

**ANALYSIS OF BROWNFIELD
CLEANUP ALTERNATIVES (ABCA)**

**CITY OF LOUISVILLE
WINSTON COUNTY DEVELOPMENT BUILDING
912 SOUTH CHURCH AVENUE
LOUISVILLE, MISSISSIPPI**

ACRES NO. 237224

PPM PROJECT NO. 30065902-04-CAP01

OCTOBER 28, 2023

DRAFT

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AT

**WINSTON COUNTY DEVELOPMENT BUILDING
912 SOUTH CHURCH AVENUE
LOUISVILLE, MISSISSIPPI
ACRES NO. 237224**

PREPARED FOR:

PREPARED FOR:

**CITY OF LOUISVILLE
2000 SOUTH CHURCH AVENUE
LOUISVILLE, MISSISSIPPI 39339**



PPM PROJECT NO. 30065902-04-CAP01

OCTOBER 28, 2023

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1.0 INTRODUCTION AND BACKGROUND

This document presents an Analysis of Brownfield Cleanup Alternatives (ABCA) for cleanup of hazardous substances identified at the Winston County Development Building (former Teters Floral Property) located at 912 South Church Avenue, Louisville, Mississippi. The Winston County Board of Supervisors currently owns the property and buildings on site. This facility is currently being utilized as a warehouse and manufacturing facility of Winston County's largest employer. This ABCA has been prepared to provide summary information on the type and quantity of hazardous substances present at the site, alternatives for remediation of these substances, and recommendation of an alternative deemed to be most feasible to protect human health and the environment and accomplish the county's goal for safe site reuse and rehabilitation of the property.

1.1 SITE DESCRIPTION AND HISTORY

1.1.1 Site Description

The Winston County Development Building (former Teters Floral Property) [Assessment, Cleanup, and Redevelopment Exchange System (ACRES) No. 237224] is located at 912 South Church Avenue in Louisville, Winston County, Mississippi 39339. The property is irregularly-shaped and consists of approximately 26 acres. The property is occupied by an approximately 400,000-square-foot building located on the east side of South Church Avenue. Hughes Creek borders the property to the east. The property is located in Section 4, Township 14 North, Range 12 East of the Choctaw, Mississippi Meridian USGS 7.5-minute Topographic Maps. More specifically, the site is more specifically located at 33° 06' 00.11" North latitude and 89° 03' 31.70" West longitude. The property is located south of downtown Louisville in a mixed-use area that includes industrial, commercial, and residential properties. The surrounding properties currently consist of commercial properties to the west, including an animal clinic, a storage facility, a construction material yard, and a convenience store. An industrial plywood facility is located to the northeast beyond Hughes Creek, and a multi-family residential property is located to the south. Historically, the surrounding land use consisted of residential and agricultural land until the early 1970s when commercial and industrial development in the area began. Site location is depicted in **Figure 1, Site Location/Topographic Map, Figure 2, Site Map, and Figure 3, Surrounding Area Map** located in **Appendix A, Figures**.

1.1.2 Site History

The property was first developed in the early 1960s by the Spartus Clock Manufacturing Company, which operated at the property until 1996, when Spartus was acquired by General Time Corporation. The Spartus Company manufactured clocks at the facility, and clock manufacturing operations included painting and plating operations. The property was acquired by Winston County in 1997 and leased to the Teters Floral company, which used the building as a distribution center for silk flowers. The eastern portion of the building was destroyed by a tornado in 2014 and the Teters Floral company moved out of the property in January 2017. The property was acquired by Winston County shortly after the Teters operations ceased. Hewlett Manufacturing, which manufactures offshore oil filters and other products, conducted plastic molding operations in the northwestern portion of the building until March 31, 2019. Hewlett Manufacturing maintained machinery that performed molding, shaping, and cutting processes used to manufacture their products. Some flammable liquids were stored within the building but kept in secured chemical cabinets.

Taylor Machine Works – Logistics Division and Hardwire, LLC (a Taylor Machine Works support company) currently occupies the entire facility. Operations performed by Taylor Machine Works are forklift assembly and completing Department of Defense contract needs.

1.2 SUMMARY OF PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Six environmental investigations have been conducted at the site to evaluate environmental conditions. A summary of findings from each of these investigations is provided below:

- **Phase I ESA, conducted by PPM Consultants, Inc. (July 9, 2018):** A Phase I ESA was conducted to identify environmental concerns on or affecting the former Teters Floral Property. The report listed the following recognized environmental conditions (REC):
 - **Current use(s) of the property.** The site is primarily vacant warehouse space, with some areas of the building being occupied by various organizations and businesses. The northern portion of the building is occupied by East Central Community College offices, a martial arts school, and the Prairie Opportunity community agency. The Hewlett Manufacturing, which manufactures offshore oil filters and other products, conducts plastic molding in the northwestern portion of the building. The Hewlett company maintains machinery that perform the molding, shaping, and cutting processes used to manufacture their products. Some flammable liquids are stored within the building, but are kept in secured

chemical cabinets. A Super Grip tire distributor and Taylor Machine Works operate in the southern portion of the building. These companies use the building for warehousing and distribution. Three unlabeled 55-gallon drums and one 300-gallon tote were observed on the western portion of the property. Staining was observed both within and outside of the shallow containment basin the drums were located in. The presence of unidentified materials within these storage containers is a REC.

- **Historical use(s) of the property prior to current use.** Interviews and historical records indicate that the property was first developed in the early 1960s by the Spartus Clock Manufacturing Company, which operated at the property until 1996, when Spartus was acquired by General Time Corporation. The Spartus Company manufactured clocks at the facility, which included painting and plating operations. The property was acquired by Winston County in 1997 and leased to the Teters Floral company, which used the building as a distribution center where silk flowers were received from China and shipped to retail stores. The eastern portion of the building was destroyed by a tornado in 2014, and the Teters Floral company moved out of the property in January 2017. Spartus conducted metal plating operations prior to the advent of regulations for storage, transportation, and disposal of hazardous materials. The potential for unrecorded release and/or onsite disposal of hazardous materials is a REC.
- **Woods Grocery.** The Woods Grocery is located adjacent to the west of the subject property. This facility operated with two 500-gallon gasoline underground storage tanks (UST) for approximately 13 years until the tanks were taken out of service, and filled with an unknown material in 1988. The operation and closure in place of USTs on an adjacent property prior to state and federal regulations and without environmental testing represent a REC.
- **Phase II ESA, conducted by PPM Consultants, Inc. (November 16, 2018):** A Phase II ESA was conducted to identify soil and/or groundwater contamination associated with Phase I ESA-identified RECs on the subject property. A total of nine soil borings were advanced on the subject property. Groundwater flow direction and groundwater concentrations are shown in **Figure 4** and **Figure 5** located in **Appendix A** .
 - Soil beneath the western portion of the site consists of sandy silts, silts, sandy clays, and/or clays underlain by silty or clayey sands. The sands were underlain by sandy clays.

- Soil beneath the eastern portion of the site consists of silty clays and clays underlain by sandy clays or sandy silts. The sandy clays and sandy silts were underlain by clayey sand layers. Clays were under the sandy clay layers and extended to boring terminations.
- Groundwater elevations measured at the temporary wells ranged from 488.25 feet (TW-8) to 498.26 feet (TW-3). Based on the potentiometric surface map, groundwater beneath the site appear to move eastward.
- VOCs, TPH-GRO, and TPH-DRO were detected in soil samples at concentrations below their Mississippi Department of Environmental Quality (MDEQ) Tier 1 Unrestricted Target Remediation Goals (TRG).
- The Resource Conservation and Recovery Act (RCRA) metals barium, chromium, lead, and mercury were detected in the soil samples at concentrations below their MDEQ Tier 1 Unrestricted TRGs.
- Arsenic concentrations exceeded MDEQ Tier 1 Unrestricted TRG in the soil samples collected from the soil borings SB-2, SB-4, SB-5, SB-7, and SB-9. The arsenic concentration detected in soil sample collected from soil boring SB-9 [4.08 micrograms per liter ($\mu\text{g/L}$)] was above the MDEQ Tier 1 Restricted TRG. The concentrations detected in soil borings are considered to be consistent with background levels in the subject area.
- RCRA metals barium and lead were detected in the groundwater samples at concentrations below their MDEQ Tier 1 TRGs.
- Cis-1,2-dichloroethene was detected in the groundwater samples collected from temporary wells TW-2 (342 $\mu\text{g/L}$) and TW-8 (86.0 $\mu\text{g/L}$) at concentrations above the MDEQ Tier 1 TRG of 70 $\mu\text{g/L}$.
- Tetrachloroethene (TCE) was detected in groundwater samples collected from temporary wells TW-2 (552 $\mu\text{g/L}$) and TW-8 (49.8 $\mu\text{g/L}$) at concentrations above the MDEQ Tier 1 TRG of 5 $\mu\text{g/L}$.
- TCE was detected in the groundwater samples collected from the temporary wells TW-2 (60.4 $\mu\text{g/L}$), TW-5 (16.2 $\mu\text{g/L}$), and TW-8 (110 $\mu\text{g/L}$) at concentrations above the MDEQ Tier 1 TRG of 5 $\mu\text{g/L}$.
- 1,2,4-Trimethylbenzene was detected in the groundwater sample collected from temporary well TW-2 (1,000 $\mu\text{g/L}$) at a concentrations above the MDEQ Tier 1 TRG of 12.3 $\mu\text{g/L}$.

- 1,3,5-Trimethylbenzene was detected in groundwater sample collected from temporary well TW-2 (270 µg/L) at a concentration above the MDEQ Tier 1 TRG of 12.3 µg/L.
- Vinyl chloride was detected in the groundwater samples collected from temporary wells TW-4 (66.4 µg/L) and TW-5 (41.0 µg/L) at concentrations above the MDEQ Tier 1 TRG of 2 µg/L.
- Based on the findings of this assessment, the former UST site (Woods Grocery) located on the adjacent property to the west of the subject property is located upgradient from the subject property. The soil boring/temporary well SB-6/TW-6 was installed to intersect groundwater downgradient of the Woods Grocery site. The analytical results of the soil and groundwater samples indicate concentrations of BTEX, TPH-GRO, TPH-DRO, and PAHs were not detected at concentrations above the MDEQ Tier 1 TRGs. Therefore, petroleum hydrocarbon fuel constituents are not migrating onto the subject property from Woods Grocery, and the associated REC from the Phase I ESA is not substantiated.
- Elevated concentrations of perchloroethylene (PCE) and its degradation products, TCE, cis-1,2-dichloroethene, and vinyl chloride, are present in the groundwater on the western portion of the site and downgradient on the eastern portion of the site. The source of PCE, TCE, and their degradation products are commonly related to the use of solvents and degreasers. Elevated concentrations of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were also detected in the groundwater collected from temporary well TW-2 on the western portion of the site. The constituents are typically associated with degraded petroleum fuel and hydrocarbon solvents. The detected concentrations of VOCs in the western portion of the site appears to be related to past site operations. Therefore, the REC from the Phase I ESA for the past use of the site for manufacturing clocks is substantiated.
- The 55-gallon drums and 300-gallon tote contain unidentified materials and pose a material threat of future release; therefore, the presence of the drums and tote is still considered to represent a REC.
- **Phase III ESA, conducted by PPM Consultants, Inc. (May 15, 2020):** Based on the findings of the Phase II ESA performed in October 2018, a Phase III ESA was conducted in January 2020. Two soil borings were converted to temporary wells (TW-10 and TW-11). Soil and groundwater samples were collected from each of the

soil borings/temporary wells and submitted for laboratory analysis. Surface water samples (SW-1 and SW-2) were collected from Hughes Creek. Two near-slab vapor samples and one ambient air sample were also collected. The surface water and vapor samples were submitted for laboratory analysis. Groundwater concentrations are shown in **Figure 6** located in **Appendix A**.

- Elevated concentrations of PCE and its degradation products, TCE and vinyl chloride, are present in the groundwater from temporary well TW-10 located on the eastern portion of the site and downgradient of the western portion of the site. PCE, TCE, and their degradation products are commonly due to the use of solvents and degreasers. The detected concentrations of VOCs from the Phase II ESA conducted in October 2018 on the western portion of the site appear to be related to past clock manufacturing operations by Spartus Clock Manufacturing Company, which was acquired by General Time Corporation. The Phase II ESA groundwater elevation data indicate groundwater beneath the site flows eastward toward Hughes Creek. The PCE and TCE concentrations detected in groundwater samples collected from temporary wells – upgradient of temporary monitoring well TW-10 – installed during the October 2018 Phase II ESA were higher than the concentrations detected in groundwater samples collected from temporary well TW-10 during the Phase III ESA, indicating the TCE and PCE contamination plume is migrating with groundwater flow eastward towards Hughes Creek.
 - The TCE concentrations detected in the surface water samples are below the TCE concentrations detected in the groundwater sample collected from temporary well TW-10 but are relatively similar. These similar concentrations, coupled with known groundwater flow direction, indicate that Hughes Creek is a receiving stream.
 - The PCE concentration detected in the near slab vapor sample SV-1 that is above the applicable residential EPA Vapor Intrusion Screening Level (VISL) but below the applicable commercial EPA VISL is not a concern because the property is currently, and will likely continue to be, used as a commercial property.
- **Sub-Slab Soil Gas and Indoor Air Sampling, conducted by PPM Consultants, Inc. (October 22, 2020):** A Sub-Slab Soil Gas and Indoor Air Sampling Event was conducted to further evaluate the Vapor Intrusion Exposure Pathway of the identified contaminants of concern (COC) on the subject property. A total of three sub-slab

soil gas samples and eight indoor air samples borings were collected at the former Teters Floral Property. Indoor air concentrations are shown in **Figure 7** located in **Appendix A**.

- The sub-slab soil gas samples from SS-1 through SS-3 were collected on October 22, 2020, and submitted to the analytical laboratory for VOC analysis. VOCs were detected in all three of the sub-slab soil gas samples submitted.
- VOCs detected in one or more of the soil gas samples collected from SS-1 through SS-3 included the following: benzene, 2-butanone (MEK), chloroform, chloromethane, dichlorodifluoromethane, ethanol, methylene chloride, propylene, PCE, and TCE. Chloroform concentrations detected in the sub-slab soil gas samples collected from SS-1 [78.5 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)] and SS-3 ($18.5 \mu\text{g}/\text{m}^3$) were above the applicable commercial EPA VISL value ($17.8 \mu\text{g}/\text{m}^3$). TCE concentrations detected in the sub-slab soil gas samples collected from SS-3 ($274 \mu\text{g}/\text{m}^3$) were above the applicable commercial EPA VISL value ($29.2 \mu\text{g}/\text{m}^3$).
- A total of eight indoor air samples were collected on January 30, 2021, and submitted to the analytical laboratory for VOC analysis. VOCs were detected in five of the eight indoor samples submitted. VOCs were not detected in the ambient air sample (#13001 – Entrance) or two of the indoor air samples (#13008 – Shipping/Receiving and #13009 – Super Grip).
- The VOCs cis-1,2-dichloroethene, tetrachloroethene, and trichloroethene were detected in one or more of the indoor air samples submitted for laboratory analysis.
- Cis-1,2-dichloroethene was detected in indoor air samples #13002 – Back Side of Office ($2.0 \mu\text{g}/\text{m}^3$) and #13004 – Transformer ($2.0 \mu\text{g}/\text{m}^3$). There is not a commercial VISL value assigned to cis-1,2-dichloroethene for indoor air.
- PCE was detected in indoor air samples #13002 – Back Side of Office ($2.6 \mu\text{g}/\text{m}^3$) and #13004 – Transformer ($3.5 \mu\text{g}/\text{m}^3$). A Brake Parts Cleaner manufactured by Berryman Products, Inc. containing approximately five to 15 percent by weight PCE was confirmed to be present and utilized within the facility by The Taylor Group. The detected PCE concentrations were below the commercial VISL value of $17.5 \mu\text{g}/\text{m}^3$.

- TCE was detected in indoor air samples #13002 – Back Side of Office (38.6 $\mu\text{g}/\text{m}^3$), #13003 – SS-3 (6.3 $\mu\text{g}/\text{m}^3$), #13004 – Transformer (23.8 $\mu\text{g}/\text{m}^3$), #13005 – Planting Area East (1.2 $\mu\text{g}/\text{m}^3$), and #13007 – Defense East (0.94 $\mu\text{g}/\text{m}^3$). The detected TCE concentrations in these samples were above the commercial VISL value of 2.99 $\mu\text{g}/\text{m}^3$.
- In the groundwater sample collected from TW-19 on June 22, 2021, benzene (0.0435 mg/L), ethylbenzene (6.84 mg/L), toluene (69.1 mg/L), and xylenes (33.2 mg/L) concentrations exceeded their respective MDEQ Tier 1 TRGs. In the groundwater sample collected from TW-19 on July 23, 2021, ethylbenzene (1.78 mg/L), toluene (23.7 mg/L), and xylenes (8.95 mg/L) concentrations exceeded their respective MDEQ Tier 1 TRGs. The laboratory detection limit for benzene was greater than the MDEQ Tier 1 TRG of 0.005 mg/L; therefore, it is possible that the <0.0100 mg/L result for the July 2021 TW-19 groundwater sample also exceeds the MDEQ Tier 1 TRG for benzene.
- **Vapor Intrusion Mitigation and Indoor Air Sampling Event by PPM Consultants (June 2022):** PPM and Snyder Environmental mobilized to the site on April 14, 2022, to execute the MDEQ-approved Vapor Intrusion Mitigation Plan. Snyder Environmental sealed approximately 22 linear feet (lf) of concrete cracks located in the entry doorway into the former degreasing area using an epoxy concrete crack sealant. Four approximately 4-inch diameter floor drains were sealed by first installing plumber’s putty into the drain to form a plug followed by filling the remaining void space above the plug with concrete to surface grade. Two of the floor drains were located in the maintenance/wiring loom storage room, and two of the floor drains were located in an electrical utility room south of the maintenance/wiring loom storage room. One 1.25-inch diameter metallic pipe fitting was sealed using a Fernco rubber fitting and a test well plug. The threads of the metallic pipe were damaged where the pipe protruded from the wall, thereby preventing the use of threaded pipe fittings to seal the pipe. An approximately 60-foot long by 1-foot wide by 10-inch deep trench was filled to surface grade with 3,000 pounds per square inch (psi) concrete provided by Bakers Ready Mix and Construction, LLC. Snyder used two cubic yards (cy) of concrete to fill the trench and the floor drains.

PPM also requested Taylor Power Systems rehabilitate an existing roof-top fan present in the former degreasing area in an attempt to increase air exchange within the impacted area.

On May 24, 2022, PPM returned to the site to collect indoor air samples to evaluate the results from the vapor intrusion (VI) mitigation activities with the following results:

- A total of five indoor air samples and one ambient air sample were collected on May 24, 2022, and submitted to a laboratory for VOC analysis. VOCs were detected in three of the five indoor samples submitted. VOCs were also detected in the ambient air sample (AA-1). The indoor air samples were evaluated against the USEPA VISLs utilizing a commercial worker scenario, a Hazard Quotient of 1, and an acceptable Target Risk of 10^6 .
 - The VOCs cis-1,2-dichloroethene, PCE, and TCE were detected in one or more of the indoor air samples and the ambient air sample submitted for laboratory analysis.
 - Cis-1,2-dichloroethene was detected in indoor air samples IA-1 ($9.75 \mu\text{g}/\text{m}^3$) and IA-3 ($0.995 \mu\text{g}/\text{m}^3$). There is not a commercial VISL screening value assigned to cis-1,2-dichloroethene for indoor air.
 - PCE was detected in indoor air samples IA-1 ($1.66 \mu\text{g}/\text{m}^3$), IA-2 ($2.56 \mu\text{g}/\text{m}^3$), and IA-3 ($3.34 \mu\text{g}/\text{m}^3$). PCE was also detected in the ambient air sample AA-1 at a concentration of $1.38 \mu\text{g}/\text{m}^3$.
 - TCE was detected in indoor air samples IA-1 ($161 \mu\text{g}/\text{m}^3$), IA-2 ($7.02 \mu\text{g}/\text{m}^3$), and IA-3 ($5.63 \mu\text{g}/\text{m}^3$). TCE was also detected in the ambient air sample AA-1 at a concentration of $1.51 \mu\text{g}/\text{m}^3$.
- **Indoor Air Sampling Event by PPM Consultants, Inc. (July 2, 2022):** A total of four indoor air samples and one ambient air sample were collected on January 2, 2022, and submitted to a laboratory for VOC analysis. VOCs were detected in three of the four indoor samples submitted. VOCs were not detected in the ambient air sample (AMB) or the indoor air sample IA-4. The indoor air samples were evaluated against the USEPA VISLs utilizing a commercial worker scenario, a Hazard Quotient of 1, and an acceptable Target Risk of 10^{-6} . Indoor air concentrations are shown in **Figure 8** included in **Appendix A**.
- Cis-1,2-dichloroethene was detected in indoor air samples IA-1 ($2.19 \mu\text{g}/\text{m}^3$), IA-2 ($3.03 \mu\text{g}/\text{m}^3$), and IA-3 ($1.99 \mu\text{g}/\text{m}^3$). There is not a commercial VISL screening value assigned to cis-1,2-dichloroethene for indoor air.
 - PCE was detected in indoor air samples IA-1 ($1.91 \mu\text{g}/\text{m}^3$), IA-2 ($2.83 \mu\text{g}/\text{m}^3$), and IA-3 ($2.84 \mu\text{g}/\text{m}^3$). A brake parts cleaner manufactured by Berryman Products, Inc. containing PCE at approximately

five to 15 percent by weight was confirmed to be present and currently utilized within the facility. The detected PCE concentrations were below the commercial VISL screening value of $47.2 \mu\text{g}/\text{m}^3$ and the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) of

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3.0 CLEANUP ALTERNATIVE EVALUATION

3.1 GROUNDWATER

Alternatives for addressing the groundwater impacts to the property were evaluated based on their effectiveness, implementability, resiliency to address potential adverse impacts caused by cost, and reasonableness. These alternatives are presented below.

3.1.1 Alternative 1 – No Action

Under this alternative, no additional assessment or remediation of groundwater would be implemented. The presence of COCs in shallow groundwater may pose a current and long-term health risk to area workers and nearby surface water features. Simply limiting the use of property resources may not prevent potential exposure to these contaminants. The only advantage to this alternative is the avoidance of cleanup costs, but it would not serve as a long-term solution of redevelopment and liability-free conveyance of the property.

There are no immediate costs incurred under the “No Action” alternative. However, indirect costs, in the form of lost economic opportunities if the current tenant does not approve of taking ownership of an impacted site, are possible. Since this alternative does little to protect the public or give favorable transfer of property incentives, this alternative is not recommended.

3.1.2 Alternative 2 – Monitored Natural Attenuation with Institutional Controls

This second alternative also does not require immediate remediation of the property. The goal of monitored natural attenuation (MNA) is to regularly monitor and quantify natural processes and degradation of the COCs found in groundwater over an extended period of time. Currently, COCs on the property pose a threat to those working in the overlying structure and the down-gradient gaining stream, Hughes Creek. This option would include institutional controls on the property deeds. The controls will limit future use of soil and groundwater of the site thereby mitigating the threat of exposure to impacted media. The controls will remain on the property indefinitely and will pass from owner to owner as the controls are recorded on the property deed. Disclosure of institutional controls is required prior to any conveyance of the property therefore, a prospective purchaser or interested party would be aware of the conditions and requirements that may accompany the property. Implementing institutional controls does not eliminate the existence of impacted media but eliminates the uncontrolled exposure route to impacted media (soil and groundwater). Any

future planned exposure pathways to impacted media would be subject to regulatory scrutiny by the MDEQ.

Under this option, the site will be required to enroll in the MDEQ Brownfield Program under the Voluntary Cleanup Program (VCP). Based on the estimated age of the environmental impacts at the site, a minimum of 30 years of groundwater monitoring is expected to be required at the property under Alternative 2. Alternative 2 would be effective in achieving the goal of reduction of COCs in shallow groundwater and would make property transfers far into the future possible. Alternative 2 would not be a desirable option, however, because it would require an extended timeline (greater than 30 years) to effectively demonstrate elimination of groundwater contamination— thereby allowing potential exposure concerns for foreseeable site plans and activities.

Preliminary costs for this Alternative are estimated to be at least \$325,380.00 (details provided below):

- Corrective Action Planning (e.g., Plans & specifications and bid specifications preparation) = \$10,000.00
- Institutional Controls
 - Preparation of Agreement and Covenant and filing on property deed = \$3,500.00 (estimated)
 - Stigma associated with property use restrictions (impacting property sale) = Cost is unknown
- Performance Monitoring and Reporting:
 - 37 groundwater sampling events (one year of quarterly sampling, four years of semi-annual sampling, and 25 years of annual sampling) of ten monitoring wells, a duplicate, and a trip blank x \$80 per VOC analysis (EPA Method 8260) = \$35,520.00
 - 93 days of sampling x 10 hours per day x \$150.00 per hour = \$139,500.00
 - 592 hours of reporting x \$150.00 per hour = \$88,800.00
 - 111 hours of report QA/QC and review x \$200.00 per hour = \$22,200.00
- Plugging and abandonment (allowing for inflation):
 - Plugging and abandoning ten monitoring wells (supplies and subcontractor) = \$20,000.00
 - Two days of oversight x 12 hours per day x \$150.00 per hour = \$3,600.00
 - Ten hours of reporting x \$150.00 per hour = \$2,060.00

- One hour of review x \$200 per hour = \$200.00

3.1.3 Alternative 3 – Ozone Sparge System with PRB

This third alternative would include the installation of an ozone sparging system. The goal of ozone sparging is to destroy the contaminants exceeding restricted and unrestricted Tier 1 TRG concentrations found in the groundwater samples taken during the Phase II and Phase III ESA activities through chemical oxidation. Currently, these contaminants pose a threat to those working in the overlying structure and to the down-gradient gaining stream, Hughes Creek.

Under this option, the site will be enrolled in the MDEQ Brownfield Program under the VCP. An estimated 150 sparge points will be required to remediate the approximately 25,000 square-foot northwestern area of the building and an additional 50 sparge points will be required to remediate groundwater underneath the southern portion of the property under Alternative 3. A permeable reactive barrier (PRB) is also proposed along the eastern property line, before Hughes Creek. Alternative 3 would be highly effective in achieving the goal of reduction of COCs in shallow groundwater and would help eliminate groundwater concerns in future property transfers. Alternative 3 also brings with it the interruption of site activities within the building. Modifications will likely be needed to adjust building use to coincide with system installation and operation for 18-months. Alternative 3 would be a desirable option because it would eliminate the groundwater contamination—thereby eliminating potential exposure concerns for future site activities.

Preliminary costs for this Alternative are estimated to be \$2,879,960.00 (details provided below):

- Corrective Action Planning (e.g., Plans & specifications and bid specifications preparation) = \$25,000.00
- Concrete coring, remediation system, and sparge point installation:
 - Installation and Oversight of 200 sparge point ozone system (supplies, subcontractor, and Environmental Professional) = \$2,000,000.00
 - Ozone System Operation and Maintenance for 18 months = \$350,000.00
- Installation and Oversight of Injectable Permeable Reactive Barrier
 - PRB Injection = \$375,000.00
 - 15 days of oversight x 12 hours per day x \$150.00 per hour = \$27,000.00
- Performance Monitoring and Reporting:

- Ten groundwater sampling events (one year of quarterly sampling and three years of semi-annual sampling) of ten monitoring wells, a duplicate, and a trip blank x \$80 per VOC analysis (EPA Method 8260) = \$9,600.00
- 25 days of sampling x 10 hours per day x \$150.00 per hour = \$37,500.00
- 160 hours of reporting x \$150.00 per hour = \$24,000.00
- 30 hours of QA/QC and review x \$200.00 per hour = \$6,000.00
- Plugging and abandonment:
 - Plugging and abandoning ten monitoring wells = \$20,000.00
 - Two days of oversight x 12 hours per day x \$150.00 per hour = \$3,600.00
 - Ten hours of reporting x \$150.00 per hour = \$2,060.00
 - One hour of review x \$200 per hour = \$200.00

3.1.4 Alternative 4 – Horizontal ISCR Injection Wells with PRB

This alternative is similar to Alternative 3; however, this option requires injecting chemical reducing agents [both in-situ chemical reduction (ISCR) and enhanced biological reduction (ERD) inoculum] into the groundwater via four horizontal injection wells underneath the current building structure location on the property. The goal of ISCR is to destroy contaminants exceeding restricted and unrestricted Tier 1 TRG concentrations on the site through chemical reduction. Currently, these contaminants pose a threat to those working in the overlying structure and to the down-gradient gaining stream, Hughes Creek.

Under this option, the site will be enrolled in the MDEQ Brownfield Program under the VCP. Four, 4-inch injection wells will be installed underneath the building with approximately 350 feet of screen, targeting the treatment interval under Alternative 4. Approximately 175,000 gallons of ISCR and ERD compounds will be injected within the subsurface treatment area. A PRB is also proposed along the eastern property line, before Hughes Creek. Alternative 4 would be highly effective in achieving the goal of reduction of COCs in shallow groundwater and would help eliminate groundwater concerns for future property transfers. Alternative 4 would be a desirable option because it would eliminate the groundwater contamination– thereby eliminating potential exposure concerns for future site activities, and this alternative would also not cause extensive disruption to current operations on the site.

Preliminary costs for this alternative are estimated to be \$1,854,160.00 (details provided below):

- Corrective Action Planning (e.g., Plans & specifications and bid specifications preparation) = \$25,000.00
- Injection wells:
 - Installation of four injection wells beneath the site structure (supplies and subcontractor) = \$343,200.00
 - 15 days of oversight x 12 hours per day x \$150.00 per hour = \$27,000.00
 - Injection of ISCR and ERD compounds at the site (supplies and subcontractor) = \$900,000.00
 - 30 days of oversight x 12 hours per day x \$150.00 per hour = \$54,000.00
- Installation and Oversight of Injectable Permeable Reactive Barrier
 - PRB Injection (supplies and subcontractor) = \$375,000.00
 - 15 days of oversight x 12 hours per day x \$150.00 per hour = \$27,000.00
- Performance Monitoring and Reporting:
 - Ten groundwater sampling events (one year of quarterly sampling and three years of semi-annual sampling) of 10 monitoring wells, a duplicate, and a trip blank x \$80 per VOC analysis (EPA Method 8260) = \$9,600.00
 - 25 days of sampling x 10 hours per day x \$150.00 per hour = \$37,500.00
 - 160 hours of reporting x \$150.00 per hour = \$24,000.00
 - 30 hours of QA/QC and review x \$200.00 per hour = \$6,000.00
- Plugging and abandonment:
 - Plugging and abandoning ten monitoring wells = \$20,000.00
 - Two days of oversight x 12 hours per day x \$150.00 per hour = \$3,600.00
 - Ten hours of reporting x \$150.00 per hour = \$2,060.00
 - One hour of review x \$200 per hour = \$200.00

3.2 VAPOR INTRUSION PATHWAY

Alternatives for addressing possible vapor intrusion impacts at the industrial facility were evaluated based on their effectiveness and implementability to address the known adverse impacts caused by previous property use and activities. These alternatives are presented below.

3.2.1 Alternative 1 – No Action and Restricted Building-Area Use

A “No-Action” alternative would leave the building in its present condition no protection of personnel within the impacted area of the building, thereby resulting in limited use. Implementation would not be difficult; however, the continued vapor intrusion issue within the area of the building increases the likelihood of indoor air quality diminishing to an unusable level. Currently, the areas of the building that are impacted by vapor intrusion are only utilized for storage and have limited access. The only advantages to No-Action are those related to immediate avoidance of expenses that would be incurred by taking action. However, in the long term, expenses associated with No-Action alternative may exceed those related to taking action at the present time due to the continued deterioration of the condition of the building and the inability to utilize certain areas of the building – limiting operational expansion. The No-Action Alternative would be highly ineffectual in achieving the goals of reduction of health risks and facilitating the use of the property. It would also not help future purchasers obtain liability-free conveyance of the property.

Direct costs associated with the No-Action Alternative and associated non-use of the building would be nothing additional for Winston County. Indirect costs, however, could include the continued inability to occupy the northwestern portion of the building with no use restrictions.

3.2.2 Alternative 2 – Demolition of Affected Area of the Building

This option would include demolition and removal of the affected area of the building. The walls, roof, and foundation within the western portion of the building would be removed and disposed of by a willing, local concrete company for reuse. Any demolition waste that is not received by the local concrete company would be disposed of at a permitted facility.

Alternative 2 would be highly effective in achieving the goal of eliminating the vapor intrusion exposure pathway for individuals within the western portion of the building as the vapor intrusion pathway cannot exist without an enclosed structure. Alternative 2 would be resilient and eliminate any future concerns of vapor intrusion within the western portion of the building. Preliminary costs for this Alternative are estimated to be \$363,100.00 (details provided below). Please note that these costs should not be relied upon as a formal cost estimate.

- Building Demolition Activities:
 - 18,000 square feet of concrete floor and wall x \$7 per square foot = \$126,000.00

- Hauling and Disposal of Unaccepted Materials at Local Landfill 600 tons (estimated) of debris x \$120/ton = \$72,000.00
- Repairs and Sealing of New Exterior Wall = \$125,000.00 (estimated)
- Demolition Oversight and Reporting:
 - \$2,500 per hour x 5 days per week x 3 weeks = \$37,500.00
 - 16 hours of reporting x \$150.00 per hour = \$2,400.00
 - One hour of review x \$200 per hour = \$200.00

3.2.3 Alternative 3 – Vapor Barrier Installation

This option would include preparation and sealing of all concrete surfaces within the proposed work area. A chemical resistant, vapor intrusion coating system will then be applied to the concrete surfaces within the work area.

Alternative 3 would be highly effective in achieving the goal of eliminating a vapor intrusion exposure pathway for individuals working within the affected area of the building. The coating system will be rated for forklift traffic, thereby allowing for the continued industrial use and supporting operations. Additionally, the selection of Alternative 3 would allow for the expanded use of the affected area – promoting economic expansion in the building. Alternative 3 would be the most resilient option because it would eliminate concerns of vapor intrusion to the building, work in tandem with other possible forms of active vapor mitigation, and allow full utilization of the current building footprint. Preliminary costs for this Alternative are estimated to be \$388,700.00 (details provided below). Please note that these costs should not be relied upon as a formal cost estimate.

- Vapor Intrusion Coating System Installation:
 - Surface Preparation, Sealing, and Application 18,000 square feet x \$20 per square foot = \$360,000.00
 - Installation Oversight 15 days x 10 hours per day x \$150 per hour = \$22,500.00
- Confirmation Air Monitoring Event After Vapor Barrier Installation:
 - Four Indoor Air Samples Analyzed for TO-15 at \$350/sample = \$1,400.00
 - 12 hours of onsite sampling and travel time x \$150.00 per hour = \$1,800.00
 - 16 hours of reporting x \$150.00 per hour = \$2,400.00
 - 3 hours of QA/QC and review x \$200.00 per hour = \$600.00

4.0 RECOMMENDATIONS

Based on this preliminary analysis, PPM makes the following recommendations regarding each Alternative:

4.1 GROUNDWATER

- **Alternative 1 – No Action**
 - The No-Action Alternative would not present additional costs but would also not benefit the current or future property owners, the surrounding community, or provide a path for Winston County and Taylor Machine Works to complete a risk-free property transfer as part of the current lease terms. Alternative 1 is not recommended.
- **Alternative 2 – Monitored Natural Attenuation with Institutional Controls**
 - Estimated Cost = At least \$325,380.00
 - The Winston County Development Building’s large size and convenient road access makes it a good option for the current industrial and/or warehouse use. While institutional controls do not remove possible exposure pathways at the facility, they are low cost and will inform tenants and workers of risks associated with groundwater contamination at the property. These institutional controls would, however, limit future uses of the property. Additionally, while monitored natural attenuation does not require active remediation and thereby incurs minimal up-front costs, it still results in long, drawn-out groundwater monitoring with continued obligations and possible environmental liability. Therefore, because Winston County wants to transfer the property without retaining environmental responsibility for groundwater impacts, Alternative 2 is not recommended.
- **Alternative 3 – Ozone Sparge System with PRB**
 - Estimated Cost = \$2,879,960.00
 - The Winston County Development Building is located in the Industrial Park of the rural town of Louisville. Winston County and the current tenant (Taylor Machine Works) have entered into a long-term lease with options to purchase.

Taylor Machine Works currently utilizes the property for forklift manufacturing and Department of Defense contract requirements. Remediating the groundwater impacts of the property would alleviate concerns of ongoing environmental requirements related to past property use and possible future exposure. This alternative will require coring through the facility foundation at multiple points and having an active system with power source for the duration of remedial actions. While this alternative will eliminate concerns with impacted groundwater beneath the site, the installation and operation of the ozone sparge system will temporarily disrupt the current operations within the western and eastern portions of the facility. This option is also the most expensive. Therefore, because Winston County and Taylor Machine Works want to utilize the property in its current configuration without disruption and find an alternative of lower cost, Alternative 3 is not recommended.

- **Alternative 4 – Horizontal ISCR Injection Wells with PRB**
 - Estimated Cost = \$1,854,160.00
 - The Winston County Development Building is located in the Industrial Park of the rural town of Louisville. Winston County and the current tenant (Taylor Machine Works) have entered into a long-term lease with options to purchase. Taylor Machine Works currently utilizes the property for forklift manufacturing and Department of Defense contract requirements. Remediating the groundwater impacts of the property would alleviate concerns of ongoing environmental requirements related to past property use and possible future exposure. Alternative 4 will utilize horizontal wells to remediate groundwater underneath the building. The horizontal wells will be installed from outside the building footprint, extending to the treatment area, thereby not disrupting facility operations. This alternative will also not require a mechanical system or power source for remediation. Similar to Alternative 3, this alternative will effectively eliminate concerns of impacted groundwater beneath the site while being lower in cost. Therefore, if Winston County and Taylor Machine Works plan to utilize the property in its current configuration without facility disruptions, Alternative 4 is recommended.

4.2 VAPOR INTRUSION PATHWAY

- **Alternative 1 – No Action and Building Left Intact**

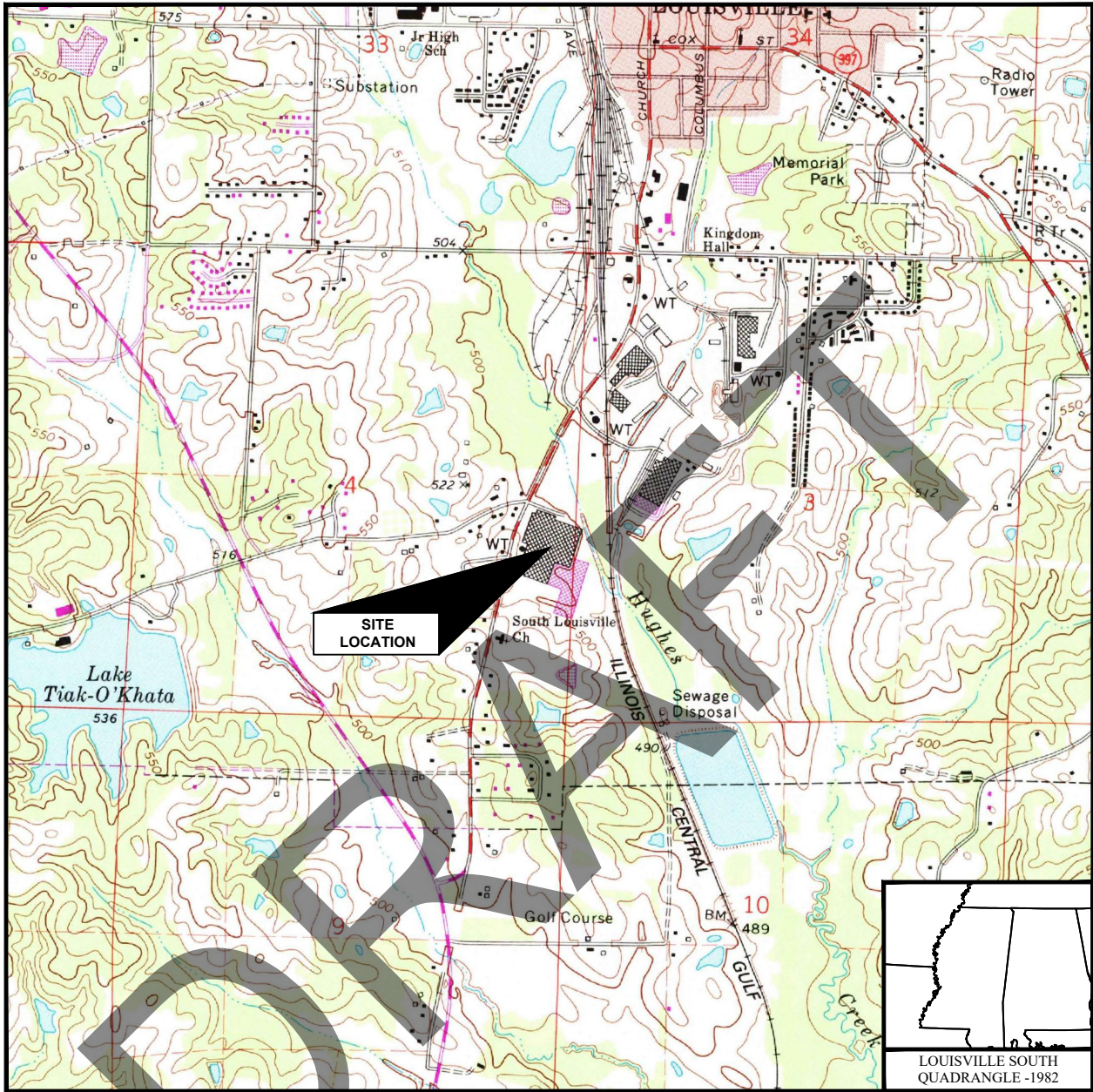
- The No-Action Alternative would not present additional costs but would result in the continued limited use of the affected area of the building, thereby limiting economic expansion. Additionally, the No-Action Alternative increases the likelihood of further degradation of indoor air quality. Alternative 1 is not recommended.
- **Alternative 2 – Demolition of the Affected Area of the Building**
 - Estimated Cost = \$363,100.00
 - The Winston County Development Building’s large size makes it a good option for continued industrial and/or warehouse use. While demolition of the affected area of the building would eliminate the current possibility of vapor intrusion, the value of the covered area for future operational expansion is important to the current and future entities occupying the property. Because Winston County and Taylor Power Systems are interested in operational expansions, Alternative 2 is not recommended.
- **Alternative 3 – Vapor Barrier Installation**
 - Estimated Cost = \$388,700.00
 - Alternative 3 would be highly effective in achieving the goal of eliminating a vapor intrusion exposure pathway for individuals working within the affected area of the building. The coating system will be rated for forklift traffic, thereby allowing for the continued industrial use and supporting operations. Additionally, the selection of Alternative 3 would allow for the expanded use of the affected area – promoting economic expansion in the building. Alternative 3 would be the most resilient option because it would eliminate concerns of vapor intrusion to the building, work in tandem with other possible forms of active vapor mitigation, and allow full utilization of the current building footprint. Alternative 3 provides for better property use at a cost that is still similar to Alternative 2. Therefore, because Winston County and Taylor power Systems are interested in operational expansions and because the cost / benefit analysis outweighs other alternatives, Alternative 3 is recommended.

DRAFT

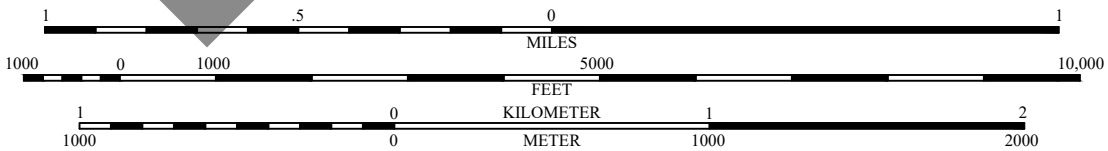
APPENDICES


DRAFT

APPENDIX A – FIGURES



SCALE: 1 : 24,000



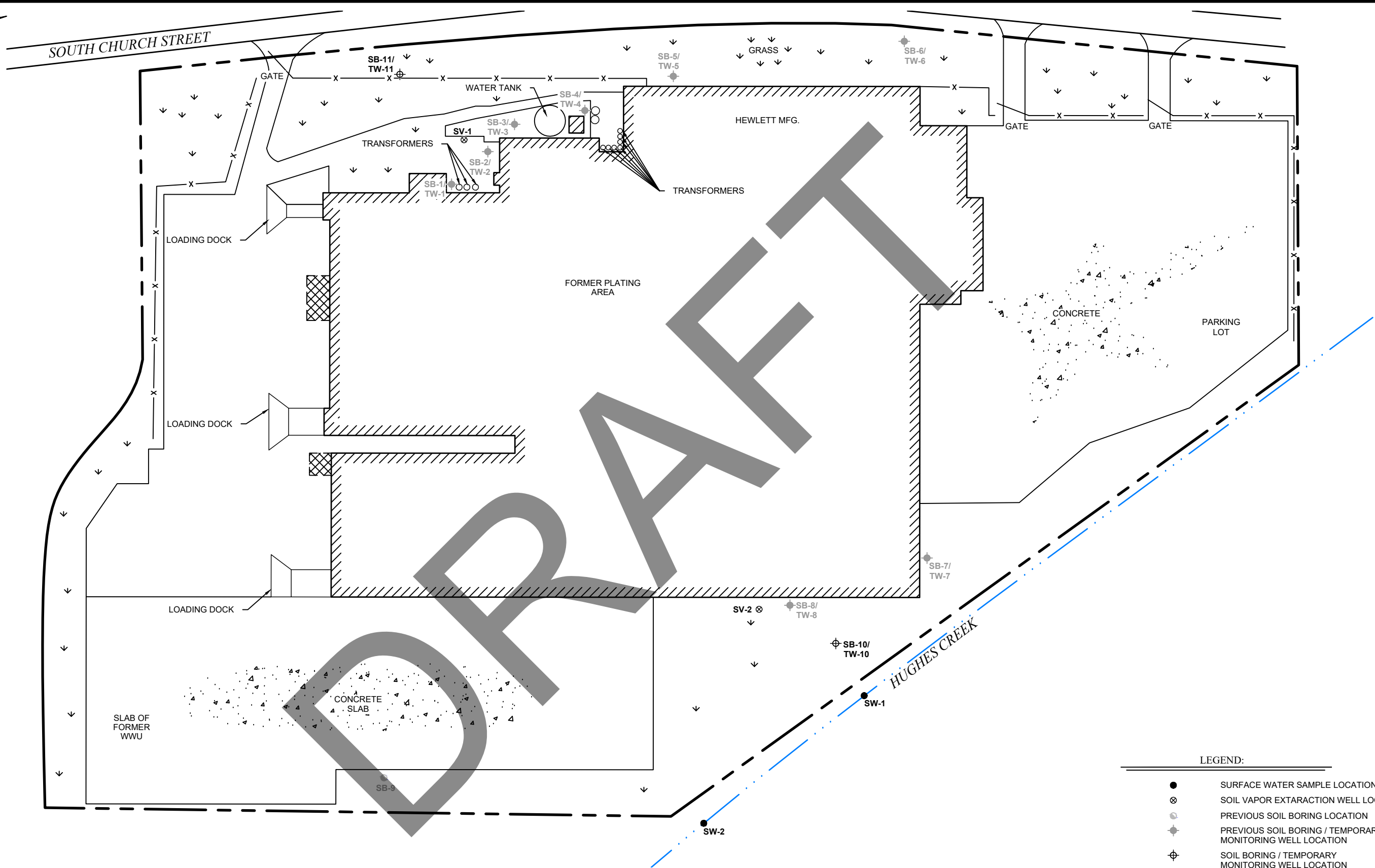
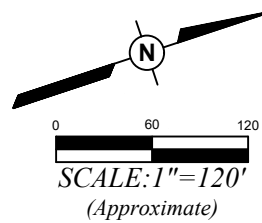
 PPM CONSULTANTS, INC. www.ppmco.com	
DRAWN BY: JCP	DRAWN DATE: 05/04/20
PROJECT NUMBER: 30065902	PHASE: CAP-01

**CITY OF LOUISVILLE
 WINSTON COUNTY
 DEVELOPMENT BUILDING**
 912 SOUTH CHURCH STREET
 LOUISVILLE, MISSISSIPPI

SITE LOCATION MAP

FIGURE NUMBER

1



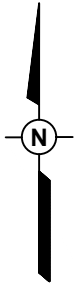
- LEGEND:
- SURFACE WATER SAMPLE LOCATION
 - ⊗ SOIL VAPOR EXTRACTION WELL LOCATION
 - PREVIOUS SOIL BORING LOCATION
 - ◆ PREVIOUS SOIL BORING / TEMPORARY MONITORING WELL LOCATION
 - ⊕ SOIL BORING / TEMPORARY MONITORING WELL LOCATION

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PROJECT NUMBER: 30065902	PHASE: CAP-01

CITY OF LOUISVILLE
WINSTON COUNTY
DEVELOPMENT BUILDING
912 SOUTH CHURCH STREET
LOUISVILLE, MISSISSIPPI

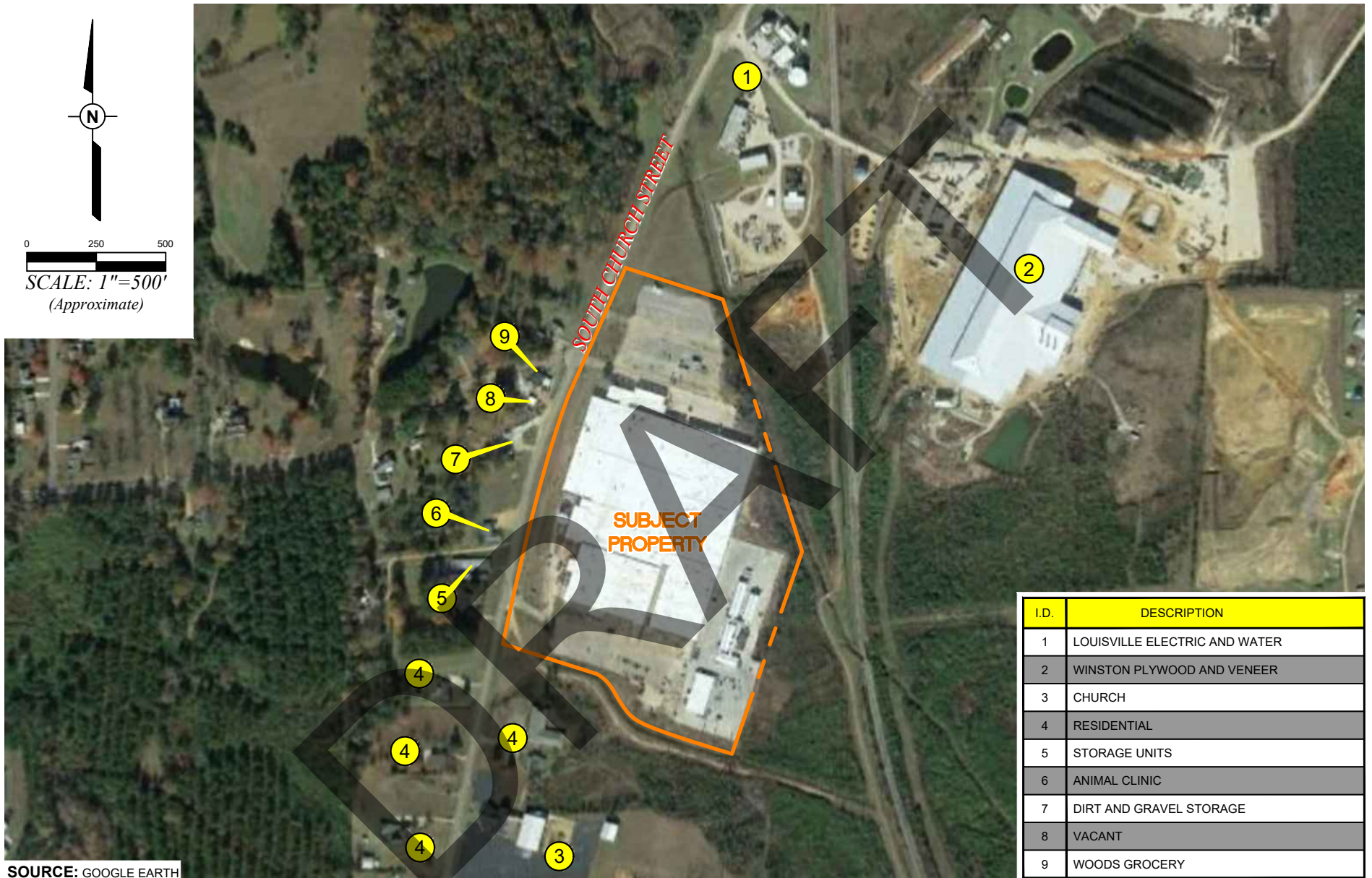
SITE MAP

FIGURE
NUMBER
2



0 250 500

SCALE: 1"=500'
(Approximate)



SOURCE: GOOGLE EARTH

I.D.	DESCRIPTION
1	LOUISVILLE ELECTRIC AND WATER
2	WINSTON PLYWOOD AND VENEER
3	CHURCH
4	RESIDENTIAL
5	STORAGE UNITS
6	ANIMAL CLINIC
7	DIRT AND GRAVEL STORAGE
8	VACANT
9	WOODS GROCERY

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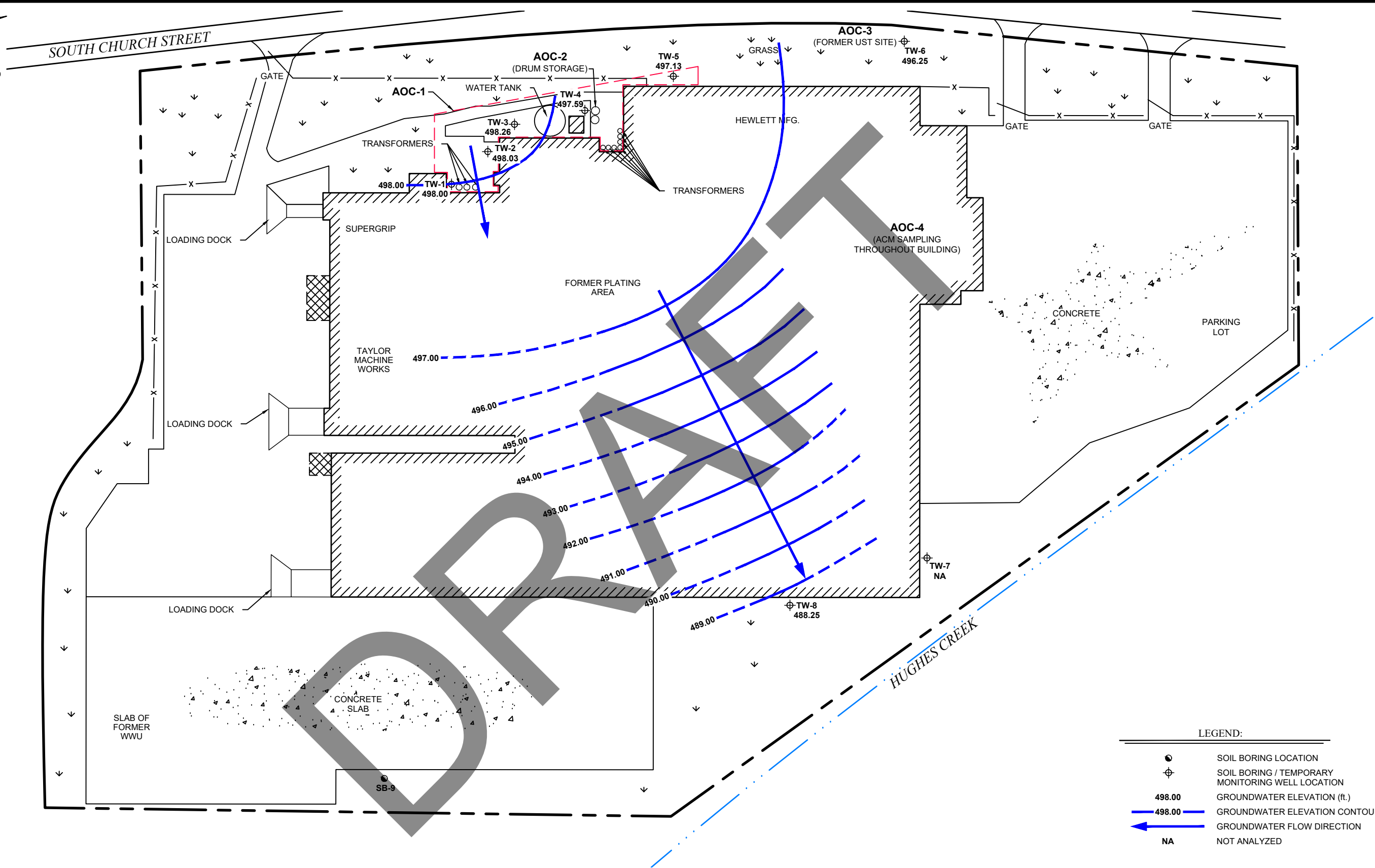
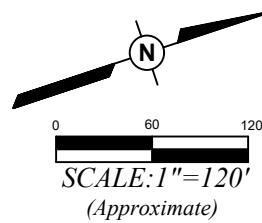
DRAWN BY: JCP	DRAWN DATE: 05/04/20
PROJECT NUMBER: 30065902	PHASE: CAP-01

CITY OF LOUISVILLE
WINSTON COUNTY
DEVELOPMENT BUILDING
912 SOUTH CHURCH STREET
LOUISVILLE, MISSISSIPPI

SURROUNDING AREA MAP

FIGURE
NUMBER

3



LEGEND:

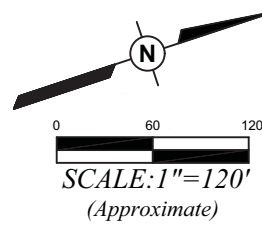
	SOIL BORING LOCATION
	SOIL BORING / TEMPORARY MONITORING WELL LOCATION
498.00	GROUNDWATER ELEVATION (ft.)
	GROUNDWATER ELEVATION CONTOUR (ft.)
	GROUNDWATER FLOW DIRECTION
NA	NOT ANALYZED

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PROJECT NUMBER: 30065901	PHASE: TO 16

**CITY OF LOUISVILLE
TETERS FLORAL PROPERTY**
912 SOUTH CHURCH STREET
LOUISVILLE, MISSISSIPPI

HISTORICAL GROUNDWATER ELEVATION MAP
(OCTOBER 11, 2018)

FIGURE
NUMBER
4



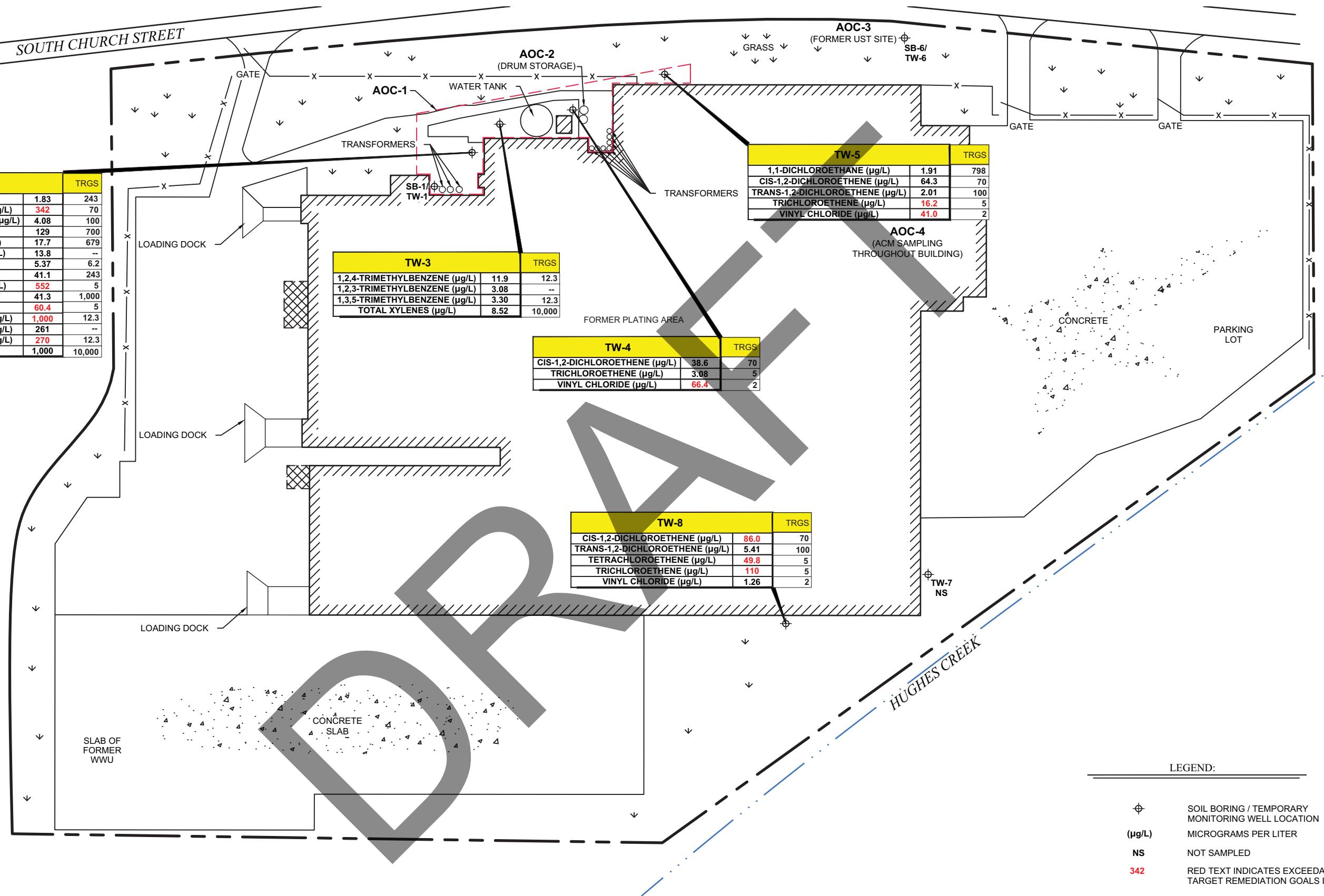
TW-2		TRGS
N-BUTYLBENZENE (µg/L)	1.83	243
CIS-1,2-DICHLOROETHENE (µg/L)	342	70
TRANS-1,2-DICHLOROETHENE (µg/L)	4.08	100
ETHYLBENZENE (µg/L)	129	700
ISOPROPYLBENZENE (µg/L)	17.7	679
P-ISOPROPYLBENZENE (µg/L)	13.8	--
NAPHTHALENE (µg/L)	5.37	6.2
N-PROPYLBENZENE (µg/L)	41.1	243
TETRACHLOROETHENE (µg/L)	552	5
TOLUENE (µg/L)	41.3	1,000
TRICHLOROETHENE (µg/L)	60.4	5
1,2,4-TRIMETHYLBENZENE (µg/L)	1,000	12.3
1,2,3-TRIMETHYLBENZENE (µg/L)	261	--
1,3,5-TRIMETHYLBENZENE (µg/L)	270	12.3
TOTAL XYLENES (µg/L)	1,000	10,000

TW-3		TRGS
1,2,4-TRIMETHYLBENZENE (µg/L)	11.9	12.3
1,2,3-TRIMETHYLBENZENE (µg/L)	3.08	--
1,3,5-TRIMETHYLBENZENE (µg/L)	3.30	12.3
TOTAL XYLENES (µg/L)	8.52	10,000

TW-4		TRGS
CIS-1,2-DICHLOROETHENE (µg/L)	38.6	70
TRICHLOROETHENE (µg/L)	3.08	5
VINYL CHLORIDE (µg/L)	66.4	2

TW-8		TRGS
CIS-1,2-DICHLOROETHENE (µg/L)	86.0	70
TRANS-1,2-DICHLOROETHENE (µg/L)	5.41	100
TETRACHLOROETHENE (µg/L)	49.8	5
TRICHLOROETHENE (µg/L)	110	5
VINYL CHLORIDE (µg/L)	1.26	2

TW-5		TRGS
1,1-DICHLOROETHANE (µg/L)	1.91	798
CIS-1,2-DICHLOROETHENE (µg/L)	64.3	70
TRANS-1,2-DICHLOROETHENE (µg/L)	2.01	100
TRICHLOROETHENE (µg/L)	16.2	5
VINYL CHLORIDE (µg/L)	41.0	2



- LEGEND:
- ⊕ SOIL BORING / TEMPORARY MONITORING WELL LOCATION
 - (µg/L) MICROGRAMS PER LITER
 - NS NOT SAMPLED
 - 342 RED TEXT INDICATES EXCEEDANCE OF MDEQ TIER 1 TARGET REMEDIATION GOALS IN GROUNDWATER

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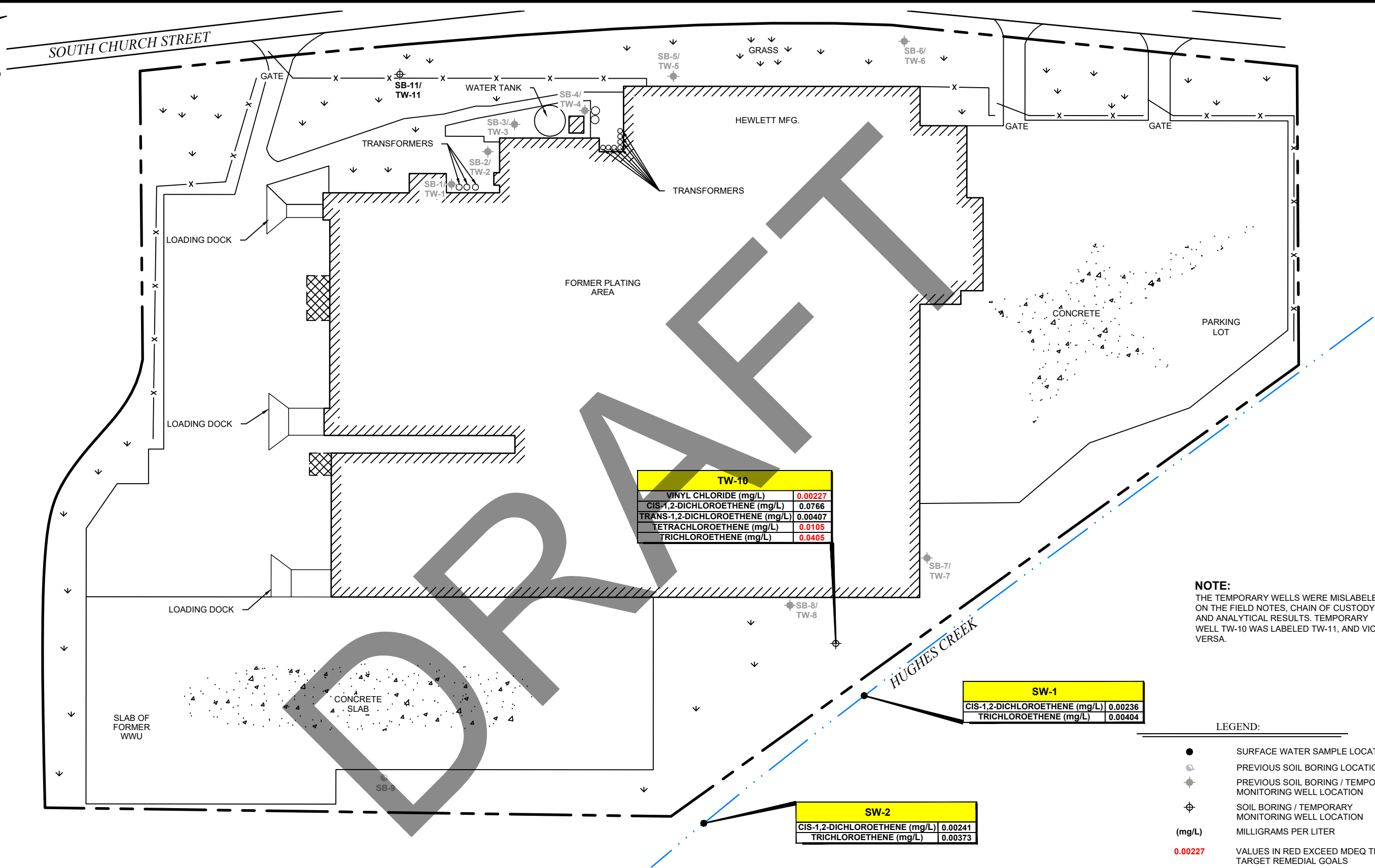
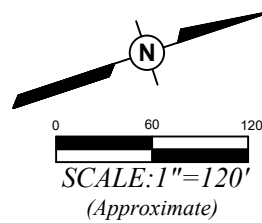
DRAWN BY: JCP
DRAWN DATE: 11/12/18

PROJECT NUMBER: 30065902
BILLING GROUP: CAP-01

CITY OF LOUISVILLE
WINSTON COUNTY
DEVELOPMENT BUILDING
912 SOUTH CHURCH STREET
LOUISVILLE, MISSISSIPPI

DETECTED VOCs IN GROUNDWATER
(OCTOBER 10-11, 2018)

FIGURE NUMBER
5



TW-10	
VINYL CHLORIDE (mg/L)	0.00227
CIS-1,2-DICHLOROETHENE (mg/L)	0.0766
TRANS-1,2-DICHLOROETHENE (mg/L)	0.00407
TETRACHLOROETHENE (mg/L)	0.0105
TRICHLOROETHENE (mg/L)	0.0405

SW-1	
CIS-1,2-DICHLOROETHENE (mg/L)	0.00236
TRICHLOROETHENE (mg/L)	0.00404

SW-2	
CIS-1,2-DICHLOROETHENE (mg/L)	0.00241
TRICHLOROETHENE (mg/L)	0.00373

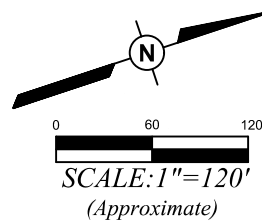
NOTE:
THE TEMPORARY WELLS WERE MISLABELED ON THE FIELD NOTES, CHAIN OF CUSTODY, AND ANALYTICAL RESULTS. TEMPORARY WELL TW-10 WAS LABELED TW-11, AND VICE VERSA.

- LEGEND:**
- SURFACE WATER SAMPLE LOCATION
 - PREVIOUS SOIL BORING LOCATION
 - ◆ PREVIOUS SOIL BORING / TEMPORARY MONITORING WELL LOCATION
 - ⊕ SOIL BORING / TEMPORARY MONITORING WELL LOCATION
 - (mg/L) MILLIGRAMS PER LITER
 - 0.00227 VALUES IN RED EXCEED MDEQ TIER 1 TARGET REMEDIAL GOALS

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DRAWN BY: JCP	DRAWN DATE: 05/04/20
PROJECT NUMBER: 30065902	PHASE: CAP-01

CITY OF LOUISVILLE
WINSTON COUNTY
DEVELOPENT BUILDING
912 SOUTH CHURCH STREET
LOUISVILLE, MISSISSIPPI

DETECTED VOCs IN GROUNDWATER AND SURFACE WATER
(JANUARY 27, 2020)



SOUTH CHURCH STREET

#13004 TRANSFORMER / IA-2	01/20/21	01/02/22
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	2.0	3.03
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	3.5	2.83
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	23.8	32.8

#13001 ENTRANCE / AMB	01/20/21	01/02/22
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.2	<0.793
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.0	<1.36
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<0.80	<1.07

#13002 BACK SIDE OF OFFICE / IA-1	01/20/21	01/02/22
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	2.0	2.19
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	2.6	1.91
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	38.6	37.6

#130049 SUPER GRIP	01/20/21
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.2
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.0
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<0.81

#13003 SS-3 / IA-3	01/20/21	01/02/22
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.2	1.99
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<0.99	2.84
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	6.3	21.1

#13005 PLANTING AREA EAST	01/20/21
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.2
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.0
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	1.2

#13007 DEFENSE EAST / IA-4	01/20/21	01/02/22
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.2	<0.793
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.0	<1.36
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	0.94	<1.07

#13008 SHIPPING / RECEIVING	01/20/21
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.2
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.0
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<0.80

- LEGEND:
- SUB-SLAB IMPLANT LOCATION
 - ⊗ INDOOR AIR SAMPLING LOCATION
 - $(\mu\text{g}/\text{m}^3)$ MICROGRAMS PER CUBIC METER
 - 37.6 GREEN TEXT INDICATES VALUES ABOVE THE USEPA VISLs (COMMERCIAL) HQ-0.1 AND TR-10*
 - 1.0 GRAY TEXT INDICATES VALUES FROM THE PREVIOUS SAMPLING EVENT.
 - ND NOT DETECTED

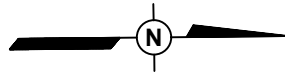
CITY OF LOUISVILLE
WINSTON COUNTY DEVELOPMENT BUILDING
 912 SOUTH CHURCH STREET
 LOUISVILLE, MISSISSIPPI

INDOOR AIR CONCENTRATIONS PRIOR TO INITIAL MITIGATION

FIGURE NUMBER
7

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DRAWN BY: JCP	DRAWN DATE: 01/21/22
PROJECT NUMBER: 30065902	PHASE: CAP-01



0 50 100
 SCALE: 1"=100'
 (Approximate)

#13004 TRANSFORMER / IA-2	05/24/22
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<0.793
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	2.56
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	7.02

#13002 BACK SIDE OF OFFICE / IA-1	05/24/22
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	9.75
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	1.66
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	161

#13001 ENTRANCE / AMB	05/24/22
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<0.793
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	1.38
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	1.51

LOADING DOCK
 #13009 SUPERGRIP
 SUPERGRIP

TAYLOR MACHINE WORKS

FORMER PLATING AREA

#13005 PLANTING AREA EAST

PLANTING AREA EAST

HEWLETT MFG.

TRENCH FILLED WITH SAWDUST

OFFICE BUILDING

LOADING DOCK

#13007 DEFENSE EAST / IA-4	05/24/22
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<0.793
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.36
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.07

DEFENSE EAST

SHIPPING / RECEIVING

LOADING DOCK

#13008 SHIPPING / RECEIVING / IA-5	05/24/22
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<0.793
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.36
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	<1.07

#13003 SS-3 / IA-3	05/24/22
CIS-1,2-DICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	0.995
TETRACHLOROETHENE ($\mu\text{g}/\text{m}^3$)	3.34
TRICHLOROETHENE ($\mu\text{g}/\text{m}^3$)	5.63

LEGEND:

- ⊗ INDOOR AIR SAMPLING LOCATION
- ($\mu\text{g}/\text{m}^3$) MICROGRAMS PER CUBIC METER
- 161 GREEN TEXT INDICATES VALUES ABOVE THE USEPA VISLS (COMMERCIAL) HQ-0.1 AND TR-10*

PPM PPM CONSULTANTS, INC. www.ppmco.com	
DRAWN BY: JCP	DRAWN DATE: 6/7/22
PROJECT NUMBER: 30065902	PHASE: CAP-01

CITY OF LOUISVILLE
 WINSTON COUNTY DEVELOPMENT BUILDING
 912 SOUTH CHURCH STREET
 LOUISVILLE, MISSISSIPPI

INDOOR AIR CONCENTRATIONS AFTER INITIAL MITIGATION

FIGURE NUMBER
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