Supply Tanks

TABLE INSET:

Maximum capacity of water supply line to tank	Diameter of overflow pipe (inches ID)
0--50 gpm	2
50--150 gpm	2 1/2
100--200 gpm	3
200--400 gpm	4
400--700 gpm	5
700--1,000 gpm	6
Over 1,000 gpm	8

(2) The potable water outlet to the tank or vat shall terminate at a distance not less than 1.5 times the height to which water can rise in the tank above the top of the overflow. This level shall be established at the maximum flow rate of the supply to the tank or vat and with all outlets except the air gap, overflow outlet closed.

(3) The distance from the outlet to the high water level shall be measured from the critical point of the potable water supply outlet.

(f) *Protective devices required.* Approved devices to protect against backflow and backsiphonage shall be installed at all fixtures and equipment where backflow or backsiphonage may occur and where a minimum air gap cannot be provided between the water outlet to the fixture or equipment and its flood level rim.

(1) *Connections not subject to back pressure.* Where a water connection is not subject to back pressure, a nonpressure type vacuum breaker shall be installed on the discharge side of the last valve on the line serving the fixture or equipment. A list of some conditions requiring protective devices of this kind is given in the following table entitled, "Cross Connections Where Protective Devices Are Required and Critical Level (C-L) Settings for Backflow Preventers":

Cross Connections Where Protective Devices Are Required and Critical Level (C-L) Settings for Backflow Preventers

TABLE INSET:

Fixture or Equipment	Method of Installation
Aspirators and ejectors	C-L at least 6 inches above flood level or receptacle served.
Dental units	On models without built-in vacuum breakers--C-L at least 6 inches above flood level rim of bowl.
Dishwashing machines	C-L at least 6 inches above flood level of machine. Install on both hot and cold water supply lines.
Flushometers (closet and urinal)	C-L at least 6 inches above top of fixture supplies.
Garbage can cleaning machine	C-L at least 6 inches above flood level of machine. Install on both hot and cold water supply lines.

Hose outlets	C-L at least 6 inches above highest point on hose line.
Laundry machines	C-L at least 6 inches above flood level of machine. Install on both hot and cold water supply lines.
Lawn sprinklers	C-L at least 12 inches above highest sprinkler or discharge outlet.
Steam tables	C-L at least 6 inches above flood level.
Tank and vats	C-L at least 6 inches above flood level in rim or line.
Trough urinals	C-L at least 30 inches above perforated flush pipe.
Flush tanks	Equip with approved ball cock. Where ball cocks touch tank water equip with vacuum breaker at least 1 inch above overflow outlets. Where ball cock does not touch tank water install ball cock outlet at least 1 inch above overflow outlet or provide vacuum breaker as specified above.
Hose bibbs (where aspirators or ejectors could be connected)	C-L at least 6 inches above flood level of receptacle served.

(2) *Connections subject to back pressure.* Where a potable water connection is made to a line, fixture, tank, vat, pump or other equipment with a hazard of backflow or backsiphonage where the water connection is subject to back pressure, and an air gap cannot be installed, the chief plumbing inspector may require the use of an approved reduced pressure principle backflow preventer. A partial list of such connection is shown in the following table entitled, "Partial List of Cross Connections Which May be Subject to Back Pressure":

Partial List of Cross Connections Which
May Be Subject to Back Pressure

Chemical lines

Dock water outlets

Individual water supplies

Industrial process water lines

Pressure tanks

Pumps

Steam lines

Swimming pools

Tanks and vats--Bottom inlets

Hose bibbs

Critical level (C-L) is defined as the level to which the backflow preventer (vacuum breaker) may be submerged before backflow will occur. Where the C-L is not shown on the preventer, the bottom of the device shall be taken as the C-L.

(g) *Barometric loops.* Water connections where an actual or potential backsiphonage hazard exists may in lieu of devices specified in subsection (f) of this section be provided with a barometric loop. Barometric loops shall precede the point of connection.

(h) *Double check-double gate valves.* The chief plumbing inspector may authorize installation of approved, double check-double gate valve assemblies with test cocks as protective devices

against backflow in connections between a potable water system and other fluid systems which present no significant health hazard in the judgment of the chief plumbing inspector.

(i) *Low pressure cutoff required on booster pumps.* When a booster pump is used on a water pressure booster system and the possibility exists that a positive pressure of ten psi or less may occur on the suction side of the pump, there shall be installed a low pressure cutoff on the booster pump to prevent the creation of a vacuum or negative pressure on the suction side of the pump, thus cutting off water to other outlets.

(Ord. No. 72-67, § 3; Code 1980, §§ 46-10--46-18)

Sec. 5-451. Maintenance requirements.

(a) *Generally.* It shall be the responsibility of building and premises owners to maintain all backflow preventers and vacuum breakers within the building or on the premises in good working order and to make no piping or other arrangements for the purpose of bypassing backflow devices.

(b) *Reduced pressure preventers.* Periodic testing and inspection schedules shall be established by the chief plumbing inspector for all reduced pressure type preventers, and the interval between such testing and inspections and overhauls of each device shall be established in accordance with the age and condition of the device. Inspection intervals should not exceed one year, and overhaul intervals should not exceed five years. These devices should be inspected frequently after the initial installation to ensure that they have been installed properly and that debris resulting from the installation has not interfered with the functioning of the device. The testing procedures shall be in accordance with the manufacturer's instructions when approved by the chief plumbing inspector.

(Ord. No. 72-67, § 4; Code 1980, §§ 46-19, 46-20)

Sec. 5-452. Violations of article.

(a) *Notice; correction; termination of water service.* The chief plumbing inspector shall notify the owner, or authorized agent of the owner, of the building or premises in which there is found a violation of this article of such violation. The chief plumbing inspector shall set a reasonable time for the owner to have the violation removed or corrected. Upon failure of the owner to have the defect corrected by the end of the specified time interval, the chief plumbing inspector may, if in his judgment an imminent health hazard exists, cause the water service to the building or premises to be terminated, or recommend such additional fines or penalties to be invoked as hereby may be provided.

(b) *Penalty.* The owner or authorized agent of the owner responsible for the maintenance of the plumbing systems in the building who knowingly permits a violation to remain uncorrected after the expiration of time set by the chief plumbing inspector shall, upon conviction by the court, be punished as provided for in section 1-6 of this Code. Each day of failure to comply with the requirements of this article after the specified time provided under subsection (a) of this section shall constitute a separate violation.

(Ord. No. 72-67, § 5; Ord. No. 135-77, § 1; Code 1980, §§ 46-21, 46-22)

Secs. 5-453--5-480 Reserved.

APPENDIX A.4

Code of Alabama 1975 Drilling Requirements and Notification of Intent to Drill A Water Well and Certification of Completion

Institutional Control Program

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA

ALABAMA
DEPARTMENT OF TRANSPORTATION

Code of Alabama 1975

Section 22-24-8

Drilling requirements.

It shall be unlawful and a violation of this chapter to drill a water well within the State of Alabama unless the following provisions are complied with:

(1) The driller of the water well shall be licensed as provided in Section 22-24-5.

(2) The driller shall, at all times during the drilling of a water well, keep posted in a conspicuous location, at or near the well being drilled or on his person, the appropriate license certificate as furnished by the board.

(3) Before the commencement of the drilling operation, the driller shall file an application of intent to drill a water well, as directed by the board.

(4) The driller of the well, within 30 days after completion of the drilling of each water well, shall deliver to the board, upon forms to be supplied by the board, a "report of well drilled." The board shall notify the local health authorities within seven days of the receipt thereof.

(5) The driller shall furnish a log and a set of samples to the State Geological Survey from wells specifically designated by the board or state geologist. The samples shall be collected during the drilling at intervals of not more than 10 feet.

(Acts 1971, No. 1516, p. 2630, §5; Acts 1980, No. 80-138, p. 206, §4.)

NOTIFICATION OF INTENT TO DRILL A WATER WELL AND CERTIFICATION OF COMPLETION

DRILLING CONTRACTOR | License Number | Address | Zip Code | Date

PROPERTY OWNER | Address (mailing) | Zip Code

WELL LOCATION | County | Township | Range | Section | 1/4 Section

Distance and direction from nearest town, community, road junction or other reference point

WELL TO BE USED FOR: ❑ Private supply ❑ Public supply ❑ Industrial supply ❑ Test well ❑ Monitoring well ❑ Irrigation Other: _____

LOCATION OF WELL: Latitude _____ Longitude _____ Diameter of well _____ Estimated depth _____

Estimated starting date _____

Drilling Method: ❑ Cable tool ❑ Rotary ❑ Jetted ❑ Bored ❑ Other: _____

SIGNATURE of Drilling Contractor

Total Depth _____ Completion Date _____

Interval	Description of cuttings

Completion date: report depths below ground level

Pump

Type: ❑ Turb. ❑ Subm. ❑ Jet ❑ Cyl Other _____

Intake depth wtertwer H.P. _____ Yield _____ gpm

Capacity

Tested by: ❑ pumping ❑ air lift ❑ bailer ❑ none

Measured Static Water Level _____ ft.

Measured pumping level _____ ft. after

_____ hrs. pumping _____ gpm

Development time prior to testing _____ hrs.

Finish

❑ Open hole ❑ Screened ❑ Slotted pipe ❑ Gravel pk.

Inerval(s) screened: _____ to _____ ft;

_____ to _____; _____ to _____ ft.

Packer(s) set at _____ and _____ ft.

Screen: diam. _____ ; Size openings _____

Casing

Interval cased	Diam. (Inches)	*Type pipe	*Type couplings	Interval grouted

*Couplings: Threaded & Coupled (T&C) Welded (W)
Threaded & coupled & welded (TC&W)

Other: _____

*Pipe: Black; PCV; Galv.; Other: _____

Quality

Water analysis obtained? (check) ❑ No ❑ Bacteriological ❑ Chemical

Analysis by: ❑ Ala Geol. Surv. ❑ U.S. Geol. Surv. ❑ Ala Health Dept. ❑ Private lab.

Signed Certification:

*For deeper well please attach continuation sheet.

Send WHITE copy to:
ALABAMA GEOLOGICAL SURVEY
P.O. BOX 869999
TUSCALOOSA, AL 35486

Send YELLOW and PINK copies to:
ADEM DRINKING WATER BRANCH
P.O. BOX 301463
MONTGOMERY, AL 36130-1463

Retain GOLD copy for your Records

ADEM FORM 60 5/02

NOTIFICATION OF INTENT TO DRILL A WATER WELL

DRILLING CONTRACTOR | License Number | Address | Zip Code | Date

PROPERTY OWNER | Address (mailing) | Zip Code

WELL LOCATION | County | Township | Range | Section | 1/4 Section

Distance and direction from nearest town, community, road junction or other reference point

WELL TO BE USED FOR: ❑ Private supply ❑ Public supply ❑ Industrial supply ❑ Test well ❑ Monitoring well ❑ Irrigation Other: _____

LOCATION OF WELL: Latitude | Longitude | Diameter of well | Estimated depth

Estimated starting date

Drilling Method: ❑ Cable tool ❑ Rotary ❑ Jetted ❑ Bored ❑ Other: _____

SIGNATURE of Drilling Contractor

Prior to drilling, mail this page to:

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

DRINKING WATER BRANCH

PO BOX 301463

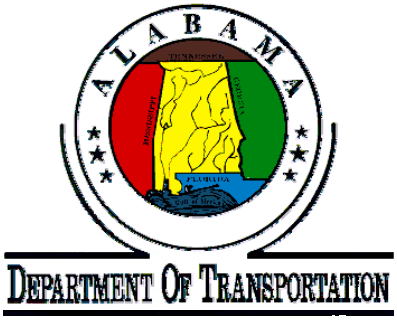
MONTGOMERY AL 36130-1463

APPENDIX A.5

Alabama Department of Environmental Management
Land Division - Uniform Environmental Covenants Program
Division 335-5

Institutional Control Program

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA



ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

LAND DIVISION - UNIFORM ENVIRONMENTAL COVENANTS PROGRAM

DIVISION 335-5

1400 Coliseum Blvd.
Montgomery, Alabama 36110

CITE AS

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ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
LAND DIVISION - UNIFORM ENVIRONMENTAL COVENANTS PROGRAM

DIVISION 335-5

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ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
LAND DIVISION - UNIFORM ENVIRONMENTAL COVENANTS PROGRAM

CHAPTER 335-5-1
GENERAL

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335-5-1-.01 Purpose. These regulations are promulgated to establish minimum requirements governing environmental covenants pursuant to the Alabama Uniform Environmental Covenants Act, Code of Alabama 1975, §§35-19-1 to 35-19-14.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§35-19-1; 35-19-13.
History: May 26, 2009.

335-5-1-.02 Applicability.

(1) These regulations apply to a property or site undergoing a response action that does not return the property to unrestricted use.

(a) An environmental covenant is required for a site if the approved environmental response project plan places a land use control on the site because it is not being remediated to unrestricted use, unless exempt in 335-5-1-.02(3).

(b) The Department, when considering the environmental response project plan for a site, may require the owner or operator or other responsible person to enter into an environmental covenant with the owner of the off-site parcels or properties to ensure that the remedy approved in the plan is protective of human health and the environment.

(c) An owner or operator or other responsible person whose environmental response project plan includes other off-site parcels or properties may voluntarily include the off-site parcels or properties in an environmental covenant.

(d) Failure to enter into an environmental covenant with an off-site property owner, for any reason, does not release or absolve the site owner or operator or other responsible person from any obligation to perform required remediation activities addressing on-site or off-site contamination, including land use controls. Lack of an environmental covenant may require the owner or operator or other responsible person to perform additional activities in the approved environmental response project plan to ensure effectiveness of the response action and the protection of human health and the environment for current and future uses of the on-site and/or off-site property.

(2) These regulations apply to environmental covenants arising from environmental response projects conducted under any of the following ADEM programs:

(a) Scrap tire remediation sites subject to 335-4.

(b) Soil and groundwater remediation sites subject to 335-6-8, 335-6-15 and 335-6-16.

(c) Solid waste disposal sites subject to 335-13.

(d) Hazardous waste disposal sites subject to 335-14.

(e) Voluntary cleanup program sites subject to 335-15.

(f) Dry cleaner remediation sites subject to 335-16.

(g) Sites subject to the Alabama Hazardous Substance Cleanup Fund Act, Code of Alabama 1975, §§22-30A-1 to 22-30A-11, and

(h) Sites being remediated by potentially responsible parties or the United States Environmental Protection Agency which are subject to the Federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §9601 et seq).

(3) For properties or sites owned by the federal government which are legally unable to execute an environmental covenant during the period of federal ownership, the following requirements shall apply:

(a) During the period of federal ownership.

(1) In lieu of an environmental covenant, a Notice of Environmental Use Restriction for properties or sites owned by the federal government shall be prepared and submitted to ADEM for approval that gives notice of the current and future use of the federal property. The Notice shall:

(i) Contain a provision that an environmental covenant shall be executed with ADEM and appropriately filed at such time the property is transferred to a non-federal owner.

(ii) Contain a provision that the Notice does not convey a property interest.

(iii) Contain a provision that, if the property is transferred to another federal agency, the environmental use restrictions shall remain in effect and be binding upon the recipient federal agency.

(iv) Be incorporated into the installation master plan or facility property management plan and shall be recorded into the land records of the property in compliance with 335-5-3-.02.

(v) Contain a provision that all cleanup plans, decision documents, permits and other instruments relying upon or referencing the Notice shall include appropriate conditions requiring that the Notice remain in place for the duration of federal ownership, and that a covenant shall be executed and filed at such time as the property is transferred to an owner that is not the federal government, and conditioning the continued approval of any selected remedies relying upon or referencing the Notice or covenant upon the timely execution and filing of a covenant at the time the property is transferred to an owner that is not the federal government.

(vi) Contain a provision that all other regulations applying to an environmental covenant shall apply to the Notice.

(b) At the time of transfer of property subject to 335-5-1-.02(3)(a) to non-federal ownership, an environmental covenant pursuant to this Division shall be executed.

(4) These regulations apply to interests in real property which are in existence at the time an environmental covenant is created or amended.

(a) An interest that has priority under other law is not affected by an environmental covenant unless the person owning the interest subordinates that interest to the covenant.

(b) A person owning a prior interest is not required to subordinate that interest to an environmental covenant or to agree to be bound by the covenant.

(c) A subordination agreement may be contained in an environmental covenant covering real property or in a separate record. If the environmental covenant covers commonly owned property in a common interest community, the subordination agreement may be signed by any person authorized by the governing board of the owners' association.

(d) An agreement by a person to subordinate a prior interest to an environmental covenant affects the priority of that person's interest but does not automatically impose any affirmative obligation on the person with respect to the environmental covenant.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §35-19-13.
History: May 26, 2009; March 26, 2013.

335-5-1-.03 Definitions. For the purpose of this Division, the following words and phrases, unless the context of 335-5 plainly indicates otherwise, shall have the following meanings:

(a) Activity and Use Limitations - Restrictions or obligations created under this Act with respect to real property.

(b) ADEM or Department - The Alabama Department of Environmental Management.

(c) Alabama Uniform Environmental Covenants Act or "Act" - Code of Alabama 1975, §§ 35-19-1 to 35-19-14.

(d) Common Interest Community - A condominium, cooperative, or other real property with respect to which a person, by virtue of the person's ownership of a parcel of real property, is obligated to pay property taxes or insurance premiums, or for maintenance, or improvement of other real property described in a recorded covenant that creates the common interest community.

(e) Director - The Director of the Alabama Department of Environmental Management or his or her designated representative.

(f) Environmental Covenant - A servitude arising under an environmental response project that imposes activity and use limitations.

(g) Environmental Response Project - A plan or work performed for environmental remediation of real property and conducted under a federal or state program governing environmental remediation of real property.

(h) Holder - The grantee of an environmental covenant that meets the requirements of 335-5-2-.01.

(i) Land Use Controls - Any restriction or control that serves to protect human health and the environment by limiting the use of or exposure to any portion of a property or site, including water resources. These controls include, but are not limited to:

1. Engineering controls for remedial actions directed toward containing or controlling the migration of contaminants through the environment. These include, but are not limited to, stormwater conveyance systems, slurry walls, liner systems, caps, leachate collection systems, pump-and-treat systems, and groundwater recovery systems. Engineering controls are classified as:

(i) Class 1, which include multi-layer caps or liner systems, soil vapor extraction systems, groundwater pump-and-treat systems, leachate and groundwater recovery systems, stormwater conveyance systems, slurry walls and active ventilation of closed spaces.

(ii) Class 2, which include clay or soil caps or liner systems, sub-structural vapor barriers, and passive ventilation of closed spaces.

(iii) Class 3, which include asphalt caps and fencing systems.

(iv) For other engineering controls not listed, ADEM shall determine the classification of the engineering control upon the request of an owner or operator or other responsible person.

2. Institutional controls that are legal or contractual restrictions on property use which remain effective after remediation is completed and are used to meet an approved environmental response project plan or proposal. These include, but are not limited to, deed notations, deed restrictions, groundwater use restrictions, restrictive covenants, conservation easements, and limited development rights. Institutional controls are classified as:

(i) Class 1, which includes any water use restriction.

(ii) Class 2, which include restrictive covenants for industrial or commercial use only or no schools or daycares, and imposition of conservation easements or limited developmental rights.

(iii) Class 3, which include restrictive covenants for no excavations, for use as greenspace only, and no hunting or fishing.

(iv) For other institutional controls not listed, ADEM shall determine the classification of the institutional control upon the request of an owner or operator or other responsible person.

(j) Owner or Operator - Includes the following:

1. In the case of a property or site, any person owning or operating that property or site.

2. Any person who owned, operated, or otherwise controlled activities at a property or site immediately prior to conveyance of title of that property or site to a unit of state or local government or loss of control of that property or site due to bankruptcy, foreclosure, tax delinquency, or abandonment.

3. The definition does not include the following:

(i) A person acting solely in a fiduciary capacity who can show evidence of ownership and who did not actively participate in the management, disposal, or release of hazardous wastes, hazardous constituents, hazardous substances or petroleum product from the property or site.

(ii) A unit of a state or local government which acquired ownership or control involuntarily through bankruptcy, tax delinquency, abandonment, or any other circumstance where the government involuntarily acquires title by virtue of its function as sovereign. This exclusion shall not apply to any state or local government that has caused or contributed to the release of hazardous wastes, hazardous constituents, or hazardous substances from the property or site.

(k) Person - An individual, corporation, business trust, estate, trust, partnership, limited liability company, association, joint venture, public corporation, government, governmental subdivision, agency, or instrumentality, or any other legal or commercial entity.

(l) Property or Site - A parcel of land defined by boundaries of a legal description where a hazardous waste, hazardous constituent, hazardous substance or petroleum product has been or is suspected to have been deposited, discharged, stored, disposed of, placed, or otherwise come to be located.

(m) Record - Information that is inscribed on a tangible medium or that is stored in an electronic or other medium and is retrievable in perceivable form.

(n) Response Action - Action taken in the event of a release or threatened release of a hazardous waste, hazardous substance, petroleum product, or other pollutant into the environment to remove or to prevent or minimize the threat to public health or the environment.

(o) Responsible Person - Any person who has contributed or is contributing to a release of any hazardous waste, hazardous constituent or hazardous substance at a property. This term includes any person who has contributed or is contributing to a release of petroleum and petroleum-based substances comprised of a complex blend of hydrocarbons derived from crude oil through processes of separation, conversion, upgrading, and finishing, such as motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents, and used oils. This term includes persons described in §§107(a)(1) through 107(a)(4) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 USC Section 9601, et seq. (CERCLA). This term excludes persons described in §107(b) of CERCLA.

(p) Restricted Use - Any use of a property or site other than unrestricted use.

(q) State - The State of Alabama.

(r) Unrestricted Use - The designation of acceptable future use at a property or site where the remediation levels, based on either background or standard exposure factors, shall have been attained in all media to allow the property or site to be used for any purpose.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama, 1975, §§35-19-2; 35-19-13.
History: May 26, 2009; March 26, 2013.

335-5-1-.04 Holder.

(1) Any person may be a holder. An environmental covenant may identify more than one holder. The holder's interest is an interest in real property.

(2) A right of the Department under the Act or under an environmental covenant, other than a right as a holder, is not an interest in real property.

(3) The Department is bound by any obligation it assumes in an environmental covenant, but does not assume obligations merely by signing an environmental covenant.

(4) Any other person who signs an environmental covenant is bound by the obligations the person assumes in the covenant; however, signing the covenant does not change the person's obligations, rights, or protections granted to or imposed upon that person under other law, except as provided in the covenant.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§35-19-3; 35-19-13.
History: May 26, 2009.

335-5-1-.05 Registry of Environmental Covenants.

(1) The Department shall establish and maintain a registry that contains all environmental covenants and any amendment or termination of those covenants executed pursuant to 335-5.

(2) In addition to the requirements of 335-5-1-.05(1), the registry may contain any other information concerning environmental covenants and the real property subject to them which the Department considers appropriate.

(3) The full text of the covenant, amendment, or termination and any other information required by ADEM shall be submitted to ADEM within thirty (30) days of its recording in the land records of the county where the property is located for inclusion in the ADEM Registry of Environmental Covenants. The person submitting the covenant may be the owner, operator, other responsible person, grantor or any holder of the covenant.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§35-19-12; 35-19-13.
History: May 26, 2009; March 26, 2013.

335-5-1-.06 Fees. The Department may assess fees to implement the provisions of the Act.

(a) A Processing and Review Fee shall be required to cover the cost of processing the covenant application and for reviewing the draft and final covenants. For sites utilizing both institutional controls and engineering controls, the processing and review fees shall be the greater of the applicable fees.

(b) A Registry Recording Fee shall be required to cover cost of establishing and maintaining the ADEM Registry of Environmental Covenants, for entering the site in this Registry, and for performing routine inspections at the site for a period of thirty (30) years to determine compliance with the covenant restrictions. For sites with more than one classification of institutional or engineering control, the Registry Recording Fee shall be the greater of the applicable fees.

(c) An owner or operator or other responsible person desiring to enter an environmental covenant shall submit a draft environmental covenant and all required fees.

(d) Fees required pursuant to this section are included in 335-1-6-.04, Schedule J.

(e) Exemptions. The following sites are exempt from paying fees in 335-1-6-.04, Fee Schedule J and in 335-5-1-.06, as specified below. These sites will be entered in the ADEM Registry of Environmental Covenants.

(1.) A site that is enrolled in the ADEM Voluntary Cleanup Program pursuant to 335-15 is exempt from paying processing and review fees in Fee Schedule J.

(2.) A site regulated under the programs listed in 335-5-1-.02(2) that has a provision for a post-closure permit which is renewable by payment of a permit fee and a provision for routine inspection by the Department or other environmental regulatory agency is exempt from paying all fees in Fee Schedule J.

(3.) A site regulated under the programs listed in 335-5-1-.02(2) that has a provision for cost reimbursement to the Department as contained in a cooperative agreement, a memorandum of agreement or an administrative order is exempt from paying the Processing and Review Fees in Fee Schedule J, to the extent such costs are reimbursable under these agreements.

(f) An owner or operator or other responsible person desiring to enter an environmental covenant for an environmental response project containing multiple individually deeded parcels off-site of the property or site which are subject to the environmental response project plan may submit an alternative fee schedule to the Department as part of its formal submittal of the environmental covenant in lieu of fees required in 335-1-6-.04, Fee Schedule J.

(1.) If submitting an alternative fee schedule, the owner or operator or other responsible person shall be required to pay the applicable processing and review fees found in 335-1-6-.04, Fee Schedule J for each individually worded covenant for off-site property that is different from land use controls or restrictions found in other covenants utilized for other individually deeded parcels off-site of the property or site subject to the environmental response project plan.

(2.) If submitting an alternative fee schedule, the owner or operator or other responsible person shall propose how to reimburse the Department for the registry recording fee which covers its cost to inspect each individually deeded off-site parcel to determine compliance with the covenant. The method to reimburse the Department shall be included in an order or agreement executed between the owner or operator or other responsible person and the Department. The length of time in years over which inspections will be conducted by the Department shall be negotiable and included in the covenant.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §35-19-13.
History: May 26, 2009; March 26, 2013.

335-5-1-.07 Process for Entering a Covenant.

(1) The owner or operator, the other responsible person or the person conducting an environmental response project may use land use control in lieu of remediating the property to a level supporting unrestricted use. The ADEM organizational unit under which the response action is being conducted shall approve the environmental response projectplan which proposes a land use control.

(2) For properties not remediated to a level supporting unrestricted use, an environmental covenant is required in accordance with 335-5-1-.02. To enter an environmental covenant, the owner or operator, the other responsible person or the person conducting an environmental response project shall submit the following to the ADEM organizational unit under which the response action is being conducted:

(a) A draft of the proposed environmental covenant.

(b) The applicable fees in Fee Schedule J of 335-1-6 and 335-5-1-.06.

(c) All pertinent information required in 335-5-2-.01(1).

(3) ADEM shall review and approve the draft covenant or request modifications. If requesting modifications to the draft covenant, ADEM shall provide the applicant with its reasons for requesting change. Upon submittal by the applicant of acceptable modifications, ADEM shall approve the draft covenant.

(4) Following ADEM review and approval of the draft covenant, the applicant shall submit two copies of the final covenant which complies with 335-5-2 for signature by the Director. Upon execution by the Director, both copies shall be returned to the applicant.

(5) Upon receiving the executed copies of the covenant from ADEM, the applicant shall have the covenant recorded in the land records of the county where the site is located, in compliance with 335-5-3-.02.

(6) One copy of the recorded covenant shall be submitted to ADEM in compliance with 335-5-1-.05(3) for entry into the ADEM Registry of Environmental Covenants.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§35-19-3; 35-19-13.
History: May 26, 2009; March 26, 2013.

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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CHAPTER 335-5-2
ENVIRONMENTAL COVENANTS

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335-5-2-.01 Covenant Contents.

(1) An environmental covenant is not effective unless it includes all of the following information:

(a) A statement that the instrument is an environmental covenant executed pursuant to the Act.

(b) A legally sufficient description of the real property subject to the covenant.

(c) A description of the activity and use limitations on the real property.

(d) Identification of every holder.

(e) The signatures of the Director, every holder, and unless waived by the Department in writing, every owner of the fee simple of the real property subject to the covenant.

(f) The name and location of any administrative record for the environmental response project reflected in the environmental covenant.

(2) The covenant may also contain any other information, restrictions, and requirements, including but not limited to any of the following:

(a) Requirements for notice following transfer of a specified interest in the property subject to the covenant.

(b) Requirements for notice concerning proposed changes in use of, applications for building permits for, or proposals for any site work affecting the contamination on, the property subject to the covenant.

(c) Requirements for periodic reports of compliance with the covenant.

(d) Rights of access to the property which are granted in connection with implementation or enforcement of the covenant.

(e) A brief narrative description of the contamination and remedy, including the contaminants of concern, the pathways of exposure, limits on exposure, and the location and extent of the contamination.

(f) Limitations on amendment or termination of the covenant in addition to those provided in 335-5-4-.02.

(g) Rights of the holder in addition to the holder's right to enforce the covenant pursuant to 335-5-5-.01.

(h) The name of the person who shall submit the environmental covenant to ADEM for listing in the registry required in 335-5-1-.05.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§35-19-4; 35-19-13.
History: May 26, 2009.

335-5-2-.02 Covenant Rules.

(1) An environmental covenant that complies with the Act and 335-5 runs with the land.

(2) An environmental covenant that is otherwise effective is valid and enforceable even if one or more of the following conditions apply:

(a) It is not appurtenant to an interest in real property.

(b) It can be or has been assigned to a person other than the original holder.

(c) It is not of a character that has been recognized traditionally at common law.

(d) It imposes a negative burden.

(e) It imposes an affirmative obligation on a person having an interest in the real property or on the holder.

(f) The benefit or burden does not touch or concern real property.

(g) There is no privity of estate or contract.

(h) The holder dies, ceases to exist, resigns, or is replaced.

(i) The owner of an interest subject to the environmental covenant and the holder are the same person.

(3) An environmental covenant or an instrument that created restrictions or obligations with respect to real property and which was recorded before the effective date of 335-5 is not invalidated because it may not comply with all provisions of the Act or 335-5, or because it was identified as an easement, servitude, deed restriction, or other interest. 335-5 does not apply in any other respect to such an instrument.

(4) Neither the Act nor 335-5 invalidates or renders unenforceable any interest, whether designated as an environmental covenant or other interest, which is otherwise enforceable under the laws of this State.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§35-19-5; 35-19-13.
History: May 26, 2009.

335-5-2-.03 Relationship to Other Land Use Law. Neither the Act nor 335-5 authorizes use of real property which is otherwise prohibited by zoning, by other law which regulates the use of real property, or by a recorded instrument that has priority over the environmental covenant. An environmental covenant may prohibit or restrict a use of real property which is authorized by zoning or by law other than the Act.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§35-19-6; 35-19-13.
History: May 26, 2009.

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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CHAPTER 335-5-3
NOTICE AND RECORDATION

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335-5-3-.01 Notices of Covenants.

(1) A copy of the environmental covenant shall be provided by the owner or operator or other responsible person and in the manner required by the Department to each of the following:

(a) Each person who signed the covenant.

(b) Each person holding a recorded interest in the real property subject to the covenant.

(c) Each person in possession of the real property subject to the covenant.

(d) Each municipality or other unit of local government in which the real property subject to the covenant is located, and

(e) Any persons that are due notice under the relevant regulatory program pursuant to which the environmental covenant is being granted.

(2) The validity of a covenant is not affected by failure to provide a copy of the covenant as required under 335-5-3-.01(1).

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§35-19-7; 35-19-13.
History: May 26, 2009.

335-5-3-.02 Recording of Covenants.

(1) An environmental covenant and any amendment or termination of the covenant must be recorded by the owner or operator or other responsible person in every county where any portion of the real property subject to the covenant is located. The environmental covenant shall be indexed to the grantor's property in the land records. For purposes of indexing, a holder shall be treated as a grantee.

(2) Except as otherwise provided in 335-5-4-.01(3), an environmental covenant is subject to the laws of the State governing recording and priority of interests in real property.

(3) Content of Recording Instrument. In lieu of recording the entire covenant, a notice may be recorded which must contain all of the following:

(a) A legally sufficient description and any available street address of the real property subject to the covenant.

(b) The names and addresses of the owner of the fee simple interest in the real property, the Department, and the holder if other than the Department.

(c) A statement that the covenant, amendment, or termination is available in a registry at the Department.

(d) A statement that the notice is notification of an environmental covenant executed pursuant to this Act.

(4) The requirements of 335-5-3-.02(3) are satisfied with a statement, executed with the same formalities as a deed in the State of Alabama, in substantially the following form:

(a) This notice is filed in the land records of the Probate Office of _____ County, Alabama, pursuant to Section 12 of the Alabama Uniform Environmental Covenants Act.

(b) This notice and the covenant, amendment, or termination to which it refers may impose significant obligations with respect to the property described below.

(c) A legal description of the property is attached as Exhibit A to this notice. The address of the property that is subject to the environmental covenant is [insert address of property] [not available].

(d) The name and address of the owner of the fee simple interest in the real property on the date of this notice is [insert name of current owner of the property and the owner's current address as shown on the tax records of the jurisdiction in which the property is located].

(e) The environmental covenant, amendment, or termination was signed by the Director of the Alabama Department of Environmental Management.

(f) The environmental covenant, amendment, or termination was filed in the registry on [insert date of filing].

(g) The full text of the covenant, amendment, or termination and any other information required by the Department is on file and available for inspection and copying in the registry maintained for that purpose by the Alabama Department of Environmental Management.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§ 35-19-8; 35-19-12; 35-19-13.
History: May 26, 2009; March 26, 2013

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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CHAPTER 335-5-4
DURATION AND AMENDMENT

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335-5-4-.01 Duration of Covenants.

(1) An environmental covenant is perpetual unless any of the following conditions apply:

(a) Its term is limited to a specific duration or terminated by the occurrence of a specific event.

(b) It is terminated or modified pursuant to 335-5-4-.01(2).

(c) It is terminated or modified by consent pursuant to 335-5-4-.02.

(d) It is terminated by foreclosure of an interest that has priority over the environmental covenant.

(e) It is terminated or modified in an eminent domain proceeding, but only if all of the following requirements are satisfied:

1. The Department is a party to the proceeding.

2. All persons identified in 335-5-4-.02(1) and (2) are given notice of the pendency of the proceeding.

3. The court determines, after hearing, that the termination or modification will not adversely affect human health, public welfare, or the environment.

(2) If the Department determines that the intended benefits of the covenant can no longer be realized, or are no longer protective of human health and the environment, it shall give notice of at least thirty (30) days to all persons identified in 335-5-4-.02(1) and (2), of its intention to petition a court, under the doctrine of changed circumstances, for termination of the covenant or reduction of its burden on the real property subject to the covenant. The Department's determination or its failure to make a determination upon request is subject to review pursuant to the Alabama Administrative Procedures Act, Code of Alabama 1975, §§41-22-1 to 41-22-27 (AAPA). After the applicable

provisions of AAPA have been satisfied, the Department may petition a court to terminate or reduce the covenant.

(3) Except as otherwise provided in 335-5-4-.01(1) and (2), an environmental covenant may not be extinguished, limited, or impaired through issuance of a tax deed, foreclosure of a tax lien, or by application of the doctrine of adverse possession, prescription, abandonment, waiver, lack of enforcement, or acquiescence, or a similar doctrine.

(4) An environmental covenant may not be extinguished, limited, or impaired by the application of any law relating to marketable title or dormant mineral interests.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§35-19-9; 35-19-13.
History: May 26, 2009.

335-5-4-.02 Amendment of Covenants.

(1) Unless otherwise specified in the environmental covenant, no environmental covenant may be amended or terminated by consent unless the amendment or termination is signed by all of the following:

(a) The Department. Where the Department waives this requirement, the current owner of the fee simple of the real property subject to the covenant shall sign.

(b) Each person who originally signed the covenant, unless a person, in a signed record, waives the right to consent or a court finds that a person no longer exists or cannot be located or identified with the exercise of reasonable diligence.

(c) Except as otherwise provided in 335-5-4-.02(4)(b), the holder.

(2) If an interest in real property is subject to an environmental covenant, the interest is not affected by an amendment of the covenant unless the current owner of the interest consents to the amendment or waives, in a signed record, the right to consent to amendments.

(3) Except for an assignment undertaken pursuant to a governmental reorganization, an assignment of an environmental covenant to a new holder is an amendment.

(4) Except as otherwise provided in an environmental covenant:

(a) A holder may not assign its interest without consent of the other parties.

(b) A holder may be removed and replaced by agreement of the parties specified in 335-5-4-.02(1)(a) and (b).

(c) A court of competent jurisdiction may fill a vacancy in the position of holder.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§35-19-10; 35-19-13.
History: May 26, 2009.

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CHAPTER 335-5-5
ENFORCEMENT

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335-5-5-.01 Enforcement of Covenants.

(1) Pursuant to Code of Alabama 1975, §22-22A-5, ADEM may pursue enforcement action for violation of an environmental covenant established under 335-5.

(2) A civil action for injunctive or other equitable relief for violation of an environmental covenant may be maintained by any of the following parties or entities:

(a) A party to the covenant.

(b) The Department.

(c) Any person to whom the covenant expressly grants power to enforce.

(d) A person whose collateral, liability, or interest in the real property may be affected by the alleged violation of the covenant.

(e) A municipality or other unit of local government in which the real property subject to the covenant is located.

(3) A person is not responsible for or subject to liability for environmental remediation solely because that person has the right to enforce an environmental covenant.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§35-19-11; 35-19-13.
History: May 26, 2009.

335-5-5-.02 Duties of the Department.

(1) The Department is designated as the administrating agency for the Act and 335-5 and is authorized to administer and enforce the Act and these regulations through the authorities granted to it by the Environmental Management Act, Code of Alabama 1975, §§22-22A-1, et seq.

(2) The designation provided in subsection (1) does not imply that the Department shall assume any administration or enforcement functions other than those directly related to the environmental covenant.

(3) With respect to an environmental response project, the Act does not limit the regulatory authority of the Department under other law.

Authors: James L. Bryant; Lawrence A. Norris.
Statutory Authority: Code of Alabama 1975, §§35-19-11; 35-19-13.
History: May 26, 2009.

APPENDIX A.6

City of Montgomery Ordinance 22-2016

Drilling Of Wells In The Area Of

The Coliseum Boulevard Plume

Institutional Control Program

Coliseum Boulevard Plume Site

Montgomery, Alabama

ALABAMA

DEPARTMENT OF TRANSPORTATION

ORDINANCE NO. 22-2016

ORDINANCE PROHIBITING DRILLING OF WELLS IN THE AREA OF THE COLISEUM BOULEVARD PLUME

WHEREAS, the City of Montgomery is provided clean, uncontaminated drinking water for all residential and commercial users in the city; and

WHEREAS, the groundwater, i.e., water below the ground surface, in various areas of the City of Montgomery was previously contaminated with one or more chemical pollutants; more specifically, in one area commonly known as the Coliseum Boulevard Plume, as shown in Figure 1; and

WHEREAS, the Coliseum Boulevard Plume is an area where groundwater use and access should be avoided; and

WHEREAS, the City has cooperated with the Alabama Department of Environmental Management and the Alabama Department of Transportation regarding the investigation, remediation and management of the groundwater contamination in the Coliseum Boulevard Plume; and

WHEREAS, the City Council for the City of Montgomery desires to further cooperate with the Alabama Department of Environmental Management and the Alabama Department of Transportation regarding institutional controls for the groundwater contamination in the Coliseum Boulevard Plume; and

WHEREAS, the City Council for the City of Montgomery is empowered to enact ordinances to protect and to promote the general public health and welfare; and

THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF MONTGOMERY, ALABAMA, the following ordinance is hereby adopted:

SECTION 1: It shall be unlawful for any person or entity to dig or drill any well or otherwise access the groundwater within the institutional control boundaries of the Coliseum Boulevard Plume as shown in Figure 1 without the express, written approval of the City.

SECTION 2: This ordinance shall become effective upon passage, approval and publication, or as otherwise provided by law.

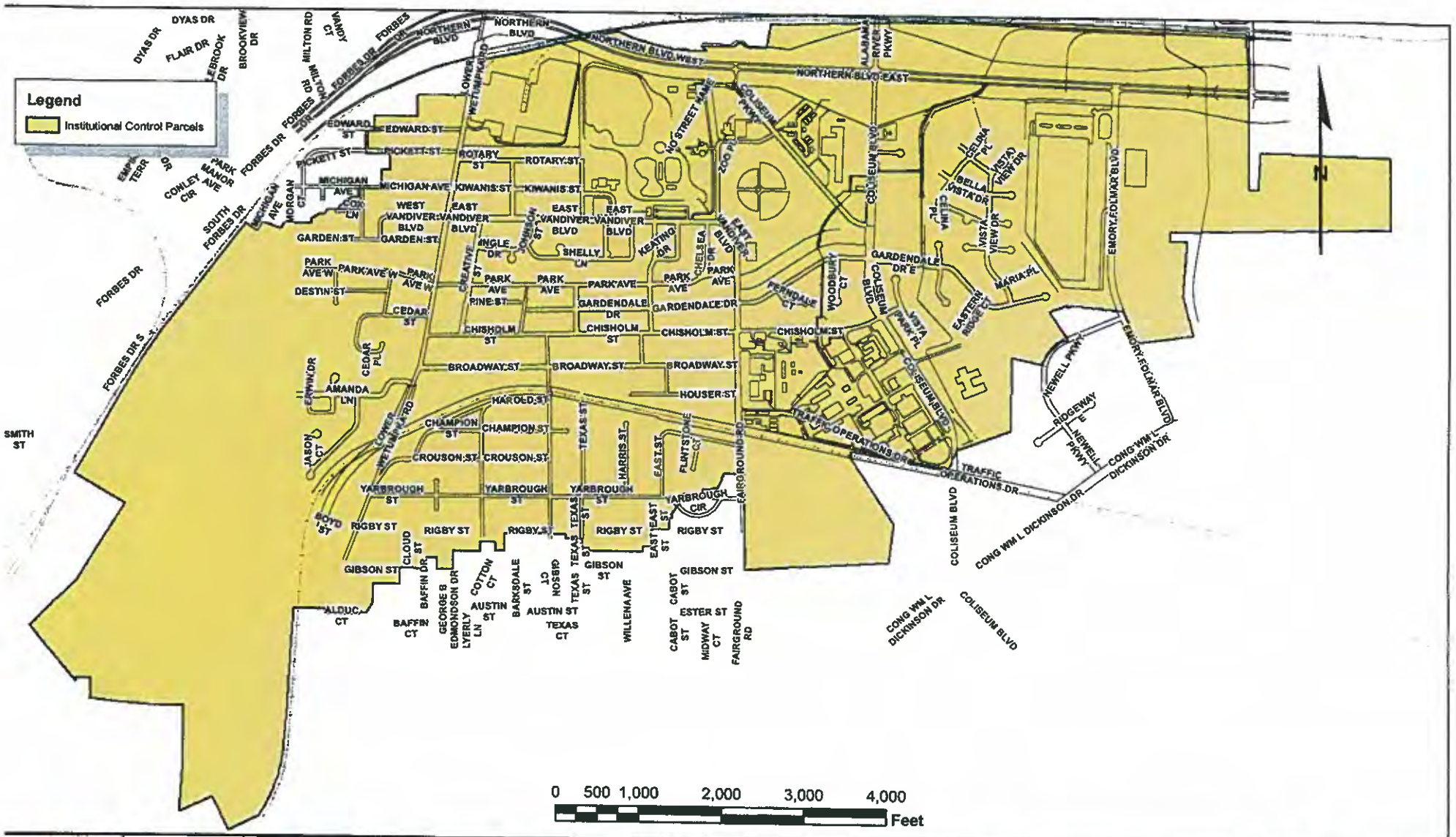
ADOPTED this the 17th **day of** May **, 2016.**

Brenda Gale Blalock

BRENDA GALE BLALOCK, CITY CLERK

APPROVED: MAY 17 2016

TODD STRANGE, MAYOR



ALABAMA DEPARTMENT OF TRANSPORTATION
COLISEUM BOULEVARD PLUME ANNUAL REPORT

Institutional Contol Boundary

MARCH 2016

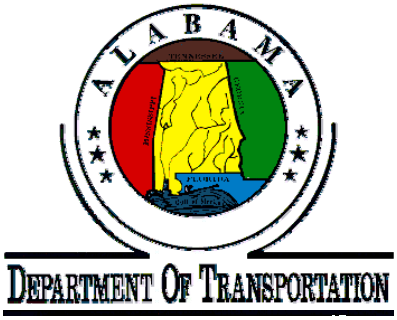
FIGURE 1

APPENDIX B

Organization Contacts

Institutional Control Program

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA



APPENDIX B

Coliseum Boulevard Plume
Institutional Control Program

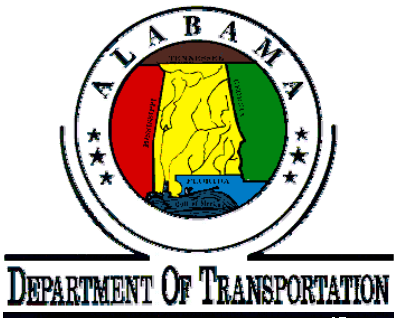
Name	Organization	Department	Address	Telephone	Email
James Dailey	Alabama Department of Environmental Management	Well Driller Licensing	1400 Coliseum Blvd. Montgomery, AL 36110	334-394-4371 334-271-7700	jwd@adem.state.al.us
Cindy Thompson	City of Montgomery	Plumbing, Mechanical and Gas Permits	103 North Perry Street Montgomery, AL 36104	334-241-2088	cthompson@montgomeryal.gov
Brooke McCraney	City of Montgomery	Chief Plumbing, Mechanical and Gas Inspector	103 North Perry Street Montgomery, AL 36104	334 -241-3156	
Blakeney Gillett	Geological Survey of Alabama	Water Information	420 Hackberry Lane Tuscaloosa, Alabama 35486	205-247-3693	bgillett@gsa.state.al.us
Irene Burgess	Geological Survey of Alabama	Water Information	420 Hackberry Lane Tuscaloosa, Alabama 35486	205-247-3677	ithompson.gsa.state.al.us
Adam Anderson	Alabama Department of Transportation	Env. Analysis & Compliance Engineer	3700 Fair-grounds Rd. 36110	334-206-2278	andersona@dot.state.al.us
Tina Creel	Alabama One Call	Membership	P.O.Box 1476 Birmingham, AL 35201-1476	205-414-1840	tcreel@al1call.com
Operator	Alabama One Call	Locate Requests		800-292-8525	NA
Meg Sacks	CSX Railroad	Media Relations		904-366-2949	

APPENDIX C

Community Outreach and Involvement

Institutional Control Program

COLISEUM BOULEVARD PLUME SITE
MONTGOMERY, ALABAMA



APPENDIX C

Coliseum Boulevard Plume
Community Outreach and Involvement
2001- Present (Revised: 10-15-14)

I. Community Outreach Group (COG)

The COG was formed in November 2001 and is a 9-member panel of residents who live on properties within the ICB. The purpose of the panel is to facilitate open dialog among citizens within the ICB, ALDOT project representatives, and ADEM. Panel meetings are held at the request of COG members or by notification of the ALDOT to maintain timely updates of project activities. Members of the COG are listed on ALDOT's CBP web site at: http://www.coliseumboulevardplume.com.

2002 COG Meeting Dates:

- March 25
- April 4
- April 23
- May 2
- May 24
- August 1
- September 19
- November 7

2003 COG Meeting Dates:

- January 9
- March 6
- March 27
- April 29
- June 5
- June 17
- July 24
- August 7
- November 25

2004 COG Meeting Dates:

- February 24
- April 27
- May 18
- June 22
- September 14

2005 COG Meeting Dates:

- February 22
- May 5
- September 8
- September 20
- November 10

2006 COG Meeting Dates:

- June 1
- April 25
- May 25
- November 30

2007 COG Meeting Dates:

- February 22
- June 19
- July 17
- November 15

2008 COG Meeting Dates:

- April 21
- August 19
- October 21
- November 25 – COG Membership Information & Recruiting Meeting (Gathering of 7 Community Churches)

2009 COG Meeting Dates:

- April 7
- May 6
- August 4
- September 1
- November 3
- December 14

2010 COG Meeting Dates:

- May 20
- September 28

2011 COG Meeting Dates:

- June 21
- September 6

2012 COG Meeting Dates:

- April 23
- November 15

2013 COG Meeting Dates

- July 11
- November 5

2014 COG Meeting Dates

- March 19
- November 4

II. Comprehensive Site-Wide Public Meetings

ALDOT has conducted and will continue to conduct comprehensive public meetings at project milestones. Public meetings are video taped and copies of the tapes are available at the CBP Public Repository, which is described below. The dates and purpose of the public meetings that have been held, to date, are:

November 6, 2001 – Announce the formation of the COG and forum for the public to pose questions to ALDOT, ADEM, ADPH and ALDOT consultants. Advertised via printed and TV media and neighborhood signage.

May 23, 2002 – Introduction of the COG and comprehensive project overview with explanation of upcoming soil-vapor and ambient-air testing within the CBP. Attended by local elected officials and provided forum for representatives from ADEM and the Montgomery Water Works & Sanitary Sewer Board to respond to citizen concerns. Advertised via printed and TV media, neighborhood signage, and door hangers.

August 1, 2002 – Presentation of interim findings of the soil-vapor and ambient-air monitoring. Provided forum for citizens to pose health-related questions or concerns to medical doctor and to a PhD toxicologist, ADEM, and a representative of the Montgomery Water and Sewer Board (also, a presenter). Advertised via printed and electronic media, neighborhood signage, and door hangers.

June 19, 2003 – Presentation of and forum for public discussion of the final results of the year-long soil-vapor and ambient-air testing. Advertised via printed and electronic media, neighborhood signage, and door hangers.

May 13, 2004 – Presentation of and forum for the discussion of the results of the comprehensive site-wide investigation. Advertised via printed and electronic media, neighborhood signage, and door hangers.

May 7 – 9, 2009 – Public review of proposed Kilby Ditch Corrective Measures Implementation Plan and the Institutional Control Plan.

February 22, 2010 – Presentation of the Coliseum Boulevard Plume site activities; ALDOT Transportation Conference.

June 9, 2010 – Presentation of the Coliseum Boulevard Plume site activities; ADEM Groundwater Conference (outreach to consultants and well drillers).

June 24, 2010 – ALDOT provided a tour of the constructed wetlands to representatives of the City of Montgomery.

September 27, 2010 - ALDOT provided a tour of the constructed wetlands to The Montgomery Advertiser.

November 18, 2010 – Stakeholder's meeting with officials from the City of Montgomery to provide updates on the CBP and Institutional Control Program.

June 2011 – ALDOT provided a tour of the constructed wetlands and the southwest treatment area to the ADEM Public Information Office and Alabama Department of Public Health Toxicologist.

August 5, 2011 – Presentation of the Coliseum Boulevard Plume site activities relative to recently adopted environmental covenants; Air and Waste Management Association Meeting.

September 18, 2013 – ALDOT conducted an overview of the CBP and status update program for interested members of the public at the Coliseum Boulevard Public library

III. Public Meetings and Outreach Activities

ALDOT has conducted and will continue to conduct public meetings to inform interested parties about CBP activities. A particularly pertinent aspect of such public involvement has been the completion of focus-group and public-information meetings to invite participation in the Institutional Control Program whereby property owners agree to a restrictive covenant to prevent use of and contact with groundwater. The property owners are compensated financially in exchange for signing the Restrictive Covenant.

Meetings have been held at local facilities so that property owners, realtors, appraisers, mortgage lenders, title insurers, and closing attorneys can be informed of CBP activities and get answers to CBP-related questions. The dates of those that have been held, to date, are as follows:

- Outreach to
    - Property Owners
        - December 12, 2006 – Focus Group; Restrictive Covenant; Residential/Commercial Property Owners
        - January 23, 2007 – Focus Group; restrictive Covenant; Residential/Commercial Property Owners
        - Public Forum; Restrictive Covenant
            - March 5, 2007
            - March 7, 2007
            - March 14, 2007
            - March 15, 2007
            - June 20, 2007
            - June 21, 2007
            - August 2, 2007
            - August 3, 2007
            - August 11, 2007
            - September 7, 2007
            - September 8, 2007

- Information meetings: Groundwater Restriction Program for Property not yet in the Institutional Control Program:
  - October 23, 2008
  - October 24, 2008
  - November 8, 2008
- **Meeting with Alabama 1 Call**
  - October 18, 2010
- **Realtors/Appraisers/Mortgage Lenders/Title Insurers/Closing Attorneys**
  - June 22, 2005
  - July 14, 2005
  - July 15, 2005
  - May 21, 2007
  - June 19, 2007
  - July 17, 2007
  - August 22, 2007
  - August 23, 2007
  - August 24, 2007
  - September 14, 2007
  - March 1, 2011
  - November 15, 2012
  - December 11, 2013

IV. Public Outreach

ALDOT has and will continue to inform church leaders, elected officials, the news media, and other interested or affected parties about CBP activities.

- Church leaders - Involved through membership on the COG, presence of or presentations by an ALDOT representative(s) at local church activities and gatherings.
- Elected officials – Involved through project updates by ALDOT representatives through formal meetings and invitations to the officials to attend and be recognized at site-wide public meetings.
- News media - ALDOT sustains an open and proactive relationship with area news media through news conferences, interview/photo ops, briefings, invitations to public meetings, and scheduled meetings with members of the editorial board of The Montgomery Advertiser newspaper. ALDOT meets with the Public Information Officer of ADEM so that the Agency is aware of ALDOT's media activities.
- Individuals – Involved by being made aware of CBP activities, as necessary, through door-to-door or telephone contacts to obtain permission for property access, acquire Restrictive Covenants, or response to questions posed on the ALDOT 24-hour information line.

V. Public Information Platforms

- **Public Repository:** Coliseum Boulevard Branch of the Montgomery Public Library. Copies of project documents and videos of site-wide public meetings.
- **24-Hour Information Line:** Telephone Number 334-353-6635 that is monitored daily during the business week. Callers can hear update of weekly project activities and leaves questions or comments for follow up. ALDOT sends a copy of the Weekly Project Update that is posted on the Information Line to each COG member, ADEM, and the Mayor's office.
- **ALDOT/CBP Web Site:** Accessed at:

  http://www.coliseumboulevardplume.com.

  This Web Site provides postings of upcoming public meetings, names of COG members, a project overview, recent Project Updates, and relevant project documents.