2024 Revised Corrective Action Plan

for

2335 LAWRENCE STREET
EAST POINT, GA 30344
PERMIT NO. HW-062D

REVISED CONSENT ORDER NO. EPD-HW-1751

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GEOLOGY CERTIFICATION

I certify that I am a qualified ground-water scientist who has received a baccalaureate or post-graduate degree in the natural sciences or engineering, and have sufficient training and experience in ground-water hydrology and related fields, as demonstrated by state registration and completion of accredited university courses, that enable me to make sound professional judgments regarding ground-water monitoring and contaminant fate and transport. I further certify that this report was prepared by myself or by a subordinate working under my direction.

Kenneth C. Summerour, P.G. #1083
Registered Professional Geologist

6-29-2024
Date

Professional Geologist Stamp/Seal

1.0 INTRODUCTION

This 2024 Revised Corrective Action Plan (2024 RCAP) is being submitted on behalf of William C. Meredith Company, Inc. (WCM) for the East Point, Georgia facility (hereafter referred to as “the site” or “the facility”). This 2024 RCAP is a revision of a 2023 RCAP developed to address Georgia Environmental Protection Division (EPD) comments which followed review of the 2021 Part-B Permit for Post-Closure Care (Part-B Permit) renewal application. These RCAP revisions are intended to address recent EPD comments provided by in a December 1, 2023 letter.

This 2024 RCAP includes a site-wide work plan intended to provide an updated phased corrective action approach while addressing data gaps identified during task completion of the 2011 RCAP. This section outlines the purpose and organization of the 2023 RCAP along with a description of previous environmental actions and other information pertinent to corrective action development.

1.1 Purpose

The purpose of the 2023 RCAP is to provide an updated remedial plan for soil, sediment, surface water, and groundwater clean-up of regulated constituents in the former surface impoundment or Hazardous Waste Management Unit (HWMU) and the Solid Waste Management Units (SWMUs). The HWMU was certified closed in December 1989. Groundwater corrective action was initiated in 1990 after installation of a pump-and-treat system. A total of 11 SWMUs have been identified at the facility.

This RCAP provides a flexible “phased” approach to allow completion of additional delineation of impacted media, evaluation of data gaps, phased installation of groundwater recovery wells, and subsequent geophysical and hydraulic testing necessary for treatment system design. The goal of this RCAP is to outline a suitable pathway for the development of the most effective course of corrective action that is protective of human health and the environment.

1.2 Organization

This RCAP is organized in a manner to provide a summary of relevant material from previous assessment work prior to a discussion of remedial options and the selected remedial method(s). Major sections of the 2023 RCAP are as follows:

1.0 Introduction
2.0 Physical Setting
3.0 Contaminant Assessment
4.0 Scope and Objectives of Corrective Action
5.0 Corrective Action Work Plan
6.0 Cost and Implementation
7.0 References

Tables, figures, schedules, and cost estimates are included as attachments.

1.3 Facility Location and Setting

The WCM facility is located at 2335 Lawrence Street in East Point, Fulton County, Georgia. The facility is located at Latitude N33^o 41' 46" and Longitude W84^o 26' 27" within East Point city limits and is set on approximately 25.8 acres of land. Wood treating operations are limited to approximately 3.21 acres. The remainder of the site property is primarily utilized for finished product storage and transport. A wooded buffer is located near the western and northwestern property boundaries. Surrounding properties are predominantly utilized for industrial or commercial use.

The current use and ownership of adjacent and nearby surrounding properties is shown on an aerial map provided as **Figure 1**. Site and surrounding topography is illustrated in **Figure 2**.

1.4 Facility Operations

WCM is a wood preservation company that has been in operation at this location since 1921. Wood products treated currently include power and telephone utility poles. Historically, treated wood products also included utility conduit, cross arms, ground wire molding, timbers and lumber. Raw materials (debarked utilities poles) are brought in via truck and rail lines. After delivery to the facility, the debarked poles are steam conditioned for approximately 12 hours in one of the treatment cylinders and pressure treated for approximately 1.5 hours to allow penetration of the wood preservation chemicals. After treatment, the poles are vacuum dried, removed from the cylinders, and placed on top of rail drip pads for sampling and curing. Cured poles are temporarily stockpiled prior to off-site transport via truck or rail line to various clients.

Hazardous wastes generated during the wood preserving operation include wastes described under codes K001 and F032. K001 sludge waste is generated from wood preserving wastewater treatment. K001 consists of water, wood fiber, sap, and dirt that is removed during wood steam conditioning and combined with small amounts of the PCP (PCP) preservative from the treating cylinders. Creosote was previously a contributor to the K001 sludge but is no longer used by this facility. F032 waste is generated at the plant during tank, equipment, sump and drip track cleanup and any drippage that contaminates soil on the facility. The F032 waste code became effective in 1992 to identify any waste other than K001 that came in contact with PCP during the wood preserving operation.

Currently, F032 and K001 solid waste residuals are filter pressed during pretreatment for solidification and are then placed in a 20 cubic yard lined roll-off container. Roll-offs are transported off-site by licensed carriers to a hazardous waste disposal facility within 90 days of waste generation. Liquid wastes are treated in the on-site wastewater treatment system prior to permitted discharge to the sanitary sewer. The facility is currently listed as a waste generator only. No active treatment of hazardous waste is performed at the facility. Recent process modifications included the addition of a steaming cylinder for untreated poles and the incorporation of a new wood preservative DCOI (4,5-Dichloro-2-N-Octyl-4-Isothiazolin-3-One) intended to replace PCP.

1.5 SWMU Descriptions

Eight SWMUs were originally identified at the site during an EPD inspection in June 1988 described in an August 1988 RCRA Facility Assessment (RFA). SWMU #9 (Old Goldfish Pond) and #10 (Stream and Culvert Area) were later added to the SWMU list in 1991 and 1998, respectively. SWMU #11 (closed HWMU surface impoundment in 1989) was added to the list in 2010.

SWMUs 1-11 are described as follows:

1. Process tank field area, including creosote truck unloading area;
2. Treating room under roof;
3. Soil areas between the concrete pad under #0 treating cylinder and the concrete foundations under #1 cylinder;
4. Railroad track "kickback" drippage area;
5. Old creosote storage tank;
6. Cooling water pond;
7. Foundation retaining wall under #1 cylinder;
8. Oil shed;
9. Old goldfish pond;
10. Stream and culvert area; and
11. Closed HWMU surface impoundment.

1.6 Previous Environmental Assessment and Corrective Action

Environmental investigations at this facility began due to the prior use of an unlined surface impoundment for the treatment of process wastewater from wood preserving activities. EPD classified the surface impoundment as a regulated HWMU subject to all pertinent Resource Conservation and Recovery Act (RCRA) requirements for closure and post-closure care. The impoundment was utilized until November 1985. In order to obtain a Hazardous Waste Permit from the EPD, WCM prepared a closure plan for the surface impoundment in June 1983. After subsequent review and revision, the plan was approved by EPD in June 1986. After approval, sludges and contaminated soils were biologically treated using an In-Situ Biological Oxidation Detoxification System (ISBODS). The ISBODS treatment involved the addition of mutant bacteria with micro-nutrients, emulsifiers, co-metabolites, and pH adjustment chemicals until degradation was observed. Contaminated wastes were treated in lined aeration lagoons over a two year period. The liquids were treated and sent through the wastewater treatment system and contaminated solids were encapsulated with quick lime to prevent leaching into the groundwater.

Final closure included a bottom three-foot compacted red clay liner, capping the top of the surface impoundment with another three feet of red clay, installing a polyethylene synthetic impervious liner, covering with two feet of soil cover, and planting a Bermuda grass cover. The HWMU was certified closed in December 1989. Since the HWMU was not "clean closed", a RCRA Hazardous Waste Facility Part-B Permit was required for groundwater monitoring and corrective action. From 1982 to 1989, a series of groundwater monitoring wells (MW-1 through MW-11, including MW-5R and 6R replacement wells) were installed to delineate the extent of regulated groundwater constituents from the former impoundment. The highest concentrations of regulated constituents included a mixture of volatile organic compounds (VOCs), semi-volatile organics (SVOCs), metals, dioxins, and non-aqueous phase liquid (NAPL) detected in MW-5R, MW-6R, and MW-11. These wells were later designated as Point of Compliance (POC) wells. A program of semi-annual groundwater sampling and monitoring was initiated to evaluate regulated constituents associated with the HWMU. The locations of monitoring wells and other site features are shown on **Figure 3**.

Concurrent with closure of the HWMU, a RCRA Facility Assessment (RFA) was performed by the EPD in 1988. During the RFA and in follow-up investigations, eight (8) SWMUs were identified. SWMU #9 and #10 were later added to the list in 1991 and 1998 respectively. SWMU #11 was added in 2010. From 1991-2004, the SWMUs were investigated, and interim corrective action (soil removal) was performed where appropriate. The locations of the SWMUs are shown on **Figure 4**

From 1989-1990, a groundwater extraction well (PW-1) was installed for product removal and hydraulic control along the down-gradient end of the former impoundment. Groundwater was pumped from PW-1 into the plant wastewater treatment system prior to discharge into the City sewer system under a sanitary discharge permit. The plant treatment system was later upgraded with an oil-water separator tank, filter press, flocculant tanks, and biological treatment unit [Allied Signal Immobilized Cell Bio treater (ICB) system].

In 1993 and later in the mid-late1990s, groundwater interceptor trenches were excavated along the northern end of the impoundment to provide a more effective means for hydraulic control. The trenches were lined with crushed granite stone and three 30-inch diameter vertical extraction points (TA, TB, and TC) were constructed using steel corrugated pipe, slotted in the lower five feet. Due to the subsequent decline in the water table, the trenches were not utilized for product recovery and groundwater extraction.

WCM was issued its first Part B Permit on September 30, 1988 (HW-062D). This permit was amended on March 30, 1993 to incorporate a corrective action program. In March 1997, an additional amendment to the permit was issued for post-closure care. The 10-year permit was renewed on September 30, 1998 and October 2009. The current permit had an effective date of November 8, 2010. (*Revised permit applications were submitted in March 2021 and July 2023, as detailed later in this section*.)

In 2004, the monitoring well network was expanded by installing five (5) additional monitoring wells (MW-3A, MW-12, MW-12A, MW-13, and MW-14) after a Class 2 Permit Modification was approved by EPD. These wells were installed to better delineate the down-gradient horizontal and vertical extent of dissolved constituents.

In May 2011, a RCAP was developed and approved concurrent with the Part B Permit renewal. The 2011 RCAP included plans for expanded source area assessments, SWMU evaluations, vertical delineation, remedial pilots, and corrective action divided into separate phases (Phases 1-8). Each RCAP phase of work was provided in a separate progress report with detailed maps, tables, and other supporting data. Phase 1 implementation of the RCAP was initiated in October-November 2011, followed by Phase 2 implementation in July 2012, Phase 3 in January-February 2013, Phase 4 in 2014-2016, Phase 5 in June 2014, and Phase 6 in 2014-2015. A Supplemental Work Plan was submitted in October 2016 which detailed proposed corrective action activities, including additional SWMU #9 and #10 delineation (Supplemental Phase 4), an impoundment investigation, additional bedrock delineation (Supplemental Phase 3), an injection and surfactant treatment system, and a permanganate treatment barrier (Phase 8). A Supplemental Phase 4 Progress Report and subsequent comment responses were submitted between November 2017 and August 2019. A Supplemental Phase 3 Progress Report was submitted in April 2021. Results of these investigations were reported in the appropriate Progress Reports and are further discussed in Sections 3.1, 3.2, 3.3, and 3.4.

Impoundment investigation activities were conducted from March to July 2017. The purpose of this investigation was to determine if the wood preserving area, which includes SWMUs #1, #2, #3, #4, #6, and #7 are a source of non-aqueous phase liquids (NAPL) detected down-gradient/cross-gradient of the impoundment (HWMU). A total of three monitoring wells (HWMU-1, HWMU-2, and HWMU-3) were installed at the southern edge of the impoundment. These wells were initially installed as temporary monitoring wells and were later converted to permanent monitoring wells. The initial results of this investigation (NAPL gauging, soil sampling, and construction details) were reported in an Impoundment Investigation Summary Report dated July 11, 2017. Analytical results from NAPL characterization and groundwater sample results were provided to EPD in an Impoundment Investigation Summary Report Addendum in May 2022. HWMU-1-3 are currently utilized for well gauging only.

In August 2017 Envirorisk prepared a Class 3 Permit Modification which was subsequently revised and approved by EPD on March 29, 2018. The Permit Modification made changes to the frequency of sampling, added additional analytical parameters (sulfide, beryllium, thallium, isobutyl alcohol, 2-hexanone, 4-methyl-2-pentanone, 2-picoline, and benzo(g,h,i)perylene) and included the newly installed wells at the facility.

Concurrently with the corrective action phases described above, a Corrective Measures Work Plan dated July 9, 2018 was submitted prior to a meeting with EPD on August 7, 2018. Following submittal of the June 10, 2019 Supplemental Phase 4 Progress Report, EPD requested preparation of an Interim Measures Work Plan to address potential off-site migration of regulated constituents via surface water and stormwater pathways.

A letter followed by a formal report was submitted by Envirorisk on September 12, 2019 and November 14, 2019, respectively, describing proposed interim measures including implementing best management practices and additional sampling. EPD approved the scope of work in a letter dated December 16, 2019. Interim measures sampling was conducted in March 2021 and December 2021 with monitoring reports submitted in August 2021 and June 2022, respectively.

On May 4, 2020, WCM submitted a Temporary Authorization (TA) Request proposing a “pause” on select site activities (including sampling requirements, submittal of the Permit application, escrow requirements, and interim measures activities) for a period of 180-days. This request was submitted due to the impact of COVID on facility operations and to facilitate incorporation of DCOI as a replacement preservative for PCP. EPD approved the TA Request on May 13, 2020. On March 31, 2021, Envirorisk submitted a Revised Part B Permit application. EPD provided comments in a review letter dated February 1, 2023. A subsequent revision was submitted on July 6, 2023 along with the 2023 RCAP. EPD provided additional Part-B Permit application and RCAP comments in a letter dated December 1, 2023. Comments related to the RCAP are addressed in this revised report, while Part-B comments will be provided in a separate submittal.

2.0 PHYSICAL SETTING

The physical setting of the site and surrounding region is described in this section. Discussion of regional characteristics was derived from published sources. Site specific characteristics, particularly geological classifications, were provided from investigations performed by previous consultants.

2.1 Climate

According to data collected from the AP Weather Station located at Atlanta Hartsfield Airport approximately five (5) miles from the site, the average monthly temperature for East Point, Georgia ranges from a low of 34 degrees Fahrenheit (°F) in January to 89°F in July. Historic averages for rainfall are approximately 50.0 inches with August being the wettest month and April being the driest month. Georgia and parts of the southeastern United States experienced a severe drought in recent years (a period of insufficient rainfall for plant growth) resulting in a decline in surficial water bodies and in groundwater elevations. The drought ended in May 2009.

2.2 Physiographic and Topographic Conditions

East Point and Fulton County are located in the Piedmont Physiographic Province (Piedmont) which regionally extends from Alabama to Maine. The Piedmont Province is topographically characterized by rolling hills and dendritic stream drainage. A review of the Physiographic Map of Georgia indicates East Point is located in the southwest portion of the Winder Slope District near the boundary with the Greenville Slope District (Clark and Zisa, 1976). The Winder Slope District is characterized by gently rolling topography which slopes gradually from an elevation of approximately 1,000 feet above sea level in the north to 700 feet at the southern edge. The district is dissected by headwater tributaries of the major streams draining to the Atlantic Ocean. The western boundary follows the drainage divide that separates streams draining to the Atlantic Ocean from those draining to the Gulf of Mexico.

The property slopes toward the north from an elevation of approximately 1,040 feet above mean sea level (msl) at the southern boundary to a low of approximately 980 feet msl at the northwest boundary near Empire Street. Prior to development, the property contained a southeast-northwest trending valley depression containing a spring-fed lake and tributary that crossed the middle of the property. The tributary was later replaced with the existing 36-inch storm drain owned by the City of East Point. Presently, this intermittent tributary carries storm water from Lawrence Street under the site where it discharges and flows behind the office building before exiting the property. The intermittent stream joins a branch of South Utoy Creek approximately 550 feet below the adjacent Mullins Paving Company property. South Utoy Creek eventually flows into the Chattahoochee River.

The current site topography along with the original topographic surface, taken from a 1925 topographic map, is shown on **Figure 2**.

2.3 Land Use and Receptors

The site and surrounding properties are utilized for industrial or commercial use. A lightly wooded buffer is present along the western and a portion of the northern property boundary. Sensitive human receptors such as schools, day cares, or related establishments are not located within close proximity to the site. Potable water for the site and surrounding properties is supplied from a surface reservoir located approximately six miles west of the City of East Point. Based on the distance, the intermittent tributary flowing through the site is assumed to have no hydraulic connection with this surface reservoir. No public or private water supply wells are known to exist within close proximity to the site.

According to data available on the Georgia Department of Natural Resources, Wildlife Resource Division website, there are three (3) plant and animal species listed in the Southwest Atlanta quadrangle in the site vicinity. These species are: Bachman's Sparrow (*Aimophila aestivalis*) listed as a "rare species," Pink Ladyslipper (*Cypripedium acaule*) listed as an "unusual species," and Georgia Aster (*Symphyotrichum georgianum*) listed as a "threatened species." A review of the website indicates that an "endangered species" means a resident species which is in danger of extinction throughout all or a significant portion of its range, or one which is designated as endangered under the provisions of the Federal Endangered Species Act of 1973. A "threatened species" means any resident species which is likely to become an endangered species within the foreseeable future. A "rare species" means any resident species which, although not presently endangered or threatened, should be protected because of its scarcity. An "unusual species" means any resident species which exhibits special or unique features and because of these features deserves special consideration in its continued survival in the United States.

Based on the urban and industrial setting of the site, with only minimal areas for significant wildlife habitat, endangered or similarly classified species are not assumed to be present as ecological receptors. As such, an ecological risk evaluation was not performed in consideration of any revised corrective action.

2.4 Regional and Site Geology

The Georgia Piedmont generally includes geologic rock units north of the boundary with the Coastal Plain Province, south of the Blue Ridge Province, and south-southeast of the Valley and Ridge Province. The Piedmont consists of a complex series of greenschist to amphibolite grade metamorphic rocks, meta-igneous, meta-sedimentary rocks, and igneous intrusives of Pre-Cambrian to Paleozoic age. Structural features in the area are generally oriented along a southwest-northeast strike imparted from regional tectonic events (McConnell & Abrams, 1984).

The Brevard Zone, a northeast/southwest trending structural shear zone, has commonly been used to divide the Georgia Piedmont into Northern and Southern segments. However, due to the presence of the same or similar rock units on either side of the Brevard Zone, recent geologic interpretations no longer describe the Georgia Piedmont in terms of segments. In addition, since similar rock formations are common to the Georgia Piedmont and Blue Ridge provinces, recent interpretations describe the Piedmont-Blue Ridge as one combined province (Crawford & Higgins, et.al., 1999). These interpretations have resulted in the re-classification of many rock formations.

Recent theories into the origin of the Piedmont-Blue Ridge have resulted in the grouping of rock formations into two assemblages: the parautochthonous continental margin assemblage and the allochthonous oceanic assemblage. The allochthonous assemblage (from an unknown origin) was theorized to have been obducted onto the parautochthonous assemblage and later isoclinally folded in the middle to late Ordovician period. Folded thrust faults in the rock assemblages were in turn displaced producing a wrench-fault system similar to the San Andreas fault in California. The parautochthonous assemblage includes Appalachian basement rocks (primarily meta-granites) of Proterozoic age intruded by middle Proterozoic age meta-volcanic and meta-plutonic rock formations. The basement rocks and intrusives are overlain by early Cambrian to early Ordovician age meta-sedimentary rock formations. The allochthonous oceanic assemblage includes late Proterozoic to early Ordovician age rock formations consisting of meta-basalts and other meta-intrusives, meta-plutonics, and ultramafics. Many of the formations in this assemblage are interpreted to be of younger age than the continental margin assemblage (Crawford & Higgins, et.al., 1999).

East Point is located in the southern portion of the Piedmont Province, approximately 10 miles south of the Brevard Zone. A review of prior publications indicates that the site and surrounding properties are underlain by the Clarkston Formation. This formation is described as a sillimanite-garnet-quartz-plagioclase-biotite-muscovite schist interlayered with a hornblende-plagioclase amphibolite (McConnell & Abrams, 1984). **Figure 5** illustrates the geologic units in and around the site. Recent interpretations group this formation in the allochthonous oceanic assemblage (Crawford & Higgins, et.al., 1999).

Outcrops at the site and surrounding areas are rarely visible due to heavy vegetation and the high degree of chemical weathering. The chemical weathering process generally produces a mantle of residual soils over the bedrock (saprolite) with thicknesses ranging from a few feet below surface to up to 50 feet. Mica schists and granitic gneisses generally weather into yellow, brown, or reddish-brown soils; whereas, mafic rocks such as amphibolites, biotite gneiss, and diabase generally weather into a more dark-red soil (Chapman, Crawford, & Tharpe, 1999). These soils generally consist of micaceous-silt and sand mixtures and clays grading into saprolite and partially weathered rock near the bedrock surface. The saprolite retains most of the original rock structure but is often highly permeable to groundwater flow (Cressler, 1983).

The site geology has been observed during the advancement of soil borings and monitoring wells, dating back to the late 1980s. Monitoring well details are summarized in **Table 1**. Boring logs generated from historic and recent RCAP investigations were used to create three cross-sections to better display subsurface geologic conditions. A Cross-Section Location Map followed by Cross-Sections A-A', B-B', and C-C' are provided as **Figures 6-9**.

A review of the boring logs and cross-sections indicates that subsurface soils consist of a silty, sandy, clay-rich highly variable fill material extending to depths of approximately 15-30 feet below ground surface (ft-bgs). The fill reportedly contains bolder-sized debris and organic materials. Residual soils encountered beneath the fill consist predominantly of micaceous sandy-silts and silty-sands with traces of clay and relict foliation (saprolite) derived from in-place weathering. At depths of approximately 35-55 ft-bgs, the saprolite can be characterized as partially weathered rock (PWR), based on higher blow counts observed during drilling (generally 50+) and appearance of less weathered minerals. Weathering in the PWR zone occurs from a combination of mechanical and chemical processes. The PWR zone consists of weathered mica schists, micaceous granitic gneiss, and biotite and hornblende-rich gneisses and schists. Competent bedrock, based on hollow stem auger refusal, was reported at depths of approximately 60-65 ft-bgs. At depths of greater than 65 ft-bgs, a micaceous gneiss was observed (MW-7B) with intermittent fracturing noted at depths of 87-118 ft-bgs.

During Supplemental Phase 3 rock coring and installation of MW-3B and MW-8 bedrock encountered below the mica schist was described as a biotite gneiss, granitic gneiss, and amphibolite/hornblende gneiss. The gneiss formations were observed to contain alternating mafic and felsic banding/foliation and wavy stress-strain features associated with ductile shearing (common in Brevard Zone formations). Intermittent fracturing was observed from depths of 53 to 200 ft-bgs.

2.5 Regional and Site Hydrogeology

The upper boundary of unconfined groundwater in the Piedmont is formed by the water table. The water table can be loosely defined as the boundary between saturated and unsaturated soil zones. The depth to the water table may range from a few feet below ground surface to up to 50 feet along hilly terrain. The water table in Piedmont regions is usually situated within the soil-saprolite residuum and the upper portion of the fractured crystalline bedrock.

In areas where saprolite thicknesses are minimal, the water table may reside almost entirely in fractured bedrock. The soil-saprolite residuum generally has a relatively large storage capacity with a low to moderate transmissivity. An exception to this is the transition zone between saprolite and bedrock (PWR) where more sandy permeable soils are generally produced from mechanical weathering of the rock unit. The PWR transition zone is often highly transmissive and depending on its thickness and orientation may act as a major groundwater pathway (Cressler, 1983).

In contrast to the saprolite and PWR zone, the bedrock fracture system generally has a relatively low storage capacity with a high transmissivity where fracture systems are interconnected (LeGrand, 1989). If bedrock fracturing is significant, a hydraulic connection between the surficial water bearing zone and deeper groundwater sources may occur at varying depths within the bedrock.

Groundwater flow in the soil-saprolite/fractured bedrock zone (sometimes referred to as the uppermost aquifer) often mimics surface topography except where controlled by preferential pathways. These pathways may be caused by heterogeneities in the soil, weathering patterns of the saprolite, foliated bedding planes, faults, fractures, or other relict bedrock features. Groundwater flow is usually unconfined in the Piedmont with recharge occurring from rainfall penetrating upland areas and discharge occurring as base flow to streams and creeks in low lying areas. These flow regimes are commonly referred to as slope aquifer systems (LeGrand,1989). Depending on the interconnection of fracture zones, a downward gradient is commonly observed in upland areas with an upward gradient present in lowlands.

Productive groundwater wells in the Georgia Piedmont may be located in the saprolite residuum, fractured crystalline bedrock, or a combination of both. Groundwater in the bedrock is transmitted via connected fractures within the rock unit that vary widely. The quantity, size, and degree of connection between these fractures or discontinuities is generally more significant than lithology in determining the amount of water available for withdrawal. Rates of withdrawal are often higher along contact zones between rock units (Chapman, Crawford, & Tharpe, 1999). Piedmont rock types with high reported secondary fracturing and groundwater yield include amphibolites, biotite gneiss, quartzites, and some schists. Secondary permeability and fracture size generally decreases with depth due to overburden pressures. In most places in the Piedmont, well yields are insignificant below a depth of 600 feet (Chapman, Crawford, & Tharpe, 1999).

The findings of previous investigations indicate that the water table occurs near the top of the residuum soils and/or at the base of the fill soils. Groundwater depths across most of the site (excluding MW-12/12A) have historically ranged from approximately 14 ft-bgs in MW-4 to 28 ft-bgs in MW-1. Groundwater depths measured in down-gradient wells MW-12 and MW-12A, located along the intermittent stream bank, have ranged from approximately 1-3 ft-bgs. Groundwater depths and calculated elevations are provided in **Table 2**.

2.6 Groundwater Flow Evaluation

The groundwater flow direction in the uppermost aquifer has been evaluated by creating Potentiometric Surface Maps using calculated groundwater elevations. A review of the April 2023 Potentiometric Surface Map, provided as **Figure 10** indicates groundwater flow is predicted to the northwest toward an unnamed tributary of South Utoy Creek, consistent with past assessments. Shallow groundwater flow does not appear to be directly discharging into the intermittent creek located on the property based on the potentiometric contours.

The average horizontal groundwater flow was calculated using data collected during the April 2023 sampling event. Calculations were performed using the following formula taken from Darcy's equation for fluid flow through a porous medium:

$$Vh = \left[\frac{K \frac{dh}{dl}}{n} \right]$$

Where:

K = the average hydraulic conductivity of 3.565×10^{-6} centimeters per second (cm/sec) or 0.010 feet per day (ft/day), calculated using data evaluated from wells PW-1, MW-5R, MW-6R, and MW-7 from May 1990 recovery tests;

dh/dl = the hydraulic gradient measured as the hydraulic head distance between up-gradient well MW-6R and down-gradient well MW-12 (April 2023 data), divided by the measured distance between the wells, equaling 0.036 ft/ft; and

n = an estimated effective porosity for a silty-sand saprolite of 20% or 0.20 (taken from *Fetter, C. W., 1988, Applied Hydrogeology, 2nd Edition, Macmillan Publishing Company, New York, 592 p*.).

Using this formula, an average horizontal groundwater flow velocity of **0.0018** ft/day or **0.657** feet per year (ft/year) was calculated.

This calculated value assumes groundwater flow occurs through a homogeneous, isotropic, porous medium. Since groundwater flow in the Piedmont is commonly influenced by secondary fracture pathways caused by soil heterogeneities and other structural features not accounted for in this equation, this calculated value should be considered an estimate only of the actual horizontal groundwater flow velocity.

Vertical groundwater flow dynamics have not been evaluated through actual field testing. Comparative observations have been made based on differences in groundwater elevation readings taken from "nested" well locations. Based on these observations, there does not appear to be a hydraulic separation between shallow residuum (saprolite) and weathered rock/top-of-rock (PWR) zones. However, calculations were performed for a vertical groundwater flow or seepage velocity using MW-7/MW-8 and MW-7A/MW-8A (Vv), MW-7A/MW-8A and MW-7B/MW-8B (Vvv), and MW-7B/MW-8B and MW-7B2/MW-8B2 (Vvvv).

Vertical Groundwater Flow Velocity (Vv) between Residuum and PWR Zones:

MW-7 and MW-7A

A review of the boring log and well schematic for MW-7A indicates the well is screened from 48-53 feet below ground surface (ft-bgs) in a weathered mica schist while MW-7 is screened from 28-38 ft-bgs in shallow residual soils. Vertical groundwater flow/seepage between MW-7 and MW-7A likely involves a combination of porous flow through soil and flow through secondary pathways caused by foliation or preferential pathways in the weathered bedrock (saprolite). The vertical groundwater flow (Vv) was calculated using Darcy's equation:

$$Vv = \left[\frac{Kv\,\frac{dh}{dl}}{n}\right]$$

Where:

Kv = the average hydraulic conductivity of 3.565 x 10^{-6} cm/sec or 0.010 ft/day, similar to published values for a weathered mica schist as described in *Batu, Vedat, 1998, <u>Aquifer Hydraulics,</u> John Wiley & Sons, Inc., New York, 727p*.;

dh/dl = the vertical hydraulic gradient measured using the head difference between MW-7 and MW-7A (April 2023 data) divided by the midpoint of each screened interval as the travel length. The calculated gradient is 0.034 ft/ft; and

n = an estimated porosity of 18% or 0.18, assuming a combination of porous and fracture flow for a schist (taken from *Batu, Vedat, 1998, <u>Aquifer Hydraulics</u>, John Wiley & Sons, Inc., New York, 727p*.).

Using these values, the calculated Vv = **0.0019** ft/day or **0.663** ft/year was calculated.

<u>MW-8 and MW-8A</u>

A review of the boring log and well schematic for MW-8A indicates the well is screened from 45-50 ft-bgs in a weathered mica schist while MW-8 is screened from 27-37 ft-bgs in shallow residual soils. As noted above, vertical groundwater flow/seepage between these wells likely involves a combination of porous flow through soil and flow through secondary pathways caused by foliation or preferential pathways in the weathered bedrock (saprolite). The vertical groundwater flow (Vv) was calculated using Darcy's equation:

$$Vv = \left[\frac{Kv\,\frac{dh}{dl}}{n}\right]$$

Where:

Kv = the average hydraulic conductivity of 3.565 x 10^{-6} cm/sec or 0.010 ft/day, similar to published values for a weathered mica schist as described in *Batu, Vedat, 1998, <u>Aquifer Hydraulics,</u> John Wiley & Sons, Inc., New York, 727p*.;

dh/dl = the vertical hydraulic gradient measured using the head difference between MW-8 and MW-8A (April 2023 data) divided by the midpoint of each screened interval as the travel length. The calculated gradient is 0.043 ft/ft; and

n = an estimated porosity of 18% or 0.18, assuming a combination of porous and fracture flow for a schist (taken from *Batu, Vedat, 1998, Aquifer Hydraulics, John Wiley & Sons, Inc., New York, 727p*.).

Using these values, the calculated Vv = **0.0024** ft/day or **0.876** ft/year was calculated.

Vertical Groundwater Flow Velocity between PWR and Bedrock Zones (Vvv):

MW-7A and MW-7B

Vertical groundwater flow/seepage between MW-7A and MW-7B is assumed to occur along secondary pathways caused by foliation, jointing, or fracturing in the PWR and bedrock. A review of the boring log for MW-7B indicates the presence of competent biotite-muscovite-gneiss bedrock beginning at a depth of 65 ft-bgs. Possible water-bearing fractures were identified during drilling at depths of 87 ft-bgs, 107 ft-bgs, 110 ft-bgs, 115 ft-bgs, and 118 ft-bgs. The aperture size, orientation, and connectivity of these fractures is unknown. The screened interval for MW-7B is 111-121 ft-bgs.

Vertical groundwater flow (Vvv) was calculated using Darcy's equation with the following values:

$$Vvv = \left[\frac{Kv \frac{dh}{dl}}{n} \right]$$

Where:

Kv = an estimate of the vertical hydraulic conductivity for fractured gneiss of 1 x 10^{-7} cm/sec or 0.0003 ft/day (taken from *Batu, Vedat, 1998, Aquifer Hydraulics, John Wiley & Sons, Inc., New York, 727p*.);

dh/dl = the vertical hydraulic gradient determined using the head difference between MW-7A and MW-7B (April 2023 data) divided by the midpoint of each screened interval as the travel length and equaling 0.024 ft/ft; and,

n = an estimated fracture porosity of 2% or 0.02 was used (taken from *Freeze, R.A., and Cherry, J.A., 1979, Groundwater: New Jersey, Prentice Hall, Inc., 604 p*.).

Using these values, the calculated Vvv = **0.00036** ft/day or **0.13** ft/year.

MW-8A and MW-8B

Similar to MW-7A and MW-7B, vertical groundwater flow/seepage between MW-8A and MW-8B is assumed to occur along secondary pathways caused by foliation, jointing, or fracturing in the PWR and bedrock. A review of the boring log for MW-8B indicates the presence of competent biotite-muscovite-gneiss bedrock beginning at a depth of approximately 55 ft-bgs. Possible water-bearing fractures were identified during drilling at depths of 53-58 ft-bgs, 61-66 ft-bgs, 66-71 ft-bgs, 71-76 ft-bgs, 91-96 ft-bgs, and 148-153 ft-bgs. The aperture size, orientation, and connectivity of these fractures is unknown. MW-8B was set as an open borehole from 55-80 ft-bgs.

Vertical groundwater flow (Vvv) was calculated using Darcy's equation with the following values:

$$Vvv = \left[\frac{Kv \dfrac{dh}{dl}}{n} \right]$$

Where:

Kv = an estimate of the vertical hydraulic conductivity for fractured gneiss of 1×10^{-7} cm/sec or 0.0003 ft/day (taken from *Batu, Vedat, 1998, Aquifer Hydraulics, John Wiley & Sons, Inc., New York, 727p*.);

dh/dl = the vertical hydraulic gradient determined using the head difference between MW-8A and MW-8B (April 2023 data) divided by the midpoint of each screened interval as the travel length and equaling 0.008 ft/ft; and,

n = an estimated fracture porosity of 2% or 0.02 was used (taken from *Freeze, R.A., and Cherry, J.A., 1979, Groundwater: New Jersey, Prentice Hall, Inc., 604 p*.).

Using these values, the calculated Vvv = **0.00012** ft/day or **0.044** ft/year

Vertical Groundwater Flow Velocity between Intermediate and Deep Bedrock Zones (Vvvv):

MW-7B and MW-7B2

Vertical groundwater flow/seepage between MW-7B (screened 111-121 ft-bgs) and MW-7B2 (screened 195-200 ft-bgs) is assumed to occur along secondary pathways caused by foliation, jointing, or fracturing in the bedrock. The extent and orientation of water-bearing fractures encountered in these two wells is unknown. Dissolved VOC and SVOC contaminant impact has been observed in MW-7B and in discrete water samples collected at intervals of 148-150 ft-bgs and 173-175 ft-bgs, during the drilling of MW-7B2. Detectable VOC/SVOC concentrations were not observed in MW-7B2 suggesting some hydraulic separation between fracture zones.

Vertical groundwater flow (Vvvv) was calculated using Darcy's equation with the following values:

$$Vvvv = \left[\frac{Kv \frac{dh}{dl}}{n} \right]$$

Where:

Kv = an estimate of the vertical hydraulic conductivity for fractured gneiss of 1 x 10^{-9} cm/sec or 0.000003 ft/day (taken from *Batu, Vedat, 1998, Aquifer Hydraulics, John Wiley & Sons, Inc., New York, 727p*.);

dh/dl = the vertical hydraulic gradient determined using the head difference between MW-7B and MW-7B2 (April 2023 data) divided by the midpoint of each screened interval as the travel length and equaling 0.033 ft/ft; and,

n = an estimated fracture porosity of 1% or 0.01 was used (taken from *Freeze, R.A., and Cherry, J.A., 1979, Groundwater: New Jersey, Prentice Hall, Inc., 604 p*.).

Using these values, the calculated Vvvv = **0.0000099** ft/day or **0.0036** ft/year.

MW-8B and MW-8B2

Vertical groundwater flow/seepage between MW-8B (open borehole 55-80 ft-bgs) and MW-8B2 (screened 148-153 ft-bgs) is assumed to occur along secondary pathways caused by foliation, jointing, or fracturing in the bedrock. Fractures were observed at MW-8B, most evidenced by moderate to slight rock weathering, iron oxide (rust colored) mineralization, and oil contaminant odor. In addition, during well installation activities, MW-8B contained oil product residue in fracture zones encountered in the 66-71 ft-bgs interval. Dissolved VOC and SVOC contaminant impact has been observed in both MW-8B and MW-8B2 suggesting hydraulic connection between fracture zones.

Vertical groundwater flow (Vvvv) was calculated using Darcy's equation with the following values:

$$Vvvv = \left[\frac{Kv \frac{dh}{dl}}{n} \right]$$

Where:

Kv = an estimate of the vertical hydraulic conductivity for fractured gneiss of 1 x 10^{-9} cm/sec or 0.000003 ft/day (taken from *Batu, Vedat, 1998, Aquifer Hydraulics, John Wiley & Sons, Inc., New York, 727p*.);

dh/dl = the vertical hydraulic gradient determined using the head difference between MW-8B and MW-8B2 (April 2023 data) divided by the midpoint of each screened interval as the travel length and equaling 0.0068 ft/ft; and,

n = an estimated fracture porosity of 1% or 0.01 was used (taken from *Freeze, R.A., and Cherry, J.A., 1979,* <u>Groundwater:</u> *New Jersey, Prentice Hall, Inc., 604 p*.).

Using these values, the calculated Vvvv = **0.0000020** ft/day or **0.00073** ft/year.

3.0 CONTAMINANT ASSESSMENT

A summary of contaminant assessment data is provided in this section based on data previously described in the 2011 RCAP, Phase 1, 2, 3, and 4 Progress Reports, Interim Measures Progress Reports, and Impoundment Summary Report. These reports have been included electronically as an attachment (**Appendix A**). A brief description of various impacted media and detected constituents is provided in the subsections below followed by a discussion of dissolved constituent trends and the horizontal and vertical extent of regulated constituents in the groundwater.

Regulated constituents primarily resulting from releases of wood treatment chemicals have been detected (or is expected to be present) in soil, sediment, surface water, and groundwater at the site. Most samples collected at the site are of groundwater associated with the HWMU. Constituents detected include a mixture of dissolved VOCs and SVOCs associated with wood treatment operations. NAPL has also been detected in POC wells. Metals and dioxins have been detected in the groundwater; however, the significance of these detections has not yet been determined relative to background conditions.

3.1 Delineation of Constituents in Soil

Soil samples were not collected during the HWMU closure or subsequent installation of monitoring wells. A total of 11 SWMUs were identified by EPD during a 1988 RCRA Facility Assessment (RFA). Soil samples have been collected from all but three, SWMUs #3, #5, and #7. Soil samples were collected based on visual observations of surface staining or potential for releases of regulated constituents. Samples were collected to evaluate the presence of regulated constituents in the soil in 1991 and 2002. Sampling results were summarized in the 2011 RCAP (Appendix A). Following approval of the 2011 RCAP, pilot based corrective action activities were implemented and detailed in phased progress reports. Descriptions of the sampling events are provided below in italicized headings by date.

July 1991 Sampling Event

On July 17-19, 1991, a total of 18 soil samples were collected for laboratory analysis from 10 separate locations by WCM personnel. The samples were collected from accessible subsurface soils around SWMUs #1, #2, #4, and #8. All samples were collected prior to excavation and renovation of the SWMU areas. Background samples (B-3) were also collected at approximate depths of one (1) inch and 12 inches adjacent to MW-1, an up-gradient well. The sampling plan followed required the collection of an initial sample from approximately 1-inch below ground surface, in a presumed “worst case” location.

If visual or olfactory indicators identified possible regulated constituents, a subsequent sample was collected at a depth of 12 inches. All samples were submitted for analysis of VOCs, SVOCs, and metals using the EPA Toxicity Characteristic and Leaching Procedure (TCLP) EPA Method 1311, as described in a draft September 1991 RFI Work Plan. TCLP analysis was performed to evaluate hazardous waste leaching characteristics and to determine disposal requirements. Due to the construction schedule, sample collection was performed prior to EPD review and approval. A later review by the EPD indicated that TCLP results would not be acceptable and required standard soils analyses using the appropriate EPA methods for SWMU #6 and any future SWMU sampling.

Non-detect or low-level concentrations were generally observed for the TCLP constituents reported. None of the TCLP levels were exceeded indicating that the samples did not exhibit hazardous characteristics. In an effort to convert the TCLP findings into mass based comparative results, the TCLP concentrations were multiplied by a factor of 20, based on the dilution factors utilized in EPA Method 1311. The resulting calculation provides theoretical "worst case" concentrations in milligrams per kilogram (mg/kg). The calculated concentrations were provided in the 2011 RCAP (Appendix A).

All of the sample locations indicated a decline in concentration at one foot, with the exception of the A-3 location collected at SWMU #2. During soil excavation, impacted soils were removed below the 12 inch depth in the SWMU areas, eliminating a future source for subsurface soil or groundwater impact.

July 2002 SWMU #6 Sampling Event

In July 2002, four soil samples (Site A, Site B, Site C, and Site D) were collected by WCM personnel from the cooling pond area (SWMU #6) following excavation around the sides of the concrete tank. The samples were collected at depths ranging from 42 to 72 inches after visual and olfactory indicators suggested that "clean" soils were encountered at depth. Samples were collected using dedicated stainless-steel scoops. The samples were submitted for analysis of VOCs, SVOCs, metals, and dioxins by a local laboratory. VOCs and metals were detected above laboratory reporting levels in all samples collected. The dioxin results also indicated detections in each of the samples; however, background samples were not collected for comparison. The results were provided in the 2011 RCAP (included electronically as **Appendix A**).

October-January 2012 Phase 1 Investigation

Phase 1 corrective action investigations were conducted from October 2011 to January 2012 at WCM. Phase 1 was the first of eight corrective action phases designed to provide a 1) a pathway to delineate the extent of target constituents in various environmental media and 2) better delineate areas potentially targeted for corrective action, as detailed in the 2011 RCAP. Phase 1 was specifically designed to delineate the extent of NAPL and high dissolved VOCs and SVOCs at the HWMU.

On October 26-28, 2011, Envirorisk installed a total of 12 temporary wells to depths of approximately 32-34 ft-bgs. The temporary wells were installed using 15-foot Schedule 40 PVC screen sections threaded to one-inch diameter PVC riser sections completed with a 1" PVC slip cap. During well installation, a total of 28 soil samples were collected from the 12 borings and were analyzed for VOCs, SVOCs, and metals. The analytical results from the soil sampling event detected a total of nine (9) VOCs, 22 SVOCs, and nine (9) Metals. During temporary well installation and/or the January 2011 sampling event, NAPL was detected in TW-3, TW-6, TW-10, TW-11, and TW-12. A sheen of NAPL was also detected in TW-7. Envirorisk recommended the installation of eight (8) additional temporary wells to aid in the completion of NAPL delineation. A copy of the March 2012 Phase 1 Progress Report is included electronically in **Appendix A**.

July 2012 Supplemental Phase 1 and Phase 2 Investigations

In July 2012, Phase 2 corrective action investigations were conducted which targeted SWMUs #1, #4, #6, and #8 around the wood preserving area. Phase 2 was specifically designed to delineate the extent of VOCs and SVOCs in soil and groundwater from prior investigations. In addition, additional delineation to complete Phase 1 was conducted.

Envirorisk oversaw the installation of 13 soil borings at SWMU #1, #4, #6, and #8 and three (3) background borings. All samples were analyzed for SVOCs, VOCs, and metals. In addition, one background sample was analyzed for dioxins, soil oxidant demand (SOD), bulk porosity, soil permeability/hydraulic conductivity, total organic carbon (TOC), and grain size. One sample from each SWMU with the exception of SWMU 8 was proposed for dioxin analysis, but due to a laboratory error, the analysis was not performed. In addition, only one sample interval from SWMU 6-1 and 6-2 was analyzed due to the apparent absence of target constituents based on photoionization detector (PID) readings and olfactory indications.

The VOC extent in fill soils (3-16 ft-bgs) was contoured to indicate the presence of three (3) zones totaling approximately 1,913 square feet (sf); however, the soil volume was not calculated. The VOC plume in saturated soils (16-36 ft-bgs) was depicted as one contoured boundary covering approximately 31,970 sf, which equates to 23,681 cubic yards. VOC concentrations were relatively low when compared to SVOCs, as would be expected due to lower dissolved VOC concentrations in the groundwater. Based on the findings, the horizontal extent of VOCs in fill and saturated soils appear to have been approximately delineated by non-detect to low level concentrations in all directions except the southeast and the south due to the presence of the Treatment/Preserving Facility.

The SVOC extent in fill soils (3-16 ft-bgs) was contoured to indicate the presence of four (4) zones totaling approximately 29,892 sf (volume not calculated). The SVOC extent in saturated soils (16-36 ft-bgs) was contoured to indicate the presence of two (2) zones totaling 43,462 sf, which equates to 32,194 cubic yards. SVOCs in fill soils were not fully delineated. SVOCs in saturated soils have been delineated in all directions except around the smaller TW-13 plume and south/southeast of the HWMU. Additional delineation at the HWMU source area was recommended.

Isoconcentration maps were prepared depicting the horizontal extent of VOCs and SVOCs in soils at the SWMU areas. VOC/SVOC impacted soils were detected at SWMUs #1, #4, and #6. Impacted soils were not detected at SWMU #8. The VOC extent in the SWMU areas was contoured to indicate the presence of three (3) zones covering approximately 3,347 sf. The SVOC extent in the SWMU areas was contoured to indicate the presence of five (-5-) zones covering approximately 8,861 sf. Concentrations were highest in samples collected at the old cooling pond area, SWMU #6. Additional horizontal and vertical delineation was recommended.

In addition, 10 temporary wells (TW-13 through TW-21, TW-23) were installed to complete NAPL delineation. Nine additional wells were recommended in the Phase 1 report; however, due to the presence of NAPL in TW-20, an additional boring (SB-22) was installed to attempt to complete delineation. TW-23 was subsequently installed further east of SB-22 due to the presence of NAPL in SB-22. The new and existing temporary wells were gauged for NAPL during installation and approximately 40 days following and were then abandoned. A copy of the October 2012 Phase 2 Progress Report is included electronically in **Appendix A**.

January-April 2013 Phase 3 Investigation

Phase 3 corrective action investigations were conducted at WCM from January – April 2013. Phase 3 is the third of eight corrective action phases, as detailed in the 2011 RCAP, and was specifically designed to delineate dissolved VOCs and SVOCs in saprolitic soils and bedrock and complete vertical delineation. In addition to completion of Phase 3 activities, background sampling of soils for dioxins and furans was conducted.

Subsurface soils were observed during the advancement of MW-5A to a depth of 46 ft-bgs and MW-7B2 to a depth of 73.5 ft-bgs prior to installation of an outer casing. A review of both boring logs indicates the presence of fill soils to depths of 28 ft-bgs in MW-7B2 and 32 ft-bgs in MW-5A followed by native sandy silt/silty sands with varying amounts of clay and evidence of foliation indicative of saprolite. The soils appeared generally consistent with previous evaluations. At MW-5A, “creosote-like” product zones were encountered from 22-23 ft-bgs and “pockets” of product were noted from 23-31 ft-bgs in fill materials. PID hits were observed in MW-5A throughout. For MW-7B2, PID hits and noticeable odors were trace or not observed (from 0-73.5’).

Soil sampling for metals was conducted during July 2012 Phase 2 implementation and results were reported in the Phase 2 Progress Report/Revised Phase 2 Progress Report. Per EPD’s request in the comments provided on July 10, 2013, results were compared to calculated background concentrations. Site background concentrations for metals were calculated by taking two times the arithmetic mean of the three background samples (SB/BK-1, SB/BK-3, and SB/BK-4 at 1 foot on 2-28-13). In cases where the background concentration was below the laboratory detection limit, the detection limit was utilized in the calculation. Based on a comparison to the calculated values, background concentrations were exceeded for all metals in at least one sample collected. Barium and zinc concentrations exceeded background concentrations most frequently. A comparison of concentrations in fill versus saprolitic (native) soils indicates about half of the exceedances were in fill soils versus half in saprolitic soils. In general, metal concentrations tended to be higher in the deeper saprolitic soils, indicating naturally occurring metals are present in the parent bedrock. Zinc concentrations were notably higher in shallow fill soils collected around SWMU #1. The source of the zinc in these fill soils may be galvanized metal debris or similar debris products located in the area(s) sampled. It is unknown the exact source of these higher concentrations around SWMU #1.

Barium concentrations exceeded background concentrations more than the other metals, so Envirorisk analyzed the sampling results in detail to determine any relevant trends. Approximately half of the exceedances were in fill material, and half were in saprolitic soils. In addition, soil samples with creosote pockets and/or odor did not exceed background concentrations more often than non-impacted soils. Based on these observations, there does not appear to be any clear pattern of barium concentrations between fill and native soils, or soils impacted with creosote.

Envirorisk further evaluated metal detections at the site by averaging concentrations by the following four (4) categories: fill with no odor/septic odor, fill with creosote odor and/or staining, saprolite above the water table (0-16 ft-bgs), and saprolite below the water table (16 ft-bgs and deeper). Soil samples collected from intervals containing charcoal, coal, and/or ash were excluded from the averaging (SWMU 1-2, SWMU 1-3, SWMU 4-3, and SWMU 4-4). Analytical results indicated concentrations of arsenic and barium slightly exceeded background concentrations in saprolitic soils; however, did not exceed the range for Piedmont soils. Chromium slightly exceeded background concentrations in fill soils only. Cobalt exceeded the calculated background concentration in saprolite below the water table only due the elevated levels in one sample collected from TW-16. The cobalt concentration in this sample was 753 mg/kg. TW-16 did not contain high concentrations of other metals tested, and since the source of this detection is unknown, the result appears to be an anomaly. When this sample is removed from the calculation, the average cobalt concentration for deeper saprolite soils is 16.2 mg/kg, below the background concentration. Zinc exceeded background concentrations in all soils except shallow saprolite. Concentrations of copper, lead, nickel, and vanadium did not exceed background concentrations in any soil type. In general, the findings suggest no significant differences in metal concentrations between native and fill soils. Based on the evaluation of the soil data, it was concluded the source of metals was likely attributed to chemical weathering of native minerals in the underlying bedrock. Additional assessment of the extent and distribution of metals at this site was not recommended.

Dioxins were collected at a depth of one foot from SB/BK-1, SB/BK-3, and SB/BK-4 in presumed "clean" locations for analysis using EPA Method 8290. Prior samples were run by EPA Method 8280 which has a higher detection limit. Sampling results indicated detections of Hexa CDD/CDF, Hepa CDD/CDF, Penta CDF, OCDF, and OCDD. A copy of the September 2013 Phase 3 Progress Report is included electronically in **Appendix A**.

November 2016 – August 2017 Supplemental Phase 3 Investigation

Based on an August 23, 2016 meeting with EPD, additional bedrock delineation was requested to evaluate VOC/SVOC distribution and hydraulic pathways. Based on investigations performed around the MW-7 well cluster, these pathways included fracture zones from 85 to 175 ft-bgs, and possibly deeper, prior to termination at 195 ft-bgs. On October 17, 2016, Envirorisk submitted a *Supplemental Work Plan/Corrective Action Cost Estimate* detailing the proposed field work associated with additional bedrock delineation (Supplemental Phase 3). Supplemental Phase 3 activities were initiated in November 2016 and included horizontal and vertical bedrock delineation through the installation of monitoring wells MW-8A, MW-8B, MW-8B2 (adjacent to MW-8), and MW-3B (adjacent to MW-3 and MW-3A). (An outer casing for bedrock monitoring well MW-5B was installed but the well was not completed.)

Subsurface soils were observed during the advancement of MW-3B to a depth of 62.5 ft-bgs, MW-8A and MW-8B to depths of approximately 50 ft-bgs, and MW-5B to a depth of 46 ft-bgs prior to installation of an outer casing. At MW-3B, MW-8A, and MW-8B, fill soils were observed to depths of approximately 25-30 ft-bgs, followed by micaceous sandy-silt/silty-sand saprolite derived from an apparent mica schist parent rock. The soils appeared generally consistent with previous evaluations. At MW-5B and MW-5A, silty, sandy fill soils extended to approximately 32 ft-bgs where native saprolite was observed. Apparent “creosote-like” product zones (NAPL) were encountered from 22-23 ft-bgs and NAPL pockets were noted from 24-31 ft-bgs in fill materials, including a black saturated zone at 27-28 ft-bgs. Based on field observations and PID/olfactory indications, the more impacted saturated soils appeared to extend to depths of approximately 35 ft-bgs. At MW-3B, odors were minimal or not observed with no detectable PID hits (from 0-62.5 ft-bgs).

In order to evaluate VOC and SVOC impact in deeper saturated soils, two (2) soil samples were collected at MW-8A and MW-5B at depths of 50 ft-bgs and 46 ft-bgs, respectively. Soil samples, identified as MW-8A-50’ and MW-5B-46’, were submitted for laboratory analysis of site-specific VOCs and SVOCs. Based on the analytical results, none of the site-specific VOCs were detected above the laboratory reporting limit in either of the two (2) soil samples. The following SVOCs were detected above the laboratory reporting limit in soil samples MW-8A-50’ and MW-5B-46’:

- MW-8A-50’ – Naphthalene [0.73 milligrams per kilogram (mg/kg)].
- MW-5B-46’ – 2-Methylnaphthalene (5.3 mg/kg), Acenaphthene (6.7 mg/kg), Anthracene (4.1 mg/kg), Benz(a)anthracene (2.0 mg/kg), Benzo(a)pyrene (0.80 mg/kg), Benzo(b)fluoranthene (1.8 mg/kg), Carbazole (2.8 mg/kg), Chrysene (2.0 mg/kg), Dibenzofuran (5.4 mg/kg), Fluoranthene (8.5 mg/kg), Fluorene (7.5 mg/kg), Naphthalene (8.6 mg/kg), Phenanthrene (18 mg/kg), and Pyrene (6.6 mg/kg).

While the detections in MW-5B-46’ do not suggest the presence of NAPL at this depth interval, these concentrations indicate a source of SVOCs for continued matrix diffusion into the groundwater. Groundwater sampling and delineation efforts are detailed in Section 3.4. A copy of the April 2021 Supplemental Phase 3 Progress Report is included electronically in **Appendix A**.

March 2014 Phase 5 Treatability Evaluation

Phase 5 was specifically designed to evaluate various chemical oxidants to determine contaminant degradation efficiencies, optimum concentration for treatment, and the most effective reaction catalyst(s). On March 14, 2014, Envirorisk oversaw the advancement of borings TS-1 and TS-2/2A using a direct push rig. TS-1 was advanced adjacent to MW-7 to a depth of approximately 36 feet below ground surface (ft-bgs). Soils were field screened using a PID and were classified on boring logs to aid in determining sample collection depth. A soil sample was collected from 28-32 ft-bgs for analysis of SVOCs. TS-2/2A were advanced immediately adjacent to MW-6R (outside of the fence) in a presumed “worst case” location to depths of approximately 40 ft-bgs. Soil samples were collected from 24-28 and 34-35 ft-bgs for analysis of SVOCs based on PID readings and olfactory indications. Soil samples collected from TS-1 and TS-2/2A were used to aid in determining background concentrations for comparison during treatability degradation testing. Based on the findings of the bench scale treatability evaluation, the following pilot tests were recommended:

- An ISCO pilot injection using sodium permanganate to evaluate use for limited area treatment and as a solid phase permeable reactive barrier (PRB), as described in Phase 6.
- A source area pilot using soil blending conducted in three large diameter borings utilizing sodium percarbonate, catalyzed hydrogen peroxide (CHP) combined with a catalyst/stabilizer, and un-catalyzed CHP (Phase 6A); and
- An ozone pilot injection to evaluate possible use as a source area or barrier treatment (Phase 6B).

Soil delineation efforts were not conducted during Phase 5 site activities. A copy of the July 2014 Phase 5 Progress Report is included electronically in **Appendix A**.

August - October 2014 Phase 6A/B Pilot Testing

Phase 6 as proposed in the 2011 RCAP initially consisted of an ISCO pilot only. However, based on the results of Phase 1 (a larger area of NAPL than previously documented) and the treatability testing (Phase 5), a soil blending pilot (Phase 6A) and ozone injection pilot (Phase 6B) was recommended. Phase 6 pilot ISCO activities involved the injection into four (4) direct push test (DPT) borings surrounding the MW-7 cluster. Soil data was not collected during this phase of corrective action. Phase 6A evaluated the effectiveness of a modified soil oxidant blending treatment in the source area using combinations of sodium percarbonate and CHP with and without stabilizers. On August 13-14, 2014 and October 24, 2014, four large diameter pilot borings (PB-1, PB-2, PB-3, and PB-4) were advanced to approximately 30-35 feet below ground surface (ft-bgs) using a “bucket” auger rig. Borings were located west of the source area and adjacent to MW-6R, near the edge of the NAPL plume. Soils were placed in lined roll-offs for ex-situ soil blending. Baseline and confirmation soil samples were collected and analyzed for SVOCs and VOCs (site specific list) from each of the pilot borings and compared to determine the percent change in concentrations as a result of soil blending using the different oxidants.

Based on the comparisons, all SVOCs were reduced to below laboratory reporting limits in PB-1, PB-2, and PB-3. PB-4 showed an increase in concentrations; however, based on field observations there was a noticeable reduction in creosote NAPL. These observations indicate that once oxidized, NAPL will break down into SVOCs, which can increase saturated soil and groundwater concentrations prior to supplemental oxidant treatment. Soil delineation efforts were not conducted during Phase 6A or ozone pilot (Phase 6B); however, creosote NAPL was visually observed in both pilot testing areas. A copy of the September 2016 Phase 6A/B Progress Report is included electronically in **Appendix A**.

March 2014 – July 2016 Phase 4 Investigations

Phase 4 consists of SWMU 9 and 10 delineation, specifically along the creek and the storm drain. Phase 4 activities included sediment and surface water sampling, sampling of temporary wells in the creek, and SWMU 10 soil delineation along the storm drain. Phase 4 activities were implemented in a phased approach, with sediment and stream sampling reported in two letters dated March 2014 and February 2015. (Sediment, surface water, and groundwater sampling efforts are discussed in Sections 3.2, 3.3, and 3.4, respectively.)

On July 26, 2016, six soil borings in SWMU 10 (SWMU10-1, -1A, -1B, -2, -3, and -4) were advanced using a Geoprobe 5400 direct push track rig. Borings were advanced to approximately 20-fts (with the exception of SWMU10-1A which encountered refusal at 16 ft-bgs). One sample was collected from a presumed “worst case” location in shallow zone soils exhibiting highest PID readings and/or based on visual/olfactory observations and one sample was collected from a deeper zone in all the borings (except SWMU10-1A and SWMU10-1B). Soil samples were analyzed for site specific SVOCs, VOCs, and metals. SVOCs were detected in SWMU 10-1B, SWMU 10-2, and SWMU 10-3 at depths ranging from 8-12 ft-bgs which may indicate migration of impacted soil/sediment in or around the storm drain. The data indicated regulated constituents in soil at or near the depth of the storm sewer suggesting that the sewer line may be acting as a conduit between the HWMU/wood treating area and SWMU 10. The soil data collected suggests source(s) other than the impoundment including possible debris from the railroad. The other sampling locations did not contain any detections of SVOCs, and no sampling locations contained VOCs.

From September 22-24, 2015, eight (-8-) borings (TW-12 to TW-19) were installed around the tributary and flood plain using a hand auger since the area was wooded and inaccessible by a drill rig. Borings were advanced to depths ranging from 6-12 ft-bgs and soil samples were collected for analysis of site-specific SVOCs, VOCs, and metals. The highest total SVOC concentration was 1,902 mg/kg detected in TW-17 at 2 ft-bgs. TW-17 was located northwest of the impoundment adjacent to the creek. TW-19, sampled at 3 ft-bgs and located slightly further west of TW-17, also contained elevated total SVOCs (225 mg/kg). TW-15, sampled at 3 ft-bgs and located south of SWMU 9 near the office building was below laboratory reporting limits. Soil samples collected from deeper depths of 5-7 ft-bgs contained trace or no SVOCs. No VOCs were detected in any of the soil samples. Soil samples were also analyzed for metals, with detections fairly consistent, with the exception of TW-17 at 2 ft-bgs which contained slightly higher detections. As previously discussed, metals at this site are attributed to naturally occurring sources. A copy of the September 2016 Phase 4 Progress Report is included electronically in **Appendix A**.

March – July 2017 Supplemental Phase 4 Investigation

Based on impacts reported in the September 2016 Phase 4 Progress Report, a Phase 4 Supplemental Delineation Sampling Plan was developed in January 2017 (revised February 2017) detailing the proposed installation and sampling of additional temporary monitoring wells in the stream. The sampling plan also proposed additional surface water and sediment sample locations and stormwater and associated sediment sample locations. The Phase 4 Supplemental Delineation Sampling Plan was approved by EPD on February 20, 2017 and Phase 4 sampling activities were conducted March – July 2017 and included the following:

- Sediment and surface water sampling of six (6) creek locations;
- Installation of 16 temporary monitoring wells in the creek;
- Soil and groundwater sampling at 16 temporary monitoring well locations; and
- Collection of stormwater and associated sediment at four (4) property boundary locations and five (5) outfall locations.

In March 2017, the highest total SVOC concentration was 451.8 mg/kg in TMW-9 at 0-1 ft-bgs. Elevated total SVOC concentrations were also observed in 0-1 ft-bgs soil samples collected southeast of TMW-9 in TWM-10 (213.7 mg/kg) and TWM-11 (104.62 mg/kg). The highest total SVOC concentration in a sample collected beneath the surface (2 ft-bgs and deeper) was 62.77 mg/kg in TMW-1 at 2 ft-bgs. Soil samples collected depths of 3 ft-bgs and deeper contained trace or no SVOCs. Other than acetone, no VOCs were detected in any of the temporary well soil samples.

In order to further evaluate possible contaminant flow pathways, PCP was evaluated using the March 2017 soil data. PCP was detected in seven (7) of the 18 soil samples collected, as follows:

- TMW-1 (0 – 1’) – 10.0 mg/kg;
- TMW-1 (2’) – 9.40 mg/kg;
- TMW-3 (0 – 1’) – 4.3 mg/kg;
- TMW-4 (0 – 1’) – 2.2 mg/kg;
- TMW-5 (0 – 1’) – 6.2 mg/kg;
- TMW-7 (0 – 1’) – 4.0 mg/kg; and
- TMW-13 (0 – 1’) – 5.0 mg/kg.

Based on the location of these samples and the shallow depth of collection, the PCP detections are likely the result of ongoing stormwater discharge impacts to the tributary and surrounding flood plain impacts. As such, additional delineation of the shallow soil impacts was recommended.

In March 2017, soil samples from the temporary monitoring wells were also analyzed for total metals, with detections consistent throughout all the samples. Total metals in samples collected from 0-1 ft-bgs ranged from 12,001.5 mg/kg in TMW-4 to 32,321.74 mg/kg in TMW-8. Total metals in samples collected from 2-9 ft-bgs ranged from 5,463.3 mg/kg in TMW-13 @ 2' to 26,492.61 ft-bgs in TMW-8 at 9'. TMW-13 contained much lower concentrations than other sample locations. Metal concentrations were consistent throughout the site at all depths, and concentrations were not higher in shallow soils, near SWMUs, or in locations where groundwater samples contained regulated constituents indicative of site operations. As previously noted, metals at this site are attributed to naturally occurring sources.

Soil sampling results were compared to the EPA's June 2017 Regional Screening Levels (RSLs) for Industrial Soil for comparison purposes only. (Please note that clean-up standards are currently set to background since a risk assessment has not been performed). During the September 2015 sampling event, SVOCs exceeded applicable standards in TW-17 only and one metal detection exceeded applicable standards (arsenic in TW-16). During the March 2017 sampling event, a few SVOC detections and multiple arsenic detections exceeded the standards. A copy of the November 2017 Supplemental Phase 4 Progress Report is included electronically in **Appendix A**.

April – July 2017 Impoundment Investigation

On April 6, 13, and 14, 2017, Envirorisk mobilized to the site to oversee the installation of three (3) temporary monitoring wells (TW-1, TW-2, and TW-3) on the south end of the former impoundment. (Temporary wells were later converted to permanent monitoring wells HWMU-1, HWMU-2, and HWMU-3.) The purpose of this investigation was to determine if past/present operations conducted in the wood preserving area, which includes SWMUs 1, 2, 3, 4, 6, and 7, act as a source of NAPL detected down-gradient/cross-gradient of the impoundment (HWMU). The wells were installed using a combination of direct push technology and hollow stem auger (HSA) drilling using 4¼" inner diameter (ID) augers. Each of the three (3) wells were drilled to a depth of approximately 35 ft-bgs. Soil logging was performed on April 6, 2017 using direct push to provide continuous cores for field examination of fill versus native soils as well as screening and analysis. Soils were screened using a PID and field NAPL test kits. A total of two soil samples were collected from each well location (for a total of six) for analysis of VOCs and SVOCs. Soil sample designations and depths are provided below:

- HWMU-TW-1-16', HWMU-TW-1-24', HWMU-TW-2-(5-6'), HWMU-TW-2-24', HWMU-TW-3-4', and HWMU-TW-3-29'

Based on the analytical results, soil impacts were observed in each of the temporary well locations with the highest concentrations of VOCs and SVOCs observed in the deeper soil samples (collected at the soil-groundwater interface). A discussion of LNAPL observations and groundwater impacts is provided in Section 3.4. A copy of the July 2017 Impoundment Summary Report and May 2022 Updated Impoundment Summary Report are included electronically in **Appendix A**.

November 2018 - April 2019 Supplemental Phase 4 Investigation

The November 2017 Supplemental Phase 4 Progress Report recommended additional delineation of soil, groundwater, stormwater and sediments at the WCM facility. EPD responded in a letter dated April 24, 2018 providing comments relevant for completion of the Phase 4 delineation investigation. WCM and Envirorisk concurred with these comments in an August 31, 2018 letter and delineation efforts were implemented in November 2018. The November 2018–April 2019 Phase 4 activities included the bulleted items listed below. (Note: sediment, surface water, and groundwater sampling efforts are discussed in Sections 3.2, 3.3, and 3.4, respectively.). An aquatic resource delineation (wetland delineation) and outfall survey was also performed.

The scope of work included the following bullet items:

- Aquatic Resource Delineation by Contour Environmental, LLC (Contour);
- Professional survey of Outfall-2 stormwater pipe at stream;
- Sediment and surface water sampling of six (6) stream locations;
- Installation of 17 temporary monitoring wells upgradient and along the stream;
- Soil and groundwater sampling at 17 temporary monitoring well locations; and
- Collection of stormwater and associated sediment at seven (7) property boundary locations and four (4) outfall locations.

From February 13-14, 2019 and March 2, 2019, and March 25-26, 2019, TMW-17 through TMW-33 were installed in locations upgradient and in and around the tributary and flood plain at locations deemed necessary to complete delineation. Temporary well locations upgradient of the tributary and flood plain (TMW-17 through TMW-21) were installed using a direct push track rig. The remaining temporary well locations (TMW-22 through TMW-33) were installed using a hand auger since the area was wooded and inaccessible by a drill rig. One of the proposed temporary well locations along the stream bank was not completed due to the steep sloping banks.

Soil borings installed upgradient of the tributary and flood plain (TMW-17 through TMW-21) were advanced to depths ranging from approximately 15 to 45 ft-bgs while soils borings installed along the tributary and flood plain (TMW-22 through TMW-33) were advanced to depths ranging from 5 to 10 ft-bgs. Soil samples were collected for analysis of site-specific VOCs, SVOCs, and metals as well as Aluminum and Mercury. One (1) soil sample (TMW-25-5 ft-bgs) was collected for analysis of Dioxins and Furans.

Soils consisted of a mixture of sandy silt at shallower depths with clay content increasing with depth. The soils appeared to consist of a combination of alluvium, fill, and native soils (saprolite) derived from in-place weathering of bedrock. Odor indicative of site operations was present at depths ranging from 1 to 10 ft-bgs in all the wells except TMW-

17, TMW-18, TMW-19, TMW-20. In addition, an apparent sheen (presumed to be creosote-related) was observed in TMW-7, TMW-9, TMW-10, TMW-11, and TMW-12.

In February and March 2019, the highest total SVOC concentration detected in surface soil (0 to 1 ft-bgs) was 46.02 mg/kg in TMW-25 at 1 ft-bgs. Total SVOCs were also detected in the following soil samples collected 0 to 1 ft-bgs:

- TMW-22 (0.70 mg/kg), TMW-23 (3.35 mg/kg), TMW-24 (2.87 mg/kg), TMW-26 – (10.43 mg/kg), TMW-29 (4.92 mg/kg), TMW-31 (10.87 mg/kg), and TMW-32 (0.43 mg/kg)

The highest total SVOC concentration in a sample collected beneath the surface (2 ft-bgs and deeper) was 1,529.4 mg/kg in TMW-25 at 5 ft-bgs. Total SVOCs were also detected in the following soil samples collected 2 ft-bgs and deeper:

- TMW-17 (4-5 ft-bgs) - 11.03 mg/kg
- TMW-23 (4 ft-bgs) - 26.60 mg/kg
- TMW-24 (5 ft-bgs) – 0.70 mg/kg
- TMW-28 (5 ft-bgs) – 44.08 mg/kg
- TMW-29 (5 ft-bgs) – 4.74 mg/kg
- TMW-29 (7 ft-bgs) – 110.09 mg/kg

VOCs were detected in the temporary well soil samples, as follows:

- Acetone – TMW-22 (0-1 ft-bgs) – 0.38 mg/kg
- Tetrachloroethene – TMW-33 (5 ft-bgs) – 0.023 mg/kg, and
- 1,2,4-Trimethylbenzene – TMW-25 (5 ft-bgs) – 0.20 mg/kg.

No other VOCs were detected above laboratory detection limits in the remaining soil samples.

Dioxins were analyzed in soil sample TMW-25-5 ft-bgs. Based on the analytical results, the following dioxin/furan compounds (tabulate total concentrations) were detected above laboratory reporting limits [results presented in nanograms per kilogram (ng/kg)]:

- Total TCDF – 140 ng/kg
- Total TCDD – 85 ng/kg
- Total PeCDF – 1,100 ng/kg
- Total PeCDD – 270 ng/kg
- Total HxCDF – 7,900 ng/kg
- Total HxCDD – 7,200 ng/kg
- Total HpCDF – 66,000 ng/kg
- Total HpCDD – 36,000 ng/kg
- OCDF – 50,000 ng/kg
- OCDD – 130,000 ng/kg

In February – March 2019, total metals detections were consistent throughout all the samples. Total metals in samples collected from 0-1 ft-bgs ranged from 10,702.87 mg/kg in TMW-28 to 22,812.2 mg/kg in TMW-22. Total metals in samples collected from 2 ft-bgs and deeper ranged from 4,785.2 mg/kg in TMW-33 at 5 ft-bgs to 30,635.13 mg/kg in TMW-27 at 4 ft-bgs. TMW-33 contained much lower concentrations than other sample locations. Metal concentrations were consistent throughout the site at all depths, and concentrations were generally not higher in shallow soils, near SWMUs, or in locations where groundwater samples contained regulated constituents indicative of site operations. As previously discussed, metals at this site are attributed to naturally occurring sources.

No additional soil samples have been collected at the site since the November – April 2019 Supplemental Phase 4 Investigation. A copy of the June 2019 Supplemental Phase 4 Progress Report is included electronically in **Appendix A**.

Data Gaps

Based on the information obtained from soil sampling on site and discussions with EPD personnel, delineation of soil is not complete. The following data gaps have been identified:

- Surface soil samples have not been collected sitewide except in SWMUs #9 and #10. Additional surface soil sampling is recommended across the site;
- Soils east, west, and south of the preserving area (SWMU #1, #4, and #6 areas) have not been delineated;
- SVOCs were detected in SWMU 10-1B, SWMU 10-2, and SWMU 10-3 at depths ranging from 8-12 ft-bgs which may indicate migration of impacted sediments in or around the storm drain that have not been delineated; and
- Soils west and northwest of TW-9 (@ 9.5 ft) have not been delineated.

It is recommended that surface soil and required subsurface soil delineation sampling be performed in conjunction with recovery system and/or vertical delineation well installations. A proposed work plan for obtaining the data needed to address data gaps is provided in Section 5.0.

3.2 Delineation of Constituents in Sediment

EPD conducted initial sediment sampling around the Former Gold Fish Pond (SWMU #9) and the Stream and Culvert Area (SWMU #10) in September 2004. The results of this event were included with the 2011 RCAP. The RCAP recommended additional sediment sampling be performed as part of Phase 4 delineation of SWMU #9 and #10, specifically the collection of six (6) surface water/sediment samples (SW/SED-4 through SW/SED-9). Following approval of the 2011 RCAP, sediment sampling was conducted as part of Phase 4 and Supplemental Phase 4 corrective action investigations. In June-July 2017, stormwater and sediment samples were collected from five (5) outfall locations (Outfall-1 through Outfall-5) and four (4) property boundary locations (PB-1 through PB-4) at the

WCM facility. Descriptions of the sampling events are provided below in italicized headings by date.

September 2004 EPD Sediment Sampling Event

In September 2004, a total of six (6) sediment samples were collected at depths of approximately 1-inch. The samples were analyzed by the EPD laboratory for SVOCs, metals, and diesel range organics (DRO). Analytical results indicated trace/low level detections of SVOCs in all of the samples except SC-10-2, collected on the north side of the stream bank, approximately 25 feet northwest of the MW-12 well cluster. DRO was also detected in concentrations ranging from 60 to 2,800 mg/kg in four (4) of the samples. DRO analytical results represent a group of medium to high boiling hydrocarbons and the results are typically used more as a screening tool rather than a compound specific indicator of constituents.

March 2014 Phase 4 Investigation

On March 17, 2014, sediment and surface water samples were collected from four (4) locations (SW/SED-5 through SW/SED-8). The sediment samples were collected approximately one to two inches below the sediment surface using a pre-cleaned stainless-steel scoop. Sediment samples were analyzed for VOCs, SVOCs, and metals. Analytical results indicated SVOC detections (limited to PAHs) were higher up-stream at the drain outfall. Metals detections were not significantly lower in down-stream samples which may indicate contribution from natural sources versus outfall drainage. A copy of the March 2014 Phase 4 Progress Report is included electronically in **Appendix A**.

January 2015 Phase 4 Investigation

On January 21, 2015, sediment and surface water samples were collected from four (4) locations (SW/SED-5 through SW/SED-8) and were analyzed for VOCs, SVOCs, and metals. SVOC detections (limited to PAHs) in sediment appeared to be higher up-stream at the drain outfall. VOCs were approximately an order of magnitude lower in up-stream samples SED-5 and SED-6, as compared to the March 2014 results. As observed in March 2014, metals detections were not significantly lower in down-stream samples which indicates contribution from natural sources versus outfall drainage. In general, the January 2015 results are lower than March 2014, presumably due to seasonal fluctuations and other factors affecting contaminant desorption. A copy of the February 2015 Phase 4 Progress Report is included electronically in **Appendix A**.

March – July 2017 Supplemental Phase 4 Investigation

On April 27, 2017, sediment and surface water samples were collected from six (6) locations (SW/SED-5 through SW/SED-10). On June 30 and July 5, 2017, Envirorisk and WCM personnel collected sediment and stormwater samples from five (5) outfall locations (Outfall-1 through Outfall-5) and four (4) property boundary locations (PB-1 through PB-

4) at the WCM facility. Sediment, surface water, and stormwater samples were collected from each of these locations and analyzed for VOCs, SVOCs, and total metals.

The results indicated the highest total SVOC concentration was 281.90 mg/kg at SED-6, located on the northern end of SWMU 9. Previously, the highest total SVOC concentration was 276.9 mg/kg at SED-5 (March 2014), located east of SWMU 9. Concentrations were generally higher in April 2017 when compared to January 2015, presumably due to seasonal fluctuations in water flow and other factors affecting contaminant desorption. No VOCs were detected in the sediment samples other than a trace of 1,2,4-Trimethylbenzene (0.0094 mg/kg) in SED-5 during the April 2017 event. Similar to 2014 and 2015 results, metal detections did not appear to be significantly lower in down-stream samples. Total metals ranged from 1,745.5 mg/kg in SED-5 to 8,059.2 mg/kg in SED-6. Aluminum accounted for a majority of the metal detections in SED-6 (7,410 mg/kg) in April 2017. If SED-6 is omitted, the highest total metal detection was 2,872.06 in SED-10. Regardless, aluminum is naturally occurring in Piedmont rich soils due to the breakdown of feldspars and other aluminosilicates, and detections were below the applicable screening value. Stream sediment sampling results were compared to Screening Values taken from EPA's *"Region 4 Ecological Risk Assessment Supplemental Guidance Interim Draft"* dated 2015 for comparison purposes only. A majority of the SVOC and metal detections exceeded applicable standards.

In June–July 2017, SVOCs were detected in all outfall/property boundary sediment samples collected with the exception of Outfall-1 and PB-1. The highest SVOC concentration in sediment was detected in Outfall-4 (located south of SWMU-9) with a total concentration of 542.73 mg/kg. Based on the sediment analytical results, total SVOCs in sediment were significantly higher at Outfall-4 when compared to detections at remaining locations. A copy of the November 2017 Supplemental Phase 4 Progress Report is included electronically in **Appendix A**.

November 2018 - April 2019 Supplemental Phase 4 Investigation

On November 14, 2018, Envirorisk collected a total of six (6) sediment and six (6) surface water samples (SW/SED-5 through SW/SED-10). Surface water and sediment samples were analyzed for VOCs, SVOCs, and total metals. In addition, Envirorisk collected sediment and stormwater samples from five (5) outfall locations (LY-1, Outfall-2, Outfall-3, Outfall-4, and Outfall-5) and seven (7) property boundary locations (PB-1, PB-1A, PB-2, PB-3, PB-4, PB-4A, and PB-4B) at the WCM facility.

In November 2018, the highest total SVOC concentration was 47.2 mg/kg at SED-6, located on the northern end of SWMU #10. Concentrations were lower in November 2018 when compared to March 2014, January 2015, and April 2017 results, presumably due to seasonal fluctuations in water flow and other factors affecting contaminant desorption. No VOCs were detected during the November 2018 sampling event. VOCs have not been historically detected in the sediment samples other than a trace of acetone (0.24 mg/kg) in SED-6 during the January 2015 event and 1,2,4-Trimethylbenzene (0.0094 mg/kg) in SED-5 during the April 2017 event. (Acetone is a naturally occurring product from microbial bio-degradation.) As observed in 2014, 2015, and 2017, metal detections were not significantly lower in down-stream samples. In November 2018, total metals ranged from 2,245.53 mg/kg in SED-5 to 5,252.72 mg/kg in SED-7. Aluminum accounted for most of the metal detections in SED-7 (4,690 mg/kg) in November 2018. If SED-6 is omitted, the highest total metal detection was 2,872.06 in SED-10.

Based on the November 2018 outfall and property boundary sediment analytical results, SVOCs were detected in all samples collected except for Outfall-3, Outfall-5, and PB-4A. The highest total SVOC concentration in sediment was detected in Outfall-2 (at the stormwater pipe) at a concentration of 95.39 mg/kg. Based on the sediment analytical results, total SVOCs were also elevated (above 20 mg/kg) at locations PB-1 (24.8 mg/kg), PB-2 (20.66 mg/kg), PB-4 (32.48 mg/kg), and PB-4B (28.0 mg/kg). Each of these locations are downgradient or adjacent to treated lumber storage areas.

Overall, the November 2018 (and June/July 2017) analytical results for total metals indicates concentrations are consistent throughout most of the stormwater and associated sediment samples collected. Differences in total concentrations are primarily due to varying detections of aluminum.

In June-July 2017, elevated aluminum concentrations were observed in stormwater samples PB-1 (34.2 mg/L) and Outfall-3 (42.8 mg/L) and in sediment samples Outfall-1 (10,000 mg/kg), Outfall-2 (22,100 mg/kg), Outfall-5 (17,000 mg/kg), and PB-4 (36,200 mg/kg). During the November 2018 stormwater sampling event, elevated aluminum concentrations were observed in sediment samples PB-2 (11,100 mg/kg), PB-3 (20,300 mg/kg), PB-4 (23,600 mg/kg), PB-4A (36,800 mg/kg), and PB-4B (19,500 mg/kg). Based on the location and distribution of aluminum detections, the data appears to indicate that an off-site source could be contributing to elevated concentrations detected. However, as previously mentioned, aluminum is also naturally occurring in Piedmont soils and may fluctuate based on the presence and degree of weathering of aluminosilicate bearing minerals in native soils.

No additional sediment samples have been collected at the site since the November 2018/April 2019 Supplemental Phase 4 Investigation. A copy of the June 2019 Supplemental Phase 4 Progress Report is included electronically in **Appendix A**.

Data Gaps

Based on the information obtained from sediment sampling on site, delineation of SVOCs in sediment is not complete and extends offsite. The following data gaps have been identified:

- Sediment samples have not been collected at the site since November 2018. Additional sediment samples should be collected at historic sample locations to provide an updated assessment of stream sediment conditions at the site.

The focus of the additional sediment delineation will be to determine the full extent of regulated constituents. Concentrations triggering the potential need for remediation will be determined based on background sampling and future risk assessment calculations. A work plan describing the intended sediment sampling, analysis, and frequency is provided in Section 5.5.

3.3 Delineation of Constituents in Surface Water

Surface water bodies located on-site are limited to the intermittent stream associated with SWMU #10 and a portion of a surface water body running along the western property boundary. Surface water sampling had not been performed at the site prior to the implementation of the Phase 4 SWMU #9 and #10 investigations outlined in the 2011 RCAP. Phase 4 activities were implemented in a phased approach, with stream sediment and surface water sampling results reported in progress reports dated March 2014, February 2015, and September 2016. In February 2017, a supplemental sampling plan was submitted and approved by EPD to include outfall and property boundary (sediment and stormwater) sample locations. Stream sediment/surface water and outfall/property boundary samples were collected in April 2017 and June-July 2017, respectively and reported in the November 2017 Supplemental Phase 4 Progress Report. Stream sediment/surface water and outfall/property boundary samples were also collected in November 2018 and results reported in the June 2019 Supplemental Phase 4 Progress Report.

In July 2018, Envirorisk completed an Interim Corrective Measures Work Plan to address impacted stormwater/run-off impacts detected during Phase 4 investigations at various outfalls and off-site surface water migration at SWMU #10. The work plan was implemented in March 2021. Stormwater, groundwater, and surface water sample results were detailed in Interim Measures Monitoring Report #1, dated August 2, 2021. A second sampling event was conducted in December 2021 with sample results detailed in Interim Measures Monitoring Report #2, dated March 22, 2022.

Since stormwater from the site could impact surface water at the stream, a discussion of the stormwater analytical results has been included in this section. Descriptions of the sampling events are provided below in italicized headings by date.

March 2014 Phase 4 Investigation

As previously noted, surface water and sediment samples were collected from four (4) locations (SW/SED-5 through SW/SED-8) on March 17, 2014. The surface water samples were collected by first filling a sterile laboratory bottle or beaker and then carefully transferring the contents into the appropriate sample containers. Surface water samples were analyzed for VOCs, SVOCs, and metals (total and dissolved). Overall, the results indicated that VOCs and SVOCs concentrations in surface water are highest near the drain outfall (SW-5) and decrease down-stream to the north-northwest. Only 1,2-Dichloroethane (attributed to an off-site source) was observed to increase in downgradient sample locations SW-7 and SW-8. Total barium was detected in all surface water samples, while total zinc was detected in SW-5 and SW-6, only. Dissolved cobalt was detected in SW-8, slightly above the laboratory reporting limit. Overall, as observed in sediment, metals detections were not significantly lower in down-stream samples which suggests contribution from natural sources versus outfall drainage. A copy of the March 2014 Phase 4 Progress Report is included electronically in Appendix A.

January 2015 Phase 4 Investigation

As previously noted, surface water and sediment samples were collected from four (4) locations (SW/SED-5 through SW/SED-8) on January 21, 2015. Surface water samples were analyzed for VOOCs, SVOCs, and total metals. The results indicated that surface water concentrations are highest near the drain outfall (SW-5) and decrease down-stream to the north-northwest. Overall, concentrations detected in January 2015 were similar to those observed in March 2014. No additional constituents were detected in January 2015. Total Barium was detected in all surface water samples, while total zinc was detected in all samples except SW-6.

Downgradient surface water samples SW-7 and SW-8 contained a few constituents in January 2015 not previously detected in March 2014 (dibenzofuran, fluoranthene, naphthalene, PCP, phenanthrene, and zinc); however, these constituents were also detected (at higher concentrations) in upgradient surface water sample locations (SW-5 and SW-6). A copy of the February 2015 Phase 4 Progress Report is included electronically in **Appendix A**.

March – July 2017 Supplemental Phase 4 Investigation

As previously noted, surface water and sediment samples were collected from six (6) locations (SW/SED-5 through SW/SED-10) on April 27, 2017. On June 30 and July 5, 2017, Envirorisk and WCM personnel collected sediment and stormwater samples from five (5) outfall locations (Outfall-1 through Outfall-5) and four (4) property boundary locations (PB-1 through PB-4) at the WCM facility. Sediment, surface water, and stormwater samples were collected from each of these locations and analyzed for VOCs, SVOCs, and total metals.

As observed with stream sediment concentrations, the March 2014, January 2015, and April 2017 surface water analytical results indicated SVOC concentrations to be higher up-stream at the drain outfall. Historically, the highest total SVOC concentration was 2,503 micrograms per liter (µg/L) at SW-5 in January 2015. In April 2017, the total SVOC concentration at SW-5 was 1,471 µg/L, a decline of approximately 1,000 µg/L from January 2015. Similarly, declines in total SVOC concentrations were observed at surface water locations (SW-6, SW-7, and SW-8) in April 2017 when compared to data collected in March 2014 and January 2015. For example, total SVOC concentrations at SW-8 in March 2014 and January 2015 were 44 µg/L and 110 µg/L, respectively. In April 2017, no SVOCs were detected at SW-8. VOC concentrations in March 2014, January 2015, and April 2017 were relatively low, as expected, due to the lack of a known VOC source on site. However, as observed with SVOC concentrations, VOC concentrations appear to be higher up-stream at the drain outfall. Declines in total VOC concentrations were observed in each of the sample locations except for SW-7. The highest total metal concentration in April 2017 was 8.92 milligrams per liter (mg/L) in SW-8, with 8.8 mg/L of the total consisting of aluminum. Metal concentrations were consistent throughout all the surface water samples collected, indicative of naturally occurring conditions.

Surface water sampling results were compared to screening values in EPA's "Region 4 Ecological Risk Assessment Supplemental Guidance Interim Draft" dated 2015 for comparison purposes only. No VOCs exceeded the screening values during any of the sampling events. SVOCs exceeded applicable standards in multiple sampling locations. Aluminum and cobalt were the only metals exceeding screening values; however, these detections were attributed to naturally occurring conditions. Future surface water samples collected from portions of the tributary with perennial flow will also be compared to Georgia In-stream Water Quality Standards (ISWQS) taken from the Georgia Rules of Water Quality Control (Chapter 391-3-6) to further evaluate compliance and the need for corrective action.

A review of stormwater analytical results for SVOCs indicate detections of pentachlorophenol (PCP) in Outfall-4 (27 µg/L), PB-1 (1,300 µg/L), PB-2 (43 µg/L), and PB-4 (55 µg/L). In addition to PCP, 2,3,4,6-Tetrachlorophenol was also detected in stormwater sample PB-1 at a concentration of 150 µg/L. No SVOCs were detected above the laboratory detection limits in any of the remaining stormwater samples (Outfall-1, Outfall-2, Outfall-3, Outfall-5, and PB-3). PCP concentrations are highest in PB-1, located furthest south, and decline in samples to the north. Stormwater originating from PB-1 flows to the northwest, along the western property boundary, toward the stream (SWMU #10). A copy of the November 2017 Supplemental Phase 4 Progress Report is included electronically in **Appendix A**.

November 2018 - April 2019 Supplemental Phase 4 Investigation

As previously noted, Envirorisk collected a total of six (6) sediment and six (6) surface water samples (SW/SED-5 through SW/SED-10) on November 14, 2018. Surface water and sediment samples were analyzed for VOCs, SVOCs, and total metals. Stormwater and sediment samples were collected from five (5) outfall locations (LY-1, Outfall-2, Outfall-3, Outfall-4, and Outfall-5) and seven (7) property boundary locations (PB-1, PB-1A, PB-2, PB-3, PB-4, PB-4A, and PB-4B) at the WCM facility.

As observed with stream sediment concentrations, the March 2014, January 2015, and April 2017 surface water analytical results indicated that SVOC concentrations were higher up-stream at the drain outfall in November 2018. Historically, the highest total SVOC concentration was 2,503 µg/L at SW-5 in January 2015. The April 2017 total SVOC concentration at SW-5 was 1,471 µg/L, a decline of approximately 1,000 µg/L from January 2015. During the November 2018, total SVOC concentration at SW-5 was 502 µg/L, a decline of approximately 500 µg/L from April 2017. Similarly, declines in total SVOC concentrations were observed at surface water locations (SW-6, SW-7, and SW-10) in November 2018 when compared to data collected in April 2017, March 2014 and

January 2015. For example, total SVOC concentrations at SW-6 in January 2015 and April 2017 was 1,367 µg/L and 538 µg/L, respectively. In April 2017, total SVOCs concentration was 106 µg/L in SW-6. Conversely, surface water sample locations SW-8 and SW-9 were non-detect for SVOCs in April 2017, but contained total SVOC concentrations of 55 µg/L and 52 µg/L, respectively, in November 2018.

VOC concentrations (primarily chlorinated constituents) in March 2014, January 2015, April 2017, and November 2018 were relatively low, as expected, due to the lack of a known chlorinated VOC source on site. However, as observed with SVOC concentrations, VOC concentrations appear to be higher up-stream at the drain outfall (SW-5). In November 2018, no VOC concentrations were detected above laboratory reporting limits except for SW-5 (5.6 µg/L) with declines in total VOC concentrations observed in each of the sample locations. Concentrations were lower in November 2018 when compared to March 2014, January 2015, and April 2017 results, presumably due to the diluting effects of surface runoff since the sampling event was conducted during an 8-hour rain event.

The highest total metal concentration in April 2017 was 8.92 mg/L in SW-8, with 8.8 mg/L of the total consisting of aluminum. Similarly, in November 2018, the highest total metals concentration was 13.3 mg/L in SW-8, with 12.8 mg/L of the total attributable to aluminum. As noted during prior events, concentrations were consistent throughout all the surface water samples collected, indicative of naturally occurring conditions. A copy of the June 2019 Supplemental Phase 4 Progress Report is included electronically in **Appendix A**.

August 2021 Interim Measures Monitoring Report #1

In March 2021, quarterly interim measures (IM) corrective measures and assessment activities included re-grading of the western property boundary locations, treated inventory relocation, gauging of monitoring wells MW-3, MW-3A, MW-3B, MW-4, MW-7, MW-7A, MW-8, MW-8A, and MW-9 to monitor the effects of the proposed deep trenching on groundwater, collection of stormwater samples PB-1, PB-2, PB-4, Outfall-1, Outfall-2, Outfall-3, Outfall-4, and Outfall-5 for laboratory analysis of VOCs, SVOCs, and Metals, and collection of surface water sample SW-9 and groundwater sample TMW-25 for laboratory analysis of site-specific VOCs, SVOCs, and Metals. Overall, stormwater and surface water sample concentrations in March 2021 were slightly higher than prior Phase 4 results. In surface water sample SW-9, 2,3,4,6-Tetrachlorophenol was detected for the first time. In groundwater sample TMW-25, total SVOC concentrations were less than detected in 2019. However, SVOCs previously not detected (2,3,4,6-Tetrachlorophenol and PCP) were detected in March 2021. As 2,3,4,6-Tetrachlorophenol and PCP were the only SVOCs detected in the outfall and property boundary samples, it was assumed that the new detections of these SVOCs in surface water and groundwater are associated with stormwater flow during rain events. A copy of the August 2021 Interim Measures Monitoring Report #1 is included electronically in **Appendix A**.

June 2022 Interim Measures Monitoring Report #2

In December 2021, quarterly IM corrective measures and assessment activities included gauging of monitoring wells MW-3, MW-3A, MW-3B, MW-4, MW-7, MW-7A, MW-8, MW-8A, and MW-9 to monitor the effects of the proposed deep trenching on groundwater. Stormwater samples PB-1, PB-2, PB-4, Outfall-1, Outfall-2, Outfall-3, Outfall-4, and Outfall-5 were collected for laboratory analysis of VOCs, SVOCs, and Metals (PB-4 was not analyzed for metals). Surface water sample SW-9 and groundwater sample TMW-25 were also collected for laboratory analysis of site-specific VOCs, SVOCs, and Metals. A review of the December 2021 data indicates VOCs, SVOCs, and metals concentrations were lower than detected in March 2021. At the property boundary locations, 2,3,4,6-Tetrachlorophenol and PCP were the only SVOCs detected above laboratory reporting limits. In December 2021, 2,3,4,6-Tetrachlorophenol and PCP were detected at each of the sample locations except for Outfall-2. The only other SVOCs detected were 2,4-Dimethylphenol, 2-Methylnaphthalene, 3,4-Methylphenol, Acenaphthene, Dibenzofuran, Fluoranthene, Fluorene, Naphthalene, and Phenanthrene in Outfall-2.

A review of historic groundwater elevations indicates the December 2021 elevations are in range with elevations observed in November 2018. Likewise, SVOCs historically associated with groundwater, were observed at Outfall-2 in November 2018 and December 2021. These observations suggest that as groundwater elevations decline and dissolved constituents become less saturated, impacts at Outfall-2 are more indicative of groundwater baseflow rather than stormwater runoff.

Surface water analytical results from SW-9 indicated no detections of 2,3,4,6-Tetrachlorophenol and PCP. Since these SVOCs were detected in most outfall and property boundary samples, this indicates that runoff originating from the property boundary and outfall areas had less impact to surface water concentrations in December 2021. In addition, Acenaphthene, Fluorene, Naphthalene, and Phenanthrene have also been detected in Outfall-2 and groundwater sample TMW-25. Based on these results, it appears surface water impacts observed in December 2021 originated from groundwater baseflow rather than stormwater runoff from the property boundary and outfall areas. Stormwater results at Outfall-3 indicated an increase in 2,3,4,6-Tetrachlorophenol and PCP concentrations in December 2021. A copy of the June 2022 Interim Measures Monitoring Report #2 is included electronically in **Appendix A**.

Data Gaps

Investigation and delineation of surface water bodies will include the following, identified as data gaps:

- Based on stormwater property boundary and outfall sample results, SVOCs (specifically PCP) from onsite stormwater are impacting the stream.

- While it is anticipated the implementation of the proposed groundwater recovery system at the site will improve surface water conditions, ongoing surface water samples need to be collected around SWMUs #9 and #10 to evaluate effectiveness.

The focus of the surface water delineation will be to determine if regulated constituents are present and the approximate extent. Concentrations triggering the potential need for remediation will be determined based on background sampling and risk calculations. A work plan is provided in Section 5.5.

3.4 Delineation of Constituents in Groundwater

Regulated groundwater constituents at the site have been investigated through the installation of monitoring wells and subsequent semi-annual/annual sampling events. Regulated constituents identified in the groundwater to date include VOCs, SVOC, Metals, and Dioxins. NAPL has been detected in POC wells and LNAPL has been detected in HWMU-2 and HWMU-3. The most recent groundwater sampling event was conducted in April 2023. Note a limited number of wells were sampled in April 2023, based on the schedule presented in the Site Sampling Plan. Compounds listed on the facility's Permit (HW-062D) along with Groundwater Protection Standards (GWPS) concentrations, are provided on **Table 3**. All or most of the VOCs, SVOCs, and possibly dioxins are attributed to the former HWMU or SWMUs in the treatment area with the exception of chlorinated VOCs that have not been detected in POC wells. VOC and SVOC constituents detected on the northwest side of the property, behind the office area, are predominantly attributed to SWMU #10. Dissolved metals detected in site groundwater are suspected to be from naturally occurring sources or from fill materials. A plan for addressing data gaps relative to the assessment of NAPL and regulated constituents in the groundwater associated with the HWMU and SWMUs is provided in Section 5.0.

NAPL

Historically, NAPL has been measured in the three POC wells (MW-5R, MW-6R, and MW-11) and in the three interceptor trench manholes (TA, TB, and TC), located immediately down-gradient. Based on odor and appearance, the NAPL appears to consist predominantly of creosote that "sinks" due to specific gravity. NAPL thicknesses have historically ranged from a sheen to 1.0 feet based on measurements collected from January 2006 to 2023 (**Table 2**). In April 2023, NAPL was measured in the POC wells at a thickness of 0.5 feet in MW-5R, MW-6R, and MW-11.

Based on the findings of the April 2012 Phase 2 investigation, the extent of NAPL covered an area of approximately 39,000 square feet (SF) to the north, west, east, and southeast of the HWMU. The estimated volume of NAPL in this area is approximately 3,900 cubic feet (or 29,172 gallons), conservatively assuming a continuous zone of NAPL (versus discrete pockets) with an average thickness of 0.1 foot. In addition, the VOC plume in saturated soils (16-36 ft-bgs), not counting SWMU areas, was estimated at 40,274 SF or 29,833 cubic yards (CY) and the SVOC extent in saturated soils 64,346 SF and 47,664 CY.

As previously noted, Envirorisk conducted a subsurface investigation within the impoundment to determine if the wood preserving area, which includes SWMUs 1, 2, 3, 4, 6, and 7 are contributing to down-gradient NAPL detections. The measurements collected from 2017 to 2023 indicated a defined NAPL (specifically LNAPL) separation observed at HWMU-2 and HWMU-3. From 2017 to 2023, LNAPL thicknesses in monitoring well HWMU-2 have ranged from 8.15 feet (April 2018) to 5.24 feet (March 2019). At HWMU-3, LNAPL thicknesses ranged from 9.85 feet (April 2023) to 4.12 feet (April 2018), with an increase in thickness observed each year measured. Historically, LNAPL has not been detected in HWMU-1, the easternmost well.

VOCs

VOC detections have included chlorinated and non-chlorinated compounds. VOCs have historically been detected in trace to low concentrations as compared to the more predominant SVOCs contained in creosote and PCP. Chlorinated VOCs have been detected in wells that are not located in a direct down-gradient flow path from the HWMU and have not been historically detected in POC wells. Based on the well distribution, historical absence of chlorinated VOCs at this facility, and other factors, an off-site source is suspected.

A total of 10 VOCs were detected in the monitoring wells above GWPS limits, currently defined as background, during the April 2023 sampling event. The VOCs detected are as follows:

- Benzene;
- Ethylbenzene;
- Toluene;
- Total Xylenes (o-Xylene and m,p-Xylene);
- Styrene;
- 1,3,5-Trimethylbenzene;
- 1,2,4-Trimethylbenzene;
- 1,2-Dichloroethane;
- Trichloroethene; and
- Tetrachloroethene.

Individual VOCs including non-chlorinated and chlorinated detected during the April 2023 sampling event are discussed below. Constituents identified in more than three monitoring wells are generally discussed in terms of concentration ranges.

Non-Chlorinated VOCs

- Benzene was detected in 6 monitoring wells and Outfall-2 at concentrations ranging from 3.2 μg/l in MW-12A to 54 μg/l in MW-5A (58 μg/l in DUP-1)

- Ethylbenzene was detected in 5 monitoring wells and Outfall-2 at concentrations ranging from 2.1 μg/l in MW-7B to 46 μg/l in MW-5A (54 μg/l in DUP-1).

- Toluene was detected in 5 monitoring wells and Outfall-2 at concentrations ranging from 1.1 µg/l in MW-12A to 49 µg/l in MM-5A (58 µg/l in DUP-1).

- Total xylenes were detected in 7 monitoring wells and Outall-2 at concentrations ranging from 7.2 µg/l in MW-12 to 84 µg/l in MW-8B2.

- Styrene was detected in MW-3B at 2.4 µg/l and MW-8B2 at 6.7 µg/l.

- 1,3,5-Trimethylbenzene was detected in 5 monitoring wells and Outfall-2 at concentrations ranging from 4.6 µg/l in MW-7B to 16 µg/l in MW-8B2.

- 1,2,4-Trimethylbenzene was detected in 9 monitoring wells and Outfall-2 at concentrations ranging from 1.2 µg/l in MW-12 and MW-12A to 40 µg/l in MW-5A.

Chlorinated VOCs

Chlorinated VOCs have historically been detected in MW-8, MW-10, MW-12, MW-12A, MW-13, and MW-14. None of these wells are located in a direct down-gradient flow path from the HWMU with the exception of MW-12/12A. Based on the well distribution and the fact that chlorinated VOCs historically were not utilized at this facility and have not been detected in the POC wells, an off-site source is suspected.

The compounds detected and concentration ranges are described below. Constituents identified in more than three monitoring wells are generally discussed in terms of concentration ranges.

- 1,2-Dichloroethane was detected in 6 monitoring wells at concentrations ranging from 1.8 µg/l in MW-8B2 to 20 µg/l in MW-12.

- Tetrachloroethene was detected in 5 monitoring wells at concentrations ranging from 1.2 µg/l in MW-8A to 4.9 µg/l in MW-12.

- Trichloroethene was detected in MW-8 at 1.1 µg/l and MW-12 at 1.4 µg/l .

VOC results are referenced as **Table 5** in this text and are included as Table E-4.

SVOCs

A total of 19 SVOCs were detected in the monitoring wells above GWPS limits, currently defined as background, during the April 2023 sampling event. The SVOCs detected are as follows:

- 2,3,4,6-Tetrachlorophenol;
- 2,4,5-Trichlorophenol
- 2,4-Dimethylphenol;
- 2-Methylnaphthalene;

- 2-Methylphenol (o-Cresol);
- 3,4-Methylphenol;
- Acenaphthene;
- Acenaphthylene;
- Anthracene;
- Carbazole;
- Dibenzofuran;
- Fluoranthene;
- Fluorene;
- Naphthalene;
- PCP;
- Phenanthrene;
- Phenol;
- Pyrene; and
- 2-picoline

SVOCs detected during the April 2023 sampling event are discussed below. Constituents identified in more than three monitoring wells are generally discussed in terms of concentration ranges.

- 2,3,4,6-Tetrachlorophenol was detected in 4 monitoring wells and Outfall-2 at concentrations ranging from 18 µg/l at Outfall-2 to 500 µg/l in MW-8B2.

- 2,4,5-Trichlorophenol was detected in MW-8B2 at 33 µg/l and in MW-8B at 100 µg/l.

- 2,4-Dimethylphenol was detected in 4 monitoring wells and Outfall-2 at concentrations ranging from 33 µg/l in MW-8B2 to 280 µg/l in MW-5A (300 µg/l in DUP-1).

- 2-Methylnaphthalene was detected in 6 monitoring wells and Outfall-2 at concentrations ranging from 10 µg/l in MW-12A to 530 µg/l in MW-8B2.

- 2-Methylphenol (o-Cresol) was detected in 3 monitoring wells and Outfall-2 at concentrations ranging from 18 µg/l in MW-8B to 100 µg/l in Outfall-2.

- 3,4-Methylphenol was detected in 4 monitoring wells and Outfall-2 at concentrations ranging from 19 µg/l in MW-3B to 160 µg/l in Outfall-2.

- Acenaphthene was detected in 5 monitoring wells and Outfall-2 at concentrations ranging from 29 µg/l in MW-7B to 260 µg/l in MW-8B2.

- Acenaphthylene was detected in MW-5A at 9.9 µg/l and in MW-8B2 at 11 µg/l.

- Anthracene was detected at Outfall-2 at 12 µg/l and in MW-8B at 15 µg/l.

- Carbazole was detected in 8 monitoring wells and Outfall-2 at concentrations ranging from 11 µg/l in MW-7 to 370 µg/l in MW-8B2.

- Dibenzofuran was detected in 8 monitoring wells and Outfall-2 at concentrations ranging from 23 µg/l in MW-7B to 140 µg/l in MW-5A (150 µg/l in DUP-1) .

- Fluoranthene was detected in MW-8B at 19 µg/l and at 22 µg/l at Outfall-2.

- Fluorene was detected in 6 monitoring wells and Outfall-2 at concentrations ranging from 23 µg/l in MW-7B to 120 µg/l in MW-8B and MW-8B2 and DUP-1 (MW-5).

- Naphthalene was detected in 8 monitoring wells and Outfall-2 at concentrations ranging from 74 µg/l in MW-7B to 6,600 µg/l in MW-8B2 (8,800 µg/l in DUP-1 (MW-5)).

- PCP was detected in 7 monitoring wells and Outfall-2 at concentrations ranging from 88 µg/l in MW-7 to 4,300 µg/l in MW-8B2.

- Phenanthrene was detected in 8 monitoring wells and Outfall-2 at concentrations ranging from 9.8 µg/l in MW-12A to 130 µg/l in MW-8B and Outfall-2.

- Phenol was detected in MW-8B at 10 µg/l and at 26 µg/l at Outfall-2.

- Pyrene was detected at Outfall-2 at 10 µg/l only.

- 2-picoline was detected at Outfall-2 at 15 µg/l only.

SVOC results are referenced as in **Table 6** in this text and are included as Table E-5.

Metals

Metals were most recently analyzed during the April 2021 groundwater monitoring event. Dissolved metals were evaluated in a reduced number of wells including MW-2, MW-3, MW-6R, MW-8, and MW-12. The concentration trends were similar with mostly declining, stable trends and a slight increase observed in MW-3, consistent with historic fluctuations. The trend in metals concentrations over time is attributed to natural fluctuations in background metals concentrations in the groundwater or fluctuating turbidity levels in the samples collected. A summary of metals detected in groundwater is referenced as **Table 7** in this text and is included as Table E-6. The source(s) of dissolved metals at this site is not clearly understood since they are not commonly associated with creosote and PCP wood treatment wastes. Historically, metals concentrations have varied in the samples presumably due primarily to sample turbidity. The higher detections observed in MW-11 may be attributed to the presence of NAPL and high turbidity in this well. Naturally occurring metals have also been detected in MW-1 indicative of background conditions.

Some metals detected may also be attributed to trace debris in fill materials used in a large portion of the site.

Dioxins

Dioxins have historically been sampled annually in conjunction with Appendix IX analysis on one of the POC wells on a rotating basis. In addition, dioxin samples have been historically collected from MW-7B. During the April 2021 sampling event (most recent dioxin sampling), dioxins analysis was performed on samples collected from MW-7B and MW-6R. Dioxin isomers detected in MW-7B include the following:

- 1,2,3,4,6,7,8-heptachloro dibenzo-p-dioxin (Total HpCDD) was detected at a concentration of 0.12 ng/L.
- 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD) was detected at a concentration of 0.63 ng/L.

Historically, Total HpCDD, Total HpCDF, and OCDF have not been detected in MW-7B. Penta CDD, Hexa CDF, Penta CDF, and OCDF (detected in 2018) were not detected during the April 2021 sampling event. In addition, the following dioxin isomers were detected in the sample collected from MW-11:

- Hexa CDD was detected at a concentration of 4.9 ng/L.
- Hexa CDF was detected at a concentration of 1.8 ng/L.
- Penta CDF was detected at a concentration of 0.31 ng/L.
- TCDD was detected at a concentration of 0.094 ng/L.
- TCDF was detected at a concentration of 0.025 ng/L.
- Total HpCDD was detected at a concentration of 110 ng/L.
- Total HpCDF was detected at a concentration of 6.1 ng/L.
- OCDD was detected at a concentration of 520 ng/L.
- OCDF was detected at a concentration of 23.0 ng/L.

Due to the presence of NAPL and/or sediment content in MW-11, and an understanding of the low solubility of dioxins, some or all of the isomers reported may not be attributed to dissolved phase impact. Future evaluation will be required to determine the significance of the dioxin detections relative to laboratory quantitative reporting limits. **Table 8** is referenced in this text and sampling results are included as Table E-7.

3.5 Horizontal Extent of Dissolved Constituents

Iso-concentration maps were prepared depicting the horizontal extent of total non-chlorinated VOCs (**Figure 11**), chlorinated VOCs (**Figure 12**), and SVOCs (**Figure 13**) for the April 2023 sampling event. These maps provide an interpretation of plume migration and source area distribution of regulated substances.

A review of the horizontal extent of non-chlorinated VOCs provided in **Figure 11** indicates the presence of two dissolved plumes. The main plume is associated with the HWMU with higher concentrations observed in the POC wells and lower concentrations terminating at or slightly north of MW-3 and MW-8. The smaller plume is located around the MW-12 well cluster and appears to be the result of cumulative discharges originating at the storm drain outlet (SWMU #10). Outfall-2 was collected at SWMU #10 and had non-chlorinated VOCs concentrations slightly higher than detected at the MW-12 cluster. The extent of the non-chlorinated VOC plume at SWMU #10 has not been delineated.

A review of the horizontal extent of chlorinated VOCs provided in **Figure 12** indicates that the dissolved plume is depicted based on low level or non-detect concentrations in wells MW-3A, MW-3B, MW-5A to the south and MW-14 to the north. (MW-14 was not sampled in April 2023 but has historically been non-detect for all VOCs.) As noted in past annual reports, the source for these compounds has not been detected in the POC wells and no historical records exist to support their use at this facility. The extent of the chlorinated plume has not been delineated north and north of MW-10 and the MW-12 cluster. (MW-13 was not sampled in April 2023 but has historically had detections of chlorinated VOCs.)

A review of the horizontal extent of SVOCs (**Figure 13**) indicates concentrations generally an order of magnitude higher than VOCs. The figures indicate the presence of two plumes associated with the HWMU and SWMU#10, similar to the non-chlorinated VOCs. Highest concentrations were detected near the preserving area. Total SVOCs concentrations at SWMU #10 locations (MW-12 cluster and Outfall-2) were detected above 1,000 µg/L. The extent of the SVOC plume at SWMU #10 has not been delineated. In addition, groundwater results from temporary wells installed during the November 2012 Phase 2 Investigation indicated that VOCs and SVOCs impacts in shallow groundwater have not been delineated to the east, west, and south of the preserving area.

3.6 Vertical Extent of Dissolved Constituents

The vertical extent of VOCs and SVOCs using the April 2023 data are illustrated on cross-sections A-A’, B-B’, and C-C’ presented as **Figures 14-19**. A review of **Figures 14**, **16**, and **18** for VOCs indicates that the vertical extent of the dissolved plume in the shallow saprolite-PWR zone, emanating from the HWMU, extends into the partially weathered rock at MW-8A (and also MW-7A during previous sampling events). The dissolved plume also extends vertically into the fractured bedrock, based on VOC concentrations at MW-7B, MW-8B and MW-8B2. At the MW-7 well cluster, VOCs are delineated vertically by MW-7B2 (historically non-detect for all VOCs at a screened interval of 195-200 ft-bgs). VOC concentrations at the MW-8 well cluster extend to the deepest vertical fracture zone at MW-8B2 (153 ft-bgs) and have not been vertically delineated. Similarly, VOCs at the MW-3 well cluster extend into the fractured bedrock in monitoring well MW-3B and have not been vertically delineated. MW-3B was installed to a depth of 200 ft-bgs and was constructed as an open hole rock well with the deepest observed fracture zone at 175 to 180 ft-bgs. It is suspected that the fracture zones observed at MW-3B and MW-8B2 are hydraulically connected, although additional investigations would be required to confirm the hydraulic connection. VOC concentrations at the MW-12/12A well cluster will also require additional vertical delineation into bedrock. While VOCs at the MW-3, MW-8, and MW-12 well clusters have not been vertically delineated, the deepest bedrock screened zone at the site at MW-7B2 (screened interval of 195-200 ft-bgs) has historically been non-detect for VOCs.

A review of **Figures 15**, **17**, and **19** for SVOCs indicates that the vertical extent of the dissolved plume in the shallow saprolite-PWR zone extends into the PWR at MW-7A and MW-8A, and then vertically into the fractured bedrock at MW-7B, MW-8B, and MW-8B2. At the MW-7 well cluster, SVOCs are vertically delineated by MW-7B2 (non-detect for all SVOCs). As observed with VOCs, while SVOCs at the MW-3, MW-8, and MW-12 well clusters have not been vertically delineated, the deepest bedrock zone observed at the site in MW-7B2 (screened interval of 195-200 ft-bgs) remains non-detect for SVOCs.

Further vertical delineation is planned as described in Section 5.0.

3.7 Estimated Volume of Regulated Groundwater Constituents

The approximate horizontal extent of NAPL and dissolved constituents exceeding GWPS concentrations is illustrated on **Figure 20**. The estimated extent of NAPL along the down-gradient portion of the closed HWMU is approximately 39,000 square feet. Assuming an average NAPL thickness of 0.1 foot, the volume of NAPL is estimated at 3,900 cubic feet or 29,127 gallons. This estimate is assumed to be higher than the actual quantity present since NAPL is expected to occur in discrete “pockets” rather than as a continuous layer.

The estimated total area of the non-chlorinated VOC dissolved plume in the upper aquifer, including the plume associated with SWMU #10, is 122,605 square feet. It should be noted that the eastern and northeastern portion of the dissolved plume is suspected to be commingled with regulated constituents discharged at the SWMU #10 storm drain, which traverses immediately east and northeast of the HWMU (**Figure 3**). The approximate magnitude and extent of regulated constituents proportioned to SWMU #10 may be estimated after the completion of future assessments.

The vertical extent of the VOC plume has not been delineated; however, for estimation of constituents in the upper aquifer, it may be assumed that the majority of the VOCs terminate at the top of competent granitic/biotite/hornblende gneiss bedrock at approximately 65 ft-bgs, below the mica schist. Groundwater impacted with regulated VOCs can be estimated assuming a vertical thickness of 40 feet for the dissolved plume, which is 65 feet minus 20 ft-bgs, based on the approximate average water table near the HWMU, and an effective porosity of 20%. This calculates as 122,605 ft^2 x 40 feet x 0.20 x 7.48 gallons per ft^3 = 7,336,683 gallons.

The estimated total area of the SVOC plume in the upper aquifer, including the plume associated with SWMU #10, is 142,000 square feet. Using the same calculation factors as above, the total volume of SVOC contaminated groundwater is 8,497,280 gallons.

Additional intermediate (screened at top-of-bedrock) and deep (screened into bedrock) proposed as part of future corrective action activities will aid in estimating the volume of contaminated groundwater in deeper fracture zones. Currently, the estimated volume and extent of LNAPL observed in HWMU monitoring wells HWMU-2 and HWMU-3 is unknown. Future subsurface assessments around the HWMU and preserving area will aid in determining the estimated volume and extent of LNAPL, VOC, and SVOCs in residuum soils and groundwater.

4.0 SCOPE AND OBJECTIVES OF CORRECTIVE ACTION

This updated 2024 RCAP has been prepared in order to provide a plan for clean-up of regulated constituents in the soil, sediment, surface water, and groundwater associated with the closed HWMU and SWMUs. Based on the findings of prior corrective action pilot investigations, supplemental bedrock assessment, and discussions with EPD personnel; site wide corrective action will initially consist of the expansion of the existing groundwater extraction (pump-and-treat) system. An overview of corrective action requirements, clean-up objectives, and screening of alternative methods is described in this section.

4.1 Corrective Action Requirements

The primary goal of corrective action is protection of human health and the environment, including soil, sediment, surface water, and groundwater. The timely implementation of corrective action is desired by the EPD to satisfy requirements of the Facility Permit (HW-062D).

4.2 Corrective Action Objectives for Soil

Corrective action objectives for impacted soils above the water table in the areas immediately down gradient from the HWMU and SWMU areas for compounds listed in the Permit will be determined based on a calculated leaching potential or other risk-based target values. Impacted soils particularly down-gradient of the HWMU and surrounding the treatment process area predominantly consist of fill materials to depths of >30 ft-bgs which contain “pockets” of creosote-like NAPL from unknown sources. These fill soils were reportedly used to backfill areas prior to construction of the rail lines and storm sewer (SWMU #10). NAPL and regulated substances detected in the fill soils above the water table do not appear to be associated with the HWMU or any of the SWMUs.

Following EPD approval of risk-based target levels, limited source removal may be performed to remove impacted soils above the water table in accessible areas. Deeper saturated soil impact, in inaccessible areas close to above ground or underground structures, may require supplemental treatment using a combination of limited bulk removal, in-situ chemical oxidation (ISCO), surfactant injection and extraction, or ex-situ/in-situ soil oxidant blending.

4.3 Corrective Action Objectives for Sediment

While sediment sampling was conducted during Phase 4 assessment activities, no additional corrective action activities has been conducted for sediment, to date. Corrective action objectives for impacted sediment will be based on site specific background concentrations or risk based values. It is anticipated that expanded operation of the proposed upgraded groundwater treatment system will ultimately reduce impacts to the stream and associated sediments through hydraulic capture and control. In addition, the facility’s conversion from PCP to DCOI will lessen and/or eliminate further surface water/sediment impacts. As described in Section 5.5, sediment and surface water sampling is recommended during annual groundwater sampling events.

4.4 Corrective Action Objectives for Surface Water

While surface water sampling was conducted during Phase 4 assessment activities, no prior corrective action activities have been conducted for surface water. Corrective action objectives for surface water in the areas immediately down gradient from the HWMU and SWMU areas for compounds listed in the Permit will be based on site specific background concentrations or risk-based values. As noted above, operation of the up-graded groundwater treatment system and the facility's conversion from PCP to will reduce future impacts to the stream. Annual surface water sampling is recommended to evaluate surface water quality with the ultimate objective of maintaining compliance with ISWQS.

4.5 Corrective Action Objectives for Groundwater

Groundwater clean-up for areas downgradient of the HWMU will include the treatment/removal of NAPL and treatment of dissolved constituents exceeding established site GWPS standards. Groundwater cleanup for SWMU areas will be determined by risk-based values. As previously discussed in Section 3.7, the estimated extent of NAPL along the down-gradient portion of the closed HWMU is approximately 39,000 square feet. Assuming an average NAPL thickness of 0.1 foot, the volume of NAPL is estimated at 3,900 cubic feet or 29,127 gallons.

The dissolved VOC plume in the upper aquifer associated with the HWMU is approximately 7,336,683 gallons. The dissolved SVOC plume in the upper aquifer associated with the HWMU is approximately 8,497,280 gallons.

Currently, the estimated volume and extent of LNAPL observed in HWMU monitoring wells HWMU-2 and HWMU-3 is unknown. Future subsurface assessments around the HWMU and preserving area will aid in determining the estimated volume and extent of LNAPL, VOC, and SVOCs in residuum soils and groundwater. Treatment volumes may be modified after performing additional groundwater assessment.

4.6 Screening of Corrective Action Alternatives

Expansion of the current groundwater extraction system is proposed in order to capture and recover NAPL and dissolved phase constituents and provide hydraulic control to limit plume migration. Supplemental corrective action alternatives are anticipated in order to achieve site-wide clean-up.

As described in the 2011 RCAP, remedial technologies previously evaluated were grouped together under the following subheadings: 1) Source Removal Technologies; 2) Mechanical Methods, and 3) Passive/Barrier Methods. Source removal technologies evaluated included the following: excavation/off-site disposal, thermal desorption, solidification and stabilization, in-Situ flushing and soil washing, solvent extraction, enhanced bioremediation, and chemical oxidation. Mechanical treatment technologies evaluated included expanded use of groundwater extraction (pump-and-treat), air sparging and soil vacuum extraction (AS/SVE), and dual phase extraction. Passive methods and barrier technologies evaluated included monitored natural attenuation (MNA), non-permeable reactive barriers, permeable reactive barriers (PRBs), and phytoremediation.

The results of the corrective action screening and evaluation identified in-situ/ex-situ chemical oxidation as the recommended source area technology. A PRB barrier utilizing a chemical oxidant or bio-remedial enhancer was identified as a potential long-term passive method for down-gradient plume control. After the findings of supplemental vertical delineation in bedrock indicated deeper bedrock impacts, the remedial strategy was modified to include expansion of the existing pump-and-treat system with optional future surfactant enhancements to aid in NAPL recovery as well as limited bulk soil removal and/or in-situ/ex-situ chemical oxidant treatment combined with In-Situ Stabilization and Solidification (ISS). A discussion of supplemental corrective action alternatives is provided in Section 5.8.

5.0 CORRECTIVE ACTION WORK PLAN

This section provides a site-wide work plan to define the corrective action approach and to address data gaps identified during evaluation of prior assessment data, described in Section 3.0. Based on the findings of prior remedial pilot testing, the goal of this corrective action work plan is to collect data needed to modify the existing groundwater extraction and treatment system. Future supplemental remedial treatment may also be employed using one or more of the technologies previously evaluated during RCAP phases or a similar technology. In addition, this plan seeks to provide a pathway to delineate the extent of target constituents in various environmental media, and further delineate areas potentially targeted for corrective action.

This work plan is described in “phases” and is intended to be flexible enough to allow re-evaluation of the plan both from a cost and feasibility standpoint after each phase of work is complete. In addition, some phases may be combined, all or in part, as a cost saving measure (i.e. maximize the use of day rate direct push drilling). Field and sampling procedures for each phase will be conducted in accordance with the Quality System and Technical Procedures for LSASD Field Branches US-EPA, Region 4, LSASD, Athens, Georgia”(www.epa.gov/quality/quality-system-and-technical-procedures-lsasd-field-branches).

The phases of work are described below and detailed in the subsections.

Phase 1 – Vertical Delineation and Initial Recovery Well Installations
Phase 2 – Short-term Yield Testing and Aquifer Testing
Phase 3 – Source Area Recovery Well Installations and Treatment System Upgrade
Phase 4 – Supplemental Vertical Delineation Well Installations
Phase 5 – SWMU #9 and #10 Surface Water and Sediment Sampling Plan
Phase 6 – Soil and Groundwater Delineation at Storm Drain and Preserving Area
Phase 7 – Additional Recovery Wells for Cross-gradient/Down-gradient Plume Control
Phase 8 – Remediation of Vadose Zone Soils
Phase 9 – Supplemental Corrective Action Alternatives

Progress Reports detailing the results of each phase listed above will be submitted to the EPD for review. In addition, annual groundwater monitoring reports will continue to be submitted as part of Permit requirements. The reports will summarize the data collected in a comprehensive manner and describe any significant findings relevant to the need for corrective action and/or future investigations. Each report will contain supporting documentation including tables, figures, graphical data (if needed), boring logs, well schematics, laboratory reports, an updated timeline and cost estimate (if applicable), and other pertinent information. In addition, any modifications needed for subsequent CAP phases will be included. An estimated schedule for completion of corrective action phases is included as **Appendix B**.

5.1 Vertical Delineation and Initial Recovery Well Installations *(Phase 1)*

In order to assess the migration of dissolved constituents in bedrock and expedite groundwater recovery system upgrades, additional intermediate (top-of-bedrock) and/or deep (bedrock) wells are proposed, as described below. *Note that the location and/or need for installation of the top-of-rock/bedrock well pairs will be determined after additional data evaluation (see Section 5.4)*.

- MW-5B (air rotary), convert into bedrock recovery well;
- MW-12B/PRW-11(MW-12B (top-of-rock-auger install/air rotary); PRW-11 (auger))

Supplemental Vertical Delineation (Section 5.4):

- MW-2A (top-of-bedrock-auger install) and MW-2B (bedrock-rock coring)
- MW-4A (top-of-bedrock-auger install) and MW-4B (bedrock-rock coring)
- MW-10A (top-of-bedrock-auger install) and MW-10B (bedrock-rock coring)
- MW-13A (top-of-bedrock-auger install) and MW-13B (bedrock-rock coring)
- MW-14A (top-of-bedrock-auger install) and MW-14B (bedrock-rock coring)

In an effort to expedite source area recovery well installations/treatment system modification, vertical bedrock delineation in Phase 1 will be limited to MW-5B (PMW-5B), MW-12B (PMW-12B), and PRW-11. Proposed vertical delineation monitoring wells are depicted on **Figure 21.** MW-5B has been partially completed with a five to six-inch diameter outer casing installed into the top of bedrock at a depth of approximately 50 ft-bgs. Prior to air rotary drilling, installation of a larger diameter outer casing (8” to 10” stainless steel) may be required. The new outer casing, if needed, will be pressure grouted in-place on the exterior and interior casing surfaces, using Portland cement or equivalent, to provide a seal protecting against down-hole migration of groundwater. The outer casing will require one to two days to install with one or more additional days for concrete curing. MW-5B will be advanced to a depth of 150-200 feet inside the cured outer casing using a compressed air driven air rotary hammer, connected to 5 to 10’ threaded drill rods.

Discrete sampling will be performed using inflatable packers prior to well completion to evaluate the vertical extent of regulated VOC/SVOC constituents. The packer system consists of one or two-inch diameter stainless steel or PVC screened pipe sections located between polybutylene inflatable bladders. After lowering to the desired depth, the packers are inflated using compressed air or nitrogen to seal off the sampling zone. Based on prior bedrock drilling, it is anticipated that a total of four (4) discrete samples will be collected at depth intervals of approximately 80', 100', 125', and 175'; however, sample intervals will be adjusted based on drilling observations. Groundwater samples will be collected after properly purging the sampling interval for analysis on an expedited turnaround in order to limit delay of the drilling effort.

In addition to discrete sampling, several optional borehole geophysical logging tools may be selected, based on scheduling and availability, in order to better assess productive fracture zones in the bedrock. Envirorisk will discuss the use and application of these borehole geophysical tools with the EPD Project Geologist prior to field implementation. The borehole instrumentation may be utilized as a suite of downhole tools or as individual tools, as described below:

- Acoustic Televiewer: This tool emits an acoustic beam reflected off the core hole wall to provide a mapped image of the fracture location, orientation, foliations, and lithologic contacts;

- Optical Televiewer: This tool is an optical camera used to record and digitize a 360-degree color image of the bore hole and planar features including strike and dip of fractures, foliation, and lithologic contacts;

- 3-Arm Caliber: This tool measures borehole diameter using spring loaded arms capable of detecting small fractures in the borehole wall;

- Fluid Temperature: This tool is used to evaluate groundwater movement based on temperature gradients in the borehole;

- Fluid Resistivity: This log is used to identify changes in electrical resistivity attributed to solute concentrations and geochemical variances caused from groundwater movement;

- Single Point Resistance (SPR) and Spontaneous Potential (SP): These logs evaluate electrical current and voltage differences due to lithology, water chemistry, and fracture variances;

- Natural Gamma: This tool measures natural gamma radiation from the rock formation and is useful for identifying lithologic variances based on minerals containing radioactive isotopes;

- Heat-Pulse Flow Meter: This meter measures the direction and rate of vertical flow in a borehole based on the temperature variances.

The geophysical logging tools are typically lowered and removed into the boreholes using a tripod wench. An experienced geophysical professional will perform the testing and provide data interpretation. Logging may be performed under ambient or pumping conditions to evaluate hydraulic properties.

After evaluating bedrock fracture zones, a 4” or greater Schedule 40 or 80 PVC well screen or stainless steel will be installed inside the outer casing for groundwater recovery. Alternatively, MW-5B may be completed as an open hole rock well after conferring with the EPD project geologist. If a well is installed, a washed silica sand pack will be installed in the borehole annulus using a tremie pipe followed by a two foot thick (minimum) hydrated bentonite seal, and final grout seal. Surface completion will likely be flush grade using a larger 2’x 2’ square manhole cover to accommodate a recovery well pump and influent/compressor lines and fittings. If a stick-up is installed, protective bollards will be installed around the above ground casing.

Due to access difficulties and the need for significant potable water to facilitate rock coring, air rotary drilling is also planned for bedrock drilling of MW-12B. The purpose of this well is to evaluate the down-gradient horizontal and vertical extent of VOCs/SVOCs in bedrock as well as hydraulic flow properties in a “down-slope” hydraulic location, where an upward vertical gradient may be present in deeper bedrock.

A Geoprobe 7822DT track mounted probe/auger/rotary rig will be utilized. Land clearing and limited grading including removal of a fallen tree and other vegetation using a small dozer or hydraulic excavator will be required prior to drilling. The boring log for adjacent well MW-12A indicated auger drilling to 34 ft-bgs where refusal in weathered granite/granite gneiss occurred. Prior to auger drilling for the outer casing, continuous probing will be performed using two-inch diameter, four- to five-foot-long sample core barrels fitted with acetate liners and advanced with threaded carbon-steel drive rods. Soils will be logged by a trained geologist/field scientist and field screened using a photoionization detector (PID) to identify soil sample locations. Based on PID readings and olfactory indicators, one or two soil samples will be collected for target VOC/SVOC laboratory analysis.

It is anticipated that the outer casing for MW-12B will be installed to auger refusal depths of 35-40 ft-bgs and will consist of 4” to 6” diameter Schedule 40 or Schedule 80 threaded PVC riser pipe. The outer casing will be pressure grouted in-place using Portland cement or equivalent, to provide a seal protecting against down-hole migration of groundwater. The outer casing will require one to two days to install with one or more additional days for concrete curing prior to air rotary borehole advancement. Air rotary drilling will be performed to depths ranging from 100-200 feet. Final well completion depths will be determined by discrete sampling for regulated VOC/SVOC constituents as described above for MW-5B. Optional borehole geophysical tools may be selected to assess productive fracture zones in the bedrock. After evaluation, a 2” Schedule 40 PVC well will be installed in the borehole or alternatively, MW-12B will be completed as an open hole rock well. If a well is installed, a washed silica sand pack will be installed in the borehole annulus using a tremie pipe followed by a two-foot thick (minimum) hydrated bentonite seal, and final grout seal. Surface completion will likely be an above grade manhole cover secured with a 2’x 2’ or 4’x 4’ concrete pad installed at ground surface.

In conjunction with MW-12B outer casing installation, PRW-11, a top-of-rock intermediate depth recovery well will be auger drilled and installed adjacent to MW-12B to a depth of 35’-40’ or refusal. No soil core samples will be collected due to the close proximity to MW-12B. PRW-11 will be utilized in a later phase upgrade to the groundwater extraction system; however, due to access difficulties, the well will be installed during the same rig mobilization. PRW-11 will be installed using 4” diameter Schedule 40 PVC with a slotted screen (0.010” slotted) interval ranging from 15’-25’, based on water table measurements and other considerations. Recovery well completion will include adding a washed silica sand pack to the borehole annulus using a tremie pipe followed by a two-foot thick (minimum) hydrated bentonite seal, and final grout seal. Surface completion will likely be flush grade using a larger 2'x 2' square manhole cover or alternatively, may be an above ground completion. The proposed location of PRW-11 is depicted on **Figure 22**.

Auger cuttings and pulverized rock fragments from air rotary drilling of MW-5B will be placed in the facility's treatment waste roll-off for incineration. Auger cuttings and air rotary fragments from drilling MW-12B and PRW-11 will be temporarily stored on-site for testing and potential off-site landfill disposal. Fluids generated from drilling and decontamination will be containerized and pumped into the facility's treatment system.

Phase 1 Installation of MW-5B, MW-12B, and PRW-11 is anticipated to require 5 to 6 weeks for field completion and preliminary evaluation.

5.2 Short-term Yield Testing and Aquifer Testing *(Phase 2)*

To aid in determination of recovery well spacing, short-term yield testing followed by more extended aquifer testing, if needed, is proposed using existing pumping well PW-1. The purpose of the short-term yield testing (or step-drawdown testing) is to determine the optimal well flow rate achievable in order to maximize hydraulic control without drawing the water level below the pump intake. Yield testing will also aid in calculating the total influent load expected for the treatment system. Ideally, this testing will be performed using PW-1 with gauging conducted in nearby MW-5A and newly installed MW-5B along with expanded measurements using the surrounding well network. Additional testing may be required using one or more existing monitoring wells, based on the findings.

Prior to yield testing, the Blackhawk® pump assembly will be temporarily removed from PW-1 and the well depth will be gauged and compared to the total depth recorded at completion. If observed well conditions suggest the need for inspection, a down-hole camera will be utilized to inspect the well interior for fouling. After the optional camera inspection, PW-1 will be redeveloped using a Waterra-style pump with surge blocks. Re-development will be performed to remove fines/sediment collected over time in the well casing and in an effort to improve hydraulic communication between the sand pack and surrounding formation. Well development fluid will be temporarily containerized in tanks located adjacent to PW-1 prior to pumping into the treatment system.

Approximately one to two days following development, after groundwater recharge, yield testing will be performed using a variable speed Grundfos submersible pump. The pump will be operated at various flow rates while drawdown extent is monitored using the surrounding monitoring well network. Prior to testing, a full round of groundwater depths will be gauged using a downhole interface probe. A programmable multi-channel datalogger will likely be utilized to capture initial drawdown data in PW-1 and likely MW-5R, MW-5A, and MW-5B. In order to determine the vertical extent of hydraulic communication, inflatable packers will be utilized to initially isolate deeper zones in MW-5B during yield testing.

Yield testing is expected to require 12 to 16 hours to complete. After determining an optimal pumping rate, a longer term aquifer test may be conducted for 24 to 48 hours. Aquifer test results will be used to gain a better understanding of long-term drawdown and aquifer recovery as well as allowing calculation of hydraulic conductivity and transmissivity for more accurate flow rate determinations.

Phase 2 testing is expected to require 4 to 5 weeks for completion of field work and preliminary evaluation.

5.3 Source Area Recovery Well Installations/System Upgrade *(Phase 3)*

After completion of Phase 2 assessment activities, recovery wells surrounding the impoundment will be installed for initial source area treatment and hydraulic control (see Figure 22). The exact number of recovery wells and spacing will be determined following yield and aquifer testing. Currently, an approximate 100-foot capture zone is estimated for shallow and intermediate depth recovery wells. This capture zone was derived based on the drawdown observed in the original aquifer test performed in May 1990. Closer spacings may be chosen for shallow recovery wells based on field logging and NAPL observations, or the Phase 2 findings, in order to enhance recovery.

Proposed source area recovery wells currently include 7 - shallow recovery wells (PSRW-1 – PSRW-7) installed to depths of 35-40 ft-bgs, 2- intermediate recovery wells (PRW-1 and PRW-2) installed to depths of 50-60 ft-bgs and located east and west of existing PW-1, also of intermediate depth, and 1– deep bedrock recovery well (MW-5B) installed to 125-200 ft-bgs.

In addition, an attempt will be made to deepen recovery trench wells around TA, TB, and TC (PSRW-A, B, and C) to depths of 35-40 ft-bgs for NAPL extraction and hydraulic control adjacent to the storm sewer. Due to the presence of gravel backfill to depths of 18-22 ft-bgs, after cutting off the corrugated metal stick-up, drilling will initially be attempted using an auger rig fitted with smaller diameter augers (2.25 or 3.25 ID). If the gravel backfill can't be penetrated with augers, drilling will be performed using either air rotary, wash rotary (similar to mud rotary), or a roller cone, as determined by a senior driller. A casing advancer will likely be required to prevent gravel borehole cave-in. After penetrating below the gravel layer, auger drilling with resume along with split spoon sampling for soil characterization.

Following installation of shallow recovery wells, a 24-hour mobile multi-phase extraction (MPE) event will be performed using a suitably sized vacuum truck/trailer for initial LNAPL recovery. Extraction will be performed using the HWMU wells and one or more of the newly installed shallow recovery wells (PSRW-1, PSRW-2, and PSRW-3) containing LNAPL. Extraction will be enhanced by placement of an interior "stinger" pipe inside the wells with a temporary vacuum seal. Extracted fluids will be pumped into a temporary trailer mounted storage tank prior to being pumped into the treatment system. Similar to yield testing, groundwater/NAPL gauging will be performed prior to and during the mobile

MPE event to gauge the effective drawdown. Vacuum influence will also be determined using vacuum gauges attached to PVC well heads.

Intermediate and deep recovery wells will be installed in a similar manner as described in Section 5.1, however, since target groundwater recovery zones will be determined during Phase 1 activities, air rotary methods will likely be utilized in deep wells rather than rock coring to expedite installations. Intermediate and deep recovery wells will be constructed using a 4-, 6-, or 10-inch diameter stainless steel casing and screen lengths will be determined based on packer testing results. Shallow recovery wells will be installed using hollow stem auger drilling methods after direct push continuous soil coring, and will also be constructed using a 4-, 6-, or 10-inch diameter stainless steel casing (or Schedule 40 or 80 PVC, if NAPL is not observed). Note that larger diameter recovery wells will be considered in locations where it is anticipated creosote DNAPL will be recovered. The screen lengths will be determined based on the results of the packer testing and field logging. Additionally, shallow recovery wells that contain little or no recoverable NAPL may be either re-located or drilled deeper for use as an intermediate depth recovery well for hydraulic control.

It is anticipated that shallow recovery wells will generally be utilized to remove NAPL/impacted groundwater with NAPL droplets/sheens at lower flow rates [i.e. <1 gallons per minute (gpm)]; while, intermediate depth recovery wells will be utilized for both recovery of impacted groundwater and hydraulic control. After determining anticipated well flow rates and target NAPL recovery areas around the impoundment, groundwater recovery extraction pumps will be selected. Ideally, above ground low flow, air lift piston pumps such as the Blackhawk® brand pump currently in use in PW-1, will be placed in shallow recovery wells for NAPL recovery.

Intermediate depth recovery wells, that do not contain appreciable NAPL, will be fitted with down-hole submersible pumps to create more drawdown for hydraulic control. All well pumps will be pneumatically driven consistent with the current recovery operation. Recovery wells fitted with above ground piston pumps will be completed above grade with protected bollards. Recovery wells with submersible pumps will be completed with flush grade vaults. All recovery wells will be connected with sub-grade piping for influent water flow and compressed air for pump operation.

The up-graded groundwater treatment system is anticipated to consist of up to 10 shallow recovery wells (PSRW-1 – PSRW-7 and PSRW-A, B, and C), 3 - intermediate depth recovery wells (PRW-1 – PRW-4 and PW-1) and 1– deep bedrock recovery well (MW-5B). Influent flow is expected to range from roughly 3,000 to 6,000 gallons per day after adding the additional recovery wells. Since the majority of the regulated substances extracted are SVOCs with minimal volatility and “stripability” based on Henry’s constants, treatment will primarily consist of NAPL separation (LNAPLs will require an oil-water separator) and carbon absorption. The current treatment system utilizes an Allied Signal Immobilized Cell Biotreater (ICB) system followed by up to four 2,000 pound carbon tanks for combined treatment of groundwater influent and process water prior to discharge to the City of East Point wastewater treatment plant. The Allied ICB system has four aerated biological compartments packed with carbon impregnated foam cubes designed to absorb and treat VOCs/SVOCs in the wastewater through biological enzyme growth.

It is anticipated that the current ICB system can be utilized along with additional activated carbon treatment. Preliminary calculations based on a 4 gpm influent stream, without pre-treatment with the ICB, indicate that 15 to 20 pounds of activated carbon may be consumed per day. Assuming 20 pounds per day usage, up to 400 days (approximately 13 months) of total treatment is achievable if all four 2,000 pound carbon tanks were used in series. Actual activated carbon usage should be much lower through continued use of the ICB system. Other pre-treatment options include chemical oxidation which is commonly used in public operated treatment works prior to biological treatment. Pre-treatment using chemical oxidation may be accomplished through use of a series of mix tanks preferably prior to ICB treatment. Common oxidants include hydrogen peroxide, sodium persulfate, and sodium/potassium permanganate; all of which were previously investigated through a treatability study and subsequent pilot testing.

Ideally, up-grades to the existing treatment system will include the flexibility of accommodating a higher volume influent stream in the future as additional recovery wells are added. Process wastewater treatment should be greatly reduced as PCP is phased out and replaced with the non-hazardous DCOI wood treatment chemical currently in use. This will likely necessitate a separation of groundwater influent from the non-hazardous waste stream generated from DCOI wastewater. Influent treatment requirements and waste stream separation considerations will be determined at a future date after the elimination of PCP and follow-up discussions with East Point personnel.

The current anticipated source area recovery well layout and generic treatment system schematic is depicted on **Figures 22-23**. Anticipated aerial treatment assuming 100-foot capture zones is depicted on **Figure 24**.

5.4 Supplemental Vertical Delineation Well Installations *(Phase 4)*

Additional vertical delineation monitoring wells may include the following:

- MW-2A/MW-2B
- MW-4A/MW-4B
- MW-10A/MW-10B
- MW-13A/MW-13B
- MW-14A/MW-14B

These wells will be installed in an effort to complete the horizontal and vertical delineation on-site of deeper bedrock zones previously investigated. Note that one or more of these well pairs may be eliminated based on initial delineation and further evaluation.

All top-of-rock intermediate depth monitoring wells (MW-2A, MW-10A, MW-13A, and MW-14A) will be installed using a hollow stem auger rig through the softer schist bedrock until auger refusal is observed in harder gneiss bedrock (50-65 ft-bgs). Prior to auger drilling, continuous soil probing will be performed using two-inch diameter, four- to five-foot-long sample core barrels fitted with acetate liners and advanced with threaded carbon-steel drive rods. Soils will be logged by a trained geologist/field scientist and field screened using a PID to identify soil sample locations. Based on PID readings and olfactory indicators, one or two soil samples will be collected for target VOC/SVOC laboratory analysis from each well boring.

Intermediate depth wells will be installed using two-inch Schedule 40 PVC screen (0.010" slotted) and threaded riser sections after the advancing each boring to bedrock refusal. Screened intervals will range from 5 to 10 feet based on water table measurements and drilling observations. The PVC well pipe will be secured by first adding a washed silica sand pack using a tremie pipe to a depth of at least two feet above the top of the well screen. An initial borehole seal (2' minimum thickness) will then be created using hydrated bentonite. The remainder of the borehole will be grouted to just below ground surface. Surface completion will consist of either a flush grade traffic bearing well vault enclosed in a 2'x 2' square concrete pad or an above ground completion. Protective bollards will be added, if needed.

Soil cuttings will be temporarily stored on-site for testing and off-site disposal and/or placement in the facility's treatment waste roll-off. Fluids generated from drilling and decontamination will be containerized and pumped into the facility's treatment system.

Monitoring wells MW-2B, MW-4B, MW-10B, MW-13B, and MW-14B will be advanced by rock coring methods to target depths up to 200 ft-bgs. The exact depths drilled will be determined by the on-site geologist based on core evaluation and discrete sample collection, using similar procedures as followed during construction of MW-3B and MW-8B. Prior to coring, an outer casing will be installed using an auger rig equipped with 4.25 and/or 6.25 interior diameter (ID) augers to auger refusal. If auger refusal is encountered in PWR, an air rotary drill rig may be required for installation of the outer casing. Since these wells are unlikely to encounter NAPL, outer casing material will consist of 4" to 6" diameter Schedule 40 PVC riser pipe. The PVC casings will be pressure grouted in-place on the exterior and interior casing surfaces, using Portland cement or equivalent, to provide a seal protecting against down-hole migration of groundwater. Each outer casing will require approximately one to two days to install. After allowing the grout to cure, the interior of the casing will be drilled out and rock coring will commence using either NQ or HQ diameter core barrels retrieved through a wire line system.

Rock coring is a wet abrasion drilling method that requires potable water in varying quantities to penetrate the hard granitic gneiss. Cores will be retrieved in five or ten-foot core barrels for detailed field examination by the field geologist. The examination will include a graphic sketch of jointing and possible water producing fracture zones, a mineralogical classification, an examination of hardness, a description of percent recovery, and an evaluation of rock quality designation (RQD). The RQD will provide an approximate measurement of the degree of jointing or fracturing in the rock mass. Rock cores will be stored in a labeled core box for future reference.

During advancement of rock wells using coring or air rotary methods, discrete groundwater sampling will be performed in an effort to determine the vertical extent of target constituents in the bedrock fractures prior to final well construction. It is anticipated that a total of four (4) discrete samples will be collected for VOC and SVOC analysis at depth intervals of approximately 80', 100', 125', and 175' using an inflatable packer sampling system. The groundwater samples will be collected after properly purging the sampling interval for analysis on an expedited turnaround in order to limit delay of the drilling effort. The packer system consists of one-inch diameter stainless steel or PVC screened pipe sections located between polybutylene inflatable bladders. The packer system will be lowered to the desired depth where it will be inflated using compressed air or nitrogen.

After inflation, a pneumatic pump will be utilized to evacuate the “packed off” zone. During extraction, hydraulic packer tests may also be performed, on some or all of the discrete zones, in an effort to gauge hydraulic conductivity of the fracture zones. This testing will involve the collection of groundwater elevations from nearby monitoring wells before and after testing to gauge draw-down and interconnectivity between residuum, PWR, and bedrock aquifer zones.

After completion of the hydraulic packer testing and “rush” groundwater sampling, the well will be constructed at the target depth. Alternatively, the geologist and WCM personnel will make a determination as to whether deeper drilling (below 200 ft-bgs) should be performed versus re-mobilization or drilling in another location. The EPD project geologist will be contacted, as time permits, to assist in this determination.

Rock wells will be constructed using pre-pack screen sections consisting of fine-grained sand enclosed in a stainless-steel mesh over a two-inch diameter, 0.010” slotted Schedule 40 PVC screen. Screen lengths will be determined based on results of the packer testing. A two-foot bentonite sleeve will be threaded to the screen section and the whole assembly will in turn be threaded to two-inch PVC riser pipe. Final grouting will be performed using a tremie pipe or similar device. Protective bollards will be installed, if necessary; however, flush mount well vaults and concrete pads will likely be installed at some of the well locations.

Soil cuttings generated during drilling will be temporarily stored on-site for testing and off-site disposal. Fluids generated from drilling and decontamination will be containerized and pumped into the facility’s treatment system.

5.5 SMWU #9 and #10 Surface Water and Sediment Sample Plan *(Phase 5)*

The facility is currently required to perform annual groundwater sampling in March as part of the Permit requirements. In order to assess current sediment and surface water conditions at the stream, annual sampling of historic sediment and surface water locations (SED/SW-5, SED/SW-6, SED/SW-7, SED/SW-8, SED/SW-9, and SED/SW-10) is recommended in conjunction with annual groundwater monitoring events. In addition, Interim Measures sampling events are recommended to continue on a semi-annual basis.

This includes sampling at stormwater locations Outfall-1, Outfall-2, Outfall-3, Outfall-4, and Outfall-5, PB-1, and PB-2; surface water location SW-9; and groundwater at TMW-25. (*Note: These samples may be collected apart from a storm event*).

After initiation of corrective action, these sampling events will also serve as performance monitoring events to evaluate the effectiveness of the upgraded groundwater extraction system (whether treatment of shallow groundwater upgradient of the stream improves surface water conditions over time). In addition, newly constructed permanent monitoring wells (described in preceding sections) will be added to the Sampling and Analysis Plan shown on **Table 4**. Surface water, stormwater, groundwater, and sediment samples will be analyzed for site specific VOCs, SVOCs, and metals. Surface water and sediment sample locations are depicted on **Figure 25**. The stormwater, groundwater, and surface water sample locations associated with Interim Measures events are depicted on **Figure 26**.

In addition to SWMUs #9 and #10, site wide surface soil/sediment sampling will be conducted. Sample locations across the site should include discolored or potentially impacted surface soils or surficial flow pathways (wet or dry). Prior to selecting sample locations, a site meeting is recommended with the Facility owner and the EPD geologist to better ascertain sampling locations. Surface soil/sediment samples will be collected using a stainless-steel scoop/spoon or directly from soils exposed beneath the gravel cover at depths of 0-2" (disposable nitrile gloves will be utilized). Recommended sample analysis includes target VOCs and SVOCs. This sampling will be conducted in conjunction with other phases of work to reduce costs.

5.6 Supplemental Soil and Groundwater Delineation *(Phase 6)*

The following data gaps have been identified:

- Soils east, west, and south of the preserving area (SWMU #1, #4, and #6 areas) have not been delineated;
- SVOCs were detected in SWMU 10-1B, SWMU 10-2, and SWMU 10-3 at depths ranging from 8-12 ft-bgs which may indicate migration of impacted sediments in or around the storm drain that have not been delineated; and
- Soils west and northwest of TW-9 (@ 9.5 ft) have not been delineated.

The extent of regulated constituents in soil (surface and subsurface) and shallow groundwater has not been delineated east, west, and south of the preserving area (SWMU #1, #4, and #6). In addition, the extent of soil impact along the storm drain line (associated with SWMU #10) and west/northwest of TW-9 has not been delineated. Envirorisk recommends the advancement of eight (8) additional borings in the locations shown on **Figure 27** for horizontal and vertical delineation purposes. Four (4) borings will be converted into temporary monitoring wells to delineate shallow groundwater impacts. It is recognized that additional soil borings will likely be required prior to soil remediation after calculated risk based target clean-up values are developed and approved.

Soil borings will be advanced using a direct push drill rig. Discrete soil samples will be collected using four-foot or five-foot long, one to two-inch diameter core sample tubes with clear, sterile, disposable acetate liners. All down hole drill rods and core samples will be decontaminated by hand washing using a non-phosphate grade detergent followed by an organic-free or de-ionized water rinse. All rinse water will be containerized for recycling with the treatment system influent.

Soil core samples will be collected continuously for visual classification and field screening (PID/olfactory) for selection of sample depths for laboratory analysis. The soil descriptions will be recorded on field boring logs by a geologist or environmental scientist in general accordance with the Unified Soil Classification System (USCS).

After visual examination and logging, selected portions of the soil cores will be placed in Ziploc style bags for field screening of volatile organics using a field calibrated PID. Readings will be collected by penetrating the bag with the tip of the PID meter and recording the instrument readout in parts per million vapor (ppmv). The PID readings will be recorded on boring logs which will be included as an appendix. Based on the PID readings, olfactory indications, and relative depth, a minimum of one (1) subsurface soil samples (depth >2 ft-bgs) and one (1) surface soil sample (depth 0 to 1 ft-bgs) will be collected from each of the soil borings and submitted for laboratory analysis of VOCs and SVOCs.

At four (4) soil boring locations, temporary wells will be constructed using 2" Schedule 40 PVC riser pipe with 10-15 foot screened intervals (0.010" slotted) and secured with a silica sand pack and bentonite seal. The temporary wells will be completed with expandable caps and will be left extending 2-3 feet above grade. The newly installed temporary wells will be developed using a peristaltic pump to ensure the sand pack was properly "seated" and improve hydraulic communication with the shallow aquifer. Temporary wells will be sampled for site-specific VOCs and SVOCs.

5.7 Additional Recovery Wells for Cross-gradient/Down-gradient Plume Control *(Phase 7)*

It is anticipated that additional cross-gradient and down-gradient recovery wells will be required for treatment and hydraulic control. The exact number of recovery wells and spacing will be determined based on follow-up evaluation; however, using an approximate 100-foot spacing a total of 2 additional PSRWs, 9 intermediate depth recovery wells, and 4 deep bedrock recovery wells are proposed (see Figure 22). The additional recovery wells will be installed using a combination of auger, air rotary, and/or rock coring, as determined by the site geologist.

5.8 Remediation of Vadose Zone Soils *(Phase 8)*

Prior soil assessments have identified impacted soils in the vadose zone particularly at depths shallower than 16 ft-bgs, that may require remediation. These impacted soils predominantly consist of fill materials to depths of >30 ft-bgs which contain "pockets" of creosote-like NAPL from unknown sources. In order to determine a calculated leaching potential, risk-based target values for vadose zone soils will need to be developed. Following approval, limited source removal may be performed to remove impacted soils above the water table in accessible areas. Deeper soil impacts, in inaccessible areas close to above ground or underground structures, may require supplemental treatment using a combination of limited bulk removal, in-situ chemical oxidation (ISCO), surfactant injection and extraction, or ex-situ/in-situ soil oxidant blending.

5.9 Supplemental Corrective Action Alternatives *(Phase 9)*

Prior RCAP pilot testing indicated that in-situ/ex-situ chemical oxidant applications and/or PRB applications would successfully reduce regulated substances in the saturated soil and groundwater as well as NAPL phases. Due to the extent of NAPL, in particular LNAPL under the southern end of the impoundment, discovery of regulated substances in deep fractured bedrock, and impoundment access; full scale implementation of these technologies was determined to be cost prohibitive. Future treatment in smaller areas or NAPL “pockets” using chemical oxidation applied via large diameter augers (soil blending) or injection-based delivery methods may be a useful alternative. In-situ stabilization and solidification (ISS) which involves mixing or blending impacted soils with Portland cement, lime, fly ash, or similar substance; offers another remedial alternative for impacted soils and possibly bedrock. ISS methods typically provide encapsulation and potential stabilization of NAPL and impacted soils but don’t provide contaminant destruction.

In recent years, combined remedy approaches utilizing oxidants including sodium persulfate combined and activated with alkaline ISS agents such as Portland cement or lime, have been successfully utilized to treat PAHs and NAPLs. These ISCO-ISS applications are typically more effective than ISS alone in source area treatments of soil and groundwater, due to the contaminant destruction that occurs as a result of ISCO oxidation radicals followed by a reduction in soil leachability caused by ISS. Potential long-term biodegradation is also achievable through cycling of residual sulfates by native sulfate reducing bacteria.

In addition, surfactant injection and subsequent extraction using the upgraded groundwater extraction system may be considered for future mass removal of NAPL and high dissolved constituents. Surfactants are compounds that are partially soluble in both oil-based (hydrophobic) and water-based (hydrophilic) solutions and are utilized to create emulsions for enhanced removal of NAPL and regulated substances sorbed to soil particles. Due to the presence of different NAPL types at this site, one or more surfactants may be required to optimize recovery. A limited bench scale treatability study is recommended prior to surfactant selection and application. Surfactant applications in the field would typically involve injection either through direct push rod tooling or injection wells installed for multiple delivery events. Treatment beneath the impoundment may be facilitated possibly using low angle sonic delivery or horizontal wells. Sonic drilling would also offer the advantage of soil and groundwater sampling prior to installation of injection or recovery wells.

Additional vertical NAPL delineation beneath the impoundment and in surrounding source areas would be recommended prior to supplemental corrective action using High Resolution Site Characterization tools such as Laser Induced Fluorescence (LIF). LIF methods are easily employed using a direct push probe rig and are less invasive than traditional sampling methods. Available methods for heavier oils and creosote include the Geoprobe Optical Interface Probe (OIP) – G, https://geoprobe.com/direct-image/oip-optical-image-profiler and the TarGOST® available from Dakota Technologies, https://www.dakotatechnologies.com/services/targost.

6.0 COST AND IMPLEMENTATION

This RCAP has been prepared with a “phased” approach in mind to allow re-evaluation of the proposed plan after subsequent data collection. A schedule for completion of RCAP phases is provided in **Appendix B** to identify each phase of work and anticipated dates for the initiation of each phase. Initial start-up of Phase 1 is scheduled to begin within 60 days of approval of this RCAP and Part B Permit Application. An itemized cost spreadsheet is included as **Appendix C**. The cost estimate will be re-evaluated and revised at each phase of the RCAP.

7.0 REFERENCES

Air Force Center for Environmental Excellence (AFCEE). 2000. Remediation of Chlorinated Solvent Contamination on Industrial and Airfield Sites. U.S. Air Force Environmental Restoration Program.

Batu, Vedat, 1998, *Aquifer Hydraulics,* John Wiley & Sons, Inc., New York, 727p.

Block, P., R. Brown, and D. Robinson. 2004. *Novel activation technologies for sodium persulfate in situ chemical oxidation.* Proceedings of the Fourth International Conference on the Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA.

Bryant, D., and J. Wilson. 2002. *Case Studies of Fenton's Reagent ISCO at MGP and Chlorinated Solvent Sites, In Situ Treatment of Groundwater Contaminated with Non-Aqueous Phase Liquid Contamination: Fundamentals and Case Studies*, Chicago, Il, December 10, 2002.

Cassidy, D., Srivastava, V., Dombrowski, F., Lingle, J., *Combining in situ chemical oxidation, stabilization, and anaerobic bioremediation in a single application to reduce contaminant mass and leachability in soil,* Journal of Hazardous Materials, Volume 297, May 2015, p.347-355.

Chaing, D., M. Verdon, S. Pittenger, and G. Smith. 2009. *Chemical Oxidation of a Broad-Spectrum PAH Contamination Using Activated Persulfate*, Remediation Technologies Symposium-2009 (RemTech 2009), Atlanta, GA, March 3-5, 2009.

Chapman, M.J., Crawford, T.J., Tharpe, W.T., 1999, *Geology and Groundwater Resources of the Lawrenceville Area, Georgia,* U.S. Geological Survey Water Resources Investigations Report 98-4233, Atlanta, GA.

Clark & Zisa, *A Physiographic Map of Georgia*, Department of Natural Resources, Georgia Geologic Survey, 1987.

Cressler, C.W., Thurmond, C.J., and Hester, W.G., 1983, *Groundwater in the Greater Atlanta Region*, Georgia, Georgia Geological Survey Information Circular 63.

Ferrarese, E.G. Andreottolaa, and I.A. Opreaa. 2008. *Remediation of PAH-Contaminated Sediments by Chemical Oxidation*, Journal of Hazardous Materials, Volume 152, Issue 1, 21 March 2008, p.128-139.

Fetter, C. W., 1988, *Applied Hydrogeology, 2nd Edition, Macmillan Publishing Company, New York, 592 p*.)

Georgia Environmental Protection Division, Department of Natural Resources, Hazardous Waste Management Branch, open record files for W.C. Meredith, Inc., GAD 058489899, Consent Order: EPD-HW-198.

Gryzenia J., D.Cassidy, and D. Hampton.2009. *Production and Accumulation of Surfactants During the Chemical Oxidation of PAH in Soil*, Chemosphere, 77(4), p.540-545.

ITRC. 2001. Technical *and Regulatory Guidance for In Situ Chemical Oxidation of Contaminated Soil and Groundwater, 2nd Edition.*

LeGrand, Harry E. (1989), *A Conceptual Model of Ground Water Settings in the Piedmont Region.* Charles c. Daniel III et. al. eds., Clemson University, Clemson, SC, 317-327.

Lohman, S. W., 1972, *Ground-Water Hydraulics,* Professional Paper 708, U.S. Department of the Interior, Geological Survey, 67 p.

McConnell, K. and Abrams, C., 1984, *Geology of Greater Atlanta Region*, Bulletin 96, Department of Natural Resources, Georgia Geologic Survey.

Norris et al., 1994, *Handbook of Bioremediation,* Lewis Publishers, Boca Raton, Fl 257 p.

Rice University, 1997: *Technology Practices Manual for Surfactants and Cosolvents*, Rice University, 6100 Main Street, Houston, TX 77005-1892, February 1997.

Tanner, J.D., et al, *Geologic Map of Georgia*, Department of Natural Resources, Geologic and Water Resources Division, Georgia Geologic Survey, 1976.

U.S. Environmental Protection Agency. 200b1. *Groundwater Pump and Treat Systems: Summary of Selected Cost and Performance Information at Superfund-financed Sites*, EPA 542-R-01-021b, December 2001, 409 p.

U. S. Environmental Protection Agency. 2006. *Engineering Issue: In Situ and Ex Situ Biodegradation Technologies for Remediation of Contaminated Sites.* U.S. EPA, Office of Research and Development. EPA 625-R-06-015, 22 pp, 2006.

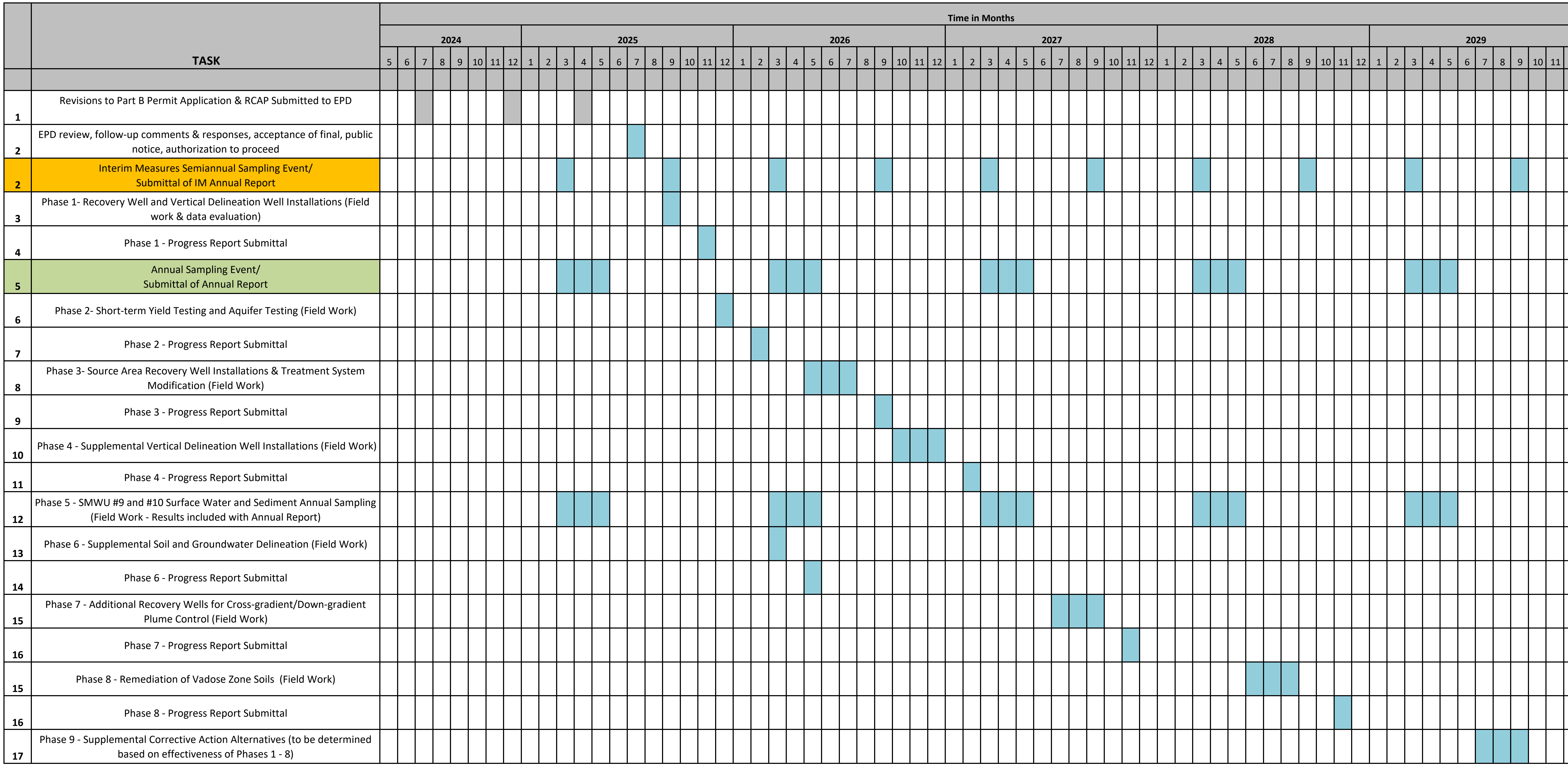
U.S. Environmental Protection Agency - *Field Branches Quality System & Technical Procedures (FBQSTP),* www.epa.gov/region4/sesd/fbqstp

U.S. Environmental Protection Agency. *Field Applications of In Situ Remediation Technologies: Chemical Oxidation.* EPA-542-R-98-008. September 1998.

Wiedemeier, T. H., 1999, *Natural Attenuation of Fuels and Chlorinated Solvents in the Subsurface*, John Wiley & Sons, Inc., New York, NY, 617 p.

Pathway to Revised Corrective Action
William C. Meredith Company, Inc.
Consent Order No. EPD-HW-1751
Updated April 5, 2025

Task Completed
Proposed Date(s)
Annual Sampling Events (set schedule)
Interim Measures Sampling Events (set schedule)



Notes: Phase numbers taken from the RCAP do not necessarily correspond to the order of implementation.

The schedule is estimated through 2029. The chart will be updated, as needed, upon completion of tasks.

DETAIL OF ANNUAL CORRECTIVE ACTION COSTS (Incurred from 10-1-22 to 9-30-23)
William C. Meredith Company, Inc.
2335 Lawrence Street
East Point, Fulton County, Georgia
Hazardous Waste Facility Permit HW-062 (D)
EPA ID No. GAD003323805

Description of Work Phases (RCRA Part B-Permit Preparation)	Unit	Rate	Cost	*2023 Incurred*
Preparation of RCRA Part-B Permit and Associate RCAP	1	n/a	n/a	$4,372.50
Project Management, EPD correspondence, Meetings and MS calls (out of scope)	1	n/a	n/a	$13,920.00
Part B Permit Review, Development of RCAP and Sitewide Corrective Action Stragegy (out of scope)	1	n/a	n/a	$8,242.50
RCAP and Part B Permit Preparation (out of scope)	1	n/a	n/a	$7,020.00
Project Management/Review, Finaize Corrective Action Strategy (Professional Geologist)	1	n/a	n/a	$2,291.25
Report processing/administrative	1	n/a	n/a	$275.00
Report materials, books, CDs, mailing/shipping costs, misc.			n/a	**$36,121.25**
PART-B PREPARATION - SUBTOTAL			**n/a**	**$0.00**
COST PLUS 10% CONTINGENCY				
GRAND TOTAL			**n/a**	**$36,121.25**

COSTS FOR ADDITIONAL DELINEATION/REMEDIATION SERVICES (Incurred from 10-1-22 to 9-30-23)
William C. Meredith Company, Inc.
2335 Lawrence Street
East Point, Fulton County, Georgia
Hazardous Waste Facility Permit HW-062 (D)
EPA ID No. GAD003323805

Phase	Description of Work Phases	Unit	Rate	Cost	*2023 Incurred*
	SWMU 9 & 10 Delineation (Supplemental Phase 4)				
	Installation of 17 TWs and 3 nested wells, soil and groundwater sampling including surface water and sediment	0	$75.00	$0.00	
4	Prepare updated Health & Safety Plan/Field preparation/Coordinate vendors (Staff Scientist)	0	$110.00	$0.00	
4	Stream gauging/staking locations/surveying (2 Field Technicians)	0	$19.75	$0.00	
4	Drilling/Installation of 17 TWs and 3 nested wells (17 @ 35 ft each and 3 @ 55 ft each)	0	$750.00	$0.00	
4	Bobcat & rolloff rental for storage of soil cuttings (assume 1 week - not including disposal)	0	$100.00	$0.00	
4	Disposal of soil cuttings (assume 22 drums = 6 cubic yards (9 tons) in a roll-off)	0	$75.00	$0.00	
4	Field oversight/logging/soil sampling during well installation (Geologist/Env. Scientist)	0	$55.00	$0.00	
4	Soil sampling assistance/soil screening/well development (Technician/Staff Scientist)	0	$10.00	$0.00	
4	NAPL test kits to screen soils	0	$110.00	$0.00	
4	Field time for groundwater sampling of 17 new TWs, 3 existing TWs, 2 surface water (2 Technicians)	0	$750.00	$0.00	
4	Survey new temporary wells relative to existing well top-of-casing (Contractor)	0	$55.00	$0.00	
4	Field oversight during surveying (Technician)	0	$75.00	$0.00	
4	Photoionization detector use for soil screening during drilling/logging	0	$200.00	$0.00	
4	Equipment use: Survey level, multi-parameter low flow meter, peristaltic pump, Grunfos, WL meter	0	$500.00	$0.00	
4	Soil/water sampling supplies, gloves, disposable teflon-lined tubing, mileage, misc.	0	$202.00	$0.00	
4	Soil analysis for VOCs/SVOCs in TWs (assume 2 samples per boring), 2 sediment samples	0	$138.00	$0.00	
4	Groundwater analysis for VOCs/SVOCs for 17 new TWs, 3 new nested wells, 2 surface water	0	$60.00	$0.00	
4	Data evaluation, CAD figures (CAD Technician)	0	$65.00	$0.00	
4	Prepare/assist with data tabulation and Progress Report Preparation (Staff Scientist)	0	$95.00	$0.00	
4	Limited Field Oversight/Prepare Delineation Progress Report (Professional Geologist)	1	n/a	n/a	$840.00
4	2nd Interim Measures Project Management, Field Prep and Lab Correspondence (out of scope)	1	n/a	n/a	$847.50
4	PG, PM review of 2nd Interim Measures Monitoring Report (out of scope)	1	n/a	n/a	$127.50
4	Clerical report processing, 2nd Interim Measures Report (out of scope)				
4	Onsite EPD meeting to discuss SWMU 9 and 10 Strategy and overall sitewide Correction Action, MW-2 rehab (out of scope)	1	n/a	n/a	$3,317.50
4	Field work including stormwater and interim measures sampling	1	n/a	n/a	
4	Data tabulation and evaluation, preparation of Interim Measures Monitoring Report (out of scope)	1	n/a	n/a	
4	Preparation of CAD figures for Interim Measures Monitoring Report (out of scope)	1	n/a	n/a	
4	Senior review of data and Interim Measures Monitoring Report (out of scope)	1	n/a	n/a	
4	**PHASE 4 SUPPLEMENTAL - SUBTOTAL**			$0.00	**$5,132.50**
	PHASE 4 - SUBTOTAL WITH CONTINGENCY (10%)	1.10	$0.00	**$0.00**	

Phase	Impoundment Investigation	Unit	Rate	Cost	*2023 Incurred*
	Installation of 3 temporary wells in the impoundment	0	$29.50	$0.00	
N/A	Drill/install 3 temporary wells using dual direct push/auger rig (3 wells @ 35 feet each = 105 ft)	0	$75.00	$0.00	
N/A	Field oversight during drilling/soil screening/sampling, 2 days (Geologist/Env. Scientist)	0	$10.00	$0.00	
N/A	NAPL test kits to screen soils (4 per well)	0	$202.00	$0.00	
N/A	Soil analysis for SVOCs/VOCs (2 samples per boring)	0	$110.00	$0.00	
N/A	Surveying 3 new temporary wells (2 Technicians)	0	$55.00	$0.00	
N/A	Field gauging for NAPL monthly following TW installation, 6 months, 4 hrs per event (Technician)	0	$55.00	$0.00	
N/A	Field times for groundwater sampling after 6 months (Technician)	0	$500.00	$0.00	
N/A	Misc. expenses, mileage, sampling supplies, PID, equipment, etc.				

		0	$0.00	$0.00	
N/A	Project management/senior review of Impoundment Investigation Report	4	$75.00	$300.00	
N/A	Data evaluation, CAD figures (CAD Technician)	16	$85.00	$1,360.00	
N/A	Data tabulation and prepare Progress Report (Staff Scientist)	1	$300.00	$450.00	
N/A	Report processing/mailing (Administrative)	4	$105.00	$420.00	
N/A	PG review of report/project management (Professional Geologist)			$2,530.00	**$0.00**
	SUBTOTAL			**$2,783.00**	
	SUBTOTAL WITH CONTINGENCY (10%)				

	Vertical Bedrock Delineation (Supplemental Phase 3)	Unit	Rate	Cost	2023 Incurred
	Installation of MW-12B (field only- results will be reported in conjunction with Phase 3/4 Progress Reports)				
3	Field preparation, scheduling, vendor coordination (Staff Scientist)	0	$55.00	$0.00	
3	Land clearing to access MW-12 cluster (Technician and equipment, chainsaw)	0	$250.00	$0.00	
3	Drill/install 4" or 6" outer casing for well MW-12B (75 ft well, outer casing to 40')	0	$37.50	$0.00	
3	Air rotary drilling for well MW-12B (from 40-75')	0	$55.00	$0.00	
3	Drilling mobilization charge including obtaining access (1 rig)	0	$750.00	$0.00	
3	Bob cat/skid steer to relocate drill cuttings up hill into drums	0	$550.00	$0.00	
3	Soil analysis for VOCs/SVOCs	0	$202.00	$0.00	
3	Field oversight during drilling/soil screening/logging/sampling (Geologist)	0	$85.00	$0.00	
3	Soil analysis for VOCs/SVOCs	0	$214.80	$0.00	
3	Well development after installation, groundwater sample collection (Technician)	0	$55.00	$0.00	
3	Groundwater analysis for VOCs/SVOCs from MW-12 cluster (3 wells)	0	$138.00	$0.00	
3	Soil cutting disposal, subtitle D landfill (assume 6 drums)	0	$100.00	$0.00	
3	Field equipment including multi-parameter meter, Grunfos pump, generator, WL meter, tubing, etc.	0	$150.00	$0.00	
	Installation of 3 rock wells to 200'				
3	Field preparation, scheduling, vendor coordination (Staff Scientist)	0	$55.00	$0.00	
3	Coring set-up fee (3 wells)	0	$100.00	$0.00	
3	Driller mobilization, coring, packer testing, well installation (Lump sum- Driller)	0	$31,950.00	$0.00	
3	Field oversight during deep well & rock coring/soil screening/logging, assume 12 days (Senior Geologist)	0	$85.00	$0.00	
3	Professional Geologist field oversight	0	$95.00	$0.00	
3	NAPL test kits, check core surfaces and fractures (8 per well)	0	$10.00	$0.00	
3	Follow up bore hole investigation- geophysical logging (3 wells)	0	$4,000.00	$0.00	
3	Field oversight during geophysical investigation, assume 4 days (Senior Geologist)	0	$85.00	$0.00	
3	Well development after installation, groundwater sample collection (Technician)	0	$55.00	$0.00	
3	Groundwater analysis for VOCs/SVOCs	0	$138.00	$0.00	
3	Soil cutting disposal, subtitle D landfill (assume 20 drums)	0	$150.00	$0.00	
3	Field time for surveying new wells (2 Technicians)	0	$55.00	$0.00	
3	Discrete sampling of rock core well at approx. 80', 100', 125', & 150' using inflatable packers including evaluation of hydraulic flow in various lithologic zones (Envirorisk time to assist driller)	0	$1,500.00	$0.00	
3	Groundwater analysis for SVOCs, "rush turnaround" for discrete samples (3 samples per well)	0	$180.00	$0.00	
3	Well construction following geophysical investigation with supplies including 5' prepack and bentonite sleeve	0	$2,000.00	$0.00	
3	Field equipment including survey level, multi-parameter meter, Grunfos pump, generator, WL meter, tubing, etc.	0	$500.00	$0.00	
3	Project Management/data evaluation (Professional Geologist)	0	$105.00	$0.00	
3	Data evaluation/tabulation, preparation of Phase 3 Supplemental Report (Project Scientist)	1	n/a	n/a	
3	PG review of Phase 3 Supplemental Report, deep well rock core logs, geological description (PG)	1	n/a	n/a	
3	Report processing/administrative, data tabulation, figure edits	1	n/a	n/a	
3	Report materials, mailing/shipping costs, misc.	1	n/a	n/a	
	PHASE 3 SUPPLEMENTAL - SUBTOTAL			$0.00	**$0.00**
	PHASE 3 - SUBTOTAL W/CONTINGENCY (10%)			**$0.00**	

	Surfactant Treatment System	Unit	Rate	Cost	2023 Incurred
N/A	Treatability evaluation of various surfactants	1	$6,500.00	$6,500.00	
N/A	Recovery well yield/drawdown testing	1	$5,500.00	$5,500.00	
N/A	Project scheduling/coordinate with vendors	20	$75.00	$1,500.00	
N/A	Installation of 28 4" permanent RWs to 50', 6.25" ID, installed using HSA, 25' screens (Driller)	1,400	$45.50	$63,700.00	
N/A	Soil management (bobcat) and disposal (assumes 21 tons at Subtitle D)	1	$2,970.00	$2,970.00	
N/A	Drilling oversight for recovery wells, assume 10 days (Geologist)	100	$75.00	$7,500.00	
N/A	Direct push drilling of injection wells, assumes 140 wells to 35' (day rate driller)	15	$1,380.00	$20,700.00	
N/A	Drilling oversight for injection wells, assume 15 days (Technician)	150	$55.00	$8,250.00	
N/A	PVC pipe, per foot (140 wells @ 35' = 4900)	4,900	$4.50	$22,050.00	
N/A	Injection well vaults and installation	140	$65.00	$9,100.00	

N/A	Surfactant injections, assume 500g per well and 3000g/day injected (day rate)	24	$1,500.00	$36,000.00	
N/A	Purchase of surfactant (assumes 500g per well of 3-5%)	1	$60,000.00	$60,000.00	
N/A	Incidentals	1	$500.00	$500.00	
N/A	Trenching and well vault installation (2 Technicians, 2 weeks)	100	$110.00	$11,000.00	
N/A	System installation and start-up (2 Technicians, 2 weeks)	80	$110.00	$8,800.00	
N/A	2" PVC for influent piping (per foot)	1,260	$2.05	$2,583.00	
N/A	Air influent tubing and 2" PVC housing (per foot)	1,260	$1.95	$2,457.00	
N/A	30-40 HP air compressor	1	$6,000.00	$6,000.00	
N/A	Air pump with quick connects	28	$1,500.00	$42,000.00	
N/A	Air pump with pressure regulators	28	$98.50	$2,758.00	
N/A	Cycle counters (rather than totalizers)	28	$185.00	$5,180.00	
N/A	Downhole tubing (50 ft lengths) within each of the 28 wells	1,400	$2.75	$3,850.00	
N/A	2'x2' vaults	28	$219.00	$6,132.00	
N/A	Control panel	1	$1,275.00	$1,275.00	
N/A	2" PVC ball valves	28	$18.75	$525.00	
N/A	PVC elbows (45 degree angles)	28	$18.75	$525.00	
N/A	Backhoe rental, each week	10	$125.00	$1,250.00	
N/A	Laboratory analysis of 5 influent samples for VOCs/SVOCs	5	$202.00	$1,010.00	
N/A	Project Management and Technical Evaluation (Professional Geologist)	16	$105.00	$1,680.00	
N/A	Data evaluation/tabulation, preparation of Progress Report (Project Scientist)	32	$75.00	$2,400.00	
N/A	Preparation of updated CAD figures (CAD Technician)	8	$65.00	$520.00	
N/A	Report processing/administrative	6	$45.00	$270.00	
N/A	Report materials, mailing/shipping costs, misc.	1	$150.00	$150.00	
	SUBTOTAL			$344,635.00	**$0.00**
	SUBTOTAL W/CONTINGENCY (10%)			**$379,098.50**	

	Construction of Treatment Barrier (Phase 8)	Unit	Rate	Cost	*2023 Incurred*
8	Drilling of 3, 2" wells to 60' around MW-3A for permanganate candle pilot (Driller)	180	$25.00	$4,500.00	
8	Drilling oversight (Technician)	8	$50.00	$400.00	
8	Purchase of permanganate candles for pilot test in 3 wells, installation	1	$2,000.00	$2,000.00	
8	Monthly parameter checks for 6 months, assume 3 hours per check (Technician)	18	$55.00	$990.00	
8	Installation of 85, 2" injection wells by augering to 40', screened 25-40' (3,400 total ft)	3400	$18.75	$63,750.00	
8	Install flush mount well vaults and concrete pads (no bumber supports)	85	$50.00	$4,250.00	
8	Oversight during injection well installation, straight auger, no soil sampling (Staff Geologist - assume 20 days)	200	$75.00	$15,000.00	
8	Bobcat & rolloff rental for storage of soil cuttings (assume 5 days - not including disposal)	1	$1,000.00	$1,000.00	
8	Installation of permanganate candles, suspended in wells	1	$3,750.00	$3,750.00	
8	ISCO candles, 60 wells x 15' = 1275'	900	$39.75	$35,775.00	
8	Professional oversight/parameter readings/health & safety monit. (7 days -Staff Scientist)	70	$55.00	$3,850.00	
8	30 day follow-up parameter evaluation & sampling of 8 wells for VOCs/SVOCs (Technician)	8	$50.00	$400.00	
8	Monthly follow-up checks for 6 months, assume 4 hours each inspection (Technician)	24	$50.00	$1,200.00	
8	Groundwater analysis for VOCs/SVOCs	8	$202.00	$1,616.00	
8	Equipment: PID meter, multi-parameter low flow meter, peristaltic pump, WL meter, etc.	7	$125.00	$875.00	
8	Misc. sampling equipment, expenses, mileage, misc.	1	$500.00	$500.00	
8	Data evaluation, CAD figures, report assistance (CAD Technician)	16	$50.00	$800.00	
8	Field parameter evaluation/tabulation, assist w/reporting (Staff Scientist)	10	$65.00	$650.00	
8	Data evaluation/Project management/limited field oversight (Professional Geologist)	16	$105.00	$1,680.00	
	PHASE 8 SUPPLEMENTAL- SUBTOTAL			$142,986.00	**$0.00**
	PHASE 8 - SUBTOTAL W/ CONTINGENCY (10%)			**$157,284.60**	
	GRAND TOTAL			**$539,166.10**	**$5,132.50**

DETAIL OF ANNUAL CORRECTIVE ACTION COSTS (Incurred from 10-1-22 to 9-30-23)
William C. Meredith Company, Inc.
2335 Lawrence Street
East Point, Fulton County, Georgia
Hazardous Waste Facility Permit HW-062 (D)
EPA ID No. GAD003323805

Description of Work Phases (ANNUAL SAMPLING)	Unit	Rate	Cost	2023 Incurred
ANNUAL SAMPLING/REPORTING (March) - 17 wells total. Sample wells not containing NAPL for VOCs/SVOCs: MW-3A, MW-3B, MW-5A, MW-5R (NAPL), MW-6R (NAPL), MW-7, MW-7A, MW-7B, MW-8, MW-8A, MW-8B, MW-8B2, MW-9, MW-10, and MW-11 (NAPL), MW-12 and MW-12A. Collect 1 duplicate and 1 equipment blank.				
Groundwater sampling of 14 MWs (assume POC wells contain NAPL), plus duplicate & equipment blank,	20	$150.00	$3,000.00	
(low flow - 2 techs - assume 20 hours)	1	$1,000.00	$1,000.00	
Equipment use: Grunfos submersible pump/generator, low flow meter, peristaltic pump, interface probe, tubing	1	$225.00	$225.00	
Sampling supplies, gloves, bailers, mileage, misc.	15	$230.00	$3,450.00	
Groundwater analysis for VOCs/SVOCs (14 samples plus 1 duplicate) NOTE: 21 wells sampled in 2022	4	$95.00	$380.00	
Field prep	1	n/a	n/a	
Vehicle mileage	16	$65.00	$1,040.00	
Data evaluation, tabulation, CADD figures, report assist. (CADD Technician)	40	$85.00	$3,400.00	
Annual Report Preparation (Project Scientist)	6	$105.00	$630.00	
Project Management/Review (Professional Geologist)	3	$65.00	$195.00	
Report processing/administrative	1	$125.00	$125.00	
Report materials, books, mailing/shipping costs, misc.			$13,445.00	
SEMI-ANNUAL SAMPLING/REPORTING EVENT - SUBTOTAL			$14,789.50	$0.00
COST PLUS 10% CONTINGENCY				

Please note sampling frequency was amended in the March 29, 2018 Class 3 Permit Modification. Sampling in March/April 2021 was a triennual event and costs are split between annual sampling and triennual sampling. All wells on site were sampled. Analytical costs are shared with the Interim Measures analytical cost.

Description of Work Phases (BIENNUAL SAMPLING)	Unit	Rate	Cost	2023 Incurred
BIENNUAL SAMPLING/REPORTING (once every 2 years in March) - 24 wells total for VOCs/SVOCs. Sample 17 wells from annual event listed above plus: MW-1, MW-2, MW-3, MW-4, MW-7B2, MW-13, and MW-14. Collect 1 duplicate and 1 equipment blank.				
Groundwater sampling of 21 MWs (assume POC wells contain NAPL), plus duplicate & equipment blank,	30	$150.00	$4,500.00	$4,915.00
23 total (low flow - 2 techs - assume 30 hours)	1	$1,250.00	$1,250.00	$1,000.00
Equipment use: Grunfos submersible pump/generator, low flow meter, peristaltic pump, interface probe, tubing	1	$250.00	$250.00	$225.00
Sampling supplies, gloves, bailers, mileage, misc.	22	$230.00	$5,060.00	$5,109.60
Groundwater analysis for VOC/SVOC (21 samples plus one duplicate)	12	$65.00	$780.00	$840.00
Data evaluation, tabulation, CADD figures, report assist. (CADD Technician)	20	$85.00	$1,700.00	$3,360.00
Annual Report Preparation (Project Scientist)	6	$105.00	$630.00	$960.00
Project Management/Report Prep/Review (Professional Geologist)	3	$65.00	$195.00	$255.00
Report processing/administrative	1	$125.00	$125.00	$320.00
Report materials, books, mailing/shipping costs, misc.			$14,490.00	$16,984.60
SEMI-ANNUAL SAMPLING/REPORTING EVENT - SUBTOTAL			$15,939.00	$18,683.06
COST PLUS 10% CONTINGENCY				

Please note sampling frequency was amended in the March 29, 2018 Class 3 Permit Modification.

Description of Work Phases (TRIENNUAL SAMPLING)	Unit	Rate	Cost	2023 Incurred
TRIENNUAL SAMPLING/REPORTING (once every 3 years in March) - Sample 17 wells for VOCs/SVOCs (annual list above). Collect one duplicate and 1 equipment blank. Sample the following 6 wells for metals: MW-2, MW-3, MW-5R, MW-8, MW-11, and MW-12. Sample MW-7B for dioxins/furans. Collect sample from one POC well for Appendix IX/dioxins/furans. Report prep time etc. listed in annual tasks above.				
Groundwater sampling for VOCs, SVOC, metals, dioxins/furans, and Appendix IX (low flow - 2 techs- assume 10	10	$150.00	$1,500.00	
hours). Time for sampling VOCs/SVOCs in Annual Event above.	1	$100.00	$100.00	
Equipment use: additional costs only for metals/dioxins/furans/Appendix IX	1	$50.00	$50.00	
Sampling supplies, gloves, bailers, mileage, misc. Additional costs only for metals/dioxins/furans/Appendix IX.	1	$230.00	$230.00	
Groundwater analysis for VOCs/SVOCs (1 POC well), other analytical costs in Annual Event above	1	$1,000.00	$1,000.00	
Groundwater analysis for Appendix IX Parameters (excluding dioxins/furans) - 1 POC well	6	$145.00	$870.00	
Groundwater analysis for Metals including sulfide (6 wells)	2	$1,150.00	$2,300.00	
Groundwater analysis for Dioxins/Furans (POC well plus MW-7B)				
Data evaluation, tabulation, CADD figures, report assist. Only includes additional time for metals/dioxins/furans/	4	$65.00	$260.00	
Appendix IX data (CADD Technician)	8	$85.00	$680.00	
Report Preparation, only includes additional time for metals/dioxins/furans/Appendix IX data (Project Scientist)	4	$105.00	$420.00	
Project Management/Report Prep/Review (Professional Geologist)	3	$65.00	$195.00	
Report processing/administrative (included with annual costs above)	1	$125.00	$125.00	
Report materials, books, mailing/shipping costs, misc. (included with annual costs above)			$7,730.00	
ANNUAL SAMPLING/REPORTING EVENT - SUBTOTAL			$8,503.00	$0.00
COST PLUS 10% CONTINGENCY				

Please note sampling frequency was amended in the March 29, 2018 Class 3 Permit Modification. Sampling in March/April 2021 was a triennual event and costs are split between annual sampling and triennual sampling. All wells on site were sampled. Analytical costs are shared with the Interim Measures analytical cost.

TOTAL 30 YEAR COST FOR SAMPLING / REPORTING				
ANNUAL COSTS (30 EVENTS)	30.0	$14,789.50	$443,685.00	
BIENNIAL COSTS (15 EVENTS)	15.0	$15,939.00	$239,085.00	
TRIENNIAL COSTS (10 EVENTS)	10.0	$8,503.00	$85,030.00	
TOTAL 30 YEAR COST FOR SAMPLING / REPORTING			$767,800.00	$18,683.06

DETAIL OF ANNUAL CORRECTIVE ACTION COSTS (Incurred from 10-1-22 to 9-30-23)
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2335 Lawrence Street
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Hazardous Waste Facility Permit HW-062 (D)
EPA ID No. GAD003323805

Description of Work Phases	Unit	Rate	Cost	*2023 Incurred*
Inspection/Maintenance Associated with Closed HWMU, Monitoring Wells (routine quarterly inspections, maintenance, repair by site manager or independent contractor)				
Daily inspections, 1.0 hr/day (refer to Appendix F-1 to F-9 for detailed list)	250.0	$80.00	$20,000.00	$20,000.00
Routine quarterly inspections (assume 4 trips @ 1 hours per inspection)	4.0	$80.00	$320.00	$320.00
Inspection Trip after 3" rain storm (assume 2 insp. per year @ 2 hours)	4.0	$80.00	$320.00	$320.00
HWMU maintenance - add fertilizer to grass cover (1/2 acre) 1 application per year	1.0	$100.00	$100.00	$100.00
HWMU maintenance - mow grass, 18 times per year or 2 times per month for 9 months	9.0	$100.00	$900.00	$900.00
HWMU maintenance - repair cap topsoil, re-seed due to rain damage, etc.	1.0	$150.00	$150.00	$150.00
HWMU maintenance - repair run-on/run-off control, crushed rock on ditches	1.0	$1,500.00	$1,500.00	$31,147.30
Misc. - replacement cost for monitoring well locks, assume every 15 years, $200 div. by 15	1.0	$13.33	$13.33	$13.33
Misc. - re-paint well procovers/casing & bollards, assume every 5 years, $450 div. by 5	1.0	$90.00	$90.00	$90.00
Misc. - repaint well numbers on casings each year, assume 3 hours @ $35 plus $15 for paint	1.0	$120.00	$120.00	$120.00
Misc. - re-grading of soil around concrete well pads, assume 1 pad per year @ 2 hours	1.0	$160.00	$160.00	$160.00
ANNUAL COST FOR INSPECTION/MAINTENANCE FOR CLOSED HWMU - SUBTOTAL			$23,673.33	$53,320.63
ADMINISTRATIVE COST (5%)			$1,183.67	
COST PLUS 5% CONTINGENCY			$26,099.85	

Description of Work Phases	Unit	Rate	Cost	*2023 Incurred*
CURRENT CORRECTIVE ACTION COSTS FOR O&M OF PUMP-AND-TREAT SYSTEM INCLUDING OPERATION OF WASTE WATER TREATMENT SYSTEM & HAZARDOUS WASTE DISPOSAL, ETC.				
Electricity est. to operate 5 HP compressor for treatment system & groundwater pumping system	1.0	$2,777.00	$2,777.00	$2,777.00
Misc. electricity to operate sump pump & filter press	1.0	$750.00	$750.00	$750.00
Labor to operate treatment system, groundwater pumps, filter press, etc. (2 hrs/day @ 104 days/yr)	208.0	$20.00	$4,160.00	$4,160.00
Purchase of flocculation chemicals	1.0	$2,260.00	$2,260.00	$2,800.00
Laboratory analysis of effluent water samples for sanitary sewer discharge	12.0	$250.00	$3,000.00	$2,795.00
Replacement of treatment system filters	12.0	$5.00	$60.00	$60.00
Replacement of activated carbon for treatment system, assume once per year, 2000 lbs per year	2,000.0	$1.14	$2,280.00	$2,280.00
Replace filter powder for treatment system	1.0	$5,840.00	$5,840.00	$5,375.66
Add heating elements and insulation to air lines	1.0	$150.00	$150.00	$0.00
Replace two heat elements in separator tank	1.0	$60.00	$60.00	$0.00
Air compressor service	1.0	$500.00	$500.00	$500.00
Repair pumps, hoses, filter press, etc. for system	1.0	$2,000.00	$2,000.00	$2,000.00
Transportation & disposal of hazardous waste, free product & wastewater generated filter press cake	1.0	$7,375.00	$7,375.00	$11,209.24
ANNUAL COST FOR O&M FOR PUMP AND TREAT & WASTEWATER TREATMENT SYSTEM			$31,212.00	$34,706.90
COST PLUS 5% CONTINGENCY			$32,772.60	
ASSUME 75% OF TOTAL O&M COSTS (PORTION OF COSTS TOWARDS FACILITY OPERATIONS)			$24,579.45	$26,030.18
TOTAL ANNUAL COST FOR INSPECTION/MAINTENANCE OF HWMU AND O&M SYSTEM			$50,679.30	$79,350.81

SUMMARY OF COSTS (Incurred from 10-1-22 to 9-30-23)
William C. Meredith Company, Inc.
2335 Lawrence Street
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Hazardous Waste Facility Permit HW-062 (D)
EPA ID No. GAD003323805

SUMMARY OF ADDITIONAL DELINEATION/REMEDIATION SERVICES COSTS			
PHASE	DESCRIPTION OF PHASES	COST	2023 Incurred
	Costs will be updated, as needed, with the appropriate Progress Reports		
4	SWMU 9 & 10 DELINEATION (SUPPLEMENTAL)	$0.00	$5,132.50
N/A	PART-B PERMIT PREPARATION	$0.00	$36,121.25
N/A	2021-2022 FISCAL YEAR COST ESTIMATE	$0.00	$1,957.50
N/A	IMPOUNDMENT INVESTIGATION	$2,783.00	$0.00
3	VERTICAL BEDROCK DELINEATION (SUPPLEMENTAL)	$0.00	$0.00
N/A	SURFACTANT TREATMENT SYSTEM	$379,098.50	$0.00
8	CONSTRUCTION OF TREATMENT BARRIER	$157,284.60	$0.00
	TOTAL DELINEATION/REMEDIATION	**$539,166.10**	**$43,211.25**

SUMMARY OF SAMPLING/REPORTING AND O&M SYSTEM COSTS	COST	2023 Incurred
ANNUAL COST FOR SAMPLING AND REPORTING	$0.00	$18,683.06
30 YEAR COST FOR SAMPLING AND REPORTING	$767,800.00	n/a
ANNUAL COST FOR INSPECTION/MAINTENANCE OF HWMU	$26,099.85	$53,320.63
30 YEAR COST FOR INSPECTION/MAINTENANCE OF HWMU	$782,995.50	n/a
ANNUAL YEAR COST FOR O&M SYSTEM	$24,579.45	$26,030.18
30 YEAR COST FOR O&M SYSTEM	$737,383.50	n/a
TOTAL SAMPLING/REPORTING AND O&M COSTS, 30 YEARS	**$2,288,179.00**	**$98,033.87**

GRAND TOTAL FOR 30 YEARS		
TOTAL DELINEATION/REMEDIATION/SAMPLING/REPORTING/O&M	**$2,827,345.10**	**n/a**
YEARLY COST (TOTAL / 20)	**$141,367.26**	**n/a**

2023 TOTAL INCURRED COSTS	
ADDITIONAL DELINEATION/REMEDIATION SERVICES COSTS	**$43,211.25**
SAMPLING/REPORTING AND O&M SYSTEM COSTS	**$98,033.87**
TOTAL SPENT IN 2023	**$141,245.12**
SHORTAGE FOR 2023	**$122.14**

NOTES: The fiscal year during this reporting period is October 1, 2022 - September 30, 2023.

COSTS FOR RCAP
William C. Meredith Company, Inc.
2335 Lawrence Street
East Point, Fulton County, Georgia
Hazardous Waste Facility Permit HW-062 (D)
EPA ID No. GAD003323805

Phase	Description of Work Phases	Unit	Rate	Cost
	Phase 1 – Vertical Delineation and Initial Recovery Well Installations			
	Conversion of MW-5B boring into bedrock recovery well and installation of bedrock monitoring well (MW-12B) and recovery well (PRW-11)			
1	Prepare updated Health & Safety Plan/Field preparation/Coordinate vendors (Project Scientist)	8	$120.00	$960.00
1	Mobilization (lump sum)	1	$700.00	$700.00
1	Land clearing of trees & limited grading behind office to install MW-12B, PRW-11 (Labor + skid steer, 2 men)	16	$350.00	$5,600.00
1	Bulldozer or small trackhoe rental for land clearing and tree removal (optional)	1	$3,500.00	$4,025.00
1	57 stone gravel, delivered to site for grading (est.)	3	$700.00	$2,100.00
1	Drilling/Installation of MW-12B and PRW-11 (hollow stem auger - per foot)	75	$65.50	$4,912.50
1	Drilling/Installation of MW-5B and MW-12B (air rotary - per foot)	300	$75.00	$22,500.00
1	Air Rotary Compressor Rental (includes delivery, no fuel surcharge, per day , 2 days of rental)	2	$850.00	$1,700.00
1	Skid steer rental for soil cutting management, on-site movement (assume 1 week)	1	$1,950.00	$1,950.00
1	Dump trailer for temporary storage of soil cuttings (assume 5 days)	5	$850.00	$4,250.00
1	Drill rig decontamination (per hour)	2	$170.00	$340.00
1	Disposal of soil cuttings (assume 8 drums, non-hazardous disposal)	8	$350.00	$2,800.00
1	Well Development (per well)	3	$140.00	$420.00
1	Field oversight/logging/soil sampling during well installation (Geologist/Env. Scientist)	80	$120.00	$9,600.00
1	Soil sampling assistance/soil screening/well sampling, NAPL gauging(Technician/Staff Scientist)	110	$105.00	$11,550.00
1	NAPL test kits to screen soils in MW-12B and PRW-11 (2 per well)	4	$13.50	$54.00
1	Field time for borehole geophysical logging (Geologist and Technician, optional cost estimate)	24	$350.00	$8,400.00
1	Photoionization detector use for soil screening during drilling/logging (per day)	5	$130.00	$650.00
1	Equipment use: Grunfos, interface probe, peristaltic, horiba, etc. (per day)	10	$750.00	$7,500.00
1	Equipment use: Geophysical logging tools (per day, optional cost)	2	$3,000.00	$6,000.00
1	Soil/water sampling supplies, gloves, disposable teflon-lined tubing (lump sum)	1	$750.00	$750.00
1	Misc. expenses, mileage, etc. (per day)	15	$250.00	$3,750.00
1	Soil analysis for VOCs/SVOCs in MW-12B and PRW-11 (assume 2 samples per well)	4	$250.00	$1,000.00
1	Groundwater analysis for VOCs/SVOCs (includes discrete interval sampling & blanks)	14	$250.00	$3,500.00
1	Data evaluation, CADD figures (Project Scientist/CADD Specialist)	24	$115.00	$2,760.00
1	Prepare/assist with data tabulation and Progress Report Preparation (Env. Scientist)	48	$120.00	$5,760.00
1	Limited Field Oversight/Progress Report Senior Review (Professional Geologist)	24	$140.00	$3,360.00
1	Report processing/administrative	6	$85.00	$510.00
1	Report materials, binders, mailing/shipping costs, misc.	1	$175.00	$175.00
	RCAP PHASE 1 - SUBTOTAL			$117,576.50
	RCAP PHASE 1 - SUBTOTAL WITH CONTINGENCY (10%)	1.10	$117,576.50	**$129,334.15**
Phase		Unit	Rate	Cost
	Phase 2 - Short-term Yield Testing and Aquifer Testing			
	Well Development/Short-term yield testing using existing pumping well PW-1			
2	Field prep and oversight during development & short-term yield testing (Geologist/Env. Scientist)	50	$120.00	$6,000.00
2	Field prep and oversight during long-term yield testing or optional aquifer testing (Geologist/Env. Scientist)	60	$120.00	$7,200.00
2	Equipment use: Grunfos, WL meter, datalogger, etc. (per day)	5	$950.00	$4,750.00
2	Misc. expenses, mileage, etc. (per day)	5	$300.00	$1,500.00
2	Data evaluation, CADD figures (CADD Specialist)	10	$115.00	$1,150.00
2	Data tabulation and prepare Phase 2 Progress Report (Project Scientist)	40	$120.00	$4,800.00
2	Report processing/administrative	8	$75.00	$600.00
2	Limited Field Oversight/Progress Report Senior Review (Professional Geologist)	16	$140.00	$2,240.00
	RCAP PHASE 2 SUBTOTAL			$28,240.00
	RCAP PHASE 2 SUBTOTAL WITH CONTINGENCY (10%)			**$31,064.00**
		Unit	Rate	Cost
	Phase 3 - Source Area Recovery Well Installations/System Upgrade			
	Installation of shallow, intermediate, and recovery trench wells for initial source area treatment and hydraulic control			
3	Prepare updated Health & Safety Plan/Field preparation/Coordinate vendors (Project Scientist)	8	$120.00	$960.00
3	Mobilization (lump sum)	1	$700.00	$700.00
3	Drilling/Installation of seven (7) shallow recovery wells (hollow stem auger - per foot)	280	$65.50	$18,340.00
3	Air Rotary Compressor Rental (includes delivery, no fuel surcharge, per day)	10	$850.00	$8,500.00
3	Drilling/Installation of two (2) intermediate recovery wells (air rotary - per foot)	120	$75.00	$9,000.00
3	Deepening of three (3) existing recovery trench wells (air rotary - per foot)	120	$75.00	$9,000.00
3	Skid steer rental for soil cutting management, on-site movement (assume 1 week)	1	$1,950.00	$1,950.00
3	Dump trailer for temporary storage of soil cuttings (assume 10 days)	10	$850.00	$8,500.00
3	Drill rig decontamination (per hour)	7	$170.00	$1,190.00
3	Disposal of soil cuttings (assume 5 rolloffs, non-hazardous waste disposal)	5	$800.00	$4,000.00
3	Well Development (per well)	12	$140.00	$1,680.00
3	Field oversight/logging/soil sampling during well installation (Geologist/Env. Scientist)	100	$120.00	$12,000.00
3	Soil sampling assistance/soil screening/well sampling/NAPL gauging(Technician/Staff Scientist)	120	$115.00	$13,800.00
3	NAPL test kits to screen soils (2 per well)	24	$13.50	$324.00
3	24-hour MPE event (lump sum)	1	$7,500.00	$7,500.00
3	Field prep and time for 24-hour MPE event oversight (Env. Scientist)	30	$120.00	$3,600.00
3	Photoionization detector use for soil screening during drilling/logging (per day)	10	$130.00	$1,300.00
3	Equipment use: Grunfos, interface probe, peristaltic, horiba, etc. (per day)	15	$750.00	$11,250.00
3	Soil/water sampling supplies, gloves, disposable teflon-lined tubing (lump sum)	1	$750.00	$750.00
3	Misc. expenses, mileage, etc. (per day)	15	$250.00	$3,750.00
3	Soil analysis for VOCs/SVOCs (assume 2 samples per well)	24	$250.00	$6,000.00
3	Groundwater analysis for VOCs/SVOCs (per well, includes blanks)	14	$250.00	$3,500.00
3	Labor for trenching, recovery well vault installation, subsurface system piping connections (2 Technicians, 3 weeks)	150	$230.00	$34,500.00
3	System modifications, add tanks, moving carbon tanks, re-configure (assume WCM personnel + Erisk engineer)	80	$145.00	$11,600.00
3	Replacement carbon (in case current tanks are oversized), etc.	1	$3,000.00	$3,000.00
3	2" PVC for influent piping (per foot)	1,500	$4.50	$6,750.00
3	Air influent tubing and 2" PVC housing (per foot)	1,500	$2.50	$3,750.00
3	30-40 HP air compressor (assume upgraded compressor replaces current in use)	1	$8,500.00	$8,500.00

3	Submersible pneumatic pumps for hydraulic control - intermeidate depth or deep RWs	3	$1,750.00	$5,250.00
3	Pressure regulators, totalizers, downhole tubing, etc for submersible pumps, est.	1	$1,650.00	$1,650.00
3	Cycle counters (rather than totalizers)	28	$185.00	$5,180.00
3	Downhole tubing (50 ft lengths) within each of the 28 wells	1,400	$2.75	$3,850.00
3	Recovery well vaults, protective bollards	12	$550.00	$6,600.00
3	System Control panel	1	$1,500.00	$1,500.00
3	2" PVC ball valves, PVC elbows and fittings, est.	1	$750.00	$750.00
3	Backhoe rental for trenching, assume 1 month	1	$4,500.00	$4,500.00
3	Data evaluation, CADD figures (CADD Specialist)	10	$115.00	$1,150.00
3	Prepare/assist with data tabulation and Progress Report Preparation (Env. Scientist)	48	$120.00	$5,760.00
3	Limited Field Oversight/Progress Report Senior Review (Professional Geologist)	32	$140.00	$4,480.00
3	Report processing/administrative	6	$85.00	$510.00
3	Report materials, binders, mailing/shipping costs, misc.	1	$175.00	$175.00
	RCAP PHASE 3 - SUBTOTAL			$237,049.00
	PHASE 3 - SUBTOTAL W/CONTINGENCY (10%)			**$260,753.90**
	Phase 4 - Supplemental Vertical Delineation Well Installations (*Optional*)	**Unit**	**Rate**	**Cost**
	Installation of five (5) intermediate (top of rock) and five (5) deep (bedrock) monitoring wells			
4	Prepare updated Health & Safety Plan/Field preparation/Coordinate vendors (Project Scientist)	8	$120.00	$960.00
4	Mobilization (lump sum)	1	$700.00	$700.00
4	Drilling/Installation of outer casing for intermediate and deep monitoring wells (hollow stem auger - per foot)	400	$65.50	$26,200.00
4	Air Rotary Compressor Rental (includes delivery, no fuel surcharge, per day)	5	$850.00	$4,250.00
4	Drilling/Installation of five (5) intermediate monitoring wells (air rotary - per foot)	125	$75.00	$9,375.00
4	Drilling/Installation of five (5) deep monitoring wells (rock coring - per foot)	800	$80.00	$64,000.00
4	Skid steer rental for soil cutting management, on-site movement (assume 1 week)	1	$1,950.00	$1,950.00
4	Dump trailer for temporary storage of soil cuttings (assume 10 days)	10	$850.00	$8,500.00
4	Drill rig decontamination (per hour)	10	$170.00	$1,700.00
4	Disposal of soil cuttings (assume 5 rolloffs, non-hazardous waste disposal)	5	$800.00	$4,000.00
4	Well Development (per well)	10	$140.00	$1,400.00
4	Field oversight/logging/soil sampling during well installation (Geologist/Env. Scientist)	120	$120.00	$14,400.00
4	Soil sampling assistance/soil screening/well sampling/NAPL gauging(Technician/Staff Scientist)	140	$105.00	$14,700.00
4	NAPL test kits to screen soils (2 per well)	20	$13.50	$270.00
4	Photoionization detector use for soil screening during drilling/logging (per day)	15	$130.00	$1,950.00
4	Equipment use: Grunfos, interface probe, peristaltic, horiba, etc. (per day)	20	$750.00	$15,000.00
4	Soil/water sampling supplies, gloves, disposable teflon-lined tubing (lump sum)	1	$750.00	$750.00
4	Misc. expenses, mileage, etc. (per day)	20	$250.00	$5,000.00
4	Soil analysis for VOCs/SVOCs (assume 2 samples per well)	20	$250.00	$5,000.00
4	Groundwater analysis for VOCs/SVOCs (per well, includes discrete interval sampling and blanks)	28	$250.00	$7,000.00
4	Data evaluation, CADD figures (CADD Specialist)	8	$115.00	$920.00
4	Prepare/assist with data tabulation and Progress Report Preparation (Env. Scientist)	48	$120.00	$5,760.00
4	Limited Field Oversight/Progress Report Senior Review (Professional Geologist)	24	$140.00	$3,360.00
4	Report processing/administrative	6	$85.00	$510.00
4	Report materials, binders, mailing/shipping costs, misc.	1	$175.00	$175.00
	RCAP PHASE 4 - SUBTOTAL			$197,830.00
	PHASE 4 - SUBTOTAL W/CONTINGENCY (10%)			**$217,613.00**
	Phase 5 - SMWU #9 and #10 Surface Water and Sediment Sample Plan	**Unit**	**Rate**	**Cost**
	Annual sediment and surface water sampling events and semiannual Interim Measures sampling events			
5	Prepare updated Health & Safety Plan/Field preparation/Coordinate vendors (Project Scientist)	8	$120.00	$960.00
5	Field prep and annual surface water and sediment sampling (Geologist/Env. Scientist)	10	$120.00	$1,200.00
5	Field prep and semi-annual interim measures sampling (Technician/Staff Scientist)	10	$105.00	$1,050.00
5	Equipment use: interface probe, peristaltic, horiba, etc. (per day)	2	$750.00	$1,500.00
5	Soil/water sampling supplies, gloves, disposable teflon-lined tubing (lump sum)	1	$750.00	$750.00
5	Misc. expenses, mileage, etc. (per day)	2	$250.00	$500.00
5	Annual surface water analysis for VOCs/SVOCs (per sample)	5	$250.00	$1,250.00
5	Annual sediment analysis for VOCs/SVOCs (per sample)	5	$250.00	$1,250.00
5	Semi-annual interim measures stormwater analysis for VOCs/SVOCs (per sample, includes blanks)	20	$250.00	$5,000.00
5	Data evaluation, CADD figures (CADD Specialist)	8	$115.00	$920.00
5	Prepare/assist with data tabulation and Progress Report Preparation (Env. Scientist)	48	$120.00	$5,760.00
5	Limited Field Oversight/Progress Report Senior Review (Professional Geologist)	24	$140.00	$3,360.00
5	Report processing/administrative	6	$85.00	$510.00
5	Report materials, binders, mailing/shipping costs, misc.	1	$175.00	$175.00
	RCAP PHASE 5 - SUBTOTAL			$24,185.00
	PHASE 5 - SUBTOTAL W/CONTINGENCY (10%)			**$26,603.50**
	Phase 6 - Supplemental Soil and Groundwater Delineation	**Unit**	**Rate**	**Cost**
	Delineation of soil and groundwater impacts at SWMUs 1, 4, and 6, SWMU 10 sample location, and TW-9			
6	Prepare updated Health & Safety Plan/Field preparation/Coordinate vendors (Project Scientist)	8	$120.00	$960.00
6	Drilling/Installation of eight (8) soil borings (direct push - per day)	2	$1,850.00	$3,700.00
6	Mobilization (lump sum)	1	$700.00	$700.00
6	Drilling/Installation of four (4) temporary monitoring wells (hollow stem auger - per foot)	160	$65.50	$10,480.00
6	Drill rig decontamination (per hour)	4	$170.00	$680.00
6	Disposal of soil cuttings (assume 15 drums)	15	$350.00	$5,250.00
6	Well Development (per well)	4	$140.00	$560.00
6	Field oversight/logging/soil sampling (Geologist/Env. Scientist)	12	$120.00	$1,440.00
6	Soil sampling assistance/soil screening/well sampling/NAPL gauging (Technician/Staff Scientist)	24	$105.00	$2,520.00
6	NAPL test kits to screen soils (2 per boring)	16	$13.50	$216.00
6	Photoionization detector use for soil screening during drilling/logging (per day)	2	$130.00	$260.00
6	Equipment use: Grunfos, interface probe, peristaltic, horiba, etc. (per day)	2	$750.00	$1,500.00
6	Soil/water sampling supplies, gloves, disposable teflon-lined tubing (lump sum)	1	$750.00	$750.00
6	Misc. expenses, mileage, etc. (per day)	2	$250.00	$500.00
6	Soil analysis for VOCs/SVOCs (assume 2 samples per well)	16	$250.00	$4,000.00
6	Groundwater analysis for VOCs/SVOCs (per well, includes blanks)	5	$250.00	$1,250.00
6	Data evaluation, CADD figures (CADD Specialist)	8	$115.00	$920.00
6	Prepare/assist with data tabulation and Progress Report Preparation (Env. Scientist)	48	$120.00	$5,760.00
6	Limited Field Oversight/Progress Report Senior Review (Professional Geologist)	24	$140.00	$3,360.00

		Unit	Rate	Cost
6	Report processing/administrative	6	$85.00	$510.00
6	Report materials, binders, mailing/shipping costs, misc.	1	$175.00	$175.00
	RCAP PHASE 6 - SUBTOTAL			$45,491.00
	PHASE 6 - SUBTOTAL W/CONTINGENCY (10%)			**$50,040.10**
		Unit	**Rate**	**Cost**
	Phase 7 - Supplemental Vertical Delineation/Recovery Well Installations			
	Installation of two (2) shallow, nine (9) intermediate, and four (4) deep recovery wells for cross-gradient/down-gradient plume control			
7	Prepare updated Health & Safety Plan/Field preparation/Coordinate vendors (Project Scientist)	8	$120.00	$960.00
7	Mobilization (lump sum)	1	$700.00	$700.00
7	Drilling/Installation of outer casing for shallow, intermediate and deep monitoring wells (hollow stem auger - per foot)	600	$65.50	$39,300.00
7	Air Rotary Compressor Rental (includes delivery, no fuel surcharge, per day)	10	$850.00	$8,500.00
7	Drilling/Installation of nine (9) intermediate monitoring wells (air rotary - per foot)	225	$75.00	$16,875.00
7	Drilling/Installation of four (4) deep monitoring wells (rock coring - per foot)	640	$80.00	$51,200.00
7	Skid steer rental for soil cutting management, on-site movement (assume 1 week)	1	$1,950.00	$1,950.00
7	Dump trailer for temporary storage of soil cuttings (assume 10 days)	10	$850.00	$8,500.00
7	Disposal of soil cuttings (assume 5 rolloffs, non-hazardous waste disposal)	5	$800.00	$4,000.00
7	Well Development (per well)	15	$140.00	$2,100.00
7	Field oversight/logging/soil sampling during well installation (Geologist/Env. Scientist)	120	$120.00	$14,400.00
7	Soil sampling assistance/soil screening/well sampling/NAPL gauging(Technician/Staff Scientist)	140	$105.00	$14,700.00
7	NAPL test kits to screen soils (2 per well)	30	$13.50	$405.00
7	Photoionization detector use for soil screening during drilling/logging (per day)	20	$130.00	$2,600.00
7	Equipment use: Grunfos, interface probe, peristaltic, horiba, etc. (per day)	25	$750.00	$18,750.00
7	Soil/water sampling supplies, gloves, disposable teflon-lined tubing (lump sum)	1	$750.00	$750.00
7	Misc. expenses, mileage, etc. (per day)	25	$250.00	$6,250.00
7	Soil analysis for VOCs/SVOCs (assume 2 samples per well)	30	$250.00	$7,500.00
7	Groundwater analysis for VOCs/SVOCs (per well, includes discrete interval sampling and blanks)	30	$250.00	$7,500.00
7	Data evaluation, CADD figures (CADD Technician)	8	$115.00	$920.00
7	Prepare/assist with data tabulation and Progress Report Preparation (Env. Scientist)	48	$120.00	$5,760.00
7	Limited Field Oversight/Progress Report Senior Review (Professional Geologist)	24	$140.00	$3,360.00
7	Report processing/administrative	6	$85.00	$510.00
7	Report materials, binders, mailing/shipping costs, misc.	1	$175.00	$175.00
	RCAP PHASE 7 - SUBTOTAL			$217,665.00
	PHASE 7 - SUBTOTAL W/CONTINGENCY (10%)			**$239,431.50**
		Unit	**Rate**	**Cost**
	Phase 8 - Remediation of Vadose Zone Soils			
	Limited removal of NAPL pockets & significanlty impacted soils to 16 feet, in accessible areas around HWMU & process area SWMUs			
	Assume landfill disposal of portion and on-site ISCO or ISCO-ISS treatment, budgetary estimate of 2,000 CY			
8	Prepare updated Health & Safety Plan/Field prep/Site Meeting (Project Scientist)	10	$120.00	$1,200.00
8	Labor to excavate, load trucks, assume 1,000 tons to local WM Subtitle D landfill for disposal, assume 2 men, 10 day	10	$2,500.00	$25,000.00
8	Subtitle D Landfill disposal, including set-up of profile for non-listed waste, manifests, etc.	1000	$65.00	$65,000.00
8	Soil Blending labor, in-situ or ex-situ, using ISCO or ISCO-ISS, assume 1,000-1,500 cubic yards, 2 men, 15 days	15	$3,000.00	$45,000.00
8	Oxidant chemicals (assume 50,000 pounds of persulfate, 100,000 lbs Portland cement)	1	$135,000.00	$155,250.00
8	Hydraulic excavator with blending attachment, skid steer, concrete barriers, etc. (rental for 1 month)	1	$20,000.00	$23,000.00
8	Professional oversight/parameter readings/health & safety monit. (Project Scientist)	250	$120.00	$30,000.00
8	TCLP lab analysis for landfill profiling (assume 5 samples for standard turnaround analysis)	5	$275.00	$1,581.25
8	Confirmatory soil sampling (assume 25 max. floors & sidewalls - VOCs/SVOCs)	25	$200.00	$5,750.00
8	Photoionization detector/interface probe (per day)	25	$130.00	$3,250.00
8	Misc. equipment/expenses, test kits, gloves, mileage, misc., etc.	1	$1,250.00	$1,250.00
6	Data evaluation, tabulation, CADD figure preparation, report preparation (Project Scientist)	48	$120.00	$5,760.00
8	Project management/evaluation/report review/limited field oversight (P.G.)	40	$140.00	$5,600.00
8	Report processing/administrative	8	$85.00	$680.00
8	Report materials, binders, mailing/shipping costs, misc.	1	$225.00	$225.00
	RCAP PHASE 8 - SUBTOTAL			$368,546.25
	PHASE 8 - SUBTOTAL W/ CONTINGENCY (10%)			**$405,400.88**
		Unit	**Rate**	**Cost**
	Phase 9 - Supplemental Corrective Action Alternatives (Assume Surfactant Treatment Option)			
	Assume surfactant injection using 12 RWs and 10 additional HWMU injection wells, extract using system			
9	Prepare updated Health & Safety Plan/Field prep/Site Meeting (Project Scientist)	8	$120.00	$960.00
9	Treatability evaluation of various surfactants to emulsify both LNAPL & creosote DNAPL (D. Cassidy, Ph.D)	1	$12,500.00	$14,375.00
9	High Resolution Site Characterization (HRSC) LIF assessment using OIP-G inside impoundment, day rate vendor	5	$3,500.00	$20,125.00
9	HRSC - LIF - 3D data modeling package (provide by HRSC vendor)	1	$5,500.00	$5,500.00
9	Direct push drilling performed with HRSC testing, day rate	5	$1,850.00	$9,250.00
9	Field oversight, logging, HRSC evaluation, data tabulation (P.G.)	50	$140.00	$7,000.00
9	Installation of 10 - 2" surfactant injection wells to 40', inside or immediately outside impoundment	400	$45.50	$18,200.00
9	Soil management (bobcat) and disposal (assumes 20 tons at Subtitle D)	1	$3,200.00	$3,200.00
9	Drilling oversight for injection wells, assume 5 days (Geologist)	50	$120.00	$6,000.00
9	Injection well vaults and installation	10	$250.00	$2,500.00
9	Surfactant injections, assume 500g into 22 - RWs/Iws, 11,000 total, assume 8 days (Eden labor)	8	$3,500.00	$32,200.00
9	Purchase of surfactant (assumes 500g per well of 10% of 11,000 gal or 1,100 gal)	1,100	$35.00	$44,275.00
9	Incidentals	1	$750.00	$750.00
9	Project management/evaluation/reporting/limited field oversight (P.G.)	10	$130.00	$1,300.00
9	Report processing/administrative	8	$85.00	$680.00
9	Report materials, binders, mailing/shipping costs, misc.	1	$225.00	$225.00
	RCAP PHASE 9 - SUBTOTAL			$166,540.00
	PHASE 9 - SUBTOTAL W/ CONTINGENCY (10%)			**$183,194.00**
	GRAND TOTAL			**$1,543,435.03**

SUMMARY OF COSTS
William C. Meredith Company, Inc.
2335 Lawrence Street
East Point, Fulton County, Georgia
Hazardous Waste Facility Permit HW-062 (D)
EPA ID No. GAD003323805

SUMMARY OF ADDITIONAL DELINEATION/REMEDIATION SERVICES COSTS		
PHASE	**DESCRIPTION OF PHASES**	**COST**
1	Phase 1 – Vertical Delineation and Initial Recovery Well Installations	$129,334.15
2	Phase 2 - Short-term Yield Testing and Aquifer Testing	$31,064.00
3	Phase 3 - Source Area Recovery Well Installations/System Upgrade	$260,753.90
4	Phase 4 - Supplemental Vertical Delineation Well Installations	$217,613.00
5	Phase 5 - SMWU #9 and #10 Surface Water and Sediment Sample Plan	$26,603.50
6	Phase 6 - Supplemental Soil and Groundwater Delineation	$50,040.10
7	Phase 7 - Supplemental Vertical Delineation Well Installations	$239,431.50
8	Phase 8 - Remediation of Vadose Zone Soils	$405,400.88
9	Phase 9 - Supplemental Corrective Action Alternatives	$183,194.00
	TOTAL DELINEATION/REMEDIATION	**$1,543,435.03**
	SUMMARY OF SAMPLING/REPORTING AND O&M SYSTEM COSTS	
	30 YEAR COST FOR SAMPLING AND REPORTING	$767,800.00
	30 YEAR COST FOR INSPECTION/MAINTENANCE OF HWMU	$782,995.50
	30 YEAR COST FOR O&M SYSTEM	$737,383.50
	TOTAL SAMPLING/REPORTING AND O&M COSTS	**$2,288,179.00**
	GRAND TOTAL FOR 30 YEARS	
	TOTAL DELINEATION/REMEDIATION/SAMPLING/REPORTING/O&M	**$3,831,614.03**
	YEARLY COST (TOTAL / 30)	**$127,720.47**

FIGURE 1	Envirorisk Consultants, Inc. 149 Lee Byrd Road Loganville GA, 30052	**LEGEND** Aerial Photograph Source: Adapted from 2009 Windows Live Online Scale: Approx Scale: 1": 300"	AERIAL VIEW OF VICINITY 2023 REVISED CORRECTIVE ACTION PLAN WILLIAM C. MEREDITH COMPANY, INC

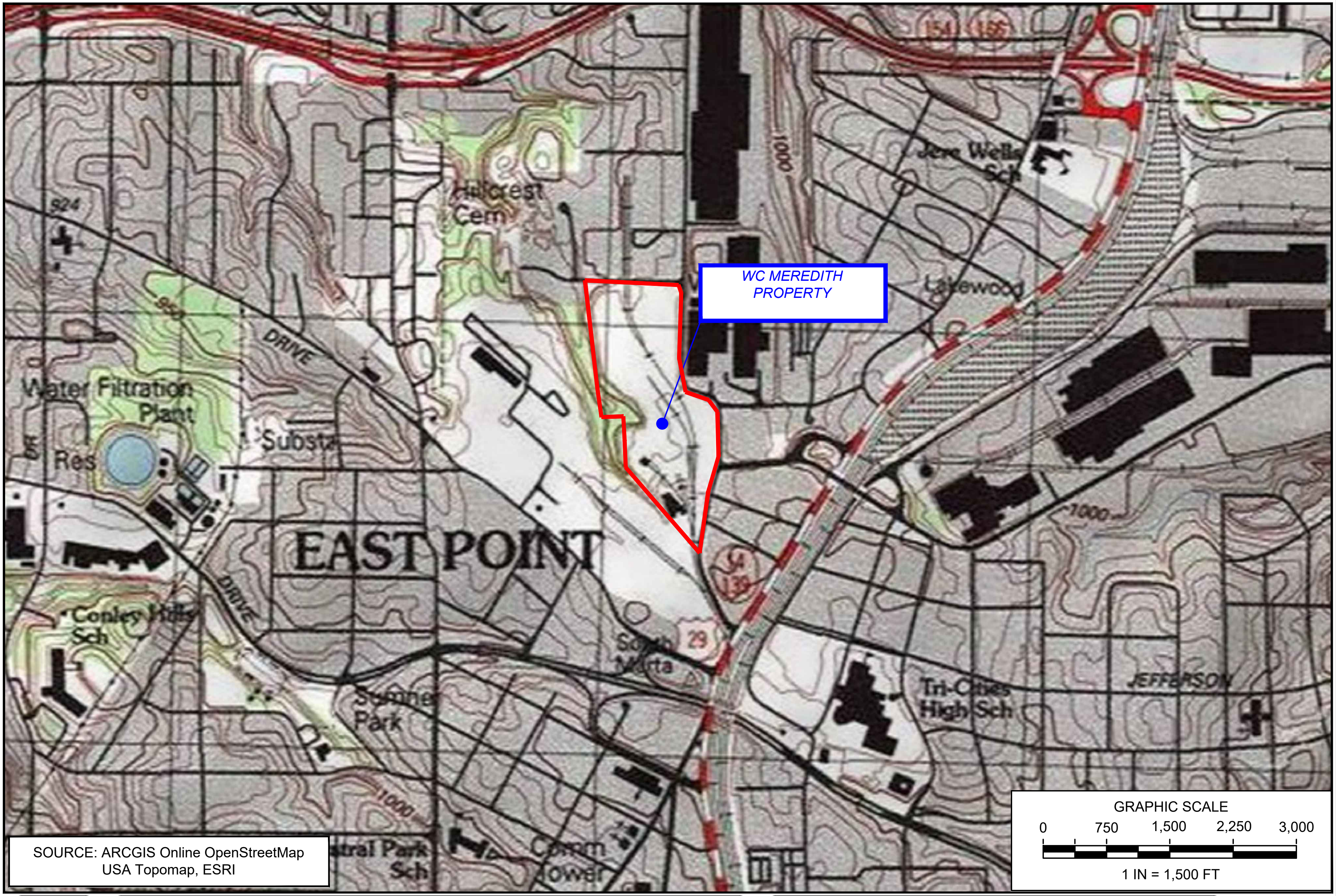


FIGURE NO

2

WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344

TOPOGRAPHIC MAP

ENVIRORISK CONSULTANTS, INC.

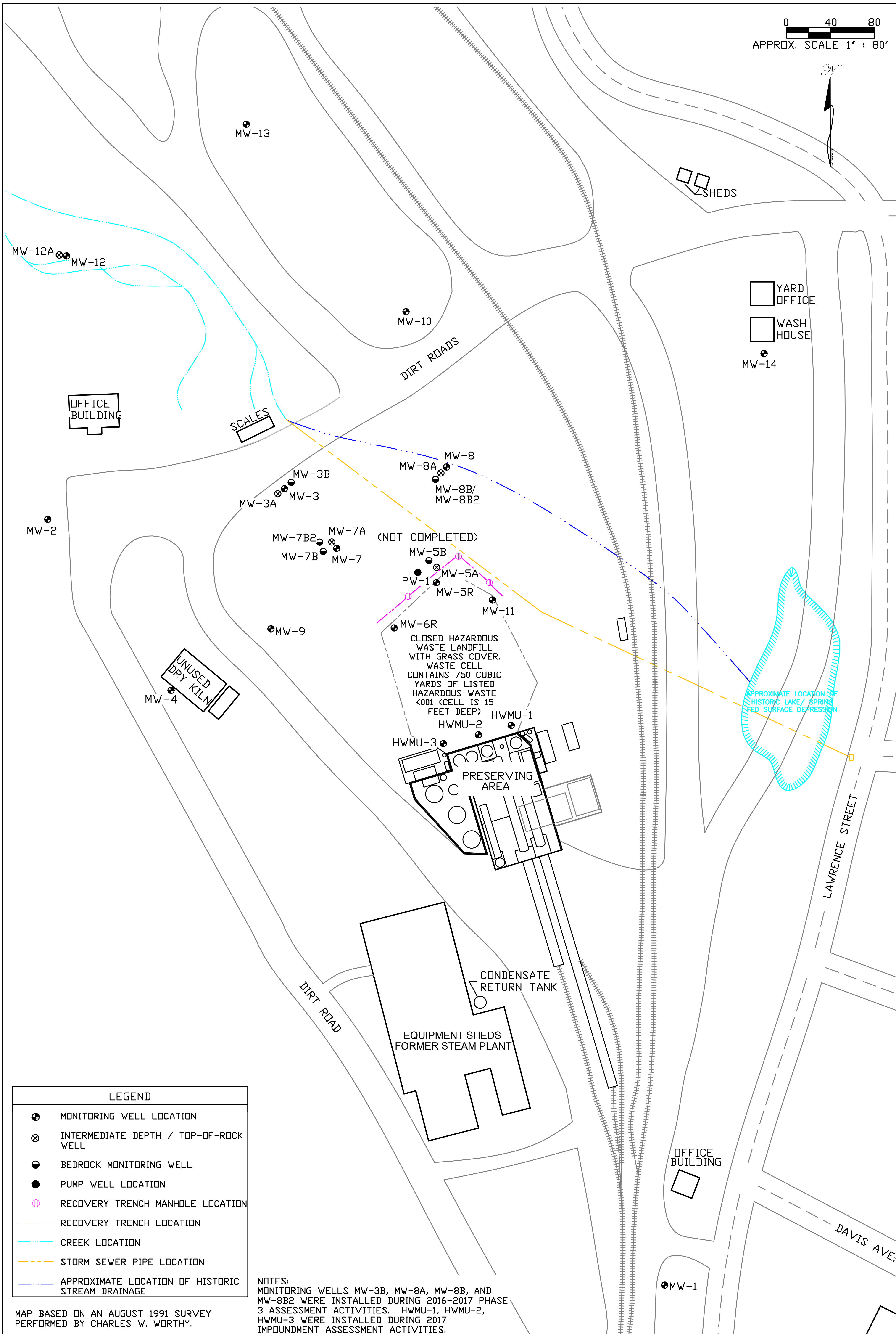
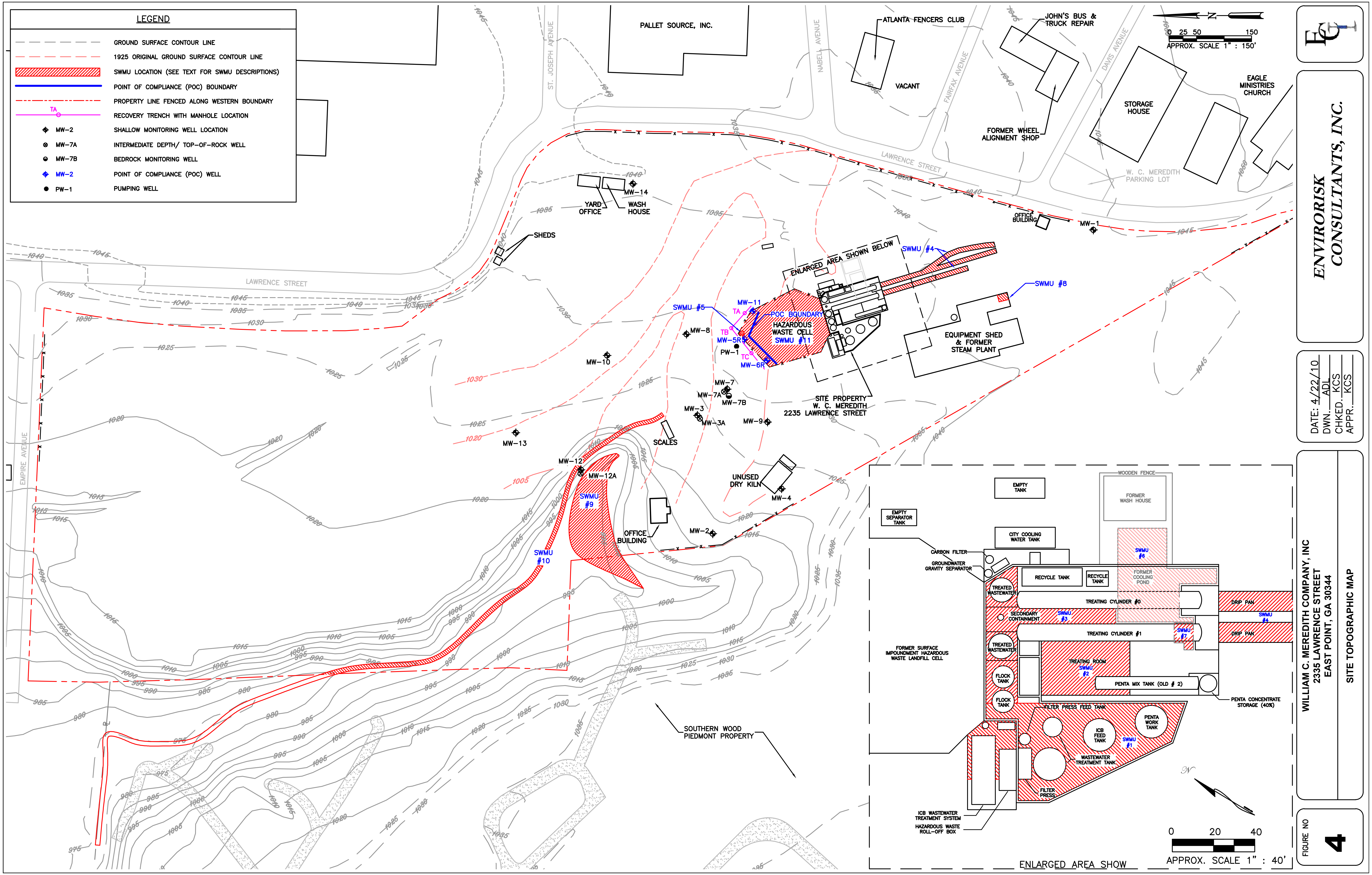


FIGURE NO	WILLIAM C. MEREDITH COMPANY 2335 LAWRENCE AVENUE EAST POINT, GA 30344	DATE: 6/2023 DWN. JPC CHKED. KP APPR. KCS	ENVIRORISK CONSULTANTS, INC.
3	SITE MAP		



LEGEND
GROUND SURFACE CONTOUR LINE
1925 ORIGINAL GROUND SURFACE CONTOUR LINE
SWMU LOCATION (SEE TEXT FOR SWMU DESCRIPTIONS)
POINT OF COMPLIANCE (POC) BOUNDARY
PROPERTY LINE FENCED ALONG WESTERN BOUNDARY
TA
RECOVERY TRENCH WITH MANHOLE LOCATION
MW-2 SHALLOW MONITORING WELL LOCATION
MW-7A INTERMEDIATE DEPTH/ TOP-OF-ROCK WELL
MW-7B BEDROCK MONITORING WELL
MW-2 POINT OF COMPLIANCE (POC) WELL
PW-1 PUMPING WELL
PALLET SOURCE, INC.
ST. JOSEPH AVENUE
NABELL AVENUE
ATLANTA FENCERS CLUB
VACANT
FAIRFAX AVENUE
JOHN'S BUS & TRUCK REPAIR
DAVIS AVENUE
FORMER WHEEL ALIGNMENT SHOP
STORAGE HOUSE
EAGLE MINISTRIES CHURCH
W. C. MEREDITH PARKING LOT
LAWRENCE STREET
0 25 50 150
APPROX. SCALE 1" : 150'
YARD OFFICE
WASH HOUSE
MW-14
SHEDS
OFFICE BUILDING
MW-1
ENLARGED AREA SHOWN BELOW
SWMU #4
SWMU #8
SWMU #5
MW-11
TA
POC BOUNDARY
HAZARDOUS WASTE CELL
SWMU #11
TB
MW-5R
PW-1
TC
MW-6R
MW-8
MW-10
EQUIPMENT SHED & FORMER STEAM PLANT
MW-7
MW-7A
MW-7B
MW-3
MW-3A
MW-9
SITE PROPERTY W. C. MEREDITH 2235 LAWRENCE STREET
MW-13
SCALES
MW-12
MW-12A
SWMU #9
UNUSED DRY KILN
MW-4
OFFICE BUILDING
MW-2
SWMU #10
EMPIRE AVENUE
SOUTHERN WOOD PIEDMONT PROPERTY
EMPTY TANK
WOODEN FENCE
FORMER WASH HOUSE
EMPTY SEPARATOR TANK
CITY COOLING WATER TANK
CARBON FILTER
GROUNDWATER GRAVITY SEPARATOR
SWMU #6
RECYCLE TANK
RECYCLE TANK
FORMER COOLING POND
TREATED WASTEWATER
TREATING CYLINDER #0
DRIP PAN
SECONDARY CONTAINMENT
SWMU #3
SWMU #4
SWMU #7
TREATING CYLINDER #1
DRIP PAN
FORMER SURFACE IMPOUNDMENT HAZARDOUS WASTE LANDFILL CELL
TREATED WASTEWATER
TREATING ROOM
SWMU #2
FLOCK TANK
PENTA MIX TANK (OLD # 2)
PENTA CONCENTRATE STORAGE (40%)
FLOCK TANK
FILTER PRESS FEED TANK
PENTA WORK TANK
ICB FEED TANK
SWMU #1
WASTEWATER TREATMENT TANK
FILTER PRESS
ICB WASTEWATER TREATMENT SYSTEM
HAZARDOUS WASTE ROLL-OFF BOX
0 20 40
APPROX. SCALE 1" : 40'
ENLARGED AREA SHOW
ENVIRORISK CONSULTANTS, INC.
DATE: 4/22/10
DWN. ADL
CHKED. KCS
APPR. KCS
WILLIAM C. MEREDITH COMPANY, INC
2335 LAWRENCE STREET
EAST POINT, GA 30344
SITE TOPOGRAPHIC MAP
FIGURE NO
4

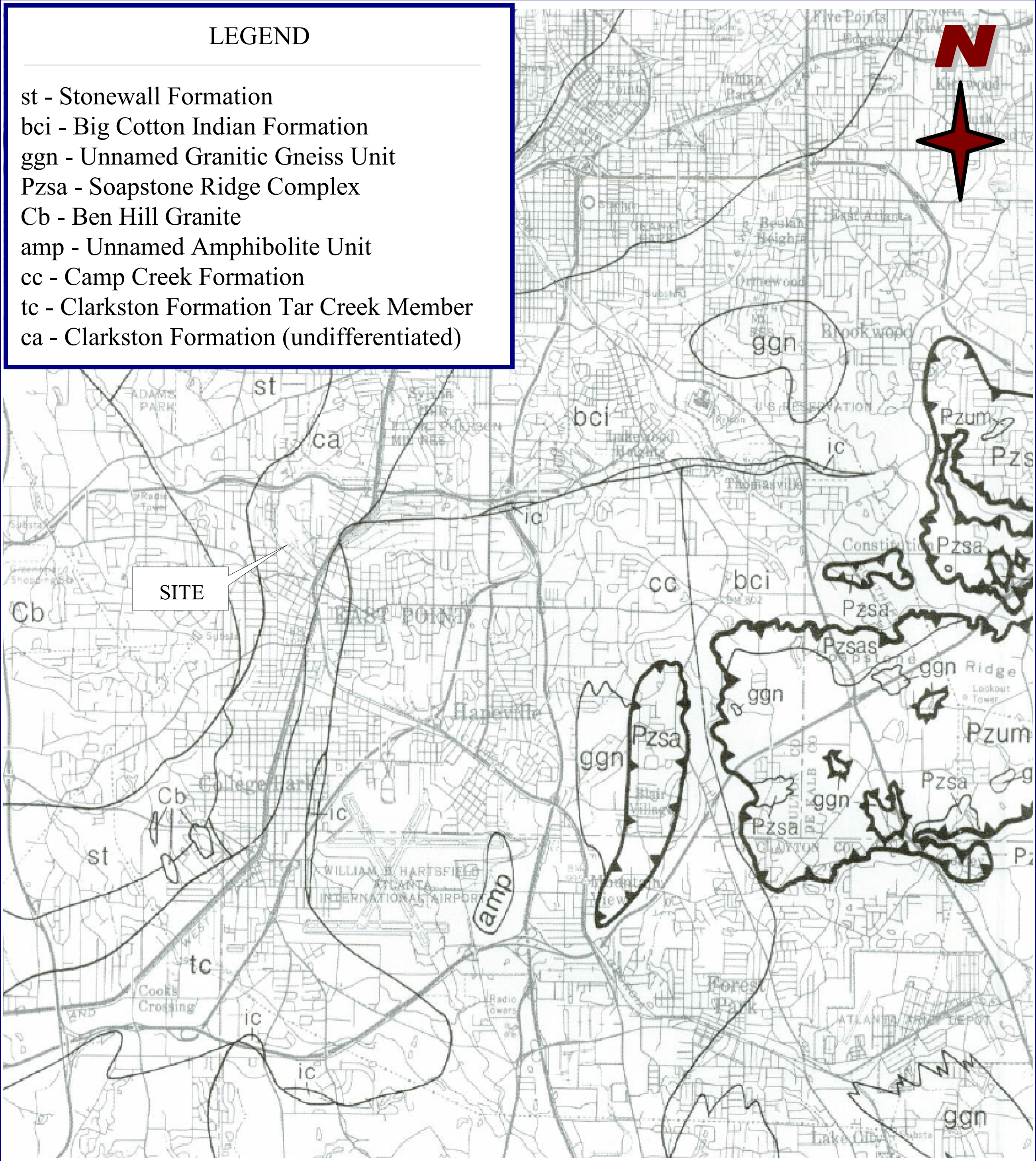
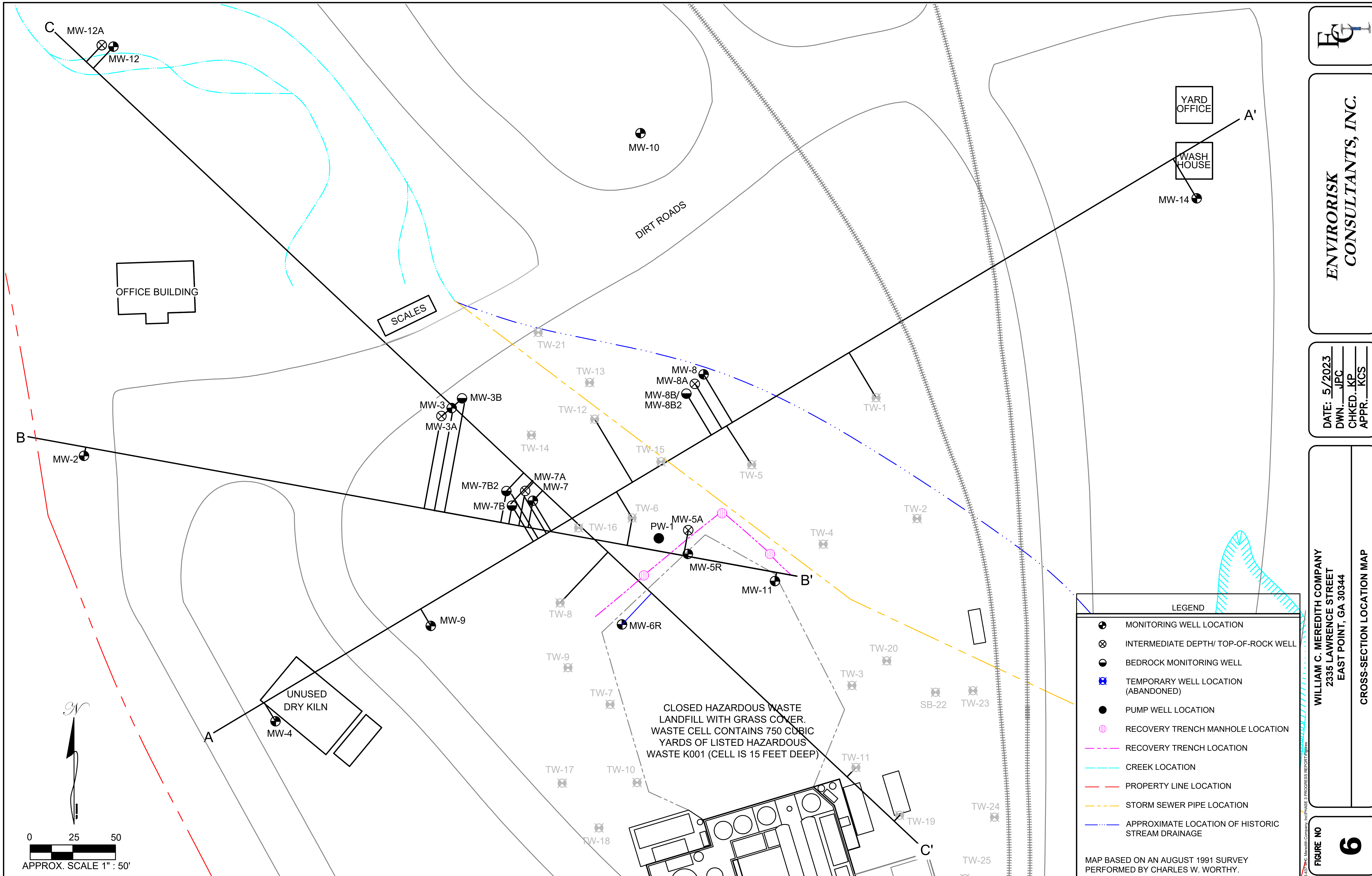


FIGURE 5 - SITE AREA GEOLOGY MAP

Envirorisk Consultants, Inc.
149 Lee Byrd Road
Loganville, GA 30052

LEGEND
Area Geology Map
Source: Geology of Greater Atl. Reg. Plate 1 East, GGS Bulletin 96, McConnell's Abram's 1984

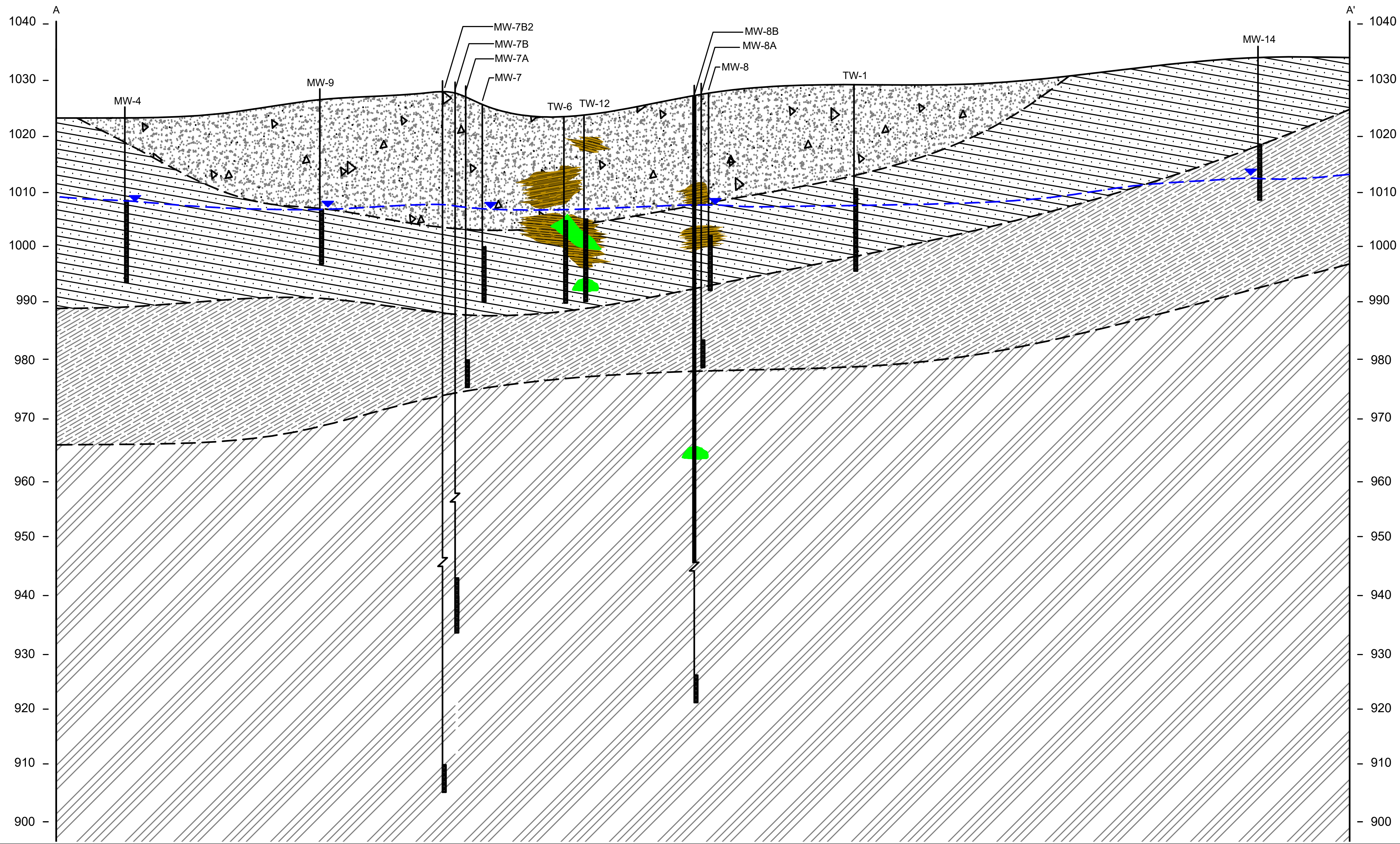
2023 REVISED CORRECTIVE ACTION PLAN
WILLIAM C. MEREDITH CO. INC. 2335 LAWRENCE STREET EAST POINT, GA 30344 PERMIT No. HW-062(D)


C
MW-12A
MW-12
MW-10
DIRT ROADS
YARD OFFICE
WASH HOUSE
A'
MW-14
OFFICE BUILDING
SCALES
TW-21
TW-13
MW-8
MW-8A
MW-8B/
MW-8B2
TW-1
TW-12
MW-3B
MW-3
MW-3A
TW-14
TW-15
TW-5
B
MW-2
MW-7A
MW-7
MW-7B2
MW-7B
TW-6
TW-16
PW-1
MW-5A
TW-4
TW-2
MW-5R
MW-11
B'
TW-8
MW-9
MW-6R
TW-20
TW-9
TW-3
SB-22
TW-23
TW-7
UNUSED DRY KILN
MW-4
A
CLOSED HAZARDOUS WASTE LANDFILL WITH GRASS COVER. WASTE CELL CONTAINS 750 CUBIC YARDS OF LISTED HAZARDOUS WASTE K001 (CELL IS 15 FEET DEEP)
TW-11
TW-17
TW-10
TW-24
TW-19
TW-18
C'
TW-25
0 25 50
APPROX. SCALE 1" : 50'
LEGEND
MONITORING WELL LOCATION
INTERMEDIATE DEPTH/ TOP-OF-ROCK WELL
BEDROCK MONITORING WELL
TEMPORARY WELL LOCATION (ABANDONED)
PUMP WELL LOCATION
RECOVERY TRENCH MANHOLE LOCATION
RECOVERY TRENCH LOCATION
CREEK LOCATION
PROPERTY LINE LOCATION
STORM SEWER PIPE LOCATION
APPROXIMATE LOCATION OF HISTORIC STREAM DRAINAGE
MAP BASED ON AN AUGUST 1991 SURVEY PERFORMED BY CHARLES W. WORTHY.
ENVIRORISK CONSULTANTS, INC.
DATE: 5/2023
DWN. JPC
CHKED. KP
APPR. KCS
WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344
CROSS-SECTION LOCATION MAP
FIGURE NO
6

LEGEND

FILL:	CONSISTS OF A MIXTURE OF GRAVEL, SAND, SILTY-SAND, CLAY, AND VARIOUS DEBRIS.
RESIDUUM SOILS:	CONSISTS OF MICACEOUS SANDY-CLAYS, SILTY-SANDS, CLAYEY-SANDS, WITH EVIDENCE OF RELICT FOLIATION INDICATIVE OF GNEISS OR SCHIST BEDROCK WITH DEPTH.
PARTIALLY WEATHERED ROCK (PWR):	CHARACTERIZED AS DENSER SOIL/ SAPROLITE (HIGH BLOW COUNT MATERIAL) CLASSIFIED AS WEATHERED MICACEOUS GRANITIC GNEISS, MICA SCHISTS, BIOTITE SCHISTS/ GNEISS, HORNBLENDE GNEISS/ SCHISTS.
FRACTURED BEDROCK:	COMPETENT GRANITIC BIOTITE-RICH GNEISS APPARENT FRACTURING OBSERVED AT VARIOUS INTERVALS (SEE BORING LOGS/CORE LOGS FOR FURTHER DETAILS).
	APPROXIMATE ELEVATION OF SHALLOW GROUNDWATER BASED ON 4/5/2023 MEASUREMENTS
	FORMATION CONTACT (DASHED WHERE GRADATIONAL)
	APPROX. LOCATION OF WOOD DEBRIS FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)
	APPROX. LOCATION OF NAPL FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)

APPROX. HORIZONTAL SCALE
60 30 0



ENVIRORISK CONSULTANTS, INC.

DATE: 5/2023
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APPR. KCS

WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344

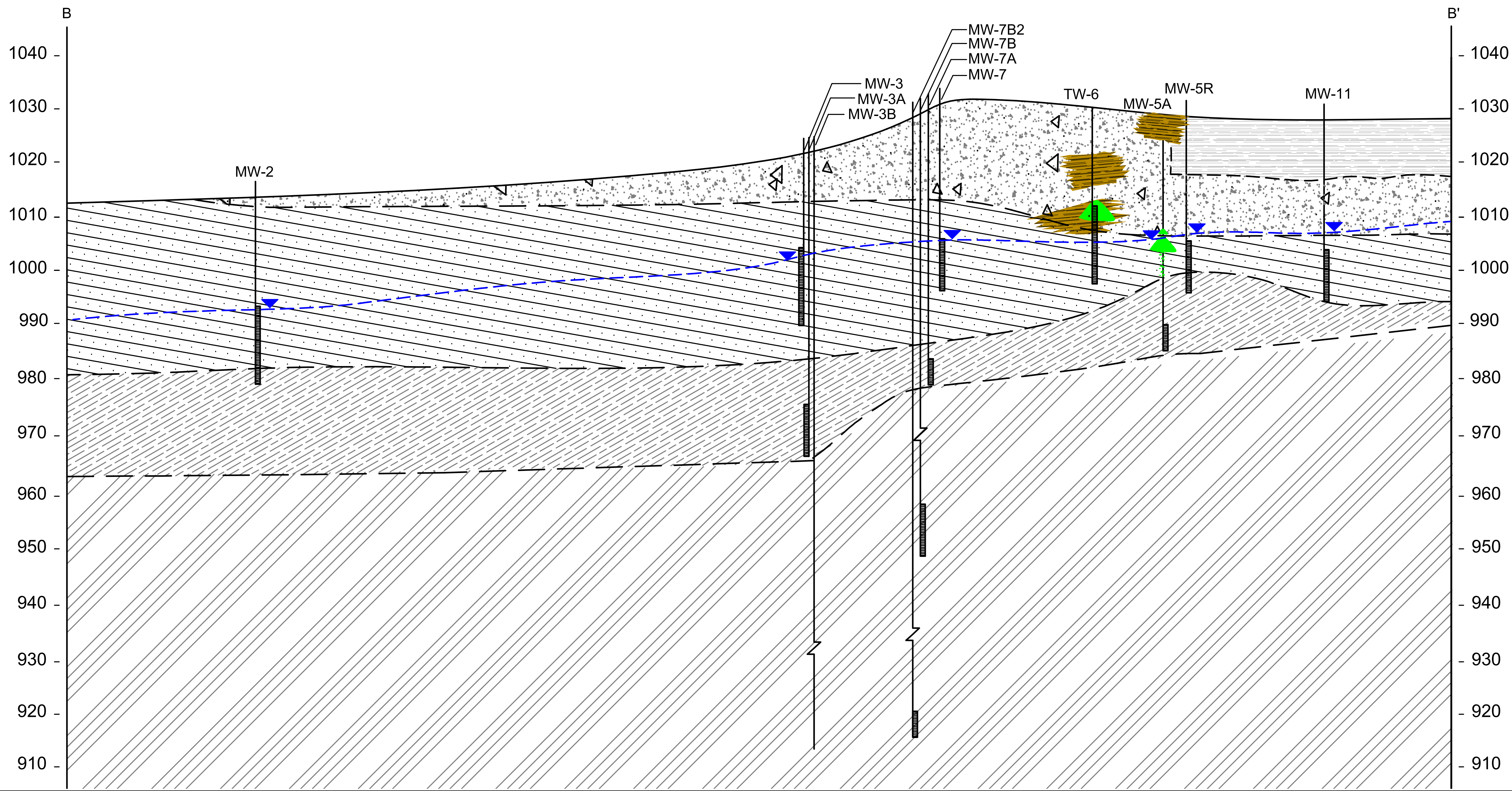
GEOLOGIC CROSS SECTION (A-A')

FIGURE NO 7

LEGEND

- **FILL:** CONSISTS OF A MIXTURE OF GRAVEL, SAND, SILTY-SAND, CLAY, AND VARIOUS DEBRIS.
- **IMPOUNDMENT FILL:** TREATED/ STABILIZED MATERIAL WITH COMPACTED LOW PERMEABILITY CLAY LAYER, BOTTOM OF FILLED AREA APPROX. 15' BELOW GRADE
- **RESIDUUM SOILS:** CONSISTS OF MICACEOUS SANDY-CLAYS, SILTY-SANDS, CLAYEY-SANDS, WITH EVIDENCE OF RELICT FOLIATION INDICATIVE OF GNEISS OR SCHIST BEDROCK WITH DEPTH.
- **PARTIALLY WEATHERED ROCK (PWR):** CHARACTERIZED AS DENSER SOIL/ SAPROLITE (HIGH BLOW COUNT MATERIAL) CLASSIFIED AS WEATHERED MICACEOUS GRANITIC GNEISS, MICA SCHISTS, BIOTITE SCHISTS/ GNEISS, HORNBLENDE GNEISS/ SCHISTS.
- APPROXIMATE ELEVATION OF SHALLOW GROUNDWATER BASED ON 4/5/2023 MEASUREMENTS
- FORMATION CONTACT (DASHED WHERE GRADATIONAL)
- APPROX. LOCATION OF WOOD DEBRIS FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)
- APPROX. LOCATION OF NAPL FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)
- **FRACTURED BEDROCK:** COMPETENT GRANITIC BIOTITE-RICH GNEISS APPARENT FRACTURING OBSERVED AT VARIOUS INTERVALS (SEE BORING LOGS/CORE LOGS FOR FURTHER DETAILS).

APPROX. HORIZONTAL SCALE 40 20 0



ENVIRORISK CONSULTANTS, INC.

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WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344

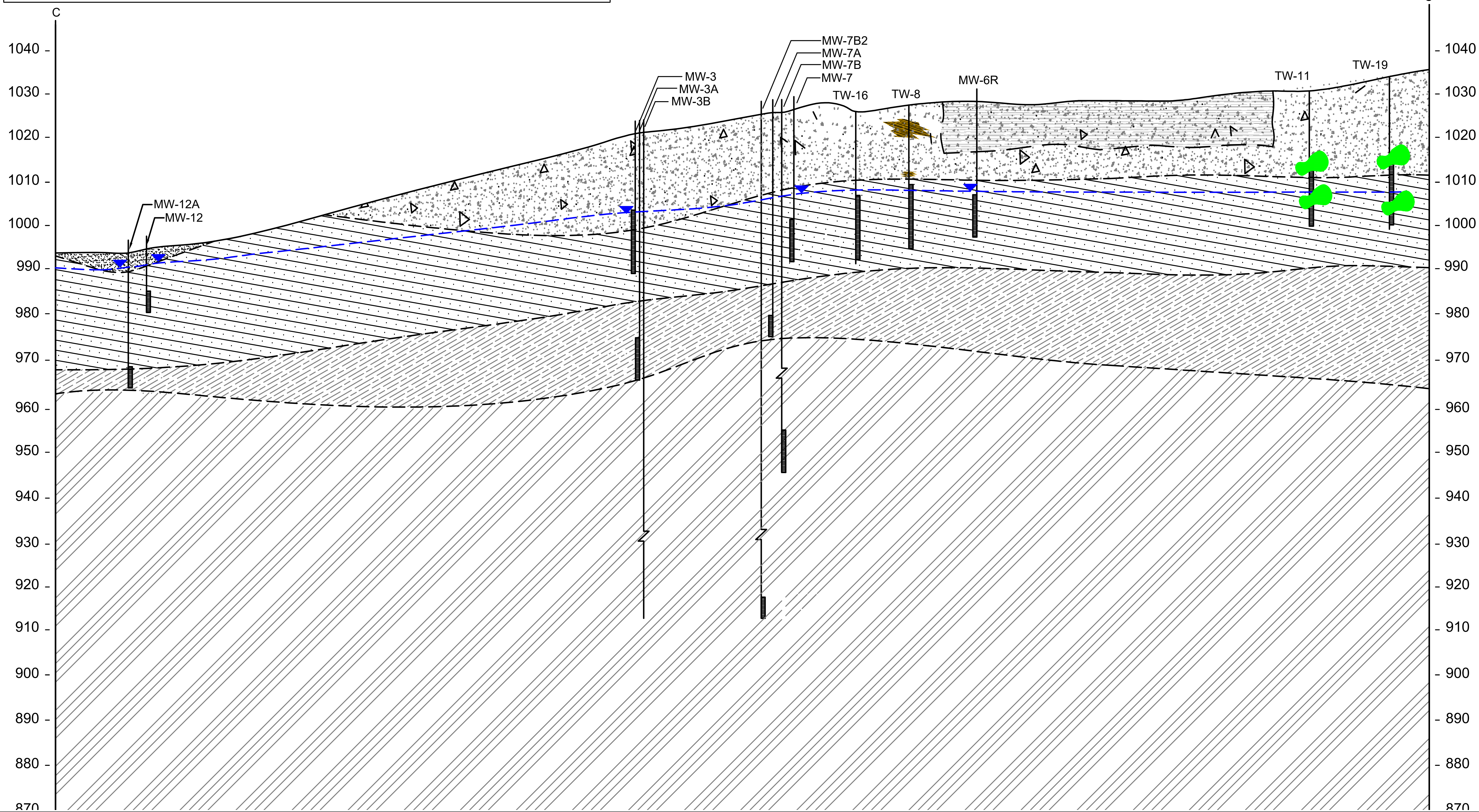
GEOLOGIC CROSS SECTION (B-B')

FIGURE NO 8

LEGEND

- FILL: CONSISTS OF A MIXTURE OF GRAVEL, SAND, SILTY-SAND, CLAY, AND VARIOUS DEBRIS.
- IMPOUNDMENT FILL: TREATED/ STABILIZED MATERIAL WITH COMPACTED LOW PERMEABILITY CLAY LAYER, BOTTOM OF FILLED AREA APPROX. 15' BELOW GRADE
- RESIDUUM SOILS: CONSISTS OF MICACEOUS SANDY-CLAYS, SILTY-SANDS, CLAYEY-SANDS, WITH EVIDENCE OF RELICT FOLIATION INDICATIVE OF GNEISS OR SCHIST BEDROCK WITH DEPTH.
- PARTIALLY WEATHERED ROCK (PWR): CHARACTERIZED AS DENSER SOIL/ SAPROLITE (HIGH BLOW COUNT MATERIAL) CLASSIFIED AS WEATHERED MICACEOUS GRANITIC GNEISS, MICA SCHISTS, BIOTITE SCHISTS/ GNEISS, HORNBLENDE GNEISS/ SCHISTS.
- APPROXIMATE ELEVATION OF SHALLOW GROUNDWATER BASED ON 4/5/2023 MEASUREMENTS
- FORMATION CONTACT (DASHED WHERE GRADATIONAL)
- APPROX. LOCATION OF WOOD DEBRIS FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)
- FRACTURED BEDROCK: COMPETENT GRANITIC BIOTITE-RICH GNEISS APPARENT FRACTURING OBSERVED AT VARIOUS INTERVALS (SEE BORING LOGS/CORE LOGS FOR FURTHER DETAILS).
- APPROXIMATE LOCATION OF NAPL FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)

APPROX. HORIZONTAL SCALE
40 20 0



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WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344

GEOLOGIC CROSS SECTION (C-C')

FIGURE NO
9

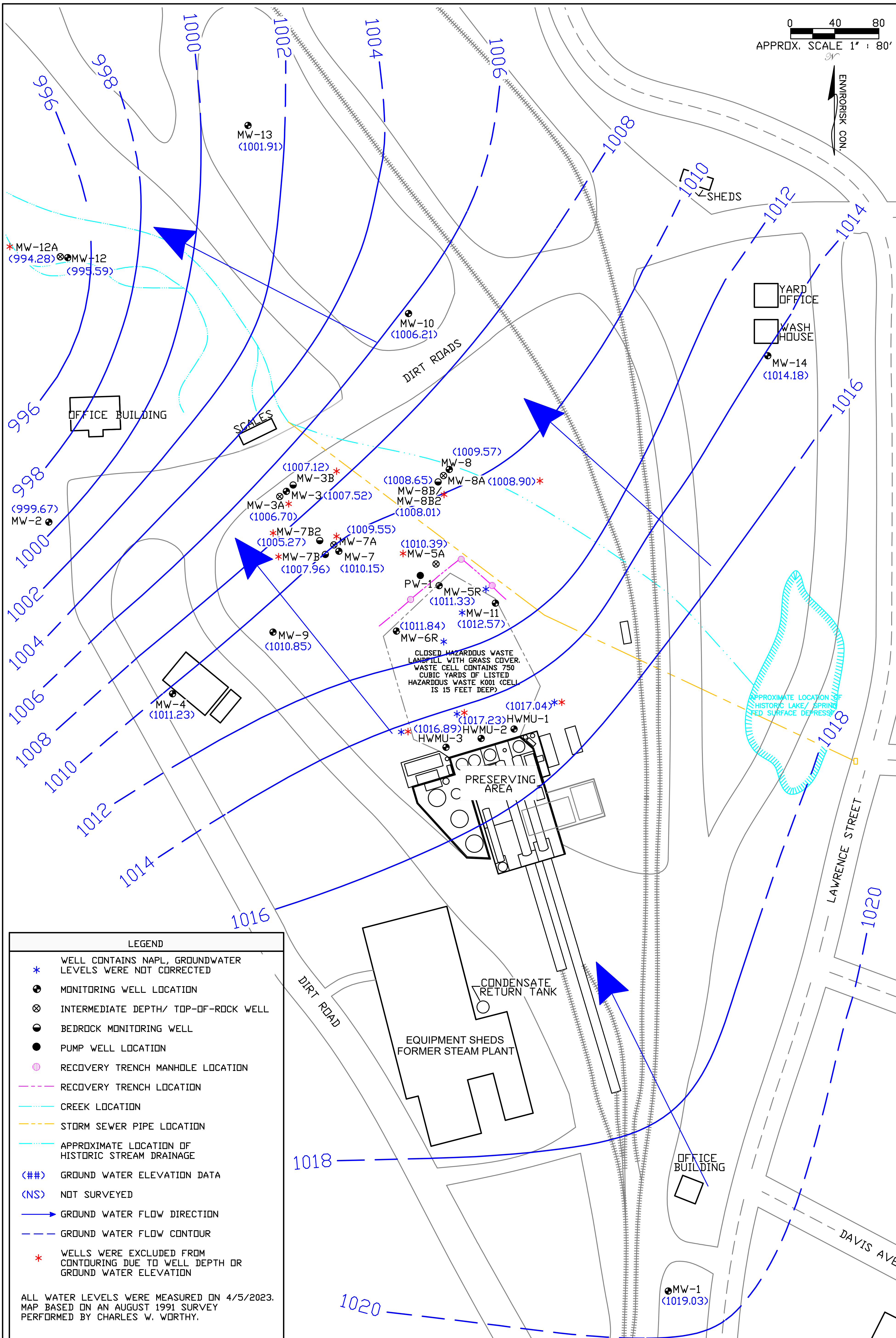


FIGURE NO	WILLIAM C. MEREDITH COMPANY 2335 LAWRENCE STREET EAST POINT, GA 30344	DATE: 5/2023 DWN. JPC CHKED. KP APPR. KCS	*ENVIRORISK CONSULTANTS, INC.*
10	POTENTIOMETRIC SURFACE MAP (4/5/2023)		

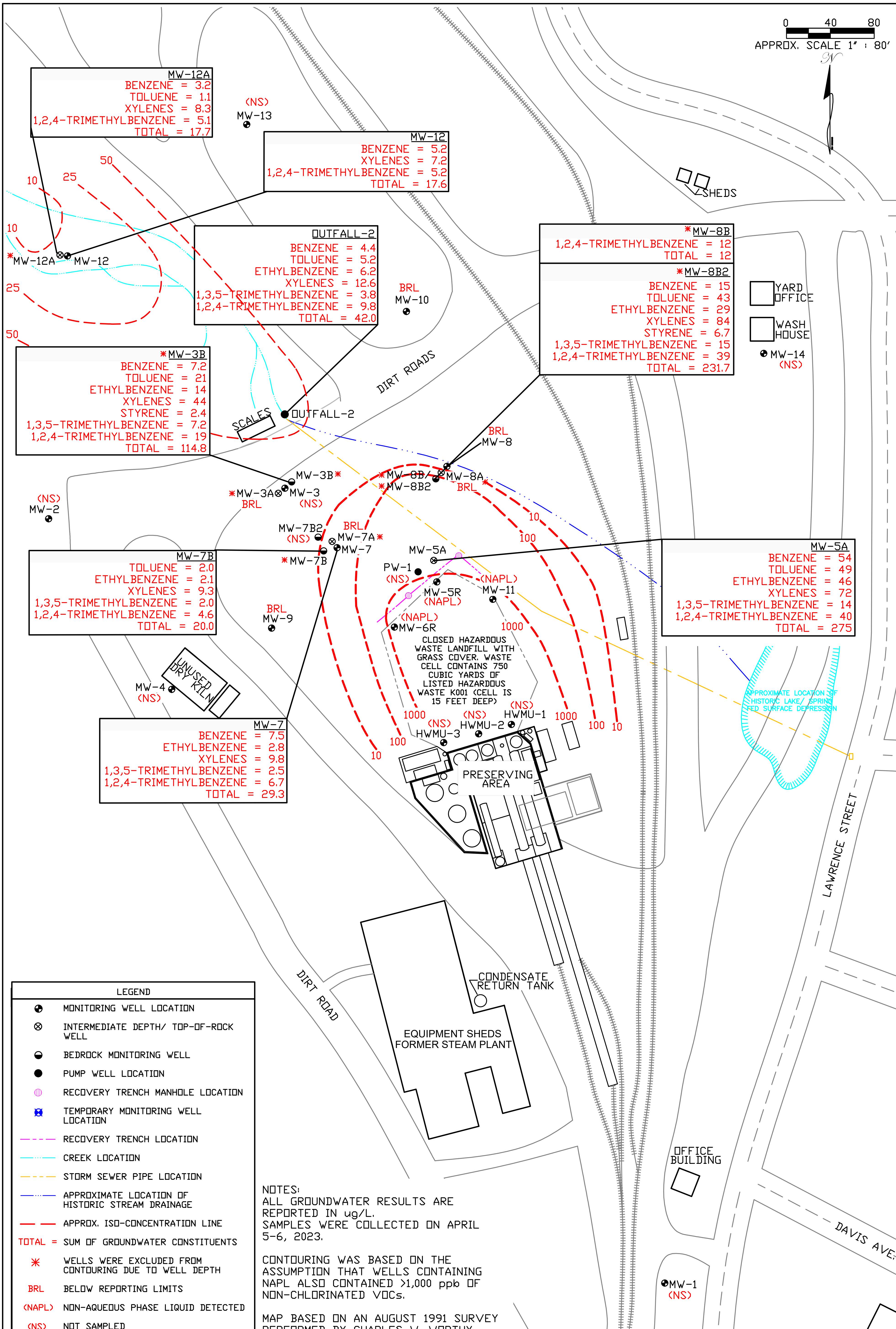


FIGURE NO **11**

WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344

HORIZONTAL EXTENT OF TOTAL NON CHLORINATED VOCs (APRIL 2023)

DATE: 5/2023
DWN. JPC
CHKED. KP
APPR. KCS

ENVIRORISK CONSULTANTS, INC.

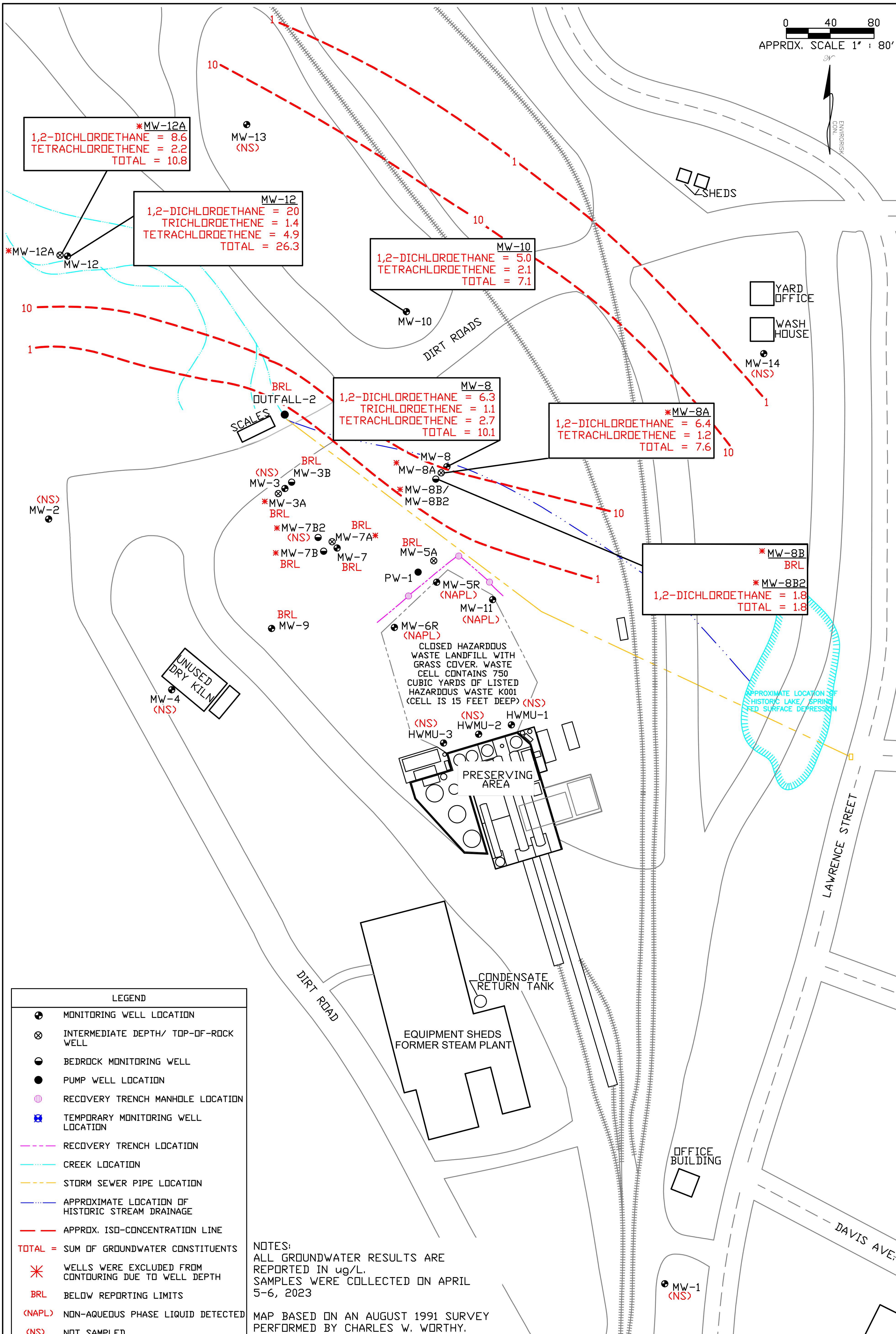


FIGURE NO
12

WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344

HORIZONTAL EXTENT OF CHLORINATED VOCs (APRIL 2023)

DATE: 5/2023
DWN. JPC
CHKED. KP
APPR. KCS

ENVIRORISK CONSULTANTS, INC.

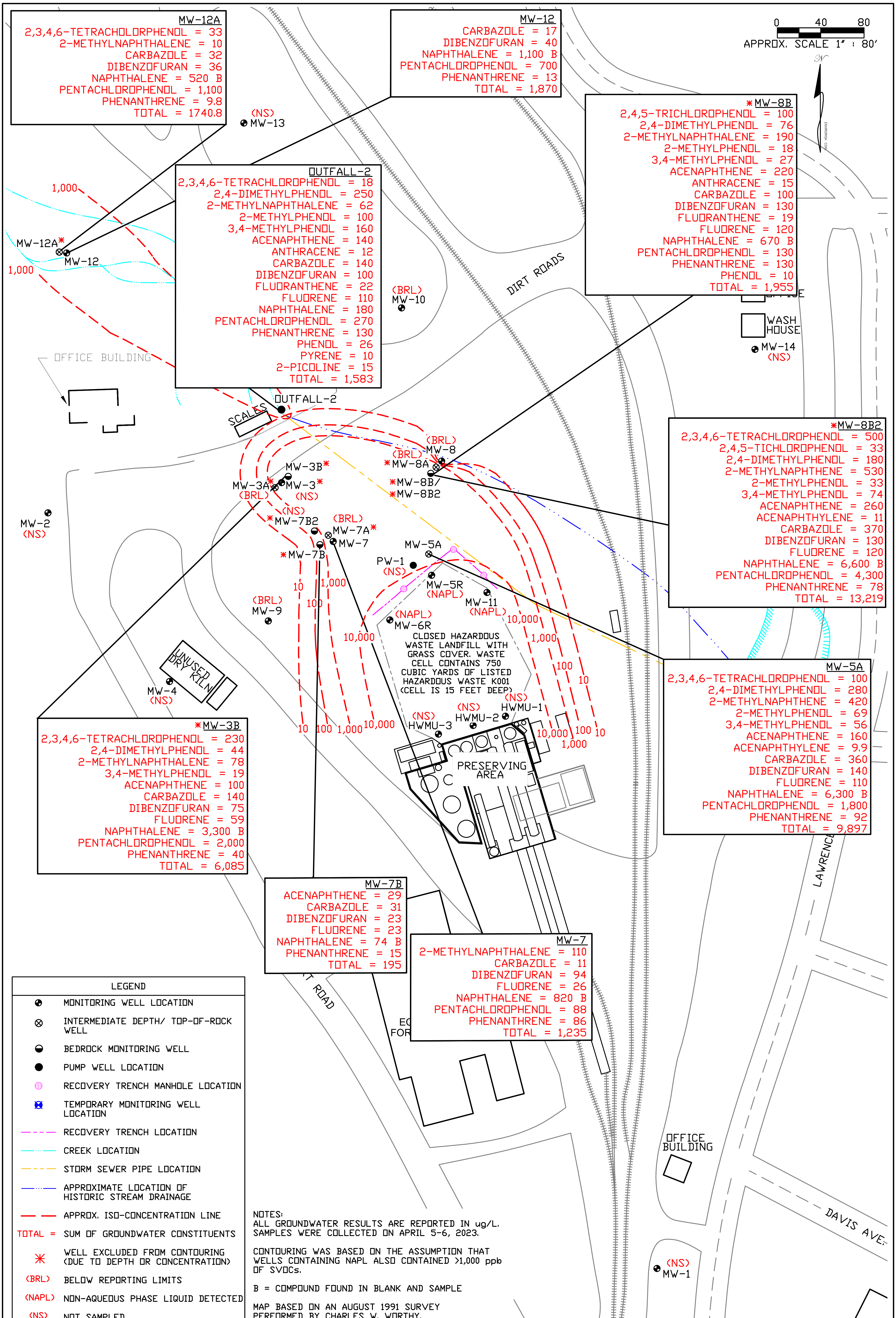


FIGURE NO	WILLIAM C. MEREDITH COMPANY 2335 LAWRENCE STREET EAST POINT, GA 30344	DATE: 5/2023	ENVIRORISK CONSULTANTS, INC.
13	HORIZONTAL EXTENT OF SVOCs (APRIL 2023)	DWN. JPC CHKED. KP APPR. KCS	

LEGEND

FILL: CONSISTS OF A MIXTURE OF GRAVEL, SAND, SILTY-SAND, CLAY, AND VARIOUS DEBRIS.

RESIDUUM SOILS: CONSISTS OF MICACEOUS SANDY-CLAYS, SILTY-SANDS, CLAYEY-SANDS, WITH EVIDENCE OF RELICT FOLIATION INDICATIVE OF GNEISS OR SCHIST BEDROCK WITH DEPTH.

PARTIALLY WEATHERED ROCK (PWR): CHARACTERIZED AS DENSER SOIL/ SAPROLITE (HIGH BLOW COUNT MATERIAL) CLASSIFIED AS WEATHERED MICACEOUS GRANITIC GNEISS, MICA SCHISTS, BIOTITE SCHISTS/ GNEISS, HORNBLENDE GNEISS/ SCHISTS.

FRACTURED BEDROCK: COMPETENT BEDROCK - HARD BIOTITE GNEISS, GRANITIC GNEISS, AND AMPHIBOLITE GNEISS WITH POTASSIUM FELDSPAR, AND QUARTZ AUGENS AND LENSES OF MICA, PYRITE AND MUSCOVITE.

APPROXIMATE ELEVATION OF SHALLOW GROUNDWATER BASED ON 4/5/2023 MEASUREMENTS

FORMATION CONTACT (DASHED WHERE GRADATIONAL)

(#) TOTAL VOC CONCENTRATION REPORTED IN ug/L
- TW NAPL MEASUREMENTS WERE TAKEN ON 7/2012
- ALL OTHER SAMPLES WERE COLLECTED 4/5-6/2023

(NS) NOT SAMPLED

(NAPL) NON-AQUEOUS PHASE LIQUID (ASSUME >1,000 FOR CONTOURING)

(BRL) BELOW REPORTING LIMIT

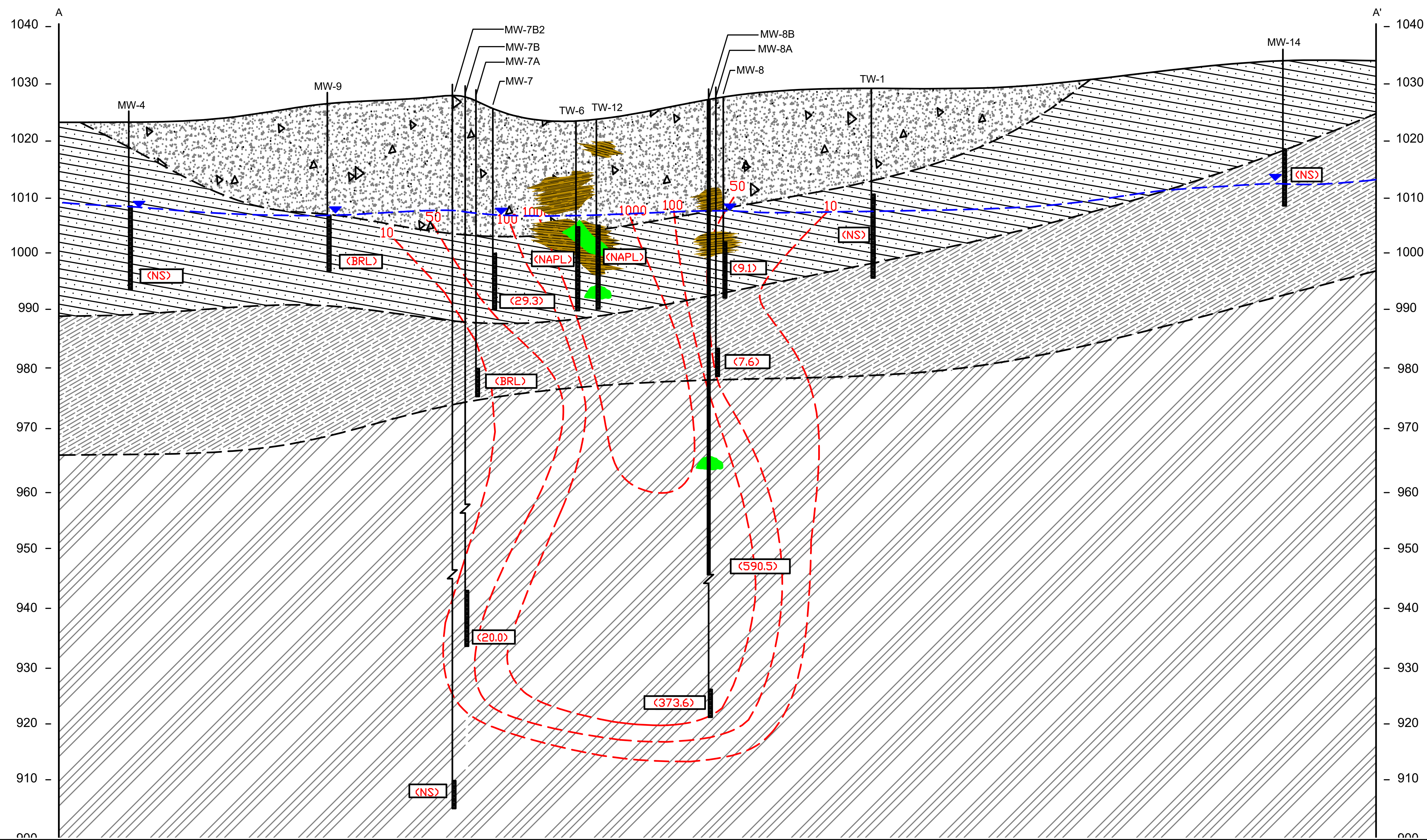
—10— TOTAL VOC ISO-CONCENTRATION LINES

APPROX. LOCATION OF WOOD DEBRIS FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)

APPROX. LOCATION OF NAPL FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)

NOTE: THE EXTENT OF NAPL SURROUNDING WELLS IS UNKNOWN, BUT HAS BEEN ESTIMATED BASED ON BORING LOG DESCRIPTIONS. IN ADDITION, VOC CONCENTRATIONS IN THE NAPL FRACTION ARE UNKNOWN. CONTOURING WAS DONE FOR THE DISSOLVED PHASE ONLY BASED ON PRIOR POC SAMPLING DATA.

APPROX. HORIZONTAL SCALE
60 30 0



ENVIRORISK CONSULTANTS, INC.

DATE: 5/2023
DWN. JPC
CHKED. KP
APPR. KCS

WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344

VERTICAL EXTENT OF VOCs (A-A')

FIGURE NO 14

LEGEND

FILL: CONSISTS OF A MIXTURE OF GRAVEL, SAND, SILTY-SAND, CLAY, AND VARIOUS DEBRIS.

RESIDUUM SOILS: CONSISTS OF MICACEOUS SANDY-CLAYS, SILTY-SANDS, CLAYEY-SANDS, WITH EVIDENCE OF RELICT FOLIATION INDICATIVE OF GNEISS OR SCHIST BEDROCK WITH DEPTH.

PARTIALLY WEATHERED ROCK (PWR): CHARACTERIZED AS DENSER SOIL/ SAPROLITE (HIGH BLOW COUNT MATERIAL) CLASSIFIED AS WEATHERED MICACEOUS GRANITIC GNEISS, MICA SCHISTS, BIOTITE SCHISTS/ GNEISS, HORNBLENDE GNEISS/ SCHISTS.

FRACTURED BEDROCK: COMPETENT BEDROCK - HARD BIOTITE GNEISS, GRANITIC GNEISS, AND AMPHIBOLITE GNEISS WITH POTASSIUM FELDSPAR, AND QUARTZ AUGENS AND LENSES OF MICA, PYRITE AND MUSCOVITE.

APPROXIMATE ELEVATION OF SHALLOW GROUNDWATER BASED ON 4/5/2023 MEASUREMENTS

FORMATION CONTACT (DASHED WHERE GRADATIONAL)

(#) TOTAL VOC CONCENTRATION REPORTED IN ug/L
- TW NAPL MEASUREMENTS WERE TAKEN ON 7/2012
- ALL OTHER SAMPLES WERE COLLECTED 4/5-6/2023

(NS) NOT SAMPLED

(NAPL) NON-AQUEOUS PHASE LIQUID (ASSUME >1,000 FOR CONTOURING)

(BRL) BELOW REPORTING LIMIT

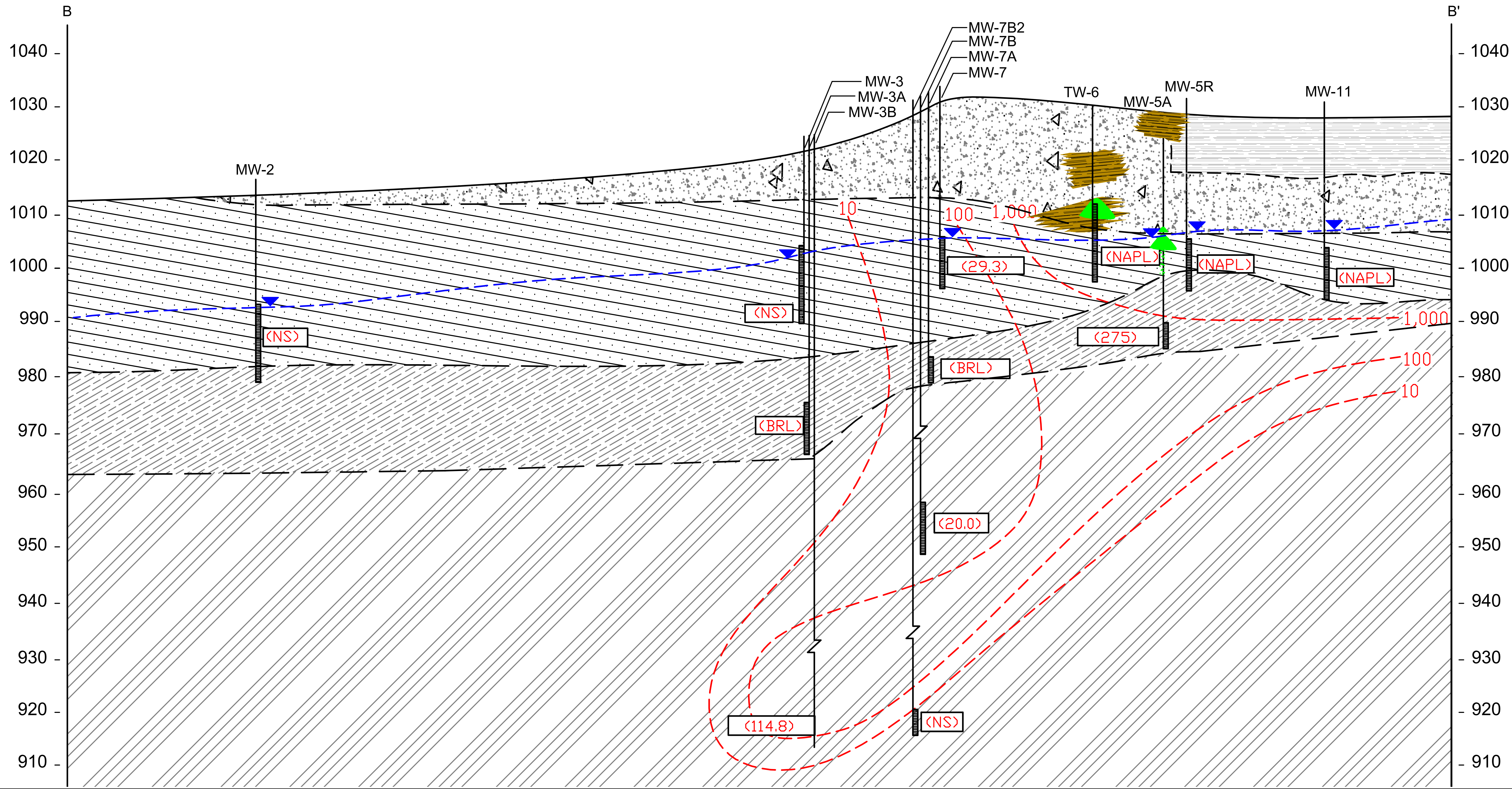
—10— TOTAL VOC ISO-CONCENTRATION LINES

APPROX. LOCATION OF WOOD DEBRIS FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)

APPROX. LOCATION OF NAPL FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)

NOTE: THE EXTENT OF NAPL SURROUNDING WELLS IS UNKNOWN, BUT HAS BEEN ESTIMATED BASED ON BORING LOG DESCRIPTIONS. IN ADDITION, VOC CONCENTRATIONS IN THE NAPL FRACTION ARE UNKNOWN. CONTOURING WAS DONE FOR THE DISSOLVED PHASE ONLY BASED ON PRIOR POC SAMPLING DATA.

APPROX. HORIZONTAL SCALE
40 20 0



ENVIRORISK CONSULTANTS, INC.

DATE: 5/2023
DWN.. JPC
CHKED.. KP
APPR.. KCS

WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344

VERTICAL EXTENT OF VOCs (B-B')

FIGURE NO 15

LEGEND

FILL: CONSISTS OF A MIXTURE OF GRAVEL, SAND, SILTY-SAND, CLAY, AND VARIOUS DEBRIS.

RESIDUUM SOILS: CONSISTS OF MICACEOUS SANDY-CLAYS, SILTY-SANDS, CLAYEY-SANDS, WITH EVIDENCE OF RELICT FOLIATION INDICATIVE OF GNEISS OR SCHIST BEDROCK WITH DEPTH.

PARTIALLY WEATHERED ROCK (PWR): CHARACTERIZED AS DENSER SOIL/ SAPROLITE (HIGH BLOW COUNT MATERIAL) CLASSIFIED AS WEATHERED MICACEOUS GRANITIC GNEISS, MICA SCHISTS, BIOTITE SCHISTS/ GNEISS, HORNBLENDE GNEISS/ SCHISTS.

FRACTURED BEDROCK: COMPETENT BEDROCK - HARD BIOTITE GNEISS, GRANITIC GNEISS, AND AMPHIBOLITE GNEISS WITH POTASSIUM FELDSPAR, AND QUARTZ AUGENS AND LENSES OF MICA, PYRITE AND MUSCOVITE.

APPROXIMATE ELEVATION OF SHALLOW GROUNDWATER BASED ON 4/5/2023 MEASUREMENTS

FORMATION CONTACT (DASHED WHERE GRADATIONAL)

(#) TOTAL VOC CONCENTRATION REPORTED IN ug/L
- TW NAPL MEASUREMENTS WERE TAKEN ON 7/2012
- ALL OTHER SAMPLES WERE COLLECTED 4/5-6/2023

(NS) NOT SAMPLED

(NAPL) NON-AQUEOUS PHASE LIQUID (ASSUME >1,000 FOR CONTOURING)

(BRL) BELOW REPORTING LIMIT

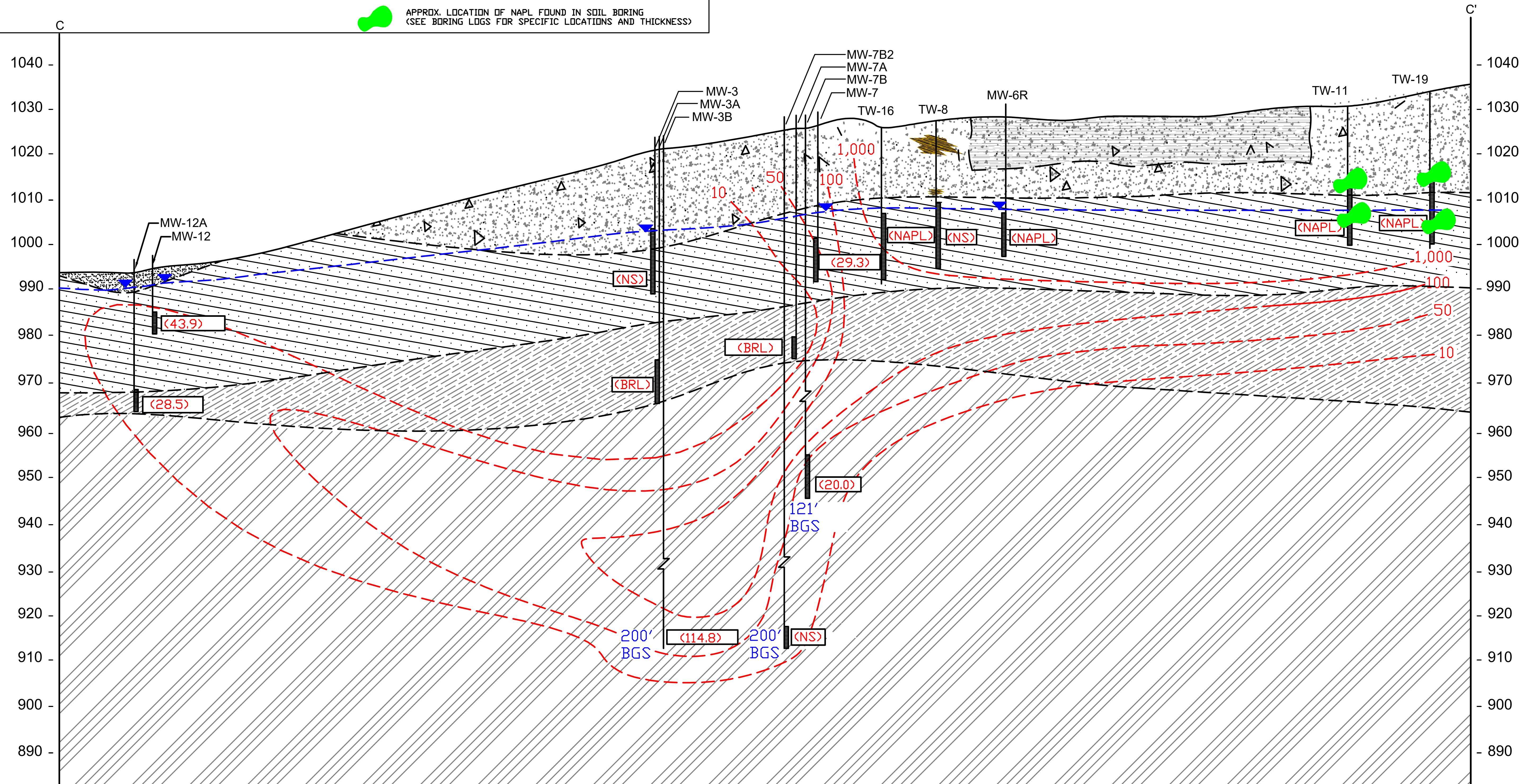
—10— TOTAL VOC ISO-CONCENTRATION LINES

APPROX. LOCATION OF WOOD DEBRIS FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)

APPROX. LOCATION OF NAPL FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)

NOTE:
THE EXTENT OF NAPL SURROUNDING WELLS IS UNKNOWN, BUT HAS BEEN ESTIMATED BASED ON BORING LOG DESCRIPTIONS. IN ADDITION, VOC CONCENTRATIONS IN THE NAPL FRACTION ARE UNKNOWN. CONTOURING WAS DONE FOR THE DISSOLVED PHASE ONLY BASED ON PRIOR POC SAMPLING DATA.

APPROX. HORIZONTAL SCALE
40 20 0



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DATE: 5/2023
DWN.: JPC
CHKED.: KP
APPR.: KCS

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2335 LAWRENCE STREET
EAST POINT, GA 30344

VERTICAL EXTENT OF VOCs (C-C')

FIGURE NO 16

LEGEND

FILL: CONSISTS OF A MIXTURE OF GRAVEL, SAND, SILTY-SAND, CLAY, AND VARIOUS DEBRIS.

RESIDUUM SOILS: CONSISTS OF MICACEOUS SANDY-CLAYS, SILTY-SANDS, CLAYEY-SANDS, WITH EVIDENCE OF RELICT FOLIATION INDICATIVE OF GNEISS OR SCHIST BEDROCK WITH DEPTH.

PARTIALLY WEATHERED ROCK (PWR): CHARACTERIZED AS DENSER SOIL/ SAPROLITE (HIGH BLOW COUNT MATERIAL) CLASSIFIED AS WEATHERED MICACEOUS GRANITIC GNEISS, MICA SCHISTS, BIOTITE SCHISTS/ GNEISS, HORNBLENDE GNEISS/ SCHISTS.

FRACTURED BEDROCK: COMPETENT BEDROCK - HARD BIOTITE GNEISS, GRANITIC GNEISS, AND AMPHIBOLITE GNEISS WITH POTASSIUM FELDSPAR, AND QUARTZ AUGENS AND LENSES OF MICA, PYRITE AND MUSCOVITE.

APPROXIMATE ELEVATION OF SHALLOW GROUNDWATER BASED ON 4/5/2023 MEASUREMENTS

FORMATION CONTACT (DASHED WHERE GRADATIONAL)

(#) TOTAL VOC CONCENTRATION REPORTED IN ug/L
- TW NAPL MEASUREMENTS WERE TAKEN ON 7/2012
- ALL OTHER SAMPLES WERE COLLECTED 4/5-6/23

* EXCLUDED FROM CONTOURING

(NS) NOT SAMPLED

(NAPL) NON-AQUEOUS PHASE LIQUID (ASSUME >1,000 FOR CONTOURING)

(BRL) BELOW REPORTING LIMIT

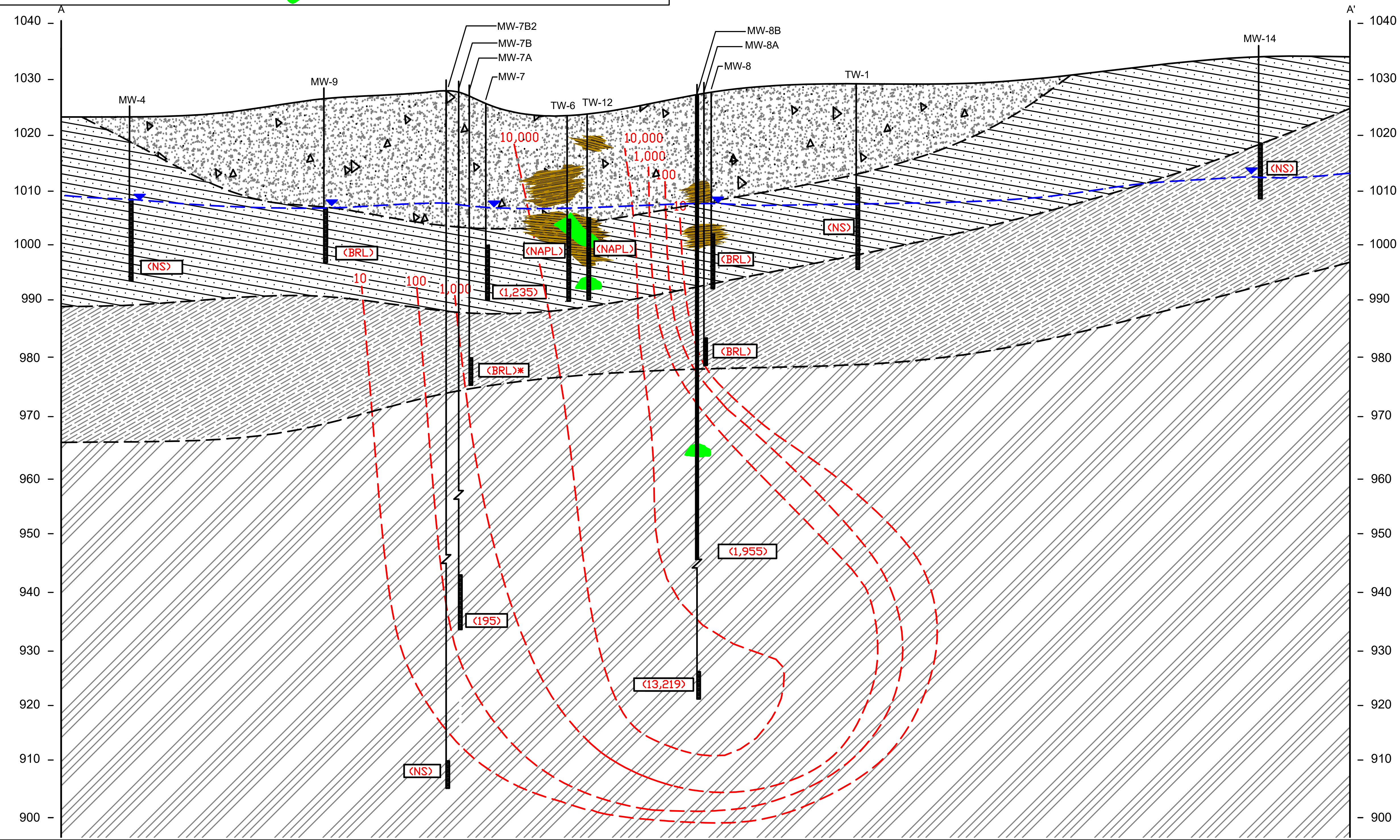
—10— TOTAL SVOC ISO-CONCENTRATION LINES

APPROX. LOCATION OF WOOD DEBRIS FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)

APPROX. LOCATION OF NAPL FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)

NOTE: THE EXTENT OF NAPL SURROUNDING WELLS IS UNKNOWN, BUT HAS BEEN ESTIMATED BASED ON BORING LOG DESCRIPTIONS. IN ADDITION, VOC CONCENTRATIONS IN THE NAPL FRACTION ARE UNKNOWN. CONTOURING WAS DONE FOR THE DISSOLVED PHASE ONLY BASED ON PRIOR POC SAMPLING DATA.

APPROX. HORIZONTAL SCALE 60 30 0



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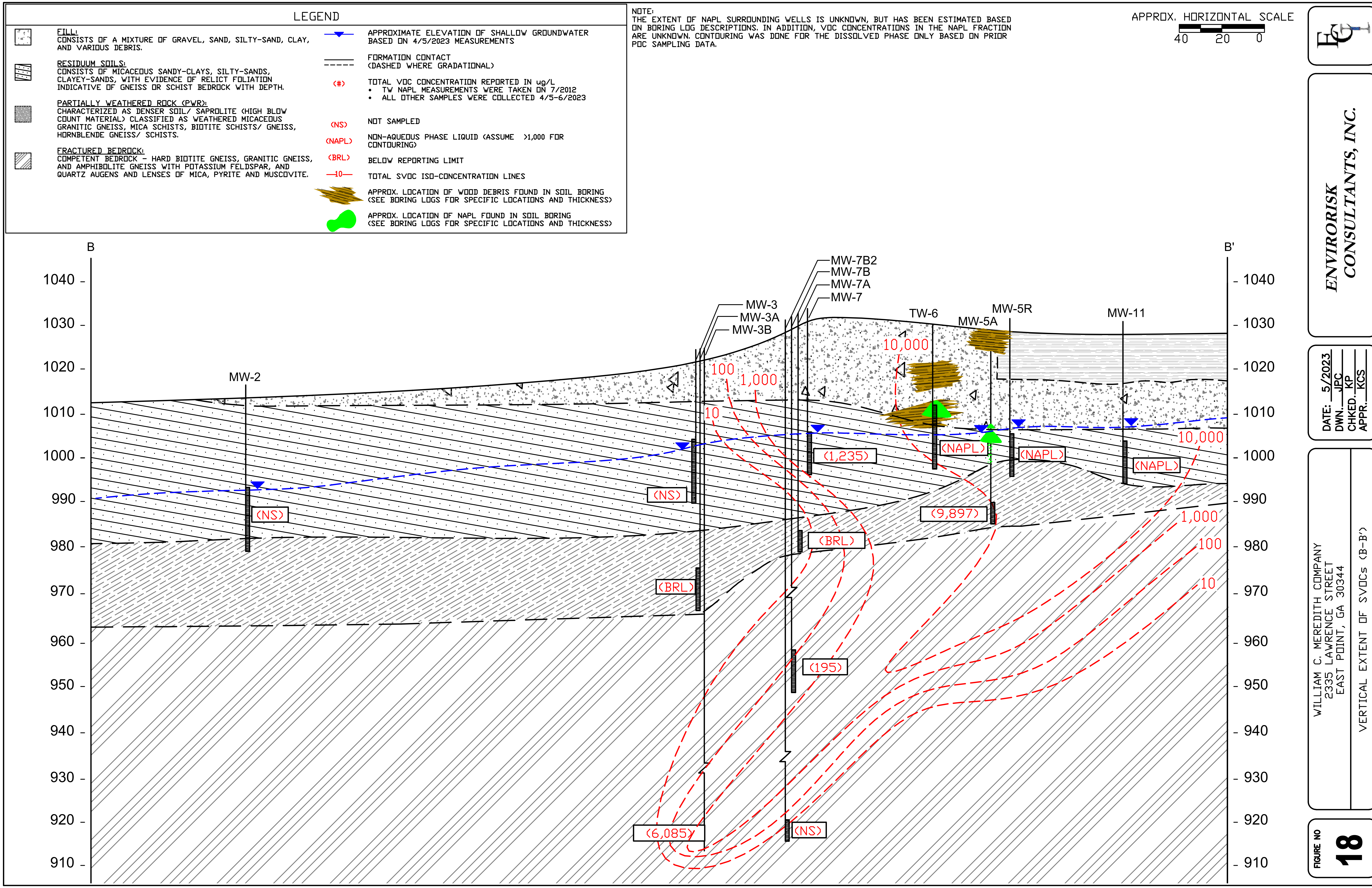
2335 LAWRENCE STREET
EAST POINT, GA 30344

VERTICAL EXTENT OF SVOCs (A-A')

FIGURE NO 17


LEGEND
FILL: CONSISTS OF A MIXTURE OF GRAVEL, SAND, SILTY-SAND, CLAY, AND VARIOUS DEBRIS.
RESIDUUM SOILS: CONSISTS OF MICACEOUS SANDY-CLAYS, SILTY-SANDS, CLAYEY-SANDS, WITH EVIDENCE OF RELICT FOLIATION INDICATIVE OF GNEISS OR SCHIST BEDROCK WITH DEPTH.
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FRACTURED BEDROCK: COMPETENT BEDROCK - HARD BIOTITE GNEISS, GRANITIC GNEISS, AND AMPHIBOLITE GNEISS WITH POTASSIUM FELDSPAR, AND QUARTZ AUGENS AND LENSES OF MICA, PYRITE AND MUSCOVITE.
APPROXIMATE ELEVATION OF SHALLOW GROUNDWATER BASED ON 4/5/2023 MEASUREMENTS
FORMATION CONTACT (DASHED WHERE GRADATIONAL)
(#) TOTAL VOC CONCENTRATION REPORTED IN ug/L
• TW NAPL MEASUREMENTS WERE TAKEN ON 7/2012
• ALL OTHER SAMPLES WERE COLLECTED 4/5-6/2023
(NS) NOT SAMPLED
(NAPL) NON-AQUEOUS PHASE LIQUID (ASSUME >1,000 FOR CONTOURING)
(BRL) BELOW REPORTING LIMIT
10 TOTAL SVOC ISO-CONCENTRATION LINES
APPROX. LOCATION OF WOOD DEBRIS FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)
APPROX. LOCATION OF NAPL FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)
NOTE: THE EXTENT OF NAPL SURROUNDING WELLS IS UNKNOWN, BUT HAS BEEN ESTIMATED BASED ON BORING LOG DESCRIPTIONS. IN ADDITION, VOC CONCENTRATIONS IN THE NAPL FRACTION ARE UNKNOWN. CONTOURING WAS DONE FOR THE DISSOLVED PHASE ONLY BASED ON PRIOR POC SAMPLING DATA.
APPROX. HORIZONTAL SCALE
40 20 0
B
B'
1040
1030
1020
1010
1000
990
980
970
960
950
940
930
920
910
MW-2
MW-3
MW-3A
MW-3B
MW-7B2
MW-7B
MW-7A
MW-7
TW-6
MW-5A
MW-5R
MW-11
(NS)
(NS)
(BRL)
(6,085)
(1,235)
(BRL)
(195)
(NS)
(NAPL)
(9,897)
(NAPL)
(NAPL)
10,000
100
1,000
10
10,000
1,000
100
10
ENVIRORISK CONSULTANTS, INC.
DATE: 5/2023
DWN. JPC
CHKED. KP
APPR. KCS
WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344
VERTICAL EXTENT OF SVOCs (B-B')
FIGURE NO
18

LEGEND

FILL: CONSISTS OF A MIXTURE OF GRAVEL, SAND, SILTY-SAND, CLAY, AND VARIOUS DEBRIS.

RESIDUUM SOILS: CONSISTS OF MICACEOUS SANDY-CLAYS, SILTY-SANDS, CLAYEY-SANDS, WITH EVIDENCE OF RELICT FOLIATION INDICATIVE OF GNEISS OR SCHIST BEDROCK WITH DEPTH.

PARTIALLY WEATHERED ROCK (PWR): CHARACTERIZED AS DENSER SOIL/ SAPROLITE (HIGH BLOW COUNT MATERIAL) CLASSIFIED AS WEATHERED MICACEOUS GRANITIC GNEISS, MICA SCHISTS, BIOTITE SCHISTS/ GNEISS, HORNBLENDE GNEISS/ SCHISTS.

FRACTURED BEDROCK: COMPETENT BEDROCK - HARD BIOTITE GNEISS, GRANITIC GNEISS, AND AMPHIBOLITE GNEISS WITH POTASSIUM FELDSPAR, AND QUARTZ AUGENS AND LENSES OF MICA, PYRITE AND MUSCOVITE.

APPROXIMATE ELEVATION OF SHALLOW GROUNDWATER BASED ON 3/28/2019 MEASUREMENTS

FORMATION CONTACT (DASHED WHERE GRADATIONAL)

(#) TOTAL VOC CONCENTRATION REPORTED IN ug/L
- TW NAPL MEASUREMENTS WERE TAKEN ON 7/2012
- ALL OTHER SAMPLES WERE COLLECTED 4/5-6/2023

(NS) NOT SAMPLED

(NAPL) NON-AQUEOUS PHASE LIQUID (ASSUME >1,000 FOR CONTOURING)

(BRL) BELOW REPORTING LIMIT

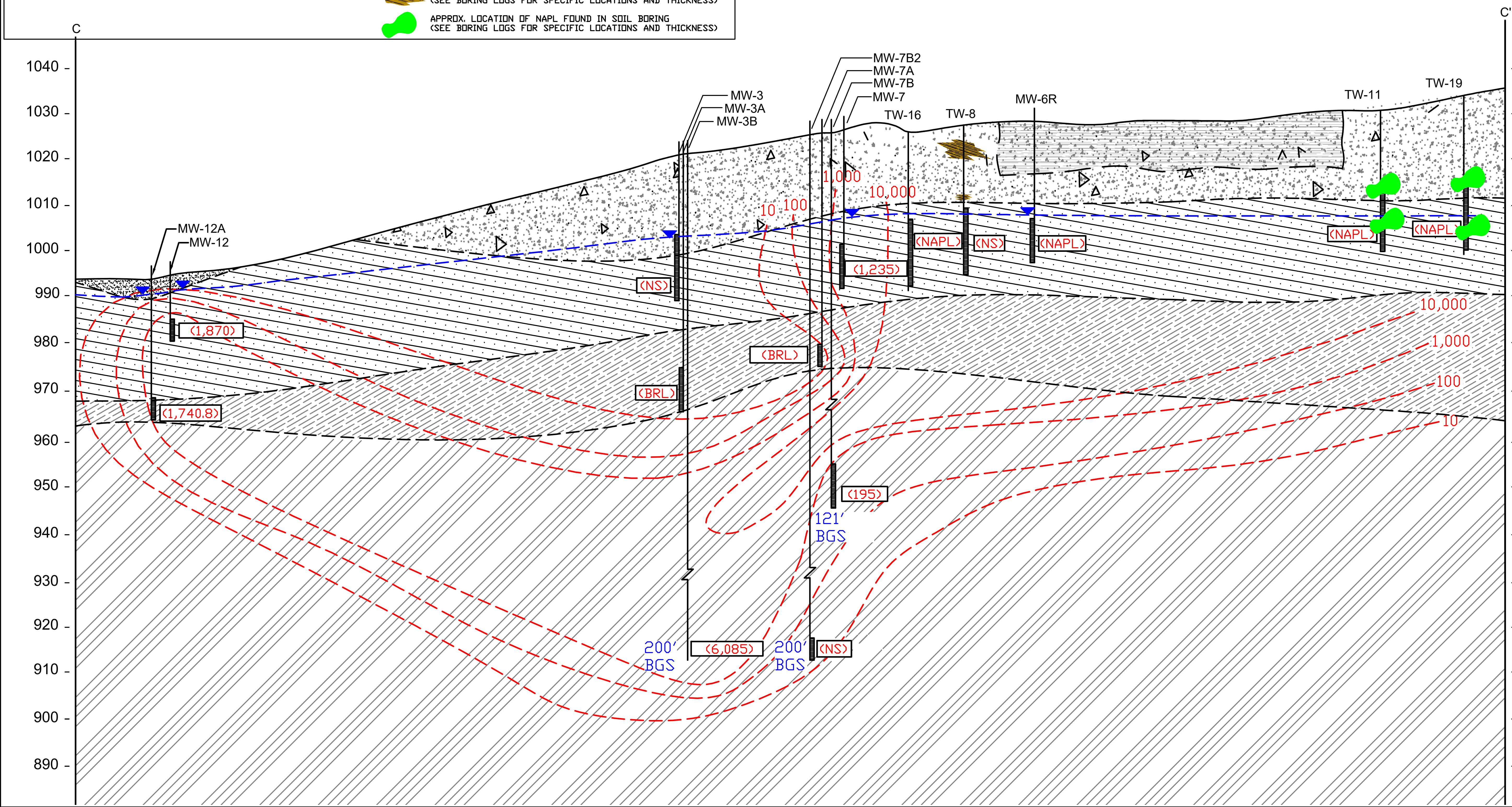
—10— TOTAL SVOC ISO-CONCENTRATION LINES

APPROX. LOCATION OF WOOD DEBRIS FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)

APPROX. LOCATION OF NAPL FOUND IN SOIL BORING (SEE BORING LOGS FOR SPECIFIC LOCATIONS AND THICKNESS)

NOTE: THE EXTENT OF NAPL SURROUNDING WELLS IS UNKNOWN, BUT HAS BEEN ESTIMATED BASED ON BORING LOG DESCRIPTIONS. IN ADDITION, VOC CONCENTRATIONS IN THE NAPL FRACTION ARE UNKNOWN. CONTOURING WAS DONE FOR THE DISSOLVED PHASE ONLY BASED ON PRIOR POC SAMPLING DATA.

APPROX. HORIZONTAL SCALE 40 20 0



ENVIRORISK CONSULTANTS, INC.

DATE: 5/2023
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CHKED. KP
APPR. KCS

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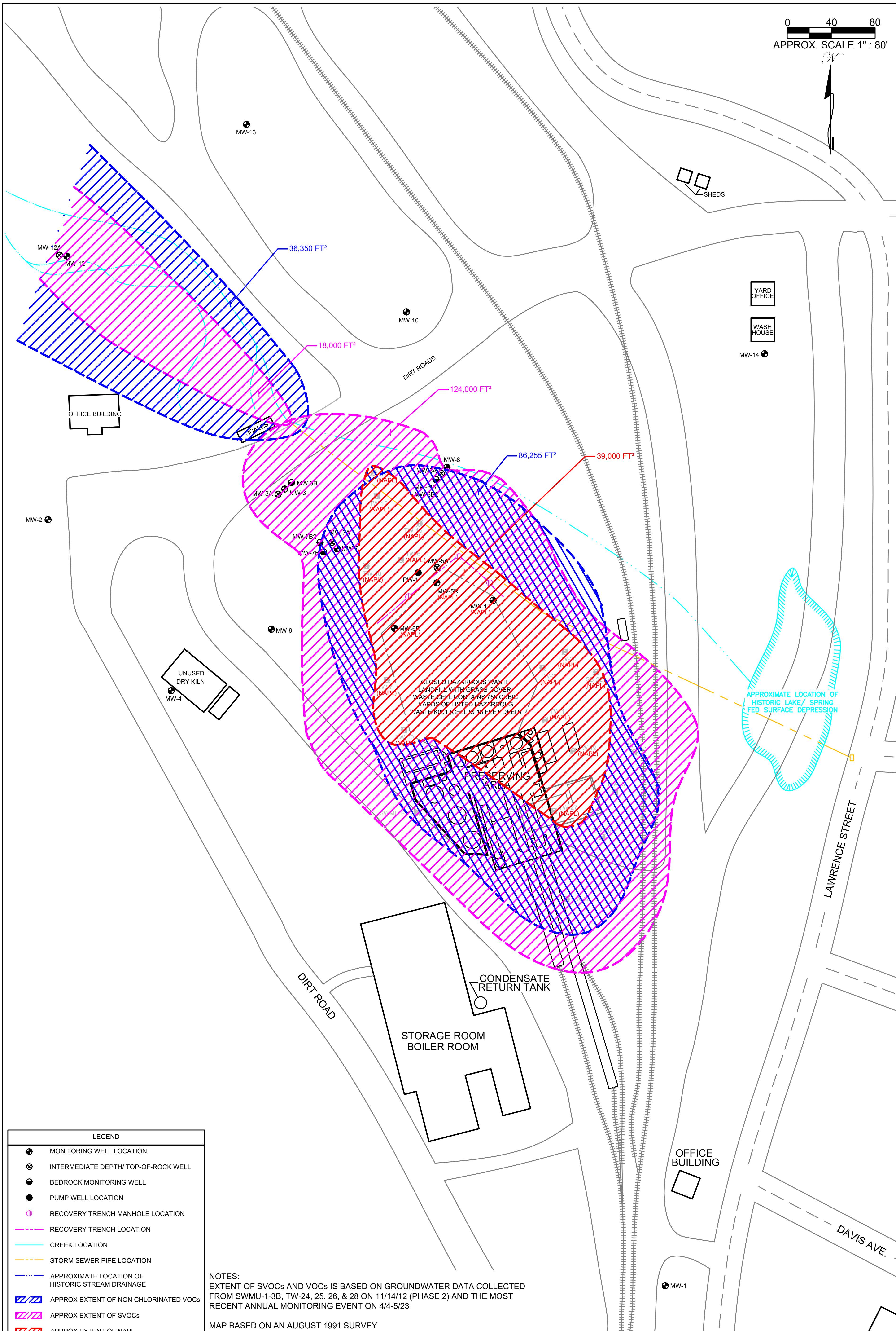
2335 LAWRENCE STREET
EAST POINT, GA 30344

VERTICAL EXTENT OF SVOCs (C-C')

FIGURE NO 19



NOTES:
EXTENT OF SVOCs AND VOCs IS BASED ON GROUNDWATER DATA COLLECTED FROM SWMU-1-3B, TW-24, 25, 26, & 28 ON 11/14/12 (PHASE 2) AND THE MOST RECENT ANNUAL MONITORING EVENT ON 4/4-5/23

MAP BASED ON AN AUGUST 1991 SURVEY PERFORMED BY CHARLES W. WORTHY.

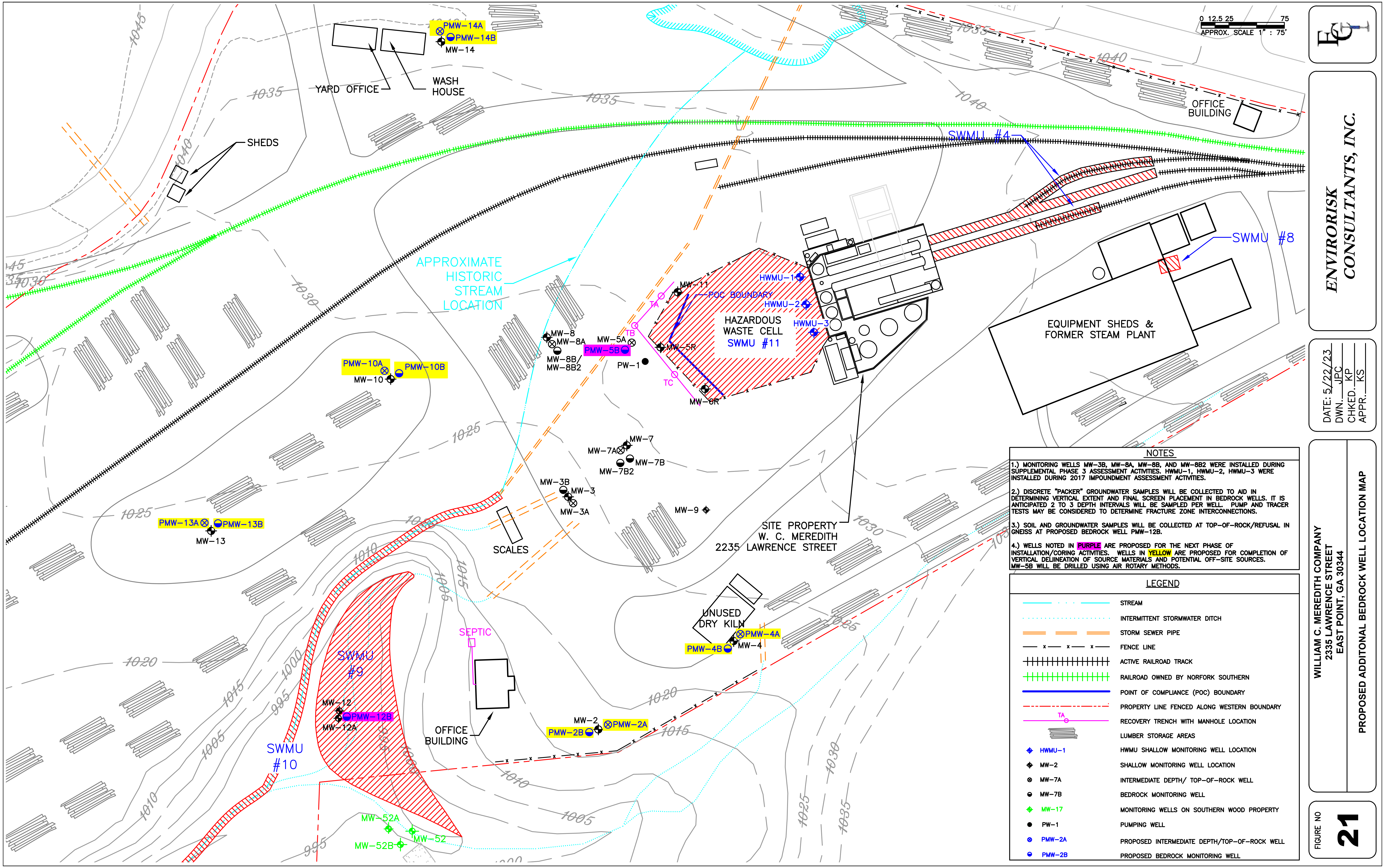
FIGURE NO
20

WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344

ESTIMATED EXTENT OF NAPL AND CONSTITUENTS EXCEEDING GWPS

DATE: 6/23
DWN. JPC
CHKED. KP
APPR. KCS

ENVIRORISK CONSULTANTS, INC.



PMW-14A
PMW-14B
MW-14
YARD OFFICE
WASH HOUSE
SHEDS
OFFICE BUILDING
SWMU #4
SWMU #8
APPROXIMATE HISTORIC STREAM LOCATION
MW-11
HWMU-1
POC BOUNDARY
HWMU-2
HWMU-3
HAZARDOUS WASTE CELL
SWMU #11
MW-8
MW-8A
MW-8B/
MW-8B2
MW-5A
PMW-5B
MW-5R
PW-1
MW-6R
TA
TB
TC
EQUIPMENT SHEDS &
FORMER STEAM PLANT
PMW-10A
PMW-10B
MW-10
MW-7
MW-7A
MW-7B
MW-7B2
MW-3B
MW-3
MW-3A
MW-9
SITE PROPERTY
W. C. MEREDITH
2235 LAWRENCE STREET
PMW-13A
PMW-13B
MW-13
SCALES
UNUSED DRY KILN
PMW-4A
PMW-4B
MW-4
SEPTIC
SWMU #9
MW-12
PMW-12B
MW-12A
OFFICE BUILDING
MW-2
PMW-2A
PMW-2B
SWMU #10
MW-52A
MW-52
MW-52B
0 12.5 25 75
APPROX. SCALE 1" : 75'
NOTES
1.) MONITORING WELLS MW-3B, MW-8A, MW-8B, AND MW-8B2 WERE INSTALLED DURING SUPPLEMENTAL PHASE 3 ASSESSMENT ACTIVITIES. HWMU-1, HWMU-2, HWMU-3 WERE INSTALLED DURING 2017 IMPOUNDMENT ASSESSMENT ACTIVITIES.
2.) DISCRETE "PACKER" GROUNDWATER SAMPLES WILL BE COLLECTED TO AID IN DETERMINING VERTICAL EXTENT AND FINAL SCREEN PLACEMENT IN BEDROCK WELLS. IT IS ANTICIPATED 2 TO 3 DEPTH INTERVALS WILL BE SAMPLED PER WELL. PUMP AND TRACER TESTS MAY BE CONSIDERED TO DETERMINE FRACTURE ZONE INTERCONNECTIONS.
3.) SOIL AND GROUNDWATER SAMPLES WILL BE COLLECTED AT TOP-OF-ROCK/REFUSAL IN GNEISS AT PROPOSED BEDROCK WELL PMW-12B.
4.) WELLS NOTED IN PURPLE ARE PROPOSED FOR THE NEXT PHASE OF INSTALLATION/CORING ACTIVITIES. WELLS IN YELLOW ARE PROPOSED FOR COMPLETION OF VERTICAL DELIINEATION OF SOURCE MATERIALS AND POTENTIAL OFF-SITE SOURCES. MW-5B WILL BE DRILLED USING AIR ROTARY METHODS.
LEGEND
STREAM
INTERMITTENT STORMWATER DITCH
STORM SEWER PIPE
FENCE LINE
ACTIVE RAILROAD TRACK
RAILROAD OWNED BY NORFORK SOUTHERN
POINT OF COMPLIANCE (POC) BOUNDARY
PROPERTY LINE FENCED ALONG WESTERN BOUNDARY
TA
RECOVERY TRENCH WITH MANHOLE LOCATION
LUMBER STORAGE AREAS
HWMU-1
HWMU SHALLOW MONITORING WELL LOCATION
MW-2
SHALLOW MONITORING WELL LOCATION
MW-7A
INTERMEDIATE DEPTH/ TOP-OF-ROCK WELL
MW-7B
BEDROCK MONITORING WELL
MW-17
MONITORING WELLS ON SOUTHERN WOOD PROPERTY
PW-1
PUMPING WELL
PMW-2A
PROPOSED INTERMEDIATE DEPTH/TOP-OF-ROCK WELL
PMW-2B
PROPOSED BEDROCK MONITORING WELL
ENVIRORISK CONSULTANTS, INC.
DATE: 5/22/23
DWN. JPC
CHKED. KP
APPR. KS
WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344
PROPOSED ADDITONAL BEDROCK WELL LOCATION MAP
FIGURE NO
21

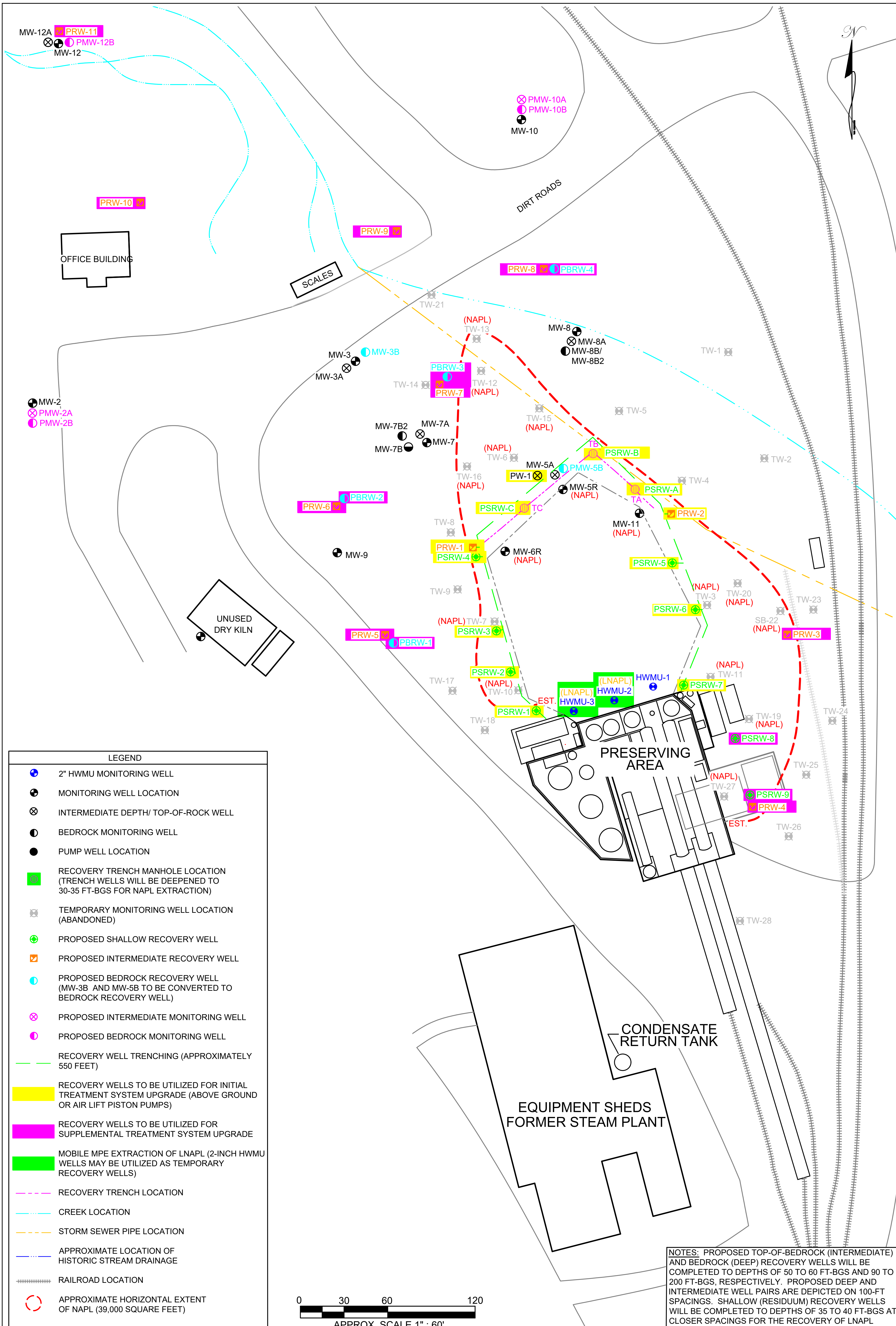


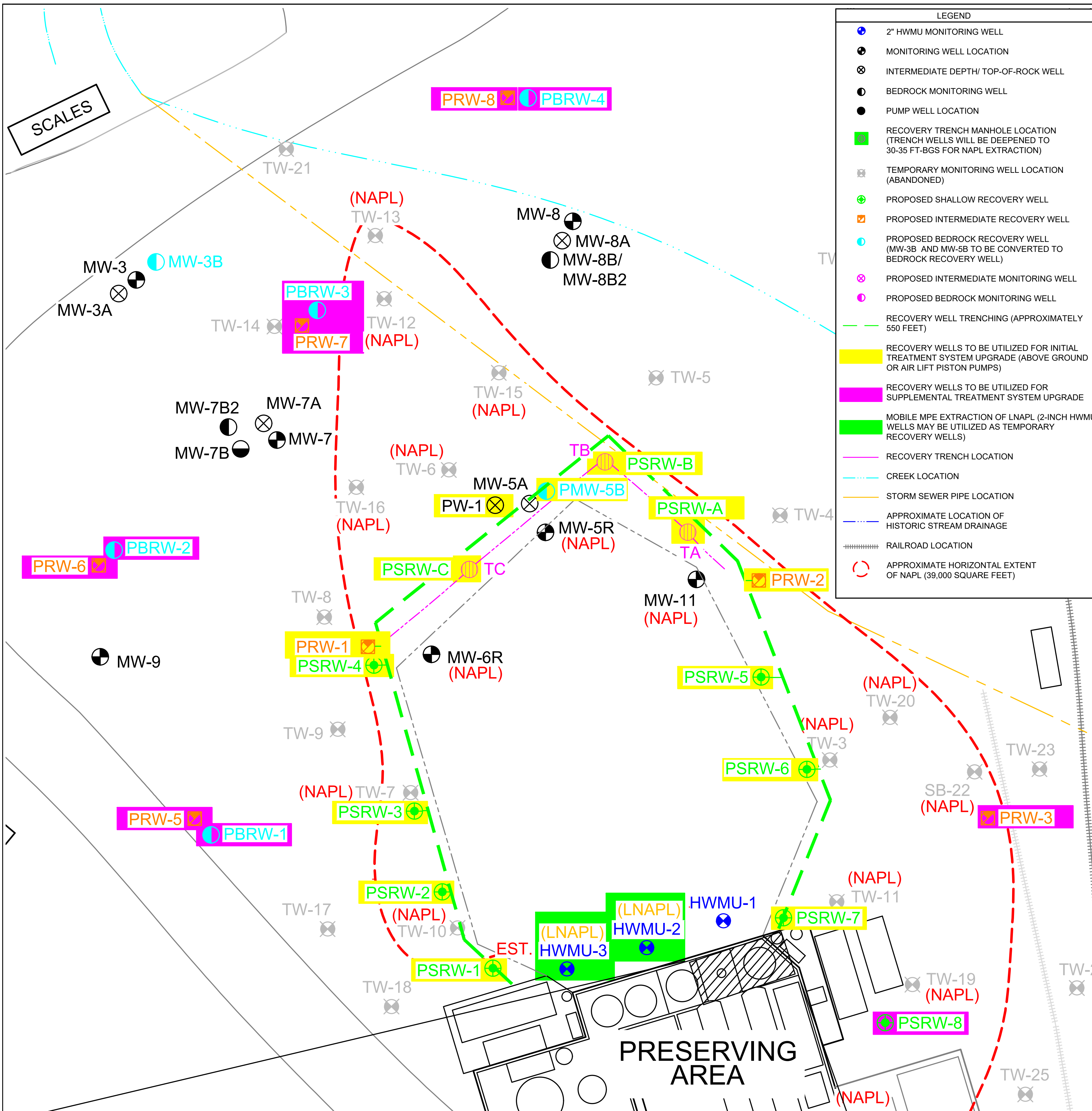
FIGURE NO **22**

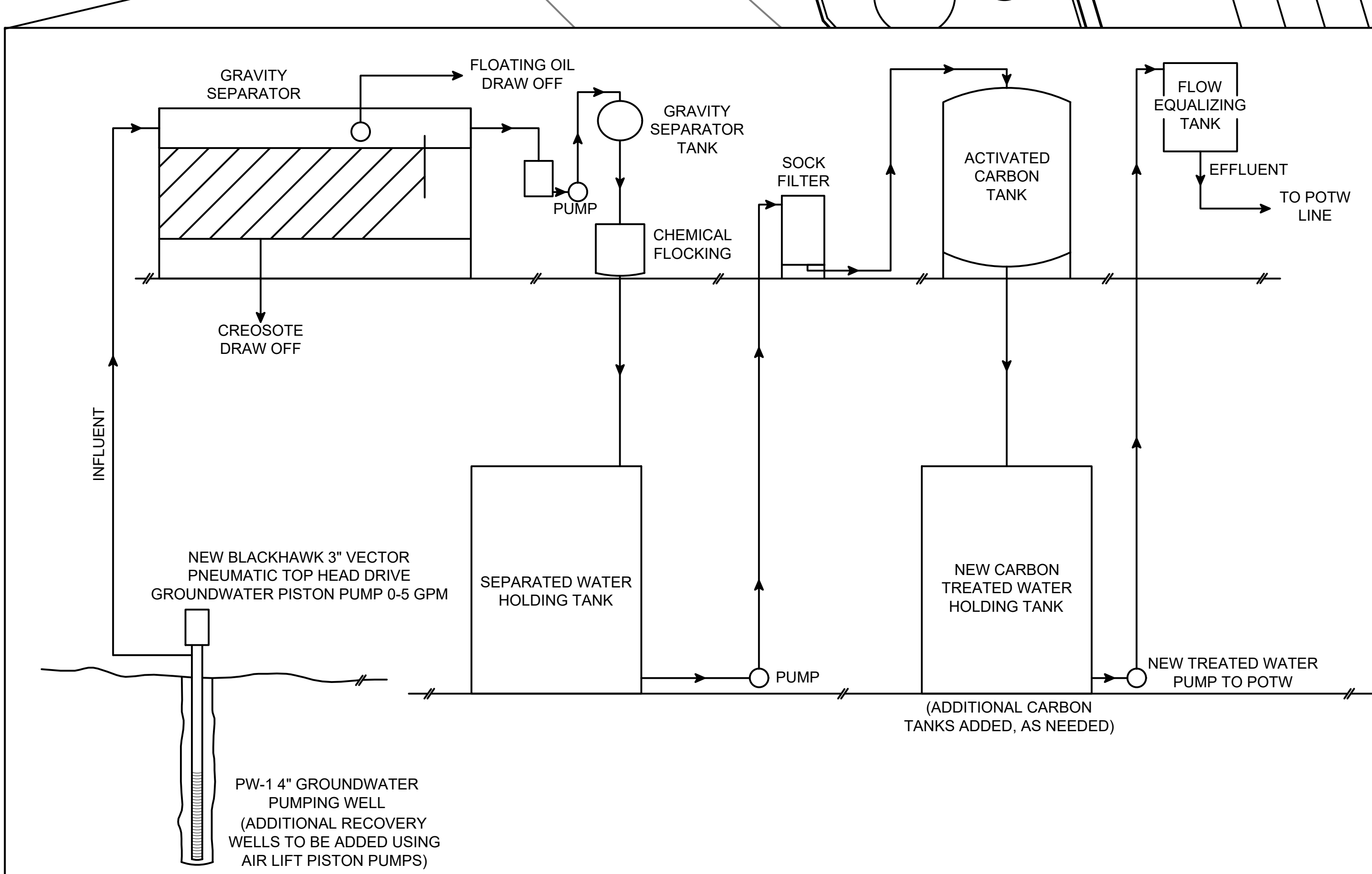
WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344

PROPOSED RECOVERY WELL LOCATION MAP

DATE: 4/20/24
DWN. JPC
CHKED. KCS
APPR. KCS

ENVIRORISK CONSULTANTS, INC.





NOTES: PROPOSED TOP-OF-BEDROCK (INTERMEDIATE) AND BEDROCK (DEEP) RECOVERY WELL WILL BE COMPLETED TO DEPTHS OF 50 TO 60 FT-BGS AND 90 TO 200 FT-BGS, RESPECTIVELY. PROPOSED DEEP AND INTERMEDIATE WELL PAIRS ARE DEPICTED ON 100-FT SPACINGS. SHALLOW (RESIDUUM) RECOVERY WELLS WILL BE COMPLETED TO DEPTHS OF 35 TO 40 FT-BGS AT CLOSER SPACINGS FOR THE RECOVERY OF LNAPL OBSERVED AT HWMU-1 AND HWMU-2.

FIGURE NO			
23	WILLIAM C. MEREDITH COMPANY 2335 LAWRENCE STREET EAST POINT, GA 30344 PROPOSED RECOVERY WELL LOCATION MAP WITH EXTRACTION DIAGRAM	DATE: 4/20/24 DWN. JPC CHKED. KCS APPR. KCS	*ENVIRORISK CONSULTANTS, INC.*

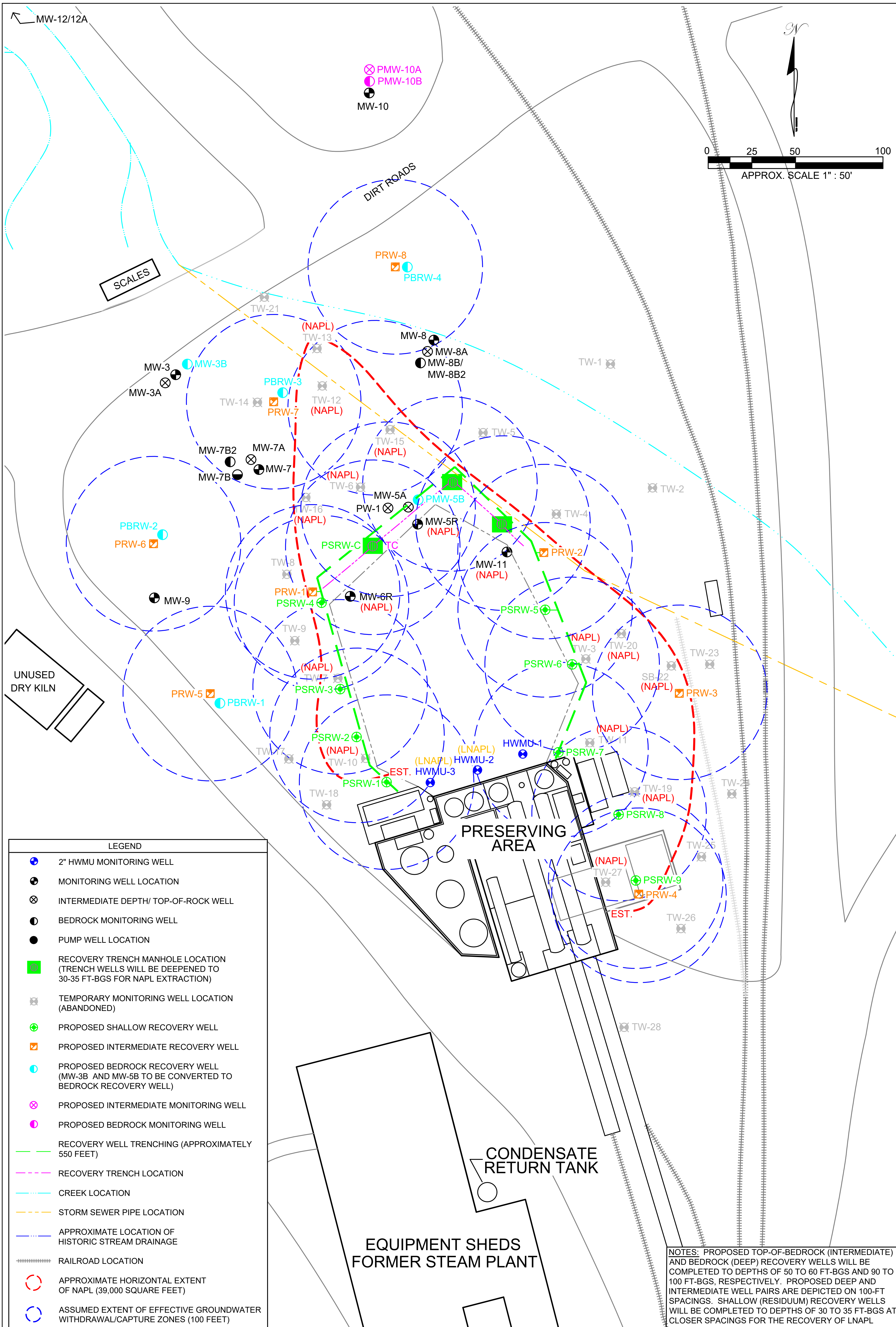


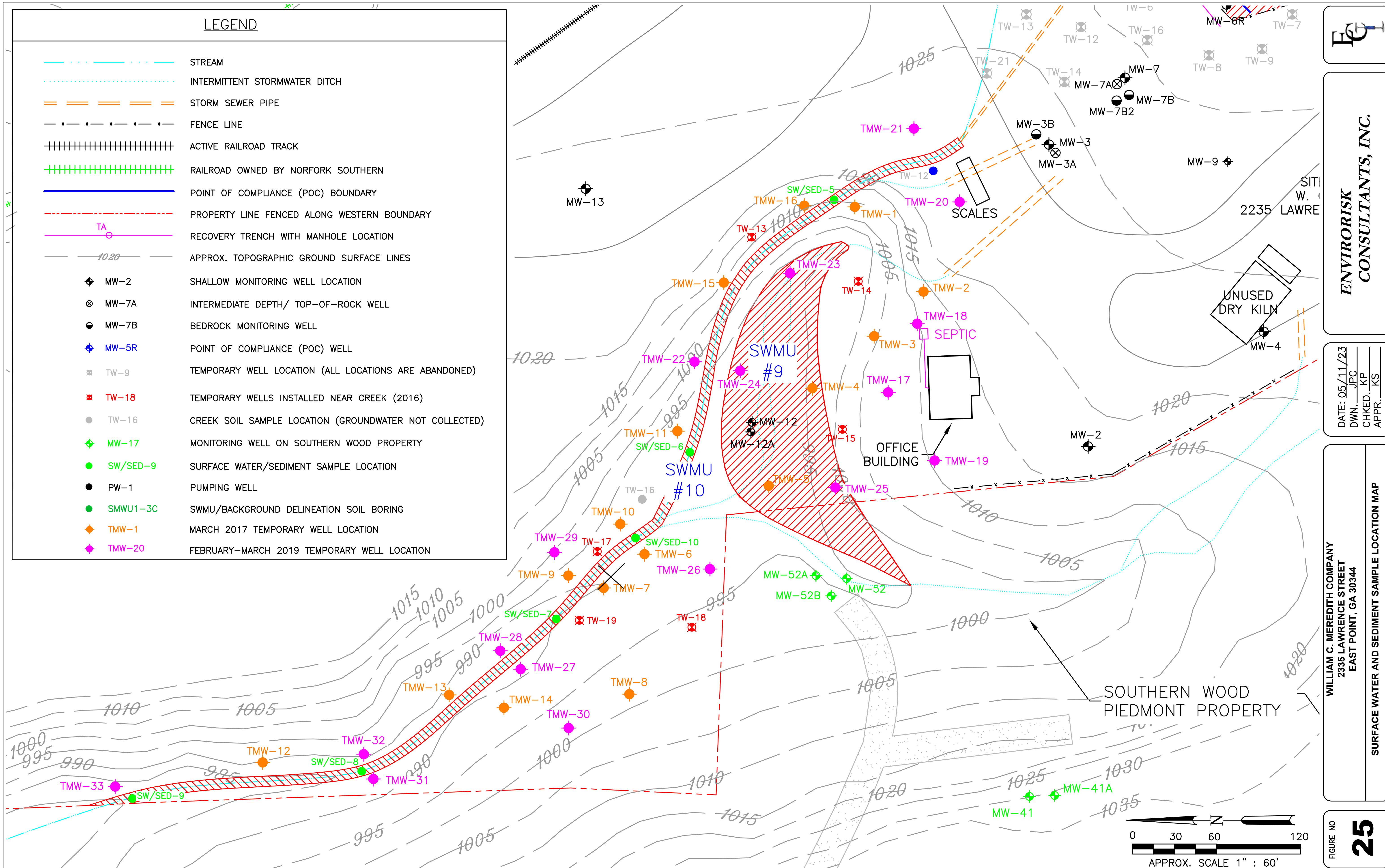
FIGURE NO **24**

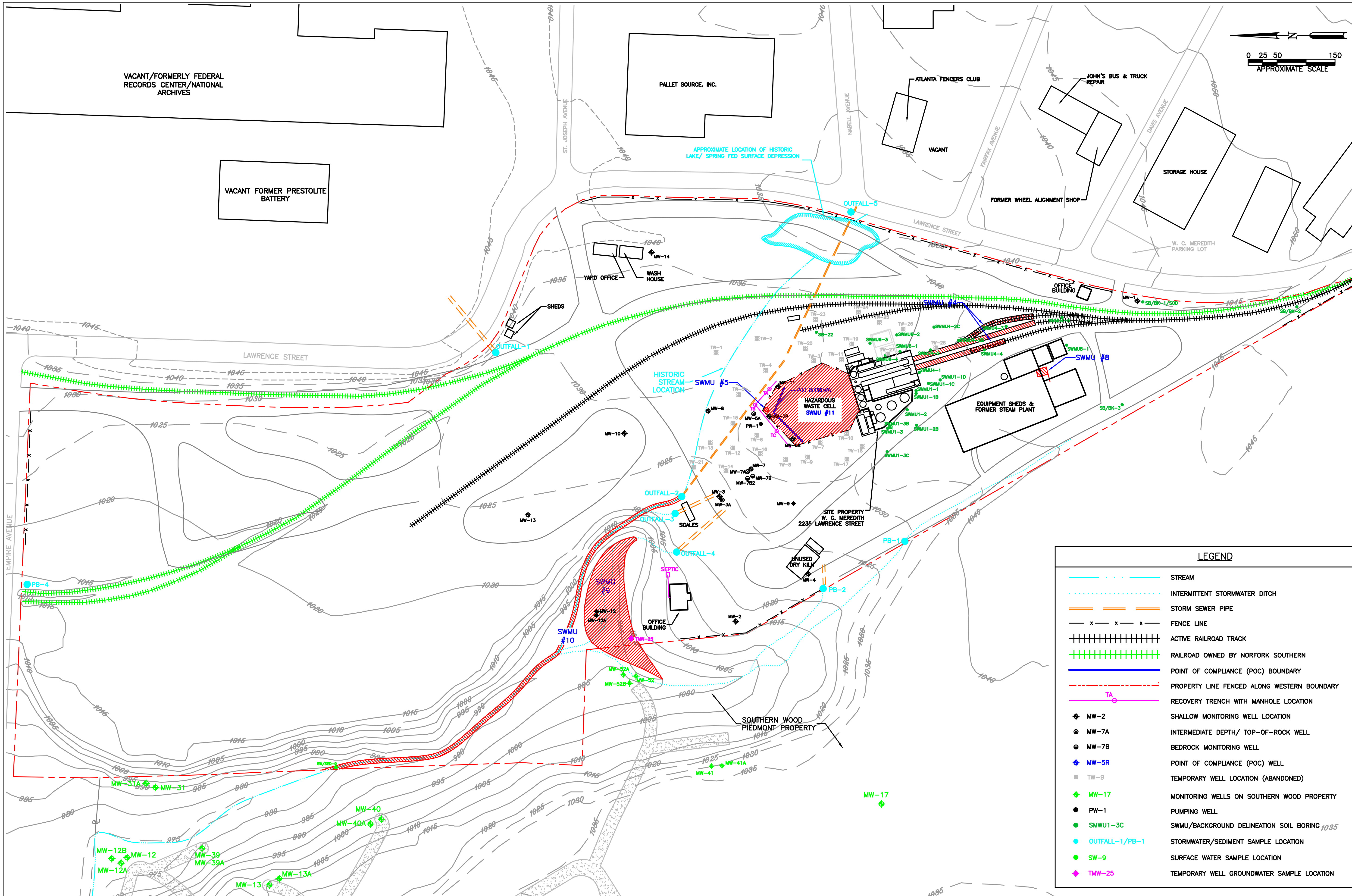
WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344

PROPOSED RECOVERY WELL CAPTURE ZONES

DATE: 4/1/24
DWN. JPC
CHKED. KCS
APPR. KCS

ENVIRORISK CONSULTANTS, INC.


LEGEND
STREAM
INTERMITTENT STORMWATER DITCH
STORM SEWER PIPE
FENCE LINE
ACTIVE RAILROAD TRACK
RAILROAD OWNED BY NORFORK SOUTHERN
POINT OF COMPLIANCE (POC) BOUNDARY
PROPERTY LINE FENCED ALONG WESTERN BOUNDARY
TA
RECOVERY TRENCH WITH MANHOLE LOCATION
1020
APPROX. TOPOGRAPHIC GROUND SURFACE LINES
MW–2 SHALLOW MONITORING WELL LOCATION
MW–7A INTERMEDIATE DEPTH/ TOP–OF–ROCK WELL
MW–7B BEDROCK MONITORING WELL
MW–5R POINT OF COMPLIANCE (POC) WELL
TW–9 TEMPORARY WELL LOCATION (ALL LOCATIONS ARE ABANDONED)
TW–18 TEMPORARY WELLS INSTALLED NEAR CREEK (2016)
TW–16 CREEK SOIL SAMPLE LOCATION (GROUNDWATER NOT COLLECTED)
MW–17 MONITORING WELL ON SOUTHERN WOOD PROPERTY
SW/SED–9 SURFACE WATER/SEDIMENT SAMPLE LOCATION
PW–1 PUMPING WELL
SMWU1–3C SWMU/BACKGROUND DELINEATION SOIL BORING
TMW–1 MARCH 2017 TEMPORARY WELL LOCATION
TMW–20 FEBRUARY–MARCH 2019 TEMPORARY WELL LOCATION
SWMU #9
SWMU #10
SCALES
UNUSED DRY KILN
SEPTIC
OFFICE BUILDING
2235 LAWRE
SOUTHERN WOOD PIEDMONT PROPERTY
MW–13
MW–12
MW–12A
MW–2
MW–3
MW–3A
MW–3B
MW–4
MW–7
MW–7A
MW–7B
MW–7B2
MW–9
MW–6R
MW–52
MW–52A
MW–52B
MW–41
MW–41A
TMW–1
TMW–2
TMW–3
TMW–4
TMW–5
TMW–6
TMW–7
TMW–8
TMW–9
TMW–10
TMW–11
TMW–12
TMW–13
TMW–14
TMW–15
TMW–16
TMW–17
TMW–18
TMW–19
TMW–20
TMW–21
TMW–22
TMW–23
TMW–24
TMW–25
TMW–26
TMW–27
TMW–28
TMW–29
TMW–30
TMW–31
TMW–32
TMW–33
TW–13
TW–14
TW–15
TW–17
TW–18
TW–19
TW–16
SW/SED–5
SW/SED–6
SW/SED–7
SW/SED–8
SW/SED–9
SW/SED–10
0 30 60 120
APPROX. SCALE 1" : 60'
ENVIRORISK CONSULTANTS, INC.
DATE: 05/11/23
DWN. JPC
CHKED. KP
APPR. KS
WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344
SURFACE WATER AND SEDIMENT SAMPLE LOCATION MAP
FIGURE NO
25



ENVIRORISK CONSULTANTS, INC.

DATE: 5/21/23
DWN. JPC
CHKED. KP
APPR. KS

WILLIAM C. MEREDITH COMPANY
2335 LAWRENCE STREET
EAST POINT, GA 30344

INTERIM MEASURES STORMWATER, GROUNDWATER, AND SURFACE WATER SAMPLE LOCATION MAP

FIGURE NO
26

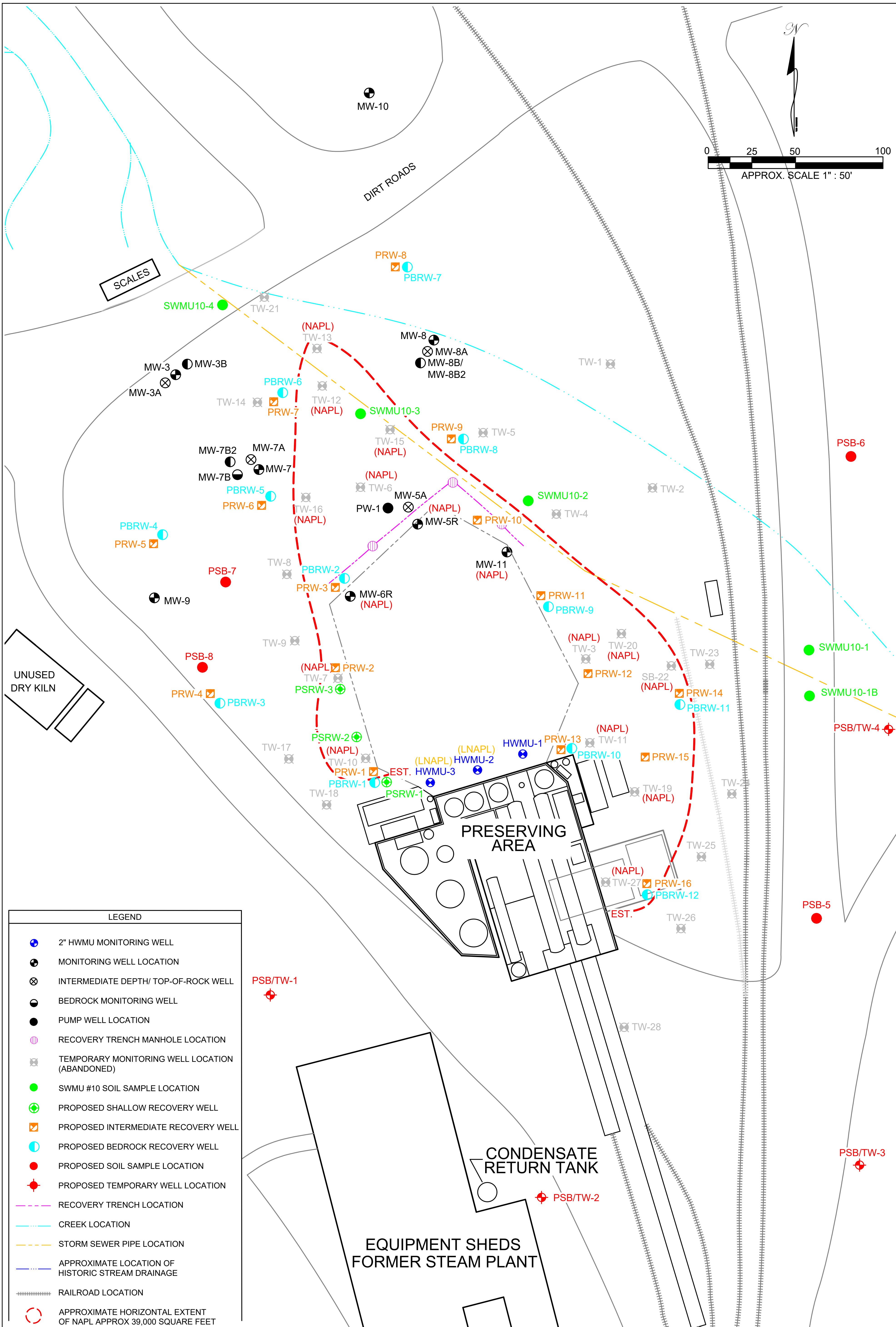


FIGURE NO			
27	WILLIAM C. MEREDITH COMPANY 2335 LAWRENCE STREET EAST POINT, GA 30344 PROPOSED SUPPLEMENTAL SOIL AND GROUNDWATER SAMPLE LOCATION MAP	DATE: 4/20/23 DWN. JPC CHKED. KCS APPR. KCS	*ENVIRORISK CONSULTANTS, INC.*

TABLE 1 – MONITORING WELLS CONSTRUCTION DETAILS
2023 RCAP
WILLIAM C. MEREDITH COMPANY
EAST POINT, GA
PERMIT NUMBER: HW-062(D)

Well Number	Date Installed	Ground Surface Elevation (Feet)	Top of Casing Elevation (Feet)	Screened Intervals (Feet)	Total Depth (Feet)	Well Description				
						Point of Compliance (POC)	Shallow Monitoring Well	Top of Rock/ Intermediate	Bedrock Well	Location
MW-1	10/9/1982	1045.0	1047.13	25.7-40.7	40.7		X			Southeast & Up-gradient/ Background Well
MW-2	10/9/1982	1018.1	1019.77	20.5-35.5	35.5		X			Northwest & Down-gradient
MW-3	10/10/1982	1023.8	1024.17	15.7-30.7	30.7		X			Northwest & Down-gradient
MW-3A	4/20/2004	1023.3	1024.96	49.2-59.2	59.2			X		Northwest & Down-gradient Nested Well
MW-3B*	May-July 2017	1023.78	1025.37	Open hole 62.5-200	200				X	Northwest & Down-gradient- Nested Well, 5" O.C. to 62.5', cored to 200'
MW-4	10/10/1982	1026.0	1026.43	14.8-29.8	29.8		X			West & Cross-gradient
MW-5R	6/2/1989	1030.0	1031.44	26.9-36.9	36.9	X	X			North Side of Impoundment/MW-5 replacement
MW-5A	1/15/2013	Not recorded	1029.01	40.4-45.4	46			X		North side of Impoundment
MW-6R	6/2/1989	1030.7	1032.80	22-32	34.8	X	X			Northwest end of Impoundment/MW-6 replacement
MW-7	2/23/1985	1027.38	1028.88	28.1-38.1	38.1		X			Down-gradient & NW of Impoundment & SE of MW-3
MW-7A	7/13/1986	1027.2	1030.25	48.4-53.4	53.4			X		Down-gradient/ NW Nested Well

TABLE 1 – MONITORING WELLS CONSTRUCTION DETAILS
2023 RCAP
WILLIAM C. MEREDITH COMPANY
EAST POINT, GA
PERMIT NUMBER: HW-062(D)

Well Number	Date Installed	Ground Surface Elevation (Feet)	Top of Casing Elevation (Feet)	Screened Intervals (Feet)	Total Depth (Feet)	Well Description				
						Point of Compliance (POC)	Shallow Monitoring Well	Top of Rock/ Intermediate	Bedrock Well	Location
MW-7B	2/9/1988	1027.0	1030.96	111-121	121				X	Down-gradient/ NW Nested Well 6.25" O.C. Set to 65'
MW-7B2	2/27/2013	Not recorded	1030.87	195-200	200				X	Down-gradient/ NW-Nested Well, 6.25" O.C. to 93', Set to 200'
MW-8	2/24/1985	1030.45	1030.93	27.1-37.1	37.1		X			Down-gradient & North of Impoundment-
MW-8A*	6/14/2017	1030.22	1032.97	45-50	50			X		Down-gradient & North of Impoundment, Nested Well
MW-8B*	May-July 2017	1030.28	1033.20	53-80	80				X	Down-gradient & North of Impoundment, Nested Well, 5" O.C. to 53', cored to 153'
MW-8B2*	May-July 2017	1030.28	1032.27	148-153	153				X	Down-gradient & North of Impoundment, Nested Well, 5" O.C. to 53', cored to 153'
MW-9	7/12/1986	1029.0	1031.95	22.8-32.8	32.8		X			Cross-Gradient West of impoundment & East of MW-4
MW-10	1/30/1988	Not recorded	1029.74	25.3-35.3	35.3		X			Down-gradient and NE of MW-8
MW-11	8/12/1989	1030.0	1032.09	27.0-37.0	37.0	X	X			NE end of Impoundment
MW-12	4/20/2004	995.3	997.97	12.3-17.3	17.3		X			Down-gradient at Stream Bank
MW-12A	4/21/2004	995.2	997.93	29.9-34.9	34.9			X		Down-gradient Nested well at Stream Bank

TABLE 1 – MONITORING WELLS CONSTRUCTION DETAILS
2023 RCAP
WILLIAM C. MEREDITH COMPANY
EAST POINT, GA
PERMIT NUMBER: HW-062(D)

Well Number	Date Installed	Ground Surface Elevation (Feet)	Top of Casing Elevation (Feet)	Screened Intervals (Feet)	Total Depth (Feet)	Well Description				
						Point of Compliance (POC)	Shallow Monitoring Well	Top of Rock/ Intermediate	Bedrock Well	Point of Compliance (POC)
MW-13	4/19/2004	1025.3	1026.52	26.1-36.1	36.1		X			Down-gradient NW of MW-10, NE of MW-12
MW-14	4/21/2004	1036.4	1037.44	16.7-26.7	26.7		X			NE & Cross-gradient
HWMU-1**	4/14/2017	1036.52	1039.66	24-34	34		X			Impoundment- SE corner
HWMU-2**	4/14/2017	1038.25	1041.45	23-33	33		X			Impoundment- South center
HWMU-3**	4/13/2017	1036.88	1040.04	24.5-34.5	34.5		X			Impoundment- SW corner
PW-1	12-1989	—	1031.18	33-43	43			X		North side of Impoundment

** MW-3B, MW-8A, MW-8B, and MW-8B2 were installed as part of CAP implementation, Phase 3.*
***HWMU wells were installed as part of CAP implementation for the impoundment investigation and are designated as Corrective Action wells.*
Note: MW-5B is not complete and is therefore not included on the table. The well location; however, is depicted on the site map.

The following wells were abandoned in 1988:

Well Number	Date Installed	Ground Surface Elevation (Feet)	Top of Casing Elevation (Feet)	Screened Intervals (Feet)	Total Depth (Feet)	Well Description				
						Point of Compliance (POC)	Shallow Monitoring Well	Top of Rock/ Intermediate	Bedrock Well	Location
MW-5	5/11/1984	1030.02	1032.90	20-35	35	X	X			North Side of Impoundment- replaced with MW-5R
MW-6	5/12/1984	1030.7	1031.71	15-30	30	X	X			NW end of Impoundment- replaced with MW-6R

TABLE 2 - GROUNDWATER ELEVATION TABLE (MWs)
2023 RCAP
WILLIAM C. MEREDITH COMPANY
EAST POINT, GA
PERMIT NUMBER: HW-062(D)

Well No.	MW-1	MW-2	MW-3	MW-3A	MW-3B	MW-4	MW-5A*
Diameter (Inch)	2	2	2	2	3.78	2	2
Well Depth (Ft)	40.70	35.50	30.70	59.20	200.00	29.80	45.40
Screen Intv (Ft)	25.7-40.7	20.5-35.5	15.7-30.7	49.2-59.2	open hole - 200	14.8-29.8	40.4-45.4
TOC Elev (Ft)	1047.13	1019.77	1024.17	1024.96	1025.73	1026.43	1029.01

DATE	MW-1 DTW	MW-1 ELEV	MW-1 NAPL	MW-2 DTW	MW-2 ELEV	MW-2 NAPL	MW-3 DTW	MW-3 ELEV	MW-3 NAPL	MW-3A DTW	MW-3A ELEV	MW-3A NAPL	MW-3B DTW	MW-3B ELEV	MW-3B NAPL	MW-4 DTW	MW-4 ELEV	MW-4 NAPL	MW-5A DTW	MW-5A ELEV	MW-5A NAPL
09/21/98	25.42	1021.71		21.76	998.01		16.75	1007.42								15.03	1011.40				
12/31/98	27.66	1019.47		20.96	998.81		17.68	1006.49								15.38	1011.05				
06/21/99	27.79	1019.34		21.61	998.16		17.69	1006.48								15.54	1010.89				
05/01/00	28.27	1018.86		20.52	999.25		17.46	1006.71								14.88	1011.55				
08/31/00	29.88	1017.25		23.56	996.21		18.88	1005.29								17.85	1008.58				
02/08/01	30.15	1016.98		20.99	998.78		18.50	1005.67								15.46	1010.97				
03/06/01	29.90	1017.23		20.15	999.62		17.73	1006.44								11.49	1014.94				
06/29/01	27.21	1019.92		20.80	998.97		16.50	1007.67								13.25	1013.18				
01/25/02	30.60	1016.53		21.49	998.28		18.42	1005.75								14.34	1012.09				
06/14/02	29.15	1017.98		22.33	997.44		17.80	1006.37								16.50	1009.93				
09/24/02	30.81	1016.32		23.35	996.42		18.81	1005.36								16.49	1009.94				
01/02/03	28.92	1018.21		28.92	990.85		16.89	1007.28								13.32	1013.11				
06/17/03	25.62	1021.51		19.63	1000.14		15.29	1008.88								11.82	1014.61				
12/29/03	27.13	1020.00		20.32	999.45		16.19	1007.98								13.39	1013.04				
07/07/04	27.63	1019.50		20.67	999.10		16.25	1007.92		17.57	1007.39					12.75	1013.68				
12/08/04	27.41	1019.72		20.06	999.71		16.41	1007.76		17.41	1007.55					13.17	1013.26				
07/12/05	26.02	1021.11		20.13	999.64		15.15	1009.02		16.23	1008.73					13.33	1013.10				
01/26/06	27.21	1019.92		21.13	998.64		16.52	1007.65		17.85	1007.11					13.85	1012.58				
07/10/06	27.18	1019.95		21.52	998.25		16.31	1007.86		17.79	1007.17					14.59	1011.84				
01/15/07	28.75	1018.38		20.50	999.27		17.00	1007.17		18.17	1006.79					14.23	1012.20				
09/07/07	29.66	1017.47		23.87	995.90		17.99	1006.18		19.77	1005.19					15.48	1010.95				
01/14/09	31.95	1015.18		22.64	997.13		18.75	1005.42		20.05	1004.91					16.51	1009.92				
07/21/09	29.52	1017.61		23.64	996.13		17.31	1006.86		20.05	1004.91					17.14	1009.29				
01/05/10	27.79	1019.34		19.28	1000.49		15.60	1008.57		16.87	1008.09					13.60	1012.83				
07/19/10	25.84	1021.29		21.68	998.09		15.51	1008.66		17.12	1007.84					14.36	1012.07				
01/27/11	28.57	1018.56		29.80	989.97		16.75	1007.42		18.39	1006.57					15.35	1011.08				
07/19/11	27.93	1019.20		23.13	996.64		16.72	1007.45		18.69	1006.27					27.45	998.98				
01/18/12	30.43	1016.70		22.09	997.68		17.86	1006.31		19.42	1005.54					17.34	1009.09				
07/17/12	30.86	1016.27		24.66	995.11		18.64	1005.53		20.54	1004.42					19.57	1006.86				
01/28/13	32.47	1014.66		22.64	997.13		19.03	1005.14		20.32	1004.64					17.70	1008.73				
07/24/13	28.78	1018.35		21.10	998.67		16.45	1007.72		17.86	1007.10					14.60	1011.83		18.35	1010.66	
01/21/14	27.97	1019.16		19.18	1000.59		16.29	1007.88		17.53	1007.43					14.44	1011.99		18.15	1010.86	
07/24/14	27.10	1020.03		22.66	997.11		16.34	1007.83		18.28	1006.68					16.83	1009.60		18.20	1010.81	
01/21/15	29.38	1017.75		20.99	998.78		17.12	1007.05		18.57	1006.39					16.66	1009.77		18.97	1010.04	
07/25/15	27.25	1019.88		22.20	997.57		16.01	1008.16		17.97	1006.99					16.11	1010.32		17.85	1011.16	
01/25/16	26.86	1020.27		18.30	1001.47		15.25	1008.92		16.34	1008.62					11.23	1015.20		17.13	1011.88	
07/27/16	27.10	1020.03		23.14	996.63		16.05	1008.12		18.20	1006.76					16.57	1009.86		17.85	1011.16	
01/17/17	29.90	1017.23		22.17	997.60		17.79	1006.38		19.26	1005.70					16.75	1009.68		19.56	1009.45	
04/04/18	29.03	1018.10		20.20	999.57		16.72	1007.45		18.12	1006.84		18.23	1007.50		15.07	1011.36		18.71	1010.30	
03/28/19	26.60	1020.53		19.77	1000.00		15.50	1008.67		16.95	1008.01		17.32	1008.41		14.11	1012.32		17.00	1012.01	
03/31/21	26.71	1020.42		20.03	999.74		16.03	1008.14		17.60	1007.36		18.05	1007.68		14.86	1011.57		18.00	1011.01	
04/19/22	27.08	1020.05		19.71	1000.06		16.20	1007.97		17.72	1007.24		18.15	1007.58		14.61	1011.82		18.55	1010.46	
04/05/23	28.10	1019.03		20.10	999.67		16.65	1007.52		18.26	1006.70		18.61	1007.12		15.20	1011.23		18.62	1010.39	
AVERAGE	28.36	1018.77		21.71	998.06		16.95	1007.22		18.24	1006.72		17.94	1007.79		15.31	1011.12		18.23	1010.78	

NOTES:

All Measurements = Feet

DTW = Depth to groundwater measured using an electronic water level indicator

ELEV = Groundwater elevation calculated as follows: TOC Elevation - DTW

NAPL = Non-aqueous phase liquids (thickness approximated)

*MW-5A and MW-3B installed during Phase 3 implementation

NS = Not Surveyed

ND = Not Detected

NM = Not Measured

NAPL was detected at intermediate depths in the water column, calculated GW elev were not corrected for floating NAPL depression

TABLE 2 - GROUNDWATER ELEVATION TABLE (MWs)
2023 RCAP
WILLIAM C. MEREDITH COMPANY
EAST POINT, GA
PERMIT NUMBER: HW-062(D)

Well No.	MW-5R			MW-6R			MW-7			MW-7A			MW-7B			MW-7B2*		
Diameter (Inch)	2			2			2			2			2			2		
Well Depth (Ft)	34.00			32			38.1			53.4			121			200		
Screen Intv (Ft)	26.9-36.9			22-32			28.1-38.1			48.4-53.4			111-121			195-200		
TOC Elev (Ft)	1031.44			1032.80			1028.88			1030.25			1030.96			1030.87		
DATE	DTW	ELEV	NAPL	DTW	ELEV	NAPL	DTW	ELEV	NAPL	DTW	ELEV	NAPL	DTW	ELEV	NAPL	DTW	ELEV	NAPL
09/21/98	20.63	1010.81		21.90	1010.90		18.89	1009.99		20.50	1009.75		21.57	1009.39				
12/31/98	21.35	1010.09		22.65	1010.15		19.66	1009.22		21.33	1008.92		22.47	1008.49				
06/21/99	21.35	1010.09		22.59	1010.21		19.75	1009.13		20.16	1010.09		22.68	1008.28				
05/01/00	21.25	1010.19		22.39	1010.41		19.47	1009.41		21.16	1009.09		22.34	1008.62				
08/31/00	22.03	1009.41		23.03	1009.77		20.63	1008.25		21.15	1009.10		23.99	1006.97				
02/08/01	21.99	1009.45		22.90	1009.90		20.13	1008.75		21.84	1008.41		23.10	1007.86				
03/06/01	21.52	1009.92		22.68	1010.12		19.85	1009.03		20.72	1009.53		22.48	1008.48				
06/29/01	20.44	1011.00		21.82	1010.98		18.67	1010.21		20.31	1009.94		21.40	1009.56				
01/25/02	21.63	1009.81		23.04	1009.76		20.34	1008.54		22.16	1008.09		23.18	1007.78				
06/14/02	21.38	1010.06		22.56	1010.24		19.81	1009.07		21.71	1008.54		23.39	1007.57				
09/24/02	22.08	1009.36		23.31	1009.49		20.71	1008.17		22.66	1007.59		24.06	1006.90				
01/02/03	20.85	1010.59		22.00	1010.80		18.99	1009.89		20.75	1009.50		21.83	1009.13				
06/17/03	18.98	1012.46		19.73	1013.07		17.01	1011.87		18.84	1011.41		20.06	1010.90				
12/29/03	19.94	1011.50		20.97	1011.83		18.08	1010.80		19.98	1010.27		21.29	1009.67				
07/07/04	19.96	1011.48		20.92	1011.88		18.17	1010.71		20.05	1010.20		21.41	1009.55				
12/08/04	19.61	1011.83		20.32	1012.48		17.82	1011.06		19.85	1010.40		21.30	1009.66				
07/12/05	18.38	1013.06		19.21	1013.59		16.58	1012.30		18.55	1011.70		19.71	1011.25				
01/26/06	19.92	1011.52	0.16	19.81	1012.99	0.188	18.24	1010.64		20.22	1010.03		21.69	1009.27				
07/10/06	19.53	1011.91	0.02	20.42	1012.38	0.094	17.96	1010.92		20.02	1010.23		21.75	1009.21				
01/15/07	20.31	1011.13	0.02	21.18	1011.62	0.25	18.67	1010.21		20.67	1009.58		22.22	1008.74				
09/07/07	20.93	1010.51	0.02	22.00	1010.80	0.083	19.77	1009.11		21.92	1008.33		23.98	1006.98				
01/14/09	22.21	1009.23	0.02	23.24	1009.56	0.04	20.70	1008.18		22.66	1007.59		24.48	1006.48				
07/21/09	20.51	1010.93	0.0017	21.68	1011.12	0.052	19.29	1009.59		21.26	1008.99		23.58	1007.38				
01/05/10	18.71	1012.73	0.05	19.73	1013.07	0.07	17.36	1011.52		19.25	1011.00		20.97	1009.99				
07/19/10	18.69	1012.75	0.01	19.71	1013.09	0.01	17.25	1011.63		19.17	1011.08		21.05	1009.91				
01/27/11	20.41	1011.03	0.02	21.25	1011.55	0.01	18.84	1010.04		27.40	1002.85		22.54	1008.42				
07/19/11	20.02	1011.42	0.02	21.12	1011.68	0.08	18.73	1010.15		20.71	1009.54		22.90	1008.06				
01/18/12	22.55	1008.89	>0.02	22.55	1010.25	>0.02	20.04	1008.84		21.90	1008.35		23.84	1007.12				
07/17/12	21.95	1009.49	0.03	23.15	1009.65	0.05	20.73	1008.15		22.71	1007.54		25.04	1005.92				
01/28/13	22.82	1008.62	0.04	23.72	1009.08	0.03	21.02	1007.86		22.87	1007.38		24.91	1006.05				
07/24/13	20.00	1011.44	0.05	20.89	1011.91	0.20	18.49	1010.39		20.28	1009.97		22.05	1008.91		23.63	1007.24	
01/21/14	19.67	1011.77	0.04	20.50	1012.30	0.21	18.15	1010.73		19.97	1010.28		21.70	1009.26		23.90	1006.97	
07/24/14	19.54	1011.90	0.01	20.58	1012.22	0.01	18.30	1010.58		20.23	1010.02		22.52	1008.44		24.61	1006.26	
01/21/15	20.62	1010.82	0.01	21.51	1011.29		19.12	1009.76		21.04	1009.21		22.03	1008.93		25.28	1005.59	
07/25/15	19.20	1012.24	0.01	20.25	1012.55		17.76	1011.12		19.91	1010.34		22.25	1008.71				
01/25/16	18.55	1012.89	0.03	19.40	1013.40		17.10	1011.78		18.90	1011.35		20.45	1010.51		22.75	1008.12	
07/27/16	19.28	1012.16	1.0	20.47	1012.33	0.50	18.20	1010.68		20.15	1010.10		22.66	1008.30		24.62	1006.25	
01/17/17	21.10	1010.34	0.8	22.17	1010.63	0.75	19.76	1009.12		21.69	1008.56		23.78	1007.18		26.18	1004.69	
04/04/18	20.36	1011.08	0.8	21.18	1011.62	0.75	18.83	1010.05		20.73	1009.52		22.95	1008.01		24.94	1005.93	
03/28/19	18.50	1012.94	1.0	19.51	1013.29	0.50	17.20	1011.68		19.14	1011.11		21.48	1009.48		23.63	1007.24	
03/31/21	19.60	1011.84	0.5	20.48	1012.32	0.33	18.05	1010.83		20.05	1010.20		22.25	1008.71		24.24	1006.63	
04/19/22	19.96	1011.48	0.25	20.65	1012.15	0.25	18.36	1010.52		20.30	1009.95		22.47	1008.49		24.82	1006.05	
04/05/23	20.11	1011.33	0.50	20.96	1011.84	0.50	18.73	1010.15		20.70	1009.55		23.00	1007.96		25.60	1005.27	
AVERAGE	20.43	1011.01	0.21	21.40	1011.40	0.23	18.87	1010.01		20.83	1009.42		22.44	1008.52		24.52	1006.35	

NOTES:

All Measurements = Feet

DTW = Depth to groundwater measured using an electronic water level indicator

ELEV = Groundwarter elevation calculated as follows TOC Elevation - DTW

NAPL = Non-aqueous phase liquids (thickness approximated)

*MW-7B2 installed during Phase 3 implementation

ND = Not Detected

NM = Not Measured

NAPL was detected at intermediate depths in the water column, calculated GW elev were not corrected for floating NAPL depression

TABLE 2 - GROUNDWATER ELEVATION TABLE (MWs)
2023 RCAP
WILLIAM C. MEREDITH COMPANY
EAST POINT, GA
PERMIT NUMBER: HW-062(D)

Well No.	MW-8	MW-8A*	MW-8B*	MW-8B2*	MW-9	MW-10
Diameter (Inch)	2	2	3.78	1	2	2
Well Depth (Ft)	37.1	50.00	80.00	153.00	32.8	35.3
Screen Intv (Ft)	27.1-37.1	45-50	53-80	148-153	22.8-32.8	25.3-35.3
TOC Elev (Ft)	1030.93	1032.97	1033.20	1032.37	1031.95	1029.74

DATE	DTW	ELEV	NAPL	DTW	ELEV	NAPL	DTW	ELEV	NAPL	DTW	ELEV	NAPL	DTW	ELEV	NAPL	DTW	ELEV	NAPL
09/21/98	20.63	1010.30											21.21	1010.74		22.34	1007.40	
12/31/98	21.88	1009.05											22.10	1009.85		23.76	1005.98	
06/21/99	22.10	1008.83											22.16	1009.79		24.17	1005.57	
05/01/00	22.04	1008.89											21.75	1010.20		24.15	1005.59	
08/31/00	23.06	1007.87											23.42	1008.53		25.20	1004.54	
02/08/01	22.89	1008.04											22.48	1009.47		25.07	1004.67	
03/06/01	22.61	1008.32											22.07	1009.88		24.50	1005.24	
06/29/01	21.13	1009.80											20.71	1011.24		22.98	1006.76	
01/25/02	23.10	1007.83											22.90	1009.05		25.24	1004.50	
06/14/02	22.42	1008.51											22.46	1009.49		24.53	1005.21	
09/24/02	23.31	1007.62											23.47	1008.48		25.43	1004.31	
01/02/03	21.81	1009.12											21.15	1010.80		23.85	1005.89	
06/17/03	19.94	1010.99											19.13	1012.82		21.79	1007.95	
12/29/03	20.95	1009.98											20.38	1011.57		22.65	1007.09	
07/07/04	21.20	1009.73											20.46	1011.49		23.04	1006.70	
12/08/04	20.94	1009.99											20.28	1011.67		22.83	1006.91	
07/12/05	19.46	1011.47											18.86	1013.09		21.08	1008.66	
01/26/06	20.04	1010.89											20.92	1011.03		22.48	1007.26	
07/10/06	20.88	1010.05											20.66	1011.29		22.68	1007.06	
01/15/07	21.64	1009.29											21.30	1010.65		23.51	1006.23	
09/07/07	22.28	1008.65											22.83	1009.12		24.27	1005.47	
01/14/09	23.55	1007.38											23.41	1008.54		25.85	1003.89	
07/21/09	21.48	1009.45											22.27	1009.68		23.50	1006.24	
01/05/10	19.78	1011.15											19.94	1012.01		21.72	1008.02	
07/19/10	19.45	1011.48											20.03	1011.92		21.02	1008.72	
01/27/11	21.42	1009.51											21.65	1010.30		23.11	1006.63	
07/19/11	21.02	1009.91											21.78	1010.17		22.75	1006.99	
01/18/12	22.62	1008.31											22.89	1009.06		24.50	1005.24	
07/17/12	22.99	1007.94											23.89	1008.06		24.99	1004.75	
01/28/13	23.76	1007.17											24.95	1007.00		25.99	1003.75	
07/24/13	20.80	1010.13											21.11	1010.84		23.76	1005.98	
01/21/14	20.69	1010.24											20.08	1011.87		22.52	1007.22	
07/24/14	20.47	1010.46											21.36	1010.59		22.19	1007.55	
01/21/15	22.18	1008.75											21.84	1010.11		23.79	1005.95	
07/25/15	20.37	1010.56											20.87	1011.08		22.13	1007.61	
01/25/16	19.74	1011.19											19.53	1012.42		21.50	1008.24	
07/27/16	20.30	1010.63											21.27	1010.68		22.00	1007.74	
01/17/17	22.27	1008.66											22.70	1009.25		24.25	1005.49	
04/04/18	21.43	1009.50		24.11	1008.86		24.41	1008.79		24.10	1008.27		21.57	1010.38		23.80	1005.94	
03/28/19	19.41	1011.52		22.13	1010.84		22.64	1010.56		22.76	1009.61		20.05	1011.90		21.07	1008.67	
03/31/21	20.50	1010.43		23.24	1009.73		23.72	1009.48		23.37	1009.00		20.97	1010.98		22.30	1007.44	
04/19/22	20.90	1010.03		23.60	1009.37		24.05	1009.15		23.75	1008.62		21.01	1010.94		22.86	1006.88	
04/05/23	21.36	1009.57		24.07	1008.90		24.55	1008.65		24.36	1008.01		21.10	1010.85		23.53	1006.21	
AVERAGE	21.41	1009.52		23.43	1009.54		23.87	1009.33		23.67	1008.70		21.51	1010.44		23.36	1006.38	

NOTES:

All Measurements = Feet

DTW = Depth to groundwater measured using an electronic water level indicator

ELEV = Groundwater elevation calculated as follows TOC Elevation - DTW

NAPL = Non-aqueous phase liquids (thickness approximated)

*MW-8A, MW-8B, and MW-8B2 installed during Phase 3 implementation

NS = Not Surveyed

ND = Not Detected

NM = Not Measured

NAPL was detected at intermediate depths in the water column, calculated GW elev were not corrected for floating NAPL depression

TABLE 2 - GROUNDWATER ELEVATION TABLE (MWs)

2023 RCAP
WILLIAM C. MEREDITH COMPANY
EAST POINT, GA
PERMIT NUMBER: HW-062(D)

Well No.	MW-11	MW-12	MW-12A	MW-13	MW-14
Diameter (inch)	2	2	2	2	2
Well Depth (Ft)	37	17.3	34.9	36.1	26.7
Screen Intv (Ft)	27.0-37.0	12.3-17.3	29.9-34.9	26.1-36.1	16.7-26.7
TOC Elev (Ft)	1032.09	997.97	997.03	1026.52	1037.44

DATE	DTW	ELEV	NAPL	DTW	ELEV	NAPL	DTW	ELEV	NAPL	DTW	ELEV	NAPL	DTW	ELEV	NAPL
09/21/98	18.83	1013.26													
12/31/98	20.11	1011.98													
06/21/99	20.16	1011.93													
05/01/00	20.18	1011.91													
08/31/00	21.15	1010.94													
02/08/01	21.07	1011.02													
03/06/01	20.72	1011.37													
06/29/01	19.31	1012.78													
01/25/02	22.16	1009.93													
06/14/02	24.53	1007.56													
09/24/02	21.40	1010.69													
01/02/03	20.04	1012.05													
06/17/03	18.29	1013.80													
12/29/03	19.25	1012.84													
07/07/04	19.46	1012.63		2.28	995.69		2.51	994.52		24.29	1002.23		23.37	1014.07	
12/08/04	19.29	1012.80		2.10	995.87		2.35	994.68		23.92	1002.60		23.05	1014.39	
07/12/05	17.90	1014.19		1.57	996.40		1.80	995.23		22.39	1004.13		21.33	1016.11	
01/26/06	19.27	1012.82	0.521	2.08	995.89		2.35	994.68		23.53	1002.99		23.03	1014.41	
07/10/06	19.15	1012.94	0.125	2.31	995.66		2.54	994.49		23.75	1002.77		22.97	1014.47	
01/15/07	19.90	1012.19	0.0417	2.25	995.72		2.40	994.63		24.41	1002.11		23.92	1013.52	
09/07/07	20.39	1011.70	0.0208	3.10	994.87		3.42	993.61		25.29	1001.23		24.38	1013.06	
01/14/09	21.56	1010.53	0.02	3.12	994.85		3.38	993.65		27.05	999.47		25.88	1011.58	
07/21/09	19.54	1012.55	0.0313	3.21	994.76		3.52	993.51		25.22	1001.30		22.89	1014.55	
01/05/10	18.16	1013.93	<0.01*	1.93	996.04		2.23	994.80		23.30	1003.22		21.31	1016.13	
07/19/10	18.12	1013.97	<0.01*	1.95	996.02		2.32	994.71		22.48	1004.04		21.40	1016.04	
01/27/11	19.82	1012.27	0.01	2.48	995.49		2.60	994.43		24.11	1002.41		23.77	1013.67	
07/19/11	19.35	1012.74	0.01	2.67	995.30		3.04	993.99		23.94	1002.58		23.03	1014.41	
01/18/12	20.81	1011.28	>0.02	2.61	995.36		2.98	994.05		25.33	1001.19		24.99	1012.45	
07/17/12	21.16	1010.93	0.03	3.48	994.49		3.81	993.22		26.02	1000.50		25.18	1012.26	
01/28/13	21.91	1010.18	0.02	3.22	994.75		3.51	993.52		27.00	999.52		26.00	1011.44	
07/24/13	18.15	1013.94	0.04	2.25	995.72		2.56	994.47		24.28	1002.24		22.56	1014.88	
01/21/14	19.09	1013.00	0.03	2.03	995.94		2.36	994.67		23.82	1002.70		22.79	1014.65	
07/24/14	18.90	1013.19	0.01	2.45	995.52		2.80	994.23		23.58	1002.94		22.33	1015.11	
01/21/15	20.17	1011.92	sheen	2.46	995.51		2.78	994.25		24.84	1001.68		24.18	1013.26	
07/25/15	18.80	1013.29	0.03	2.4	995.57		2.77	994.26		23.45	1003.07		22.26	1015.18	
01/25/16	18.30	1013.79	0.01	1.52	996.45		1.85	995.18		22.62	1003.90		21.61	1015.83	
07/27/16	18.90	1013.19	1.0	2.55	995.42		2.92	994.11		23.25	1003.27		22.45	1014.99	
01/17/17	20.59	1011.50	0.5	2.65	995.32		3.00	994.03		25.15	1001.37		24.79	1012.65	
04/04/18	19.70	1012.39	0.5	2.31	995.66		2.68	994.35		24.39	1002.13		23.41	1014.03	
03/28/19	18.05	1014.04	0.5	1.90	996.07		2.29	994.74		22.55	1003.97		21.00	1016.44	
03/31/21	18.85	1013.24	1.0	1.91	996.06		2.25	994.78		23.35	1003.17		22.35	1015.09	
04/19/22	19.09	1013.00	0.75	2.20	995.77		2.57	994.46		23.95	1002.57		22.51	1014.93	
04/05/23	19.52	1012.57	0.50	2.38	995.59		2.75	994.28		24.61	1001.91		23.26	1014.18	
AVERAGE	19.79	1012.30	0.26	2.39	995.58		2.70	994.33		24.20	1002.32		23.17	1014.27	

NOTES:

All Measurements = Feet

DTW = Depth to groundwater measured using an electronic water level indicator

ELEV = Groundwarter elevation calculated as follows: TOC Elevation - DTW

NAPL = Non-aqueous phase liquids (thickness approximated)

*During January and July 2010 sampling events, sheen/NAPL detected on probe

ND = Not Detected

NM = Not Measured

NAPL was detected at intermediate depths in the water column calculated GW elev were not corrected for floating NAPL depression

TABLE 2 - GROUNDWATER ELEVATION TABLE (MWs)
2023 RCAP
WILLIAM C. MEREDITH COMPANY
EAST POINT, GA
PERMIT NUMBER: HW-062(D)

Well No.	HWMU-1*	HWMU-2*	HWMU-3*
Diameter (Inch)	2	2	2
Well Depth (Ft)	34.00	33.00	34.50
Screen Intv (Ft)	24-34	23-33	24.5-34.5
TOC Elev (Ft)	1039.66	1041.45	1040.04

DATE	DTW	DTLNAPL	ELEV	LNAPL	DTW	DTLNAPL	ELEV	LNAPL	DTW	DTLNAPL	ELEV	LNAPL
09/21/98												
12/31/98												
06/21/99												
05/01/00												
08/31/00												
02/08/01												
03/06/01												
06/29/01												
01/25/02												
06/14/02												
09/24/02												
01/02/03												
06/17/03												
12/29/03												
07/07/04												
12/08/04												
07/12/05												
01/26/06												
07/10/06												
01/15/07												
09/07/07												
01/14/09												
07/21/09												
01/05/10												
07/19/10												
01/27/11												
07/19/11												
01/18/12												
07/17/12												
01/28/13												
07/24/13												
01/21/14												
07/24/14												
01/21/15												
07/25/15												
01/25/16												
07/27/16												
01/17/17												
04/04/18	23.31		1016.35		33.00	24.85	1014.48	8.15	28.00	23.88	1015.09	4.12
03/28/19	21.25		1018.41		28.00	22.76	1017.33	5.24	26.30	21.80	1017.07	4.50
03/31/21	21.90		1017.76		31.00	23.46	1016.03	7.54	29.50	22.45	1015.76	7.05
04/19/22	22.00		1017.66		30.00	23.59	1016.19	6.41	27.00	22.60	1016.30	4.40
04/05/23	22.62		1017.04		31.65	24.22	1017.23	7.43	33.00	23.15	1016.89	9.85
AVERAGE	22.22		1017.44		30.73	23.78	1016.25	6.95	28.76	22.78	1016.22	5.98

NOTES:
All Measurements = Feet
DTW = Depth to groundwater measured using an electronic water level indicator
ELEV = Groundwater elevation calculated as follows TOC Elevation - DTW
NAPL = Non aqueous phase liquids (thickness approximated)
*HWMU-1, -2, -3 were installed in 2017 as part of corrective action activities

NS = Not Surveyed
ND = Not Detected
NM = Not Measured
NAPL was detected at intermediate depths in the water column calculated
GW elev were not corrected for floating NAPL depression.
LNAPL = Light Non-aqueous phase liquids (thickness measured with interface probe)

TABLE 3 – GROUNDWATER PROTECTION STANDARDS
WILLIAM C. MEREDITH COMPANY INC.
EAST POINT, GEORGIA
PERMIT NUMBER: HW-062(D)

HAZARDOUS CONSTITUENT	CONCENTRATION LIMIT (GWPS)
VOCs	
1, 1-Dichloroethene	Background
Acetone	Background
2-Butenone (Methyl Ethyl Ketone)	Background
1, 1, 1-Trichloroethane	Background
Benzene	Background
1, 2-Dichloroethane	Background
Trichloroethene	Background
Toluene	Background
Tetrachloroethene	Background
Ethylbenzene	Background
Xylenes	Background
Styrene	Background
1, 3, 5-Trimethylbenzene	Background
1, 2, 4-Trimethylbenzene	Background
SVOCs	
2-Chlorophenol	Background
Acenaphthene	Background
2-Methylnaphthalene	Background
2-Methylphenol (o-Cresol)	Background
3, 4-Methylphenol	Background
Acenaphthylene	Background
2, 4-Dimethylphenol	Background
Anthracene	Background
2, 4-Dinitrophenol	Background
Benzo(a)anthracene	Background
Benzo(a)pyrene	Background
Benzo(b)fluoranthene	Background
2, 3, 4, 6 Tetrachlorophenol	Background
Pentachlorophenol	Background
Benzo(k)fluoranthene	Background
Phenol	Background
2, 4, 6-Trichlorophenol	Background
Chrysene	Background
Dibenzo(a, h)anthracene	Background
Fluoranthene	Background
Fluorene	Background
Indeno(1, 2, 3-cd)pyrene	Background
Naphthalene	Background
Carbazole	Background
Dibenzofuran	Background
Phenanthrene	Background
Pyrene	Background
4-Chloro-3-methylphenol	Background

TABLE 3 – GROUNDWATER PROTECTION STANDARDS
WILLIAM C. MEREDITH COMPANY INC.
EAST POINT, GEORGIA
PERMIT NUMBER: HW-062(D)

METALS	
Arsenic	50 µg/L
Barium	1,000 µg/L
Cadmium	10 µg/L
Chromium	50 µg/L
Cobalt	Background
Copper	Background
Lead	50 µg/L
Nickel	Background
Selenium	10 µg/L
Vanadium	Background
Zinc	Background
DIOXINS	
Penta CDD	Background
Hexa CDD	Background
Hexa CDF	Background
Penta CDF	Background
TCDD	Background
TCDF	Background

TABLE 4 - MONITORING WELL SAMPLING & ANALYSIS PLAN
2023 RCAP
WILLIAM C. MEREDITH COMPANY
EAST POINT, GA
PERMIT NUMBER: HW-062 (D)

Well No.	Sampling Frequency	VOCs	SVOCs	Metals	Dioxins/ furans	Appendix IX
MW-1*	Every 2 years	X	X			
MW-2	Every 2 years	X	X			
	Every 3 years			X		
MW-3	Every 2 years	X	X			
	Every 3 years			X		
MW-3A	Annual	X	X			
MW-3B	Annual	X	X			
MW-4	Every 2 years	X	X			
MW-5R**	Annual	X	X			
	Every 3 years			X		
	Once every 9 years				X	X
MW-5A	Annual	X	X			
MW-6R**	Annual	X	X			
	Once every 9 years				X	X
MW-7	Annual	X	X			
MW-7A	Annual	X	X			
MW-7B	Annual	X	X			
	Every 3 years				X	
MW-7B2	Every 2 years	X	X			
MW-8	Annual	X	X			
	Every 3 years			X		
MW-8A	Annual	X	X			

TABLE 4 - MONITORING WELL SAMPLING & ANALYSIS PLAN
2023 RCAP
WILLIAM C. MEREDITH COMPANY
EAST POINT, GA
PERMIT NUMBER: HW-062 (D)

Well No.	Sampling Frequency	VOCs	SVOCs	Metals	Dioxins/ furans	Appendix IX
MW-8B	Annual	X	X			
MW-8B2	Annual	X	X			
MW-9	Annual	X	X			
MW-10	Annual	X	X			
MW-11**	Annual	X	X			
	Every 3 years			X		
	Once every 9 years				X	X
MW-12	Annual	X	X			
	Every 3 years			X		
MW-12A	Annual	X	X			
MW-13	Every 2 years	X	X			
MW-14	Every 2 years	X	X			

NOTES:
* MW-1 is a background well.
** Wells MW-5R, MW-6R, and MW-11 are POC wells. They will be sampled for SVOCs/VOCs annually (if NAPL is not present), metals every 3 years, and Appendix IX parameters on a rotating basis once every nine years (one well every three years).

The following wells were installed as part of corrective action activities and are not included in the regularly scheduled sampling plan:

- HWMU-1
- HWMU-2
- HWMU-3

These wells will be gauged during annually during sampling events. The wells will be sampled in accordance with recommendation set forth in the applicable Progress Reports.

TABLES 5-8 ARE PROVIDED IN THE SECTION E TABLES APPENDIX