Draft Environmental Assessment Report

Memphis
INTERNATIONAL AIRPORT

Memphis Shelby County Airport Authority

East Holmes Road Site Preparation

June 2021

AIRPORT SPONSOR CERTIFICATION

I certify that the information I have provided above is, to the best of my knowledge, correct. I also recognize and agree that no construction activity, including but not limited to site preparation, demolition, or land disturbance, shall proceed for the above proposed project(s) until FAA issues a final environmental decision for the proposed project(s), and until compliance with all other applicable FAA approval actions (e.g., ALP approval, airspace approval, grant approval) has occurred.

James Hay

James Hay (Feb 23, 2021 13:37 CST)

02/23/2021

SIGNATURE

DATE

James Hay

NAME

Director of Development

TITLE

Memphis-Shelby County Airport Authority

901-922-8224

AFFILIATION

PHONE #

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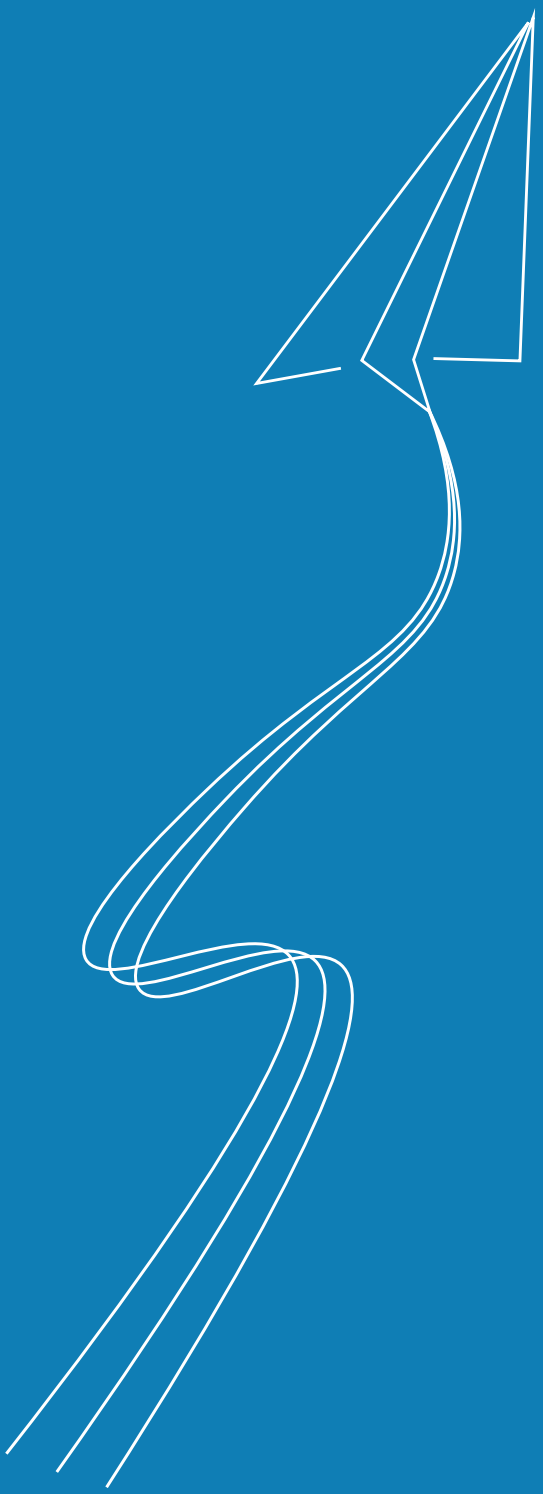
FIGURES

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY



PURPOSE AND NEED OF THE PROPOSED ACTION

The Proposed Action consists of the preparation of approximately 245-acres of vacant land (the Site) owned by the Memphis-Shelby County Airport Authority (MSCAA) in Memphis, Shelby County, Tennessee (Figures 1 and 2). A reasonably foreseeable connected action includes the redevelopment of the vacant Site, by private companies with an interest in constructing cargo holding or distribution facilities. A Proposed Site Plan identifies the potential for approximately 1.5 million square feet (sf) of facility space at the Site with approximately 300,000 sf of additional space allotted for future growth, if needed (Figure 3). The Proposed Site Plan is a conceptual design and may change to meet the need of specific needs of long-term tenants. The preparation of the vacant Site by MSCAA, future redevelopment of the Site as cargo holding or distribution facilities, and long-term operation of the future facilities are evaluated in this Draft Environmental Assessment (EA) Report as the Proposed Action.

The purpose of the Proposed Action is to return an approximately 245-acre MSCAA-owned vacant Site to productive economic use while maintaining compatibility with surrounding land uses and Memphis International Airport (MEM) operations, including aircraft noise. The need is generated by the MSCAA's mission with respect to land holdings, to comply with grant assurances, integrate compatible land uses, promote operational and financial efficiency, and spur economic development opportunities for MEM and the surrounding area. Under the current scenario, the MSCAA owns and maintains the approximately 245-acre vacant Site. The need to comply with grant assurances, promote operational and financial efficiency, and spur economic benefit is not met under the current scenario.

PROPOSED ACTION

The Site is located on the south side of East Holmes Road and the west side of Swinnea Road in Memphis, Tennessee, approximately 1 mile south of MEM, at the Tennessee/Mississippi state line (Figure 2). The Site is not contiguous with airport the Security Identification Display Area (SIDA). The Site is also located within a 50-square-mile area, termed "Airport City" in the *Memphis Aerotropolis Airport City Master Plan* (Master Plan) (Memphis 2014). The Master Plan, developed by the City of Memphis, The Department of Housing and Urban Development, and the Greater Memphis Chamber, describes Airport City as an area that "faces pervasive

blight, obsolescence, commercial disinvestment, and an oversupply of unproductive, vacant and underutilized land" (Memphis 2014). The project will have negligible impacts on MEM flight operations and is consistent with the Master Plan (Memphis 2014).

To mitigate for previously unacceptable aircraft noise, the Site, was purchased using federal grant funds as part of an Airport Improvement Program (noise buyout program) from the late 1980s to the early 2000s. Due to measures taken to reduce aircraft noise, a portion of the Site is located outside of the 65-decibel noise contour (MEM 2015). Approximately half of the Proposed Action Site is located within the 65-decible noise contour. The northwest portion of the Site remains within the 70-decibel noise contour (MEM 2015). By accepting federal grant funds to purchase the Site and mitigate for unacceptable aircraft noise, MSCAA is obligated to certain grant assurances. FAA Grant Assurance #31c relates to the financial self-sufficiency of the airport. It indicates that land shall be considered to be needed for airport purposes under this assurance if (1) it may be needed for aeronautical purposes (including runway protection zones) or serve as noise buffer land, and (2) the revenue from interim uses of such land contributes to the financial self-sufficiency of the airport (85 Federal Register [FR] 12048).

The MSCAA proposes to prepare the approximately 245-acre Site for redevelopment by overseeing tree removal, Site grading, utility main extensions, and construction of stream crossings to allow for future site pad development by private companies. Proposed Site preparation activities are anticipated to reflect the conceptual design depicted in Figure 3. However, should changes occur to the Proposed Site design, additional impacts will be addressed through the applicable permitting and processes. The MSCAA proposed to oversee the extension of sanitary sewer and water services, gas and electrical services and meters, installation of stream crossings, and placement of fill to bring future building pads, parking lots, and driveways to required elevations. Approximately 220,000 cubic yards of soil will be required to prepare the Proposed Action Site for the proposed buildings, driveways, and parking lots. It is anticipated that the fill material would come from the Proposed Action Site, resulting in a balance of material at the Site. One temporary stream crossing is proposed for construction purposes and one permanent steam crossing is proposed at the Proposed Action Site. Construction associated with Site preparation is estimated to last between 6 to 9 months.

Reasonably foreseeable connected actions include construction of facilities by a private developer(s) and long-term operation of future facilities by a MEM tenant(s). Construction associated with future facilities at the Site is estimated to last between 6 to 9 months. Site developers and tenants have not been identified at this time. The assumptions for routine operation of the Proposed Action include movement of approximately 240 distribution trucks and approximately 200 employee vehicles accessing the facilities 24 hours per day.

The Proposed Action is consistent with planning efforts conducted to date. The Proposed Action furthers the goals defined in the *Memphis Airport Area Land Use Study Final Report* adopted by the City of Memphis and Shelby County in 1992. The study was the result of a multi-year land use planning effort involving the MSCAA and five local governments: the City of Memphis and Shelby County, Tennessee; the cities of Southaven and Horn Lake in Mississippi; and DeSoto County, Mississippi. Public involvement included meetings, workshops, and mailings reaching approximately 15,000 citizens within the 90-square-mile study area. The goal of the *Memphis Airport Area Land Use Study Final Report* was to carry out or facilitate the recommended noise mitigation actions that required the adoption of plans, land use policies, and ordinances by units of local government, including changes in zoning.

Figure 1 - Site Location Map

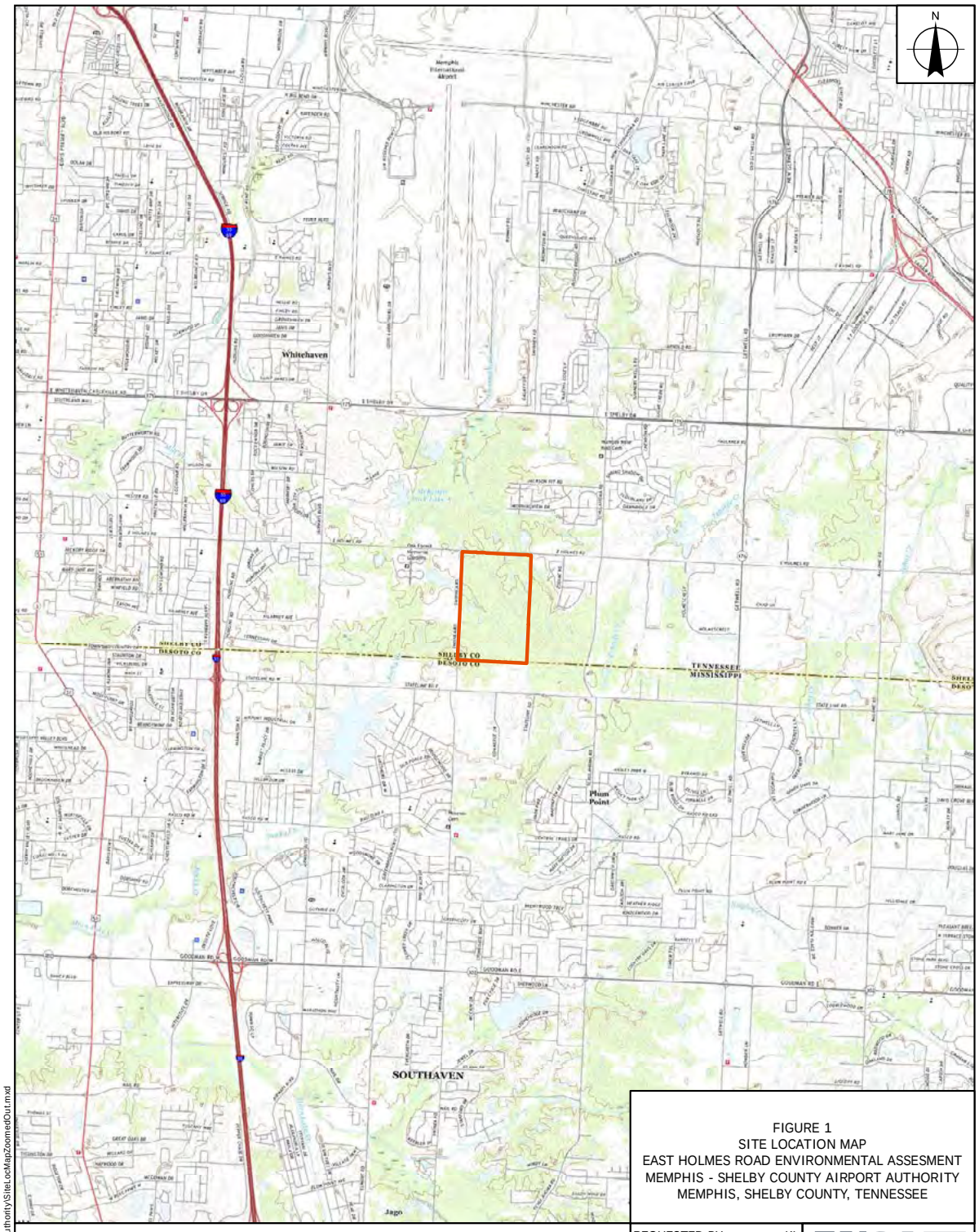


FIGURE 1
SITE LOCATION MAP
EAST HOLMES ROAD ENVIRONMENTAL ASSESMENT
MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY
MEMPHIS, SHELBY COUNTY, TENNESSEE

REQUESTED BY:	KL
DRAWN BY:	RK
DATE:	12/17/2020
PROJECT:	0888821806

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Source: U.S. Geological Survey. Pleasant Hill Quadrangle, Mississippi [Map]. Photorevised 2018. 1:24,000. 7.5 Minute Series.Southeast Memphis & Southwest Memphis Quadrangle, Tennessee [Map]. Photorevised 2019. 1:24,000. 7.5 Minute Series. Horn Lake Quadrangle, Mississippi [Map]. Photorevised 2018. 1:24,000. 7.5 Minute Series.

Figure 2 - Site Map

Figure 3 - Conceptual Site Plan

LEGEND

- STREAM
- APPROXIMATE UTILITY LINE
- POND
- WETLAND
- PROPOSED BUILDINGS (42.43 ACRES)
- PROPOSED DETENTION BASIN (3.96 ACRES)
- PROPOSED ROADS AND PARKING (29.51 ACRES)
- APPROXIMATE UTILITY EASEMENT
- APPROXIMATE SUBJECT PROPERTY BOUNDARY

NAD 1983 STATE PLANE TENNESSEE FEET

0 260 520

SCALE IN FEET

FIGURE 3
PROPOSED SITE PLAN
EAST HOLMES ROAD ENVIRONMENTAL ASSESMENT
MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY
MEMPHIS, SHELBY COUNTY, TENNESSEE

REQUESTED BY:	KL
DRAWN BY:	NR
DATE:	2/16/2021
PROJECT:	0888821806

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X:\MSCAA\ProposedSitePlanMap.mxd

Source: Google Earth Pro Imagery - 03/14/2018

NO ACTION ALTERNATIVE

Under the No Action Alternative, the MSCAA would not prepare the airport-owned land and private companies would not construct cargo holding or distribution facilities at the Site. Under the No Action Alternative, the Site would not meet the need of the Proposed Action. The Site would remain unproductive vacant land and would not contribute to operational efficiency or economic benefit, or be developed under a land use compatible with aircraft noise. The Site would continue to contribute to the current supply of underproductive and underutilized vacant land within the Airport City area. Two additional sites owned by the MSCAA were evaluated for the project but were eliminated from further consideration based on a lack of compliance with the site evaluation factors, as discussed in Section 2.3.

ENVIRONMENTAL ASSESSMENT

The FAA is the lead federal agency and is preparing this Draft EA Report in accordance with the National Environmental Policy Act (NEPA); Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations Parts 1500- 1508); FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*; and FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*.

IMPACTS

This Draft EA Report evaluated impacts to each of the resource areas in two phases: construction of the proposed facilities (6 to 9 months) and long-term operation of the proposed facilities. When compared to the No Action Alternative, the Proposed Action may create short-term (lasting during construction) or long-term (greater than 5 years) impacts affecting various resource areas. Impacts are also identified as either adverse or beneficial. This Draft EA Report uses the following terms in assessing impacts resulting from the Proposed Action.

Negligible Impact:

A resource area would not be affected, or the impacts would be at or below the level of detection, and changes would not result in any measurable or perceptible consequences.

Minor Short-Term Impact:

Impacts on a resource area would be detectable for a short period (during construction), localized, and of minor consequence to the overall sustainability of the resource. Mitigation measures, required to offset adverse short-term impacts, would be achievable and would be in addition to compliance with existing regulations, design planning, or best management practices.

Minor Long-Term Impact:

Impacts on a resource area would be detectable for a longer term (typically more than 5 years) and associated with the long-term operation of the Proposed Action. Mitigation measures, required to offset adverse long-term impacts, would be achievable and more extensive than those considered for minor short-term adverse impacts.

Significant Impact:

Impacts on a resource area would be long-term and would have substantial consequences for the sustainability of a resource area or region. A determination of significant impacts would warrant an Environmental Impact Statement.

DETERMINATION

This Draft EA Report describes the following resource areas and assesses the potential for the Proposed Action to affect these resource areas: air quality; biological resources; climate; coastal resources; United States Department of Transportation (U.S. DOT) Act, Section 4(f); farmlands; hazardous materials; historical, architectural, archaeological, and cultural resources; land use; natural resources and energy supply; noise and noise-compatible land use; socioeconomics, environmental justice, and children's environmental health and safety risks; visual effects; and water resources.

Based on the analysis presented in this Draft EA Report and coordination to date with project agencies, the Proposed Action would result in both short-term and long-term impacts to the assessed resources areas, when compared to the No Action Alternative. However, no significant impacts to any resource area are anticipated through the undertaking of the Proposed Action. As a result of the Proposed Action, the following determinations of impacts were made.

Identified Negligible Impact: The Proposed Action was determined to have a negligible impact on the following resource areas, when compared to the No Action Alternative: coastal resources; farmlands; historical, architectural, archaeological, and cultural resources; and land use.

Identified Minor, Short-Term Impacts: Minor, short-term impacts have been identified, when compared to the No Action Alternative, for the following resource areas, due to the short-term construction phase of the Proposed Action: air quality, biological resources, climate, farmlands, hazardous materials, solid waste, and pollution prevention, natural resources and energy supply, noise and noise-compatible land use, socioeconomics, environmental justice, and children's environmental health and safety risks, visual effects, and water resources. The identified minor adverse impacts will be avoided or minimized though compliance with existing regulations, design planning and best management practices, therefore mitigation measures are not proposed.

- Minor, short-term adverse air quality impacts are anticipated during the construction phase of the Proposed Action. Incremental impacts on air quality are related to the generation of fugitive dust and mobile source emissions from construction-related activity. The Proposed Action is presumed to conform with the State Implementation Plan, and is not anticipated to exceed applicable *de minimis* thresholds.
- Minor, short-term adverse biological impacts are anticipated during the Site preparation through removal of vegetation where required, alteration of wetlands, and disturbance of wildlife using the Site from operational light or noise. Overall, approximately 77 acres of the approximately 245-acre Site will be disturbed (Figure 4). Site design planning has been incorporated to avoid the majority of the aquatic features present at the Site. Best management practices to address erosion and sediment will be implemented and maintained during construction activities.
- Minor, short-term adverse climate impacts are anticipated during the construction phase of the Proposed Action. Incremental impacts to climate are related to mobile source emissions from construction-related activity. The Proposed Action is not anticipated to exceed the carbon dioxide equivalent threshold of 25,000 metric tons per year.
- The Proposed Action will result in minor, short-term adverse impacts to Prime Farmlands relating to the conversion of land currently zoned as Conservation Agriculture. However, the Tennessee United States Department of Agricultural (USDA),

determined the proposed project does not significantly impact Prime Farmland and/or farmland of statewide importance in the county since only 0.0656% will be converted.

- The Proposed Action will result in minor short-term adverse impacts on hazardous materials, solid waste, and pollution prevention, primarily relating to an increase in impervious surface. The anticipated impacts will be minimized though compliance with existing regulations, design planning and best management practices.
- The Proposed Action will have minor short-term adverse impacts on natural resources and energy supply consumed during the construction phase of the Proposed Action; however, the anticipated consumption need will not exceed available supplies or result in significant adverse impacts to natural resources or energy supplies.
- Minor, short-term adverse noise and noise-compatible land use impacts are anticipated during the construction phase of the Proposed Action. Construction is proposed to occur only during daytime (business) hours for 6 to 9 months. The resulting construction noise is considered temporary and will not result in significant impacts to surrounding land uses.
- Minor, short-term beneficial impacts with respect to socioeconomics could be realized through an increase in job availability during the short-term construction phase of the Proposed Action.
- The Proposed Action Site is in an area with a larger percentage of minority and low-income populations, when compared to state and national percentages. Therefore, the short-term adverse impacts identified in the Draft EA Report are further considered through the lens of socioeconomics, environmental justice and children's environmental health and safety risk. This Draft EA Report has identified minor, short-term adverse impacts to resources areas, when compared to the No Action Alternative; however, the identified impacts are not anticipated to lead to disproportionately high and significant adverse impacts for the surrounding population or impact the physical or natural environment in a way that is unique to the surrounding population. Disproportionately high and adverse effects, in the form of unacceptable aircraft noise impacts to this area, have been previously mitigated. In addition, the identified impacts are not anticipated to lead to a disproportionate health or safety risk to children, relating to asthma, unintentional injuries, developmental disorders, or cancer.
- Minor, short-term adverse visual effects impacts are anticipated during the 6- to 9- month construction phase of the Proposed Action. The conceptual design planning includes siting the proposed facilities to allow for the greatest distance between the proposed facilities and adjacent parcels, while avoiding impacts to onsite aquatic resources.
- Minor, adverse short-term impacts to water quality are associated with the Proposed Action based on Site disturbance associated with construction and an increase in impervious surface at the Site. The Proposed Action, in its current configuration, is anticipated to impact Stream 1, Wet Weather Conveyances 1, 2, 3, and 9, Wetlands 8 and 9, and Pond 1 (Figure 4). The proposed impact includes the installation of two, approximately 30-foot stream crossings at Stream 1: one permanent and one temporary, construction-related stream crossing. The tem-

porary stream crossing installed during construction as a haul route would be removed after construction is completed. The impacts to aquatic resources resulting from the Proposed Action, in its current configuration, does not trigger Tennessee Department of Environment and Conservation (TDEC) or United States Army Corps of Engineers (USACE) permit thresholds requiring mitigation. However, it should be noted that the Proposed Site Plan is based on conceptual site design planning. Should changes occur to the Site design, any additional impacts will be addressed through the same TDEC and USACE permit process. Further, the Proposed Action is anticipated to result in approximately 72.5 acres of new impervious surface at the Site. The requirements for National Pollutant Discharge Elimination System permit and Stormwater Pollution Prevention Plan will be required to minimize impacts to water resources. The Proposed Action is not anticipated to result in significant adverse impacts to water resources

Identified Minor Long-Term Impacts: Minor, long-term impacts have been identified, when compared to the No Action Alternative, for the following resource areas, due to the long-term operation of a distribution/e-commerce fulfillment facility: air quality, biological resources, climate, farmlands, hazardous materials, solid waste, and pollution prevention, land use, natural resources and energy supply, noise and noise-compatible land use, and socioeconomics, environmental justice, and children's environmental health and safety risks, visual effects, and water resources. The identified minor adverse impacts will be avoided or minimized though compliance with existing regulations, design planning and best management practices, therefore mitigation measures are not proposed.

- Minor, long-term adverse air quality impacts are anticipated during the operation of the Proposed Action. Incremental impacts on air quality will be related to the generation of mobile source emissions associated with cargo holding or distribution facilities, including daily movement and idling of fleet vehicles and employee vehicles. The Proposed Action is presumed to conform with the State Implementation Plan, and is not anticipated to exceed applicable *de minimis* thresholds.

- Minor, long-term adverse biological impacts are anticipated through removal of vegetation where required, alteration of wetlands, and disturbance of wildlife using the Site from operational light or noise. Overall, approximately 77 acres of the approximately 245-acre Site will be disturbed (Figure 4). Site design planning has been incorporated to avoid the majority of the aquatic features present at the Site. Best management practices to address erosion and sediment will be implemented and maintained during construction activities.

- Minor, long-term adverse climate impacts are anticipated during the operation of the Proposed Action. Incremental impacts on air quality will be related to the generation of mobile source emissions associated with the long-term operation of a cargo holding or distribution facilities. The Proposed Action is not anticipated to exceed the carbon dioxide equivalent threshold of 25,000 metric tons per year.

- The Proposed Action will result in minor, long-term adverse impacts to Prime Farmlands relating to the conversion of land currently zoned as Conservation Agriculture. However, the Tennessee USDA, determined the proposed project does not significantly impact Prime Farmland and/or farmland of statewide importance in the county since only 0.0656% will be converted.

- The Proposed Action will result in minor, long-term adverse impacts on hazardous materials, solid waste, and pollution pre-

vention, primarily relating to an increase in impervious surface. The anticipated impacts will be minimized though compliance with existing regulations, design planning and best management practices.

- The Proposed Action will result in minor, long-term adverse impacts to land use. There would be a change in land use under the Proposed Action from Conservation Agriculture likely to Employment District. Proposed Action Site will adhere to the *Memphis and Shelby County Unified Development Code* (Memphis 2010). The operation of cargo holding or distribution facilities will follow local zoning ordinances and permitting processes of City of Memphis and Shelby County government The Proposed Action is not in conflict with the objectives of federal, regional, state, or local land use plans, policies, or controls for the area. The Proposed Action is in compliance with FAA Grant Assurances.

- The Proposed Action will have minor, long-term adverse impacts on natural resources and energy supply consumed through operation of the Site; however, the anticipated consumption need will not exceed available supplies or result in significant adverse impacts to natural resources or energy supplies.

- Minor, long-term adverse noise impacts are anticipated due to operation the Proposed Action, when compared to the No Action Alternative. The Proposed Action will contribute to an increase in connected actions that support the shipment of goods, including truck transit. However, the modeled outdoor sound contours representing a worst-case operation scenario where half of the fleet trucks are assumed to be heavy trucks (i.e. tractor trailers), do not exceed 65 decibels. The Proposed Action would not have a significant adverse impact with respect to noise and noise-compatible land use. As part of the Draft EA, a Traffic Generation Report was completed, which determines if a Traffic Impact Study will be required for the Proposed Action. *The East Holmes Road Site Preparation Trip Generation Report and Traffic Analysis Memorandum* indicates that a Traffic Impact Study will be required during the City of Memphis Plan Review process, based on the expected vehicle trip generation. However, the forthcoming seven-lane expansion of East Holmes Road, as defined in the Tennessee Department of Transportation, Project Identification Number 107040.00, will result in ample capacity to accommodate site-generated trips and will not result in significant adverse impact to neighborhood or regional traffic.

- Minor, long-term beneficial impacts with respect to socioeconomics could be realized through an increase in job availability and tax revenue through the operation of future cargo holding or distribution facilities. The Proposed Action will also meet the identified need to financial efficiency and spur economic development opportunities for MEM and the surrounding area.

- Minor, long-term adverse visual effects impacts are anticipated for the operation of the Proposed Action. The presence of future cargo holding or distribution facilities will permanently alter the Site and viewshed from adjacent areas. Vegetation along the perimeter of the Site, will reduce the potential for significant adverse impacts of light emissions encroachment into the surrounding parcels. Nighttime security lighting and vehicle lighting associated with the movement of fleet and employee vehicles 24 hours per day will result in light emissions. Exterior

security lighting would remain directional and focus on exterior entrances, bay doors, and parking lots to minimize adverse offsite impacts of lighting such as light trespass and obtrusive light. Lighting will comply with Article 4 – *General Development Standards of the Memphis and Shelby County Unified Development Code* for outdoor site lighting and FAA requirements for lighting within a flight path.

- Minor, adverse long-term impacts to water quality are associated with the Proposed Action based on, the permanent alteration of streams and wetlands, and an increase in impervious surfaces at the Site. The impacts to water resources will be minimized though compliance with existing regulations, alternation of steam and wetland permitting, design planning, and best management practices to minimize the impacts to the fullest extent possible. The Proposed Action, in its current configuration, is anticipated to impact Stream 1, Wet Weather Conveyances 1, 2, 3, and 9, Wetlands 8 and 9, and Pond 1 (Figure 4). The proposed impact includes the installation of two, approximately 30-foot stream crossings at Stream 1: one permanent and one temporary, construction-related stream crossing. The impacts to aquatic resources resulting from the Proposed Action, in its current configuration, does not trigger Tennessee Department of Environment and Conservation (TDEC) or United States Army Corps of Engineers (USACE) permit thresholds requiring mitigation. Further, the Proposed Action is anticipated to result in approximately 72.5 acres of new impervious surface at the Site. The requirements for National Pollutant Discharge Elimination System permit and Stormwater Pollution Prevention Plan will be required to minimize impacts to water resources. The Proposed Action is not anticipated to result in significant adverse impacts to water resources

FINDING OF NO SIGNIFICANT IMPACT

Implementation of the Proposed Action as analyzed in this Draft EA Report would not constitute a major federal action that would have significant impact on the human environment, within the meaning of Section 102(2)(C) of the National Environmental Policy Act of 1969. This analysis presented in this Draft EA Report indicates that a Finding of No Significant Impact is appropriate, and that an Environmental Impact Statement is not required.

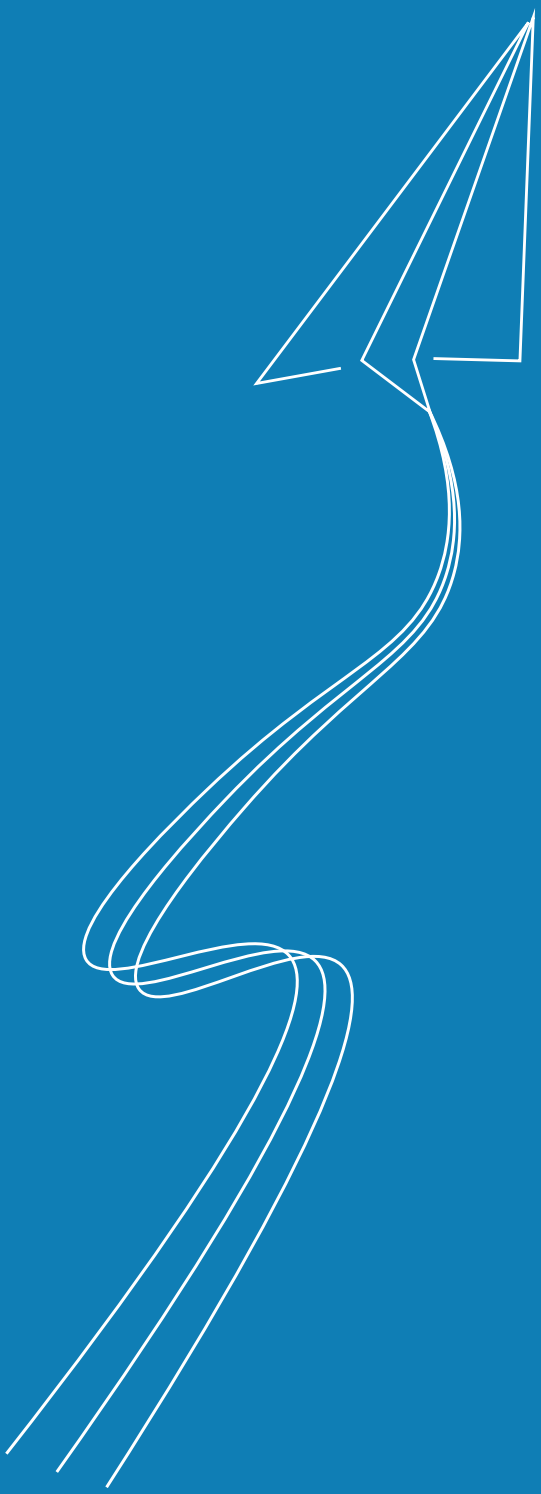
Figure 4 - Aerial Aquatic Resources Map

SECTIONS 1.0 AND 2.0

Section 1.0
Introduction Section

Section 2.0
Proposed Action and Alternatives

1.0 INTRODUCTION



1.1 PROJECT BACKGROUND

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245 acre tract of vacant land (the Site) for future development as cargo holding or distribution facilities. The lead federal agency for the undertaking is the Federal Aviation Authority (FAA). The Proposed Action consists of preparing the Site for future development and leasing the Site for non aviation, airport tenant use. The MSCAA owns and operates Memphis International Airport (MEM), as well as two general aviation airports. The MSCAA is self-funded and receives no local tax revenue.

The Site is located on the south side of East Holmes Road and the west side of Swinnea Road in Memphis, Tennessee, approximately 1 mile south of MEM, at the Tennessee/Mississippi state line (Figures 1 and 2). The Site is not contiguous with the airport Security Identification Display Area (SIDA). A physical address does not yet exist for the entire Site; it is comprised three tax parcels (09440000107, 09440000128, and 09440000129) totaling 245.8 acres. The surrounding land consists of a mix of vacant, forested land, commercial industrial development, and places of worship.

The purpose of the Proposed Action is to prepare the Site for future development by private companies with an interest in constructing cargo holding or distribution facilities. A Proposed Site Plan identifies the potential for approximately 1.5 million square feet (sf) of facility space at the Site with approximately 300,000 sf of additional space allotted for future growth, if needed (Figure 3). The Proposed Action will meet MSCAA's need to productively utilize land holdings and comply with grant assurances, while maintaining compatibility with MEM operations, including aircraft noise. Following Site preparation, the MSCAA intends to lease the Site thereby returning it to productive use and enhancing operational and financial efficiency, while ensuring development that is compatible with aircraft noise. According to the *MEM Part 150 Study Update Noise Exposure Maps*, the airspace above the Site is located within a main MEM aircraft flight path (MEM 2015). The project will have negligible impacts on MEM flight operations and is consistent with the *Memphis Airport Area Land Use Study Final Report* (Memphis 1992), the *Memphis Aerotropolis Airport City Master Plan* (Memphis 2014).

The proposed Site preparation includes tree removal, grading, utility main extensions, and construction of stream crossings to allow for future site pad development by pri-

vate companies. The MSCAA proposed to oversee the extension of sanitary sewer and water services, gas and electrical services and meters, installation of stream crossings, and placement of fill to bring future building pads, parking lots, and driveways to required elevations. Construction associated with Site preparation is estimated to last between 6 to 9 months.

A reasonably foreseeable connected action includes the construction of cargo holding or distribution facilities by a private developer(s) and long-term operation of future facilities by a MEM tenant(s). Construction associated with future facilities at the Site is estimated to last between 6 to 9 months. Site developers and tenants have not been identified at this time.

The preparation of the Site and reasonably foreseeable non-aviation development triggers the FAA policies and procedures to ensure agency compliance with the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] §§ 4321-4335), the requirements set forth in the Council on Environmental Quality (CEQ), Title 40, Code of Federal Regulations (CFR), parts 1500-1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (CEQ Regulations); FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*; FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*; and United States Department of Transportation (U.S. DOT) Order 5610.1D, *Procedures for Considering Environmental Impacts*. The following sections provide a detailed analysis of this project in the form of a Draft Environmental Assessment (EA) to assist in determining if this project's Proposed Actions will have significant environmental impacts.

1.2 PURPOSE AND NEED

The purpose of the Proposed Action is to prepare the approximately 245-acre MSCAA-owned vacant Site for future development by private companies with an interest in constructing cargo holding or distribution facilities. The Proposed Action is located within a 50-square-mile area, termed "Airport City" in the *Memphis Aerotropolis Airport City Master Plan* (Master Plan) (Memphis 2014). The Master Plan, developed by the City of Memphis, The Department of Housing and Urban Development, and the Greater Memphis Chamber, describes Airport City as an area that "faces pervasive blight, obsolescence, commercial disinvestment, and an oversupply of unproductive, vacant and underutilized land" (Memphis 2014).

The need is generated by the MSCAA's mission with respect to land holdings, to comply with grant assurances, integrate compatible land uses, and promote operational and financial efficiency for MEM and its tenants. The Proposed Action will meet MSCAA's need to productively utilize land holdings and comply with grant assurances, while maintaining compatibility with MEM operations, including aircraft noise. According to the *MEM Part 150 Study Update Noise Exposure Maps*, the airspace above the Site is located within a main MEM aircraft flight path (MEM 2015). Following Site preparation, the MSCAA intends to lease the Site thereby returning it to productive use and enhancing operational and financial efficiency, while ensuring development that is compatible with aircraft noise.

To mitigate for previously unacceptable aircraft noise, the Site, was purchased using federal grant funds as part of an Airport Improvement Program (noise buyout program) from the late 1980s to the early 2000s. Due to measures taken to reduce aircraft noise, a portion of the Site is located outside of the 65-decibel noise contour (MEM 2015). Approximately half of the Proposed Action Site is located within the 65-decible noise contour. The northwest portion of the Site remains within the 70-decibel noise contour (MEM 2015). By accepting federal grant funds to purchase the Site and mitigate for unacceptable aircraft noise, MSCAA is obligated to certain grant assurances. FAA Grant Assurance #31c relates to the financial self-sufficiency of the airport. It in-

dicates that land shall be considered to be needed for airport purposes under this assurance if (1) it may be needed for aeronautical purposes (including runway protection zones) or serve as noise buffer land, and (2) the revenue from interim uses of such land contributes to the financial self-sufficiency of the airport (85 Federal Register [FR] 12048).

1.3 ENVIRONMENTAL ASSESSMENT

NEPA requires federal agencies to evaluate and consider environmental impacts for projects that utilize federal funding. The level of documentation required depends on the level of such environmental impacts. An EA is used to determine if a federal action would result in significant impact on the human environment. An Environmental Impact Statement (EIS) is prepared for federal actions that have been determined through an EA to have significant impact on the human environment. The FAA determined that an EA is the appropriate level of documentation for the preparation of the vacant Site and reasonably foreseeable future development at the Site on East Holmes Road in Memphis, Shelby County, Tennessee.

1.4 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

A Notice of Availability of the Draft EA was published in The Commercial Appeal on June 25, 2021 and in The Memphis Daily News on June 22 and June 23, 2021. The public notice was posted on the MEM Facebook page and MEM Twitter account on June 22, 2021. The Draft EA Report was also available for download at the MEM website, https://www.flymemphis.com/environment, and is available upon request to facilitate public access. Members of the public were able to comment on the Draft EA within 30 days of the published notice.

2.0 PROPOSED ACTION AND ALTERNATIVES

This section describes the two alternatives evaluated in this Draft EA Report: the Proposed Action Alternative and the No Action Alternative. Also included in this section is a discussion of the alternatives considered but eliminated from further consideration.

2.1 PROPOSED ACTION ALTERNATIVE

The Proposed Action consists of preparing the Site for future development and leasing the Site for construction and operation of cargo holding or distribution facilities. The Proposed Action will have negligible impacts on MEM flight operations and is consistent with the *Memphis Airport Area Land Use Study Final Report* (Memphis 1992), the *Memphis Aerotropolis Airport City Master Plan* (Memphis 2014).

The Site is located approximately 1 mile south of MEM on the southeast corner of East Holmes Road and Swinnea Road and north of the Tennessee/Mississippi state line, in Memphis, Shelby County, Tennessee (Figure 1). The Site is not contiguous with the airport SIDA. A physical address does not exist for the entire Site; it comprises three tax parcels (09440000107, 09440000128, and 09440000129) totaling 245.8 acres. The Site is predominantly wooded and contains jurisdictional wetlands and streams. A Texas Gas Company natural gas pipeline transects the north portion of the Site. A Tennessee Valley Authority (TVA) power line easement crosses the south Site parcel and a Valero and a Memphis Light, Gas and Water (MLGW) gas line easement is along the west and south Site boundaries.

2.1.1 SITE PREPARATION

The purpose of the Proposed Action is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. A Proposed Site Plan identifies the potential for approximately 1.5 million

sf of facility space at the Site with approximately 300,000 sf of additional space allotted for future growth, if needed (Figure 3). Site preparation will include tree removal, grading, filling, utility main extensions, and construction of stream crossings to allow for future site pad development by private companies. MSCAA proposed to oversee the extension of sanitary sewer and water services, gas and electrical services and meters, installation of stream crossings, and placement of fill to bring future building pads, parking lots, and driveways to required elevations. Approximately 220,000 cubic yards of soil will be required to prepare the Proposed Action Site for the proposed buildings, driveways, and parking lots. It is anticipated that the fill material would come from the Proposed Action Site, resulting in a balance of material at the Site. One temporary stream crossing is proposed for construction purposes and one permanent steam crossing is proposed at the Proposed Action Site. The permanent stream crossing will provide a route to the southernmost future facility. Construction associated with Site preparation is estimated to last between 6 to 9 months.

Reasonably foreseeable connected actions include construction of facilities by a private developer(s) and long-term operation of future facilities by a MEM tenant(s). Construction associated with future facilities at the Site is estimated to last between 6 to 9 months. Site developers and tenants have not been identified at this time. The Site preparation, Site development, and operation of future facilities are collectively considered to comprise the Proposed Action.

2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the MSCAA would not prepare the airport-owned land for development and future lease. Under the No Action Alternative, the Site would not meet the need of the Proposed Action. The Site would remain unproductive vacant land and would not contribute to operational efficiency or economic benefit, or be developed under a land use compatible with aircraft noise. The Site would continue to contribute to the current supply of underproductive and underutilized vacant land within the Airport City area.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED

The MSCAA selected a Site for the Proposed Action based on site evaluation factors listed below.

1. Sites that are owned by the MSCAA and available for release or lease and development compatible with MEM operations, including aircraft noise.
2. Sites of a reasonable size, configuration, and purchase terms to permit acceptable facility site design, including adequate ingress and egress to a paved thoroughfare, access to utilities, ample space for parking, and access to an Interstate.
3. Sites that exhibit no obvious negative environmental influences that cannot be corrected or acceptably mitigated.

Two additional sites owned by the MSCAA were evaluated for the project but were eliminated from further consideration based on a lack of compliance the site evaluation factors. An approximately 26-acre vacant site located south of Ketchum Road and east of Airways Achievement Academy was considered for preparation; however, the Ketchum Road site was deemed inadequate due to the relatively small site size, with respect to facility site configuration. An approximately 980-acre site located immediately south of Runways 36R and 36C was also considered for preparation; however, given the proximity to airport runways the site is subject to FAA grant assurance and compliance with slope safety requirements that preclude development. The East Holmes Road site met all the evaluation factors and was selected for release, as other possible or prudent alternatives were not identified.

SECTION 3.0

Affected Environment and Environmental Consequences

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Section 3 of the Draft EA Report describes the natural and human environments that exist at the approximately 245-acre Site and the potential environmental impacts of the Proposed Action. The environmental impacts can be described as beneficial or adverse and can vary in magnitude. The impacts of the Proposed Action are associated with construction and long-term operation of facilities at the approximately 245-acre Site. The Proposed Action may create short term (lasting during construction) or long-term (lasting more than five years) environmental impacts. For this Draft EA Report, the magnitude of environmental impacts will generally be classified as follows.

No Impact:

A resource would not be affected, or the impacts would be at or below the level of detection (negligible), and changes would not result in any measurable or perceptible consequences.

Minor Short-Term:

Impacts on a resource would be detectable for a short period (typically during construction), would be localized, and would be of minor consequence to the sustainability of the resource. Mitigation measures, if needed to offset adverse short-term effects, would be simple and achievable.

Minor Long-Term:

Impacts on a resource would be readily detectable for a period of more than five years, measurable, and associated with the operation of the Proposed Action. Mitigation measures, if needed to offset adverse long-term effects, would be achievable but more extensive than those for short-term.

Significant:

Impacts on a resource would be obvious, long-term, and would have substantial consequences on a regional scale. Mitigation measures, if needed to offset adverse significant effects, would be extensive. Significant impacts would warrant an EIS to further assess the impacts to affected resources as a result of the Proposed Action.

This Draft EA Report describes the following resource areas and assesses the potential for the Proposed Action to affect them: air quality; biological resources; climate; coastal resources; U.S. DOT Act, Section 4(f); farmlands; hazardous materials, solid waste and pollution prevention; historical, architectural, and cultural resources; land use; natural resources and energy supply; noise and noise-compatible land use; socioeconomics, environmental justice, and children's environmental health and safety risks; visual effects; and water resources.

3.1 AIR QUALITY

3.1.1 REGULATORY SETTING

The Clean Air Act (CAA) is the primary statute related to the evaluation of air quality considered in this EA. In accordance with the CAA, the United States Environmental Protection Agency (U.S. EPA) has set National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants considered harmful to public health and the environment. The criteria air pollutants are carbon monoxide, lead, nitrogen dioxide, ground-level ozone, sulfur dioxide, and particulate matter. Particulate matter with diameters of less than 10 microns is known as PM10, and particulate matter with a diameter of less than 2.5 microns is known as PM2.5. Volatile organic compounds, nitrogen oxides, and other greenhouse gases (GHG) are also related to air quality and are considered as precursors to ozone formation. A discussion of GHG emissions is included in Section 3.3.

The U.S. EPA classifies air quality according to whether the concentrations of criteria air pollutants in ambient air of a designated area exceed set NAAQS. Areas are designated as either in "attainment," "nonattainment," "maintenance," or "unclassified" with respect to NAAQS for criteria air pollutant(s). An attainment status indicates that the air quality within a designated area is below the respective NAAQS for criteria air pollutant(s). Nonattainment indicates that the air quality exceeds the NAAQS for the criteria air pollutant(s). Maintenance indicates that the air quality within a designated area was previously designated as nonattainment for a criteria air pollutant(s) but has been re-designed to attainment status under an approved plan. An unclassified air quality designation means that there is not enough information to classify an area appropriately, so the area is assumed to be in attainment of the NAAQS.

For areas designated as nonattainment or maintenance status, the CAA requires the adoption of a State Implementation Plan (SIP) to achieve the NAAQS for the criteria air pollutant(s). The FAA is responsible for deciding whether its actions involving an airport located in a nonattainment or maintenance area require a general conformity evaluation. The term "general conformity" refers to the process of demonstrating that a federal action conforms to the applicable SIP before the proposed action is undertaken.

Under the CAA, the General Conformity Rule (the Rule) allows for federal agencies to present categories of actions that have been documented to be *de minimis* and therefore should be ''presumed to conform'' to the Rule. If the Proposed Action is not specifically exempt or classified as presumed to conform, it is necessary to conduct an emissions inventory as part of the applicability analysis to determine if emissions are likely to equal or exceed the established screening criteria emission rates known as the "*de minimis* thresholds." The U.S. EPA document, *De Minimis* Tables, is included in Attachment 2.

The U.S. EPA has defined broad categories of exempt actions under 40 CFR 93.153(c)(2) that result in no emissions increase or increases in emissions that are clearly de minimis. These actions are not subject to further analysis for applicability, conformity, or regional significance under the Rule. As part of the FAA's Federal Register Notice dated February 12, 2007, one such exempted action, relating to the Proposed Action evaluated in this Draft EA Report, is stated as "actions

(or portions thereof) associated with transfers of land, facilities, title, and real properties through an enforceable contract or lease agreement where the delivery of the deed is required to occur promptly after a specific, reasonable condition is met, and where the federal agency does not retain continuing authority to control emissions associated with the lands, facilities, title, or real properties are presumed to conform to *de minimis* thresholds (40 CFR 93.153[c][2][xix])." However, the Proposed Action also includes the evaluation of environmental impacts associated with the reasonably foreseeable construction and long-term operation of cargo holding or distribution facilities. The following sections offer a quantitative analysis of air quality impacts based on the full scope of the Proposed Action, aligning with actions presumed to conform with the Rule.

3.1.2 AFFECTED ENVIRONMENT

The affected environment with respect to air quality is the Greater Memphis Metropolitan area, including Shelby County, Tennessee, and portions of DeSoto County, Mississippi, and Crittenden County, Arkansas. This air quality area is collectively termed "Memphis, TN-MS-AR" by the U.S. EPA. and is in maintenance status for the 2008 8-hour ozone and carbon monoxide NAAQS.

The Ambient Air Monitoring Branch of the Shelby County Health Department monitors air quality throughout Shelby County. The Shelby County Health Department develops, operates, and maintains a regional air monitoring network of 23 monitors at seven site locations, including one at MEM. Air quality data are reported daily for ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. The U.S. EPA uses the collected air quality data to publish a color-coded Air Quality Index (AQI) on the AirNow.gov website.

Annual air quality statistics for 2020 will not be finalized until May 1, 2021. However, during 2019, the AQI for Memphis included 221 days where the air quality was classified as good, noted in green on the AQI. In 2019, 139 days were classified as moderate, noted in yellow on the AQI. According to the U.S EPA, moderate air quality is acceptable; however, for some pollutants such as ground level ozone or particle pollution, there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution. In 2019, five days were classified as unhealthy for sensitive groups, noted in orange. Members of sensitive groups, such as older adults and children, may experience health effects on those days. In 2019, no days were classified as unhealthy or very unhealthy for air quality.

Three 30-day interval AQI outputs for 2020 are included in Attachment 2, showing the daily AQI from May 14 to June 11, from August 25 to September 23, and from October 16 to November 14, 2020. The AQI output for those dates shows the majority of days classified as good air quality days, 17 days classified as moderate air quality days, and one day classified as unhealthy air quality for Memphis, Tennessee.

The topography of the Site is relatively flat with lower elevations towards the center of the Site. The physical and meteorological conditions at the 245-acre Site are not anticipated to hinder the dispersal of any potential air emissions.

3.1.3 ENVIRONMENTAL CONSEQUENCES

3.1.3.1 PROPOSED ACTION

Under the Proposed Action, MSCAA would prepare an approximately 245-acre Site, located approximately 1 mile south of MEM, in Memphis, Tennessee. The purpose of the Proposed Action is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. The proposed

Site Plan identifies the potential for approximately 1.5 million sf of facility space at the Site with approximately 300,000 sf of additional space allotted for future growth, if needed (Figure 3). The future development of the Site is reasonably foreseeable; therefore, environmental impacts associated with the preparation of the land and the future development are considered together as the Proposed Action in this Draft EA Report.

The Proposed Action would not increase airside capacity and does not include any aircraft movement or combustion of jet fuel or aviation gasoline. The Proposed Action does not include operations utilizing boilers, incinerators, or other operations requiring an air emissions permit. The Proposed Action will result in minor short-term and long-term adverse impacts on air quality, when compared to the No Action Alternative. The anticipated impacts to air quality relate to the generation of fugitive dust and mobile source emissions from the short-term construction period and long-term operation of the Proposed Action.

Impacts to air quality resulting from the Proposed Action were modeled using the U.S. EPA Motor Vehicle Emission Simulator (MOVES) emission model. The MOVES model calculates estimated emissions from mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics. For the air quality impact analysis, direct emissions associated with an estimated 9-month construction period were calculated separately from indirect emissions, associated with the increase in fleet and employee vehicle trips. The following paragraphs detail the assumptions used to calculate air quality emissions within MOVES. Model defaults within MOVES were assumed unless otherwise stated. The MOVES output is included in Attachment 2.

Incremental impacts to air quality are anticipated from onsite engine-powered construction equipment, worker commutes, material transport, and evaporative/volatilization sources. The duration of the construction is divided into two phases: site preparation and building construction. Onsite diesel-powered site preparation equipment modeled within MOVES includes the following equipment:

- (1) Cement and Mortar Mixer
- (1) Dumper/Tender
- (1) Excavator
- (1) Grader
- (1) Off-Highway Truck
- (1) Rubber Tired Loader
- (1) Skid Steer Loader
- (1) Tractor
- (1) Trencher

Onsite diesel-powered building construction equipment modeled within MOVES includes the following equipment.

- (1) Cement and Mortar Mixer
- (1) Crane
- (1) Dumper/Tender
- (1) Excavator
- (1) Grader
- (1) Off-Highway Truck
- (1) Paver
- (1) Paving Equipment
- (1) Plate Compactor
- (1) Roller
- (1) Rubber Tired Loader
- (1) Signal Board
- (1) Skid Steer Loader
- (1) Surfacing Equipment
- (1) Tractor
- (1) Trencher

The duration of the project-related construction is assumed to be 12 months (6 months for site preparation and 6 months for building construction). Site preparation equipment is conservatively assumed to operate from June through December 2021 while building construction equipment would operate from January through June 2022. However, in a real-world scenario, construction requiring heavy equipment would be intermittent and would vary from day-to-day depending on Shelby County meteorological conditions such as wind or rain. It is assumed that construction activity will occur five days each week. For each day of construction activity, it is assumed that 378 construction worker passenger cars, 378 construction worker trucks, and 295 material delivery trucks access the site. Trip rate assumptions are based on conservative standards for building construction worker and vendor trips (CalEEMod 2017).

The assumptions for routine operation of future facilities are based on a similar MSCAA project, the Ketchum Road Land Release. The development proposed at the Ketchum Road Site in Memphis, Tennessee, includes an approximately 819,000 sf e-commerce fulfillment facility. Operational assumptions in the *Ketchum Road Land Release Environmental Assessment* include the daily movement and idling of approximately 120 delivery trucks and approximately 100 employee vehicles (FAA 2021). The Site Plan for the Proposed Action identifies 1.8 million sf of potential cargo holding or distribution facility space; 1.5 million sf of initial development, with approximately 300,000 sf of additional space allotted for future growth, if needed, (Figure 3). In the absence of an identified end-user(s) for the Site, operational assumptions considered in the *Ketchum Road Land Release Environmental Assessment* were doubled, based on the increase in total square feet proposed, 1.8 million sf. Operational assumptions for the Proposed Action include the daily movement and idling of approximately 264 delivery trucks and approximately 220 employee vehicles.

It is assumed that both delivery trucks and employee vehicles accessing the site would travel 30 miles round trip. Delivery trucks are modeled as diesel-fueled combination unit long haul trucks within the MOVES model. Model defaults are utilized to calculate fleet mix inputs for commuting workers. Model defaults include an assumption that 98% of commuting worker passenger vehicles are gasoline-fueled, 1% are diesel-fueled, and 1% are ethanol-fueled. The MOVES output is included in Attachment 2. The emission estimates calculated for the Proposed Action are presented in Table 1 and are below applicable *de minimis* thresholds, and therefore conform to the SIP and the requirements of The Clean Air Act.

Table 1 - Proposed Action Emission Estimates and *De Minimis* Thresholds (in Tons per Year)

Source	Nitrogen Oxides	Volatile Organic Compounds	Carbon Monoxide	PM 10	PM 2.5	Sulfur Dioxide
Direct Emissions (construction)	6.45	8.27	61.03	0.17	0.15	0.02
Indirect Emissions (operation)	14.43	6.28	51.01	0.43	0.40	0.043
De Minimis Threshold	100	100	100	100	100	100

Notes:
PM10 = Particulate matter with diameter of less than 10 microns.
PM2.5 = Particulate matter with diameter of less than 2.5 microns.

Additional context regarding the incremental impact of increased emissions due to construction and operation of the Proposed Action is provided through comparison to regional transportation actions that have demonstrated conformity with the SIP. The Memphis Metropolitan Planning Organization (MPO) is responsible for transportation policy development, planning, and programming for the counties of Shelby and Fayette, Tennessee, and DeSoto and Marshall, Mississippi, collectively known as the MPO Planning Area. The MPO completed an air quality conformity determination for the collective impact of hundreds of transportation projects in the *Livability 2050: Regional Transportation Plan, Fiscal Year 2020-23 Transportation Improvement Program* (MPO 2020). The MPO demonstrated that emissions estimates for future transportation projects in the greater Memphis area, through 2050, do not exceed applicable *de minimis* thresholds and are presumed to conform with the SIP. Of note, the expansion of the segment of Holmes Road adjacent to the Proposed Action is included as one of the projects evaluated by the MPO to determine conformity. The air quality conformity determination letter for the Transportation Improvement Program (TIP) and an excerpt of the Livability 2050 report listing the Holmes Road expansion project details are included in Attachment 2.

The Proposed Action is anticipated to have minor, short-term and long-term adverse impacts on air quality, when compared to the No Action Alternative. However, the air quality impacts are not anticipated to exceed applicable *de minimis* thresholds and will be minimized though compliance with Shelby County Health Department regulations and best management practices used to control fugitive dust and air emissions and minimize minor adverse impacts to air quality due to construction of the Proposed Action. Examples of best management practices include requiring onsite construction equipment be well maintained and equipped with the latest emissions control equipment, use of water sprays, application of cover materials and installation of vehicle wheel washing stations to minimize track-out onto local roadways. The use of natural gas-powered trucks or electric vehicles could also offset minor adverse impacts on air quality

3.1.3.2 NO ACTION ALTERNATIVE

There would be no change in air quality under the No Action Alternative.

3.1.4 MITIGATION

The Proposed Action will not exceed applicable *de minimis* thresholds and is presumed to conform with the SIP; therefore, mitigation for air quality is not proposed.

3.2 BIOLOGICAL RESOURCES

3.2.1 REGULATORY SETTING

As stated in FAA Order *1050.1F Desk Reference*, biological resources are valued for their intrinsic, aesthetic, economic, and recreational qualities, and include fish, wildlife, plants, and their respective habitats (FAA 2020). Typical categories of biological resources include:

- Terrestrial and aquatic plant and animal species
- Game and non-game species
- Special status species (state- or federally listed threatened or endangered species, marine mammals, or species of concern, such as species proposed for listing or migratory birds)
- Environmentally sensitive or critical habitats

The primary statutes, regulations, Executive Orders, and other guidance related to the evaluation of biological resources considered in this Draft EA Report are as follows:

1. The Bald and Golden Eagle Protection Act
2. The Endangered Species Act
3. Fish and Wildlife Coordination Act
4. Magnuson-Stevens Fishery Conservation and Management Act
5. Marine Mammal Protection Act
6. Migratory Bird Treaty Act
7. Executive Order 13112, *Invasive Species*
8. Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*
9. Executive Order 13751, *Safeguarding the Nation from Impacts of Invasive Species*
10. CEQ, *Guidance on Incorporating Biodiversity Considerations into Environmental Impact Analysis Under the National Environmental Policy Act*

As part of the Draft EA Report, informal consultation with the United States Fish and Wildlife Service (USFWS), the Tennessee Department of Environment and Conservation (TDEC), and the Tennessee Wildlife Resources Agency (TWRA) was initiated to determine whether any state-listed, federally-listed or candidate species or designated critical habitat are likely to be adversely affected by the Proposed Action. In addition, the USFWS Information for Planning and Conservation (IPaC) website was reviewed for a list of federally protected species and migratory birds with the potential to occur in the area. An informal level of consultation with the USFWS and TWRA was determined to be appropriate, based on research of the biological resources at the urban Proposed Action Site and inspection of the Site conducted by two biologists on April 15-16, 2020.

3.2.2 AFFECTED ENVIRONMENT

The Proposed Action Site is approximately 1 mile south of MEM at the Tennessee/Mississippi state line (Figure 1). The Site is currently vacant and predominantly wooded (Figure 2). A TVA transmission easement is located within the south portion of the Site, a Texas Gas Company transmission easement is within the north portion of the Site, and a Valero and MLGW easement is within the west portion of the Site (Figure 2). Representative photos of the Site are included in Attachment 3.

The Site is located on a local drainage divide. The principal drainage on the Site is Hurricane Creek, which flows northeasterly into Nonconnah Creek, and the Nonconnah Creek Watershed located in northwest Mississippi and southwest Tennessee. The southwestern portion of the Site is drained by a southwesterly flowing unnamed tributary that feeds into Rocky Creek in De Soto County, Mississippi. Rocky Creek flows west then northwest, emptying into Horn Lake Creek in Shelby County, Tennessee. There are several wetlands on the Site. A discussion of water resources is included in Section 3.14. The National Wetlands Inventory map layer, and Federal Emergency Management Agency floodplain map layer are included as Figure 4 and Figure 5, respectively.

Figure 5 - TN Historical Commission Surveyed Sites

According to a Phase I Environmental Site Assessment (ESA) of the Site conducted by EnSafe Inc. (EnSafe) in 2020, the Site has experienced significant disturbances. Based on information reviewed, the Site was developed for residential use as early as the 1930s. Historical information reviewed indicates portions of the Site were utilized for sand and gravel mining from around 1950 until 1979.

During a survey on April 15-16, 2020, biologists identified herbaceous and aquatic habitat at the Site. Biologists did not observe any critical habitat or threatened, endangered species, or migratory birds with the potential to exist in the area. Dominant plants included a mix of grasses and herbaceous plants in the open areas (e.g., transmission line and gas pipeline easements) and hardwood forested areas dominated by maple (Acer rubrum and Acer negundo), Hickory species (mostly Carya glabra), Hackberry (Celtis laevigata), cottonwood (Populus deltoides), Sweetgum (Liquidambar styraciflua), Oak (Quercus) species, and American elm (Ulmus americana).

Table 2 includes a list of threatened, endangered, or special status species whose occurrences have been documented in Shelby County, and have the potential to occur at the Site. The list of species on Table 2 are either federally designated by the USFWS and listed on the IPaC output, or by the State of Tennessee and published in the TDEC, Division of Natural Areas, Interactive Rare Species Database. Output from IPaC and the TDEC database is included in Attachment 3.

Table 2 - Federal/State Threatened, and Endangered or Special Status Species for Shelby County

Scientific Name	Common Name	Federal Status	State Status
Birds			
Dendroica cerulea	Cerulean Warbler	NS	D
Haliaeetus leucocephalus	Bald Eagle	NS	D
Limnothlypis swainsonii	Swainson's Warbler	NS	D
Sternula antillarum athalassos	Interior Least Tern	E	E
Thryomanes bewickii	Bewick's Wren	NS	D
Falco sparverius paulus	American kestrel*	NS	NS
Mammals			
Myotis septentrionalis	Northern Long-eared Bat	T	NS
Myotis sodalis	Indiana Bat	E	NS
Neotoma floridana illinoensis	Eastern Woodrat	NS	D
Reptiles			
Pituophis melanoleucus	Northern Pinesnake	NS	T
Plants			
Heteranthera multiflora	Multiflowered Mud-plantain	NS	S
Hottonia inflata	American Featherfoil	NS	S
Iris fulva	Copper Iris	NS	T
Magnolia virginiana	Sweetbay Magnolia	NS	T
Panax quinquefolius	American Ginseng	NS	S-CE
Rhynchospora harveyi	Harvey's Beakrush	NS	T
Schisandra glabra	Red Starvine	NS	T
Silene ovata	Ovate Catchfly	NS	E
Symphyotrichum praealtum	Willow Aster	NS	E
Ulmus crassifolia	Cedar Elm	NS	S

Notes:
Sources: Tennessee Department of Environment and Conservation Division of Natural Areas. Rare Species Viewer
http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9014:3::::::

USFWS IPaC website https://ecos.fws.gov/ipac/

* = Migratory bird, not a threatened or endangered species
NS = No Status
D = Deemed in Need of Management
E = Endangered
T = Threatened
S = Special Concern
CE = Commercial Exploitation

During the April 15-16, 2020 site visit, EnSafe biologists also conducted a survey of habitat suitability for the Indiana Bat (Myotis sodalis) and Northern Long-eared Bat (Myotis septentrionalis). The USFWS tracks the occurrence of the Indiana Bat and Northern Long-Eared Bat in Tennessee. The USFWS bat occurrence maps included in Attachment 3 indicate the listed bat species do not occur in Shelby County. However, a bat habitat survey was conducted according to procedures outlined in the 2019 USFWS Range-Wide Indiana Bat Summer Survey Guidelines. Several snags were identified during the survey, but these snags did not generally exhibit a sufficient degree of peeling or shaggy bark nor any major cavities that would serve as suitable bat roosting habitat. Most of the snags observed were dead willow (Salix nigra) trees, and no shagbark hickories (Carya ovata) were observed during the two-day Site survey. Most of the snags and aquatic resources were located within densely-forested areas that seemed unsuitable as flyway corridors. Some portions of the larger streams in the northeast quadrant of the Site traverse cleared, open (approximately 100 feet wide) utility line easements, but these altered patches of land would be expected to function as low resource value habitats. A wider utility line easement (approximately 230 feet wide) running through the southern portion allows a stream to cross, but that is buried in a culvert. In general, evidence of historical activities at the Site have left certain places highly altered.

Informal consultation with USFWS and TWRA specific to the Proposed Action did not identify any listed species that would be affected. On January 27, 2021, the USFWS reached a decision regarding potential impacts resulting from the Proposed Action with respect to threatened and endangered species, stating, "Based on the current property condition and best information available at this time, we would not anticipate federally listed species occurring at the site." The USFWS correspondence is included in Attachment 1. On January 28, 2021, the TWRA reached a decision regarding potential impacts resulting from the Proposed Action with respect to State-listed species, stating, "We do not anticipate adverse impacts to state listed species under our authority due to the proposed project; provided that best management practices to address erosion and sediment are implemented and maintained during construction activities." The TWRA correspondence is included in Attachment 1.

3.2.3 ENVIRONMENTAL CONSEQUENCES

3.2.3.1 PROPOSED ACTION

The Proposed Action includes the preparation of the Site for future development by private companies with an interest in constructing cargo holding or distribution facilities. A Proposed Site Plan identifies the potential for approximately 1.5 million sf of facility space at the Site with approximately 300,000 sf of additional space allotted for future growth, if needed (Figure 3). Site preparation will include tree removal, site grading and fill, utility main extensions, and stream crossings to allow for future Site pad development by private companies. The Proposed Action includes the extension of sanitary sewer and water services, gas and electrical services and meters, installation of stream crossings, construction of new streams, and placement of fill to bring future building pads, parking lots, and driveways to required elevations. This infrastructure will permanently alter the urban habitat at the Site through removal of vegetation where required, alteration of wetlands, and disturbance of wildlife using the Site. The alteration of existing aquatic features and anticipated 72.5 acre increase in impervious surface at the Site are discussed further in Section 3.14. Overall, approximately 77 acres of the approximately 245-acre Site will be disturbed (Figure 4).

Tree removal activities will comply with all Shelby County ordinances, including replanting trees and shrubs in the final landscape design. With respect to removal of vegetation, TDEC strongly encourages disposal methods such as wood chipping, rather than open burning, to minimize the impact on nearby homes and businesses. However, if open burning is employed as a vegetation

disposal method, the open burning must comply with the Shelby County Health Department open burning regulations and, where applicable, the State Division of Forestry burning regulations. The Shelby County Health Department will be contacted prior to conducting any open burning of any vegetative or construction/demolition related debris generated from Site preparation activities. Proposed design planning includes natural vegetative buffers at the perimeter of the Proposed Action Site to account for tree removal during Site preparation and interrupt sight lines from adjacent properties.

A storm water detention pond is proposed at the Site to account for an increase of approximately 77 acres of impervious surface. The Proposed Action will disturb more than an acre of land, which will require a construction stormwater general permit, which is further discussed in Sections 3.7 and 3.14. The detention of storm water at the Site will require compliance with the National Pollutant Discharge Elimination System (NPDES), which is discussed further in Sections 3.7 and 3.14. Overall, the loss of urban habitat at the Site due to the Proposed Action is considered minor and will not result in significant adverse impacts to biological resources.

Executive Order 13112 requires the prevention and control of invasive species. It directs Federal agencies to not authorize, fund, or carry out actions that they believe are likely to cause or promote the introduction or spread of invasive species in the U.S. unless the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species, and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions. The guidelines of Executive Order 13112 will be adhered to while constructing and maintaining the project to control and prevent the spread of any invasive species to the Site. To the extent possible, invasive-free seed mixtures will be used and revegetation will occur with native or noninvasive plant species.

Potential impacts on biological resources from the long-term operation of the Proposed Action include disturbance of light-sensitive or noise-sensitive species. Assumptions regarding operational light and noise associated with future facilities is primarily attributed to exterior security lighting and the flow of fleet trucks and employee vehicles in and out of the Site. The Proposed Action would not impact animals sensitive to light emissions, such as sea turtles. The context and intensity of light and noise impacts associated with the Proposed Action includes consideration of the urban setting, adjacent East Holmes Road, Swinnea Road, and noise associated with aircraft flight paths. Overall, the potential disturbance to urban wildlife from operational light or noise is considered minor and will not result in significant adverse impacts to biological resources.

Based on context and intensity indicators for biological resource impacts noted in FAA Order 1050.1F, the Proposed Action will not:

- Adversely impact special status species or their habitats or include a permanent loss of plant or wildlife species
- Adversely impact a species' reproductive success rate or mortality rate
- Impair a species' ability to sustain the minimum population levels required for population maintenance

The Proposed Action is anticipated to have minor, short-term and long-term adverse impacts on biological resources, when compared to the No Action Alternative. Site design planning has been incorporated to avoid the majority of the aquatic features present at the Site. Best management practices to address erosion and sediment will be implemented and maintained during construction activities. The impacts to biological resources due to the Proposed Action will not result in significant adverse impacts to biological resources.

3.2.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur, and no impacts to biological resources would result.

3.2.4 MITIGATION

Based on the lack of significant adverse impacts to biological resources, mitigation is not proposed for the Proposed Action.

3.3 CLIMATE

3.3.1 REGULATORY SETTING

As stated in FAA Order *1050.1F Desk Reference*, minimizing GHG emissions and identifying potential future impacts of climate change are important for a sustainable national airspace system (FAA 2020). GHGs are defined as carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (FAA 2020). Of the six recognized GHGs, only carbon dioxide is a direct aircraft combustion product (FAA 2020). For FAA NEPA evaluations, carbon dioxide, measured in metric tons, is considered the most important anthropogenic source for air traffic action or airport operations. Non-aircraft emission sources are typically not affected by airspace and procedural actions (FAA 2020). Potential climate impacts, as indicated by GHG emissions, are evaluated separately from air quality, based on the statutes, regulations, Executive Orders, and guidance listed below.

The primary statutes, regulations, Executive Orders, and other guidance related to the evaluation of climate considered in this Draft EA Report are as follows:

1. The Clean Air Act of 1970
2. Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*
3. Executive Order 13653, *Preparing the United States for the Impacts of Climate Change*
4. Executive Order 13693, *Planning for Federal Sustainability in the Next Decade*
5. Executive Order 13807, *Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects*
6. CEQ, *Federal Greenhouse Gas Accounting and Reporting Guidance*
7. CEQ, *Final Guidance on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews*

3.3.2 AFFECTED ENVIRONMENT

The Proposed Action Site is located in Shelby County, Tennessee, which is in attainment for all criteria air pollutants except the 2008 8-hour ozone and carbon monoxide NAAQS that are considered to be in maintenance status. The Site is maintained as vacant land by the MSCAA. The AQI for Memphis, published daily by the U.S. EPA, is considered satisfactory, and air pollution poses little or no health risk on most days of the year (Attachment 2).

3.3.3 ENVIRONMENTAL CONSEQUENCES

3.3.3.1 PROPOSED ACTION

The Proposed Action would not increase airside capacity and does not include any aircraft movement or combustion of jet fuel or aviation gasoline. The Proposed Action does not include operations utilizing boilers, incinerators, or other operations requiring an air emissions permit. The Proposed Action will result in minor short-term and long-term adverse impacts on climate, when compared to the No Action Alternative. The anticipated incremental impacts to climate relate to the generation of fugitive dust and mobile source emissions from the short-term construction period and long-term operation of the Proposed Action.

Incremental impacts to climate resulting from the Proposed Action were modeled using the U.S.

MOVES emission model. The MOVES model calculates estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics. For the climate impact analysis, direct emissions associated with an estimated 12-month construction period were calculated separately from indirect emissions, associated with the increase in fleet and employee vehicle trips. The following paragraphs detail the assumptions used to calculate GHG emissions within MOVES. Model defaults within MOVES were assumed unless otherwise stated. The MOVES output is included in Attachment 2.

Incremental impacts to climate are anticipated from onsite engine-powered construction equipment, worker commutes, and material transport. The duration of the construction is divided into two phases: site preparation and building construction. Onsite diesel-powered site preparation equipment modeled within MOVES includes the following equipment:

- (1) Cement and Mortar Mixer
- (1) Dumper/Tender
- (1) Excavator
- (1) Grader
- (1) Off-Highway Truck
- (1) Rubber Tired Loader
- (1) Tractor
- (1) Trencher

Onsite diesel-powered building construction equipment modeled within MOVES includes the following equipment:

- (1) Cement and Mortar Mixer
- (1) Crane
- (1) Dumper/Tender
- (1) Excavator
- (1) Grader
- (1) Off-Highway Truck
- (1) Paver
- (1) Paving Equipment
- (1) Plate Compactor
- (1) Roller
- (1) Rubber Tired Loader
- (1) Signal Board
- (1) Skid Steer Loader
- (1) Surfacing Equipment
- (1) Tractor
- (1) Trencher

The duration of the project-related construction is assumed to be 12 months (6 months for site preparation and 6 months for building construction). Site preparation equipment is conservatively assumed to operate from June through December 2021 while building construction equipment would operate from January through June 2022. However, in a real-world scenario, construction requiring heavy equipment would be intermittent and would vary from day-to-day depending on Shelby County meteorological conditions such as wind or rain. It is assumed that construction activity will occur five days each week. For each day of construction activity, it is assumed that 378 construction worker passenger cars, 378 construction worker trucks, and 295 material delivery trucks access the site. Trip rate assumptions are based on conservative standards for building construction worker and vendor trips (CalEEMod 2017).

The assumptions for routine operation of future facilities are based on a similar MSCAA project, the Ketchum Road Land Release. The devel-

opment proposed at the Ketchum Road Site in Memphis, Tennessee, includes an approximately 819,000 sf e-commerce fulfillment facility. Operational assumptions in the *Ketchum Road Land Release Environmental Assessment* include the daily movement and idling of approximately 120 delivery trucks and approximately 100 employee vehicles (FAA 2021). The Site Plan for the Proposed Action identifies 1.8 million sf of potential cargo holding or distribution facility space; 1.5 million sf of initial development, with approximately 300,000 sf of additional space allotted for future growth, if needed (Figure 3). In the absence of an identified end-user(s) for the Site, operational assumptions considered in the *Ketchum Road Land Release Environmental Assessment* were doubled, based on the increase in total square feet proposed, 1.8 million sf. Operational assumptions for the Proposed Action include the daily movement and idling of approximately 264 delivery trucks and approximately 220 employee vehicles.

Table 3 includes the GHG emissions calculated for the Proposed Action Project and the U.S. EPA GHG Reporting Program (GHGRP) threshold. The GHGRP (codified at 40 CFR Part 98), requires the reporting of GHG data and other relevant information from facilities that exceed 25,000 metric tons of carbon dioxide equivalents per year. The GHG emissions estimates calculated for the Proposed Action are below the GHGRP threshold of 25,000 metric tons of carbon dioxide equivalent.

Additional context regarding the incremental impact of increased GHG emissions due to construction and operation of the Proposed Action is provided through comparison to regional transportation actions. The MPO quantitatively evaluated the collective impact of hundreds of transportation projects, including an expansion of Holmes Road adjacent to the Proposed Action site, in the *Livability 2050: Regional Transportation Plan, Fiscal Year 2020-23 Transportation Improvement Program* (MPO 2020). The resulting air quality conformity determination for the evaluated transportation projects demonstrated that the tons-per-day emissions estimates for GHGs do not exceed corresponding emission thresholds per year, through 2050. It should be noted that the MPO is not required to make conformity determinations for GHGs. The air quality conformity determination letter for the TIP is included in Attachment 2.

The Proposed Action is anticipated to have minor, short-term and long-term adverse impacts on climate, when compared to the No Action Alternative. The Proposed Action is presumed to conform with the SIP. Incremental impacts to climate from the Proposed Action are not anticipated to exceed applicable GHGRP thresholds and will be minimized though compliance with existing regulations and best management practices.

Table 3 - Proposed Action Greenhouse Gas Emissions and Carbon Dioxide Equivalent Threshold (in Metric Tons per Year)

Source	Carbon Dioxide	Methane	Nitrous Oxide
Direct Emissions (construction)	2,580.83	0.44	0.26
Indirect Emissions (operation)	5,232.22	1.25	0.132
GHGRP Threshold	25,000	25,000	25,000

Notes:
GHGRP = The U.S. EPA GHG Reporting Program

3.3.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur, and no impacts to climate would result.

3.4 COASTAL RESOURCES

3.4.1 REGULATORY SETTING

According to FAA Order *1050.1F Desk Reference*, coastal resources include the natural resources occurring within coastal waters and their adjacent shorelands (FAA 2020). Coastal resources include islands, transitional and intertidal areas, salt marshes, wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as fish and wildlife and their respective habitats within these areas (FAA 2020). Coastal resources include the coastlines of the Atlantic and Pacific Oceans, the Great Lakes, and the Gulf of Mexico.

The primary statutes, regulations, and Executive Orders related to the protection of coastal resources considered in this Draft EA Report are as follows:

1. The Coastal Barrier Resources Act
2. The Coastal Zone Management Act
3. The National Marine Sanctuaries Act
4. Executive Order 13089, *Coral Reef Protection*
5. Executive Order 13547, *Stewardship of the Ocean, Our Coasts, and the Great Lakes*

3.4.2 AFFECTED ENVIRONMENT

The Proposed Action Site is located Memphis, Tennessee. The Proposed Action does not impact coastlines of the Atlantic and Pacific Oceans, the Great Lakes, or the Gulf of Mexico. Therefore, impacts to coastal resources resulting from the Proposed Action are not reasonably foreseeable.

3.4.3 ENVIRONMENTAL CONSEQUENCES

3.4.3.1 PROPOSED ACTION

There would be no changes to coastal resources under the Proposed Action.

3.4.3.2 NO ACTION ALTERNATIVE

There would be no changes to coastal resources under the No Action Alternative.

3.4.4 MITIGATION

Based on the location of the Proposed Action, there are no impacts to coastal resources; therefore, mitigation is not proposed for the Proposed Action.

3.5 DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(F)

3.5.1 REGULATORY SETTING

According to FAA Order *1050.1F Desk Reference*, Section 4(f) of the United States Department of Transportation (DOT) Act of 1966 protects significant publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historic sites (FAA 2020). Section 4(f) provides that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or land of a historic site of national, state, or local significance, only if there is no feasible and prudent alternative to using that land, and the program or project includes all possible planning to minimize harm resulting from the use (FAA 2020).

A Section 4(f) use can occur under two scenarios: Physical Use or Constructive Use. Physical Use involves the actual physical taking of Section 4(f) property through the purchase of land or a permanent easement, physical occupation

of a portion or all the property, or alteration of structures or facilities on the property (FAA 2020). Constructive Use refers to the severity of impacts resulting from the Proposed Action on a Section 4(f) property. Constructive Use includes impacts that are so severe that the activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the Section 4(f) property that contribute to its significance or enjoyment are substantially diminished. This means that the value of the Section 4(f) property, in terms of its prior significance and enjoyment, is substantially reduced or lost (FAA 2020).

The primary statutes, regulations, and other guidance related to the evaluation of Section 4(f) property considered in this Draft EA Report are as follows:

1. Land and Water Conservation Fund Act of 1965
2. U.S. DOT Act – Section 4(f)
3. Safe, Accountable, Flexible, Efficient Transportation Equity Act
4. United States Department of Defense Reauthorization

3.5.2 AFFECTED ENVIRONMENT

The affected environment, with respect to Section 4(f), considers sites identified by the Tennessee Historical Commission (THC), located at and near the Proposed Action Site on Swinnea Road. Figure 5 references the location of the THC-surveyed sites. These sites are discussed in detail in Section 3.8.

The onsite surveyed resources and other identified resources were considered during the coordination with the State Historic Preservation Office (SHPO), the THC. In correspondence dated December 4, 2020, the THC determined that no historic properties eligible for listing in the National Register of Historic Places will be affected by the Proposed Action (Attachment 1). Based on the SHPO determination, the Proposed Action is not anticipated to impact section 4(f) properties.

3.5.3 ENVIRONMENTAL CONSEQUENCES

3.5.3.1 PROPOSED ACTION

There would be no changes to Section 4(f) resources under the Proposed Action.

3.5.3.2 NO ACTION ALTERNATIVE

There would be no changes to Section 4(f) resources under the No Action Alternative.

3.5.4 MITIGATION

Impacts to Section 4(f) resources are not anticipated under the Proposed Action; therefore, mitigation is not proposed.

3.6 FARMLANDS

3.6.1 REGULATORY SETTING

According to FAA Order *1050.1F Desk Reference*, farmlands are defined as those agricultural areas considered important and protected by federal, state, and local regulations (FAA 2020). Important farmlands include all pasturelands, croplands, and forests considered to be prime, unique, or of statewide or local importance. Farmland does not include land already in or committed to urban development or water storage (FAA 2020).

The primary statute and guidance related to the protection of farmlands resources considered in this Draft EA Report are as follows:

1. Farmland Protection Policy Act
2. CEQ Memorandum on Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA

3.6.2 AFFECTED ENVIRONMENT

The Proposed Action Site is in an urban area of The Proposed Action Site is in an urban area of Memphis, Shelby County, Tennessee (Figure 1). The Proposed Action Site was mapped using the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Web Soil Survey. The NRCS Web Soil Survey output, included in Attachment 4, indicates that the Site is primarily composed of six soil types: Collins, Falaya, Grenada, Gullied land, Loring, and Memphis. Four of the onsite soil types (Collins, Falaya, Loring, and Memphis) are considered Prime Farmland in Shelby County, Tennessee. In total, 130 acres of the Site is considered to contain Prime Farmland.

3.6.3 ENVIRONMENTAL CONSEQUENCES

3.6.3.1 PROPOSED ACTION

Under the Proposed Action, MSCAA would prepare an approximately 245-acre Site, located approximately 1 mile south of MEM, in Memphis, Tennessee. The Proposed Action includes the preparation of the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. The proposed Site Plan identifies the potential for approximately 1.5 million sf of facility space at the Site with approximately 300,000 sf of additional space allotted for future growth, if needed (Figure 3).

The Proposed Action will permanently alter the use of the project Site and result in minor short-term and long-term adverse impacts on farmland, when compared to the No Action Alternative. The anticipated impacts to farmland relate to the conversion of land currently zoned as Conservation Agriculture. Figure 6 depicts the Site soil map overlain by the conceptual site plan.

The Tennessee USDA, NRCS was consulted to determine whether significant impacts or mitigation would be required for the conversion of Prime Farmland, as defined in the Farmland Protection Policy Act, to nonagricultural uses.

In correspondence dated December 8, 2020, the Tennessee USDA Area 2, determined the proposed project does not significantly impact Prime Farmland and/or farmland of statewide importance in the county since only 0.0656% will be converted (Attachment 1)

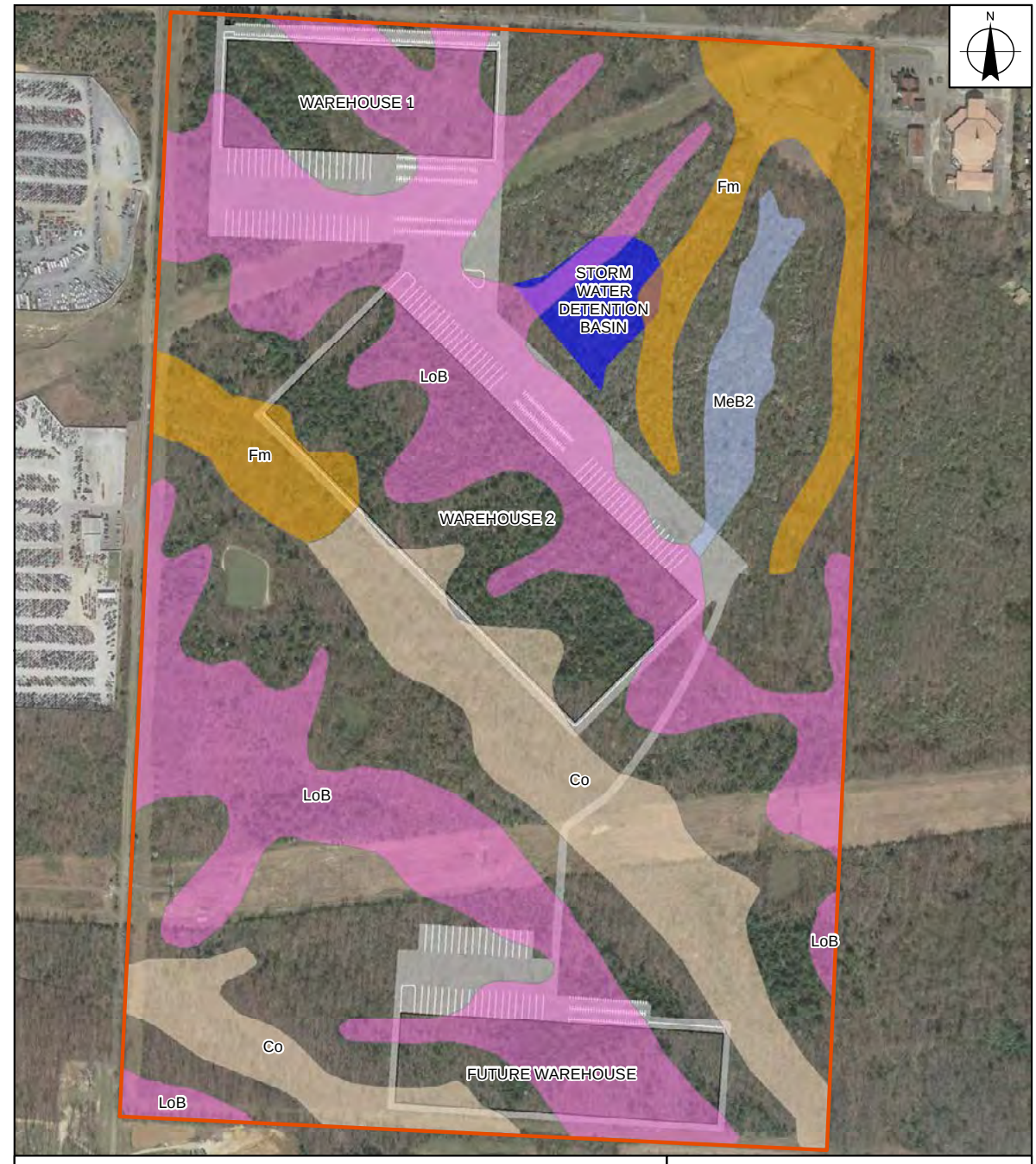
3.6.3.2 NO ACTION ALTERNATIVE

There would be no changes to farmlands under the No Action Alternative.

3.6.4 MITIGATION

Based on the USDA determination, mitigation is not required or proposed.

Figure 6 - Prime Farmland Map



LEGEND

CO	COLLINS SILT LOAM, 0 TO 2 PERCENT SLOPES, OCCASIONALLY FLOODED, BRIEF DURATION (PRIME FARMLAND)
FM	FALAYA SILT LOAM (PRIME FARMLAND)
LOB	LORING SILT LOAM, 2 TO 5 PERCENT SLOPES (PRIME FARMLAND)
MEB2	MEMPHIS SILT LOAM, 2 TO 5 PERCENT SLOPES, MODERATELY ERODED, NORTHERN PHASE (PRIME FARMLAND)

PROPOSED BUILDINGS (42.43 ACRES)
PROPOSED DETENTION BASIN (3.96 ACRES)
PROPOSED ROADS AND PARKING (29.51 ACRES)
APPROXIMATE SUBJECT PROPERTY BOUNDARY

NAD 1983 STATE PLANE TENNESSEE FEET

0 260 520

SCALE IN FEET

FIGURE 6
PRIME FARMLAND MAP
EAST HOLMES ROAD ENVIRONMENTAL ASSESMENT
MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY
MEMPHIS, SHELBY COUNTY, TENNESSEE

REQUESTED BY:	KL
DRAWN BY:	NR
DATE:	6/3/2021
PROJECT:	0888821806

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X:\MSCAA\PrimeFarmlandMap_v3.mxd

3.7 HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

3.7.1 REGULATORY SETTING

According to FAA Order *1050.1F Desk Reference*, hazardous materials, solid waste, and pollution prevention as an impact category includes an evaluation of the following:

- Waste streams that would be generated by a project, potential for the wastes to impact environmental resources, and the impacts on waste handling and disposal facilities that would likely receive the wastes
- Potential hazardous materials that could be used during construction and operation of a project, and applicable pollution prevention procedures
- Potential to encounter existing hazardous materials at contaminated sites during construction, operation, and decommissioning of a project
- Potential to interfere with any ongoing remediation of existing contaminated sites at the proposed project site or in the immediate vicinity of a project site

The primary statutes, regulations, Executive Orders, and other guidance related to the evaluation of hazardous materials, solid waste, and pollution prevention considered in this Draft EA Report are as follows:

1. Comprehensive Environmental Response, Compensation, and Liability Act (as amended by the Superfund Amendments Reauthorization Act of 1986 and the Community Environmental Response Facilitation Act of 1992)
2. Emergency Planning and Community Right-to-Know Act
3. Federal Facilities Compliance Act
4. Hazardous Materials Transportation Act
5. Oil Pollution Act
6. Pollution Prevention Act
7. Resource Conservation and Recovery Act
8. Toxic Substances Control Act
9. Executive Order 12088, *Federal Compliance with Pollution Control Standards*
10. Executive Order 12580, *Superfund Implementation* as amended by Executive Order 13016, as further amended by Executive Order 13308
11. CEQ Memorandum on Pollution Prevention and NEPA
12. FAA Orders and Advisory Circulars
13. Tennessee Solid Waste Management Act of 1991
14. Tennessee Department of Environment and Conservation, *Solid Waste Management Rule 0400*, Chapter 11 for Solid Waste and Chapter 12 for Hazardous Waste

3.7.2 AFFECTED ENVIRONMENT

The Proposed Action Site is approximately 245 acres located in Memphis, Tennessee (Figure 1). The affected environment considered for hazardous materials, solid waste, and pollution prevention includes any contaminated sites within or in the immediate vicinity of the Proposed Action area and the nearest receiving waterbody. The Site is located on a drainage divide; the principal drainage on the Site is Hurricane Creek, which flows northeasterly into Nonconnah Creek, and the Nonconnah Creek Watershed located in northwest Mississippi and southwest Tennessee. The southwestern portion of the Site is drained by a southwesterly flowing unnamed

tributary that feeds into Rocky Creek in De Soto County, Mississippi. Rocky Creek flows west then northwest, emptying into Horn Lake Creek in Shelby County, Tennessee. Water Resources are discussed in detail in Section 3.14. The affected environment for this resource area also includes the local disposal capacity for solid and hazardous wastes generated from the Proposed Action. The identification of contaminated sites and solid and hazardous waste disposal capacity are discussed in the following subsections.

3.7.2.1 IDENTIFICATION OF CONTAMINATED SITES

The 2020 Phase I ESA, included in Attachment 5, was conducted to:

- Evaluate the probability of impact to the surface water, groundwater, and/or soils within the Site boundaries through a review of regulatory information and a reconnaissance of the Site and vicinity
- Evaluate historical land usage to identify previous conditions that could potentially impact the environmental condition of the Site
- Conduct all appropriate inquiries as defined by ASTM International (ASTM) E1527-13, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*, and U.S. EPA Standards and Practices for All Appropriate Inquiries in 40 CFR Part 312
- Evaluate the potential for onsite and offsite contamination
- Provide a professional opinion regarding the potential for environmental impact at the Site and a list of recognized environmental conditions (RECs)

ASTM E1527-13 defines a REC as "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment." For the purposes of this practice, "migrate" and "migration" refer to the movement of hazardous substances or petroleum products in any form, including solid and liquid, at the surface or subsurface and vapor in the subsurface.

As part of the Phase I ESA, federal, state, and local database listings were searched for contaminated sites or for sites with the potential for contamination, including sites with fuel storage tanks. The Proposed Action Site was not listed in any of the federal, state, or local databases researched. Several sites were identified within the ASTM approximate minimum search distances for databases. However, the conclusions of the Phase I ESA revealed no evidence of recognized environmental conditions, controlled recognized environmental conditions, or historical recognized environmental conditions in connection with the subject property (EnSafe 2020a). Of note, the Proposed Action Site was identified as a homestead as early as the 1930s. Historical information reviewed indicates at least portions of the Proposed Action Site were used in surface mining of construction sand and gravel from around 1950 until the mining operation was abandoned on April 4, 1979. The Proposed Action Site property was inspected in 1980 by the U.S. EPA and a site description on the inspection report indicated the site as an "old gravel pit, now overgrown, no sign of stain, leachate, or disturbance".

The TDEC Division of Solid Waste Management (DSWM) manages legacy solid waste sites predating the Solid Waste Management Program initiated in 1972. The DSWM advises that any wastes unearthed during the project are subject to a hazardous waste determination and must be managed appropriately.

3.7.2.2 IDENTIFICATION OF SOLID AND HAZARDOUS WASTE DISPOSAL CAPACITY

The DSWM regulates material recovery facilities, transfer stations, and landfills for sanitary or municipal solid waste, industrial waste, farming wastes, and construction and demolition waste. A list of the operating permitted landfills in Shelby County including Class I, II, III, and IV landfills as of April 17, 2020, is included in Attachment 6. Waste is accepted at the following permitted landfills:

- Class I landfills, which accept non-hazardous municipal solid wastes such as household wastes, approved special wastes, and commercial wastes
- Class II landfills, which accept non-hazardous industrial wastes, commercial wastes, and fill
- Class III landfills, which accept Class IV wastes plus landscaping, land clearing, and farming wastes
- Class IV landfills, which accept construction/demolition wastes, shredded tires, and waste with characteristics similar to construction/demolition wastes

According to a 2018 Land Use Control Board (LUCB) Staff Report, the landfills that serve the Proposed Action area have sufficient capacity to receive wastes associated with the construction and operation phases of the Proposed Action through 2055. The Staff Report is included in Attachment 5. Hazardous waste is not anticipated to be generated by the Proposed Action.

Any wastes associated with the Proposed Action, including but not limited to: grading, excavation, and construction, materials destined for disposal, unforeseen damages and repairs, cleanup, surface stabilization, and leaks and spills, will be handled in accordance with the TDEC *Solid Waste Management Rule 0400*, Chapter 11 for Solid Waste and Chapter 12 for Hazardous Waste.

3.7.3 ENVIRONMENTAL CONSEQUENCES

3.7.3.1 PROPOSED ACTION

The preparation of the Site is anticipated to result in an increase in solid waste, when compared to the No Action Alternative. Preparation of the Site will involve clearing and grading portions of the Site to allow for approximately 1.5 million sf of facility space at the Site, with approximately 300,000 sf of additional space allotted for future growth, if needed (Figure 3). Approximately 220,000 cubic yards of soil will be required to prepare the Site for the proposed buildings, driveways, and parking lots. It is anticipated that the fill material would come from the Site, resulting in a balance of material at the Site. Disposal of cleared trees and unsuitable soils is anticipated as a result of the Proposed Action. Figure 7 depicts the areas where site fill is anticipated. Haul routes are proposed to minimize impacts to onsite water resources. Two stream crossings are proposed in connection with the haul routes. One temporary stream crossing is proposed for construction purposes and one permanent steam crossing is proposed at the Site. The permanent stream crossing will provide a route to the southernmost future facility. Figure 8 depicts the proposed haul routes in connection with the Proposed Action.

Figure 7 - Estimated Fill Areas

Figure 8 - Estimated Haul Road Location

The long-term operation of the Proposed Action is anticipated to result in an increase in solid waste, when compared to the No Action Alternative. Solid waste associated with cargo holding or distribution facilities may include items such as recyclable paper and packaging, waste associated with clerical functions, and employee break rooms such as food and beverage containers. Based on a review of operating permitted landfills in Shelby County, solid waste disposal related to the Proposed Action would result in minor, short-term adverse impacts to, solid waste when compared to the No Action Alternative. However, impacts to solid waste due to the Proposed Action are not considered significant.

The Proposed Action is not anticipated to result in the generation of hazardous waste. However, construction of the Proposed Action may include the use of paint, adhesives, and solvents. According to TDEC, any wastes associated with construction and operations of the Proposed Action must be handled in accordance with the Solid and Hazardous Waste Rules and Regulations of the state. This includes all materials that would be classified as solid and/or hazardous wastes per TDEC *Solid Waste Management Rule 0400*, Chapter 11 for Solid Waste, and Chapter 12 for Hazardous Waste.

The project construction contractor is responsible for proper storage and disposal of unused products and would determine the classification of all waste streams, including Universal Waste and Hazardous Waste per TDEC Solid Waste Management Rules 0400-12-01.12 and 0400-12-01.03(b). Limited (non-bulk) quantities of flammable liquids and combustible liquids are exempted from hazardous material labeling, unless the material is offered for transportation or transported by aircraft. Fuel associated with construction equipment or fleet vehicles will be contained inside the equipment and vehicles. Onsite fleet fueling is not proposed for the operation of the Proposed Action.

The Proposed Action will result in approximately 72.5 acres of impervious surface at the Site. A permanent stormwater detention pond is proposed to capture the anticipated increase in stormwater runoff at the Proposed Action Site (Figure 4). The stormwater detention pond will be designed to handle typical stormwater retention. However, an emergency outfall with capacity to handle added stormwater during a 50-year storm event may be included in the final design.

The U.S. EPA has developed permitting regulations under the National Pollutant Discharge Elimination System (NPDES) to control stormwater discharges associated with industrial activity. As a result, NPDES permitting authorities, delegated to the TDEC, Division of Water Resources, issue stormwater permits to control runoff from these industrial facilities. The Proposed Action will disturb more than an acre of land, which will require a construction stormwater general permit. Prior to commencement of future facilities activities, the developer will submit a Notice of Intent for Construction Activity Stormwater Discharges to TDEC, Division of Water Resources. The proposed site activities are also subject to the requirements of a Tennessee NPDES Multi-Sector Stormwater Permit for Industrial Activities and regulations under the U.S. EPA Sector P: Freight Transportation Facilities.

Requirements for coverage under an industrial stormwater permit include development of a written stormwater pollution prevention plan (SWPPP), implementation of control measures, and submittal of a request for permit coverage, usually referred to as the Notice of Intent. The SWPPP will provide an assessment of potential sources of pollutants in stormwater runoff, such as petroleum, and control measures that will be implemented at the facility to minimize the discharge of these pollutants in runoff from the Proposed Action Site. These control measures include site-specific best management practices, maintenance plans, inspections, employee training, and reporting.

In addition, installation of sediment controls such as filter berms and silt fences will be required to capture and retain mobilized debris and sediment during construction. Following construction activities, the tenant would also develop and submit a site-specific SWPPP and the Notice of Intent.

Minor short-term and long-term adverse impacts to pollution prevention are associated with the Proposed Action, when compared to the No Action Alternative. The impacts to are related to Site disturbances associated with the proposed construction and an increase in impervious surface at the Site. The Proposed action will comply with the NPDES Stormwater Permitting Program. Therefore, the Proposed Action is not anticipated to result in significant adverse impact to water resources.

The factors associated with hazardous materials, solid waste, and pollution prevention have been evaluated in this Draft EA Report in light of context and intensity to determine if significant impacts would result from the Proposed Action for this resource area. The Proposed Action will not:

- Violate applicable federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management
- Involve a contaminated site
- Generate an appreciably different quantity or type of solid waste, use a different method of collection or disposal, and/or exceed local disposal capacity

The Proposed Action will result in minor short-term and long-term adverse impacts on hazardous materials, solid waste, and pollution prevention, when compared to the No Action Alternative. The anticipated impacts relate to Site disturbances associated with site preparation, future facilities construction, and an increase in impervious surface at the Site. Identified impacts will be minimized though compliance with existing regulations, design planning, and best management practices.

3.7.3.2 NO ACTION ALTERNATIVE

There would be no changes to hazardous materials, solid waste, or pollution prevention under the No Action Alternative.

3.7.4 MITIGATION

Mitigation is not proposed based on the lack of significant impacts as a result of hazardous materials use, solid waste generation, and pollution prevention procedures.

3.8 HISTORICAL, ARCHITECTURAL, ARCHEOLOGICAL, AND CULTURAL RESOURCES

3.8.1 REGULATORY SETTING

According to FAA Order *1050.1F Desk Reference*, historical, architectural, archeological, and cultural resources encompass a range of sites, properties, and physical resources relating to human activities, society, and cultural institutions (FAA 2020). Such resources include past and present expressions of human culture and history in the physical environment, such as prehistoric and historic archaeological sites, structures, objects, and districts that are considered important to a culture or community (FAA 2020). Historical, architectural, archeological, and cultural resources also include aspects of the physical environment, namely natural features and biota, which are a part of traditional ways of life and practices and are associated with community values and institutions (FAA 2020).

The primary statutes, regulations, Executive Orders, and other requirements related to historical, architectural, archeological, and cultural resources considered in this Draft EA Report are as follows:

1. American Indian Religious Freedom Act
2. Antiquities Act of 1906
3. Archeological and Historic Preservation Act
4. U.S. DOT Act, Section 4(f)
5. Historic Sites Act of 1935
6. National Historic Preservation Act
7. Native American Graves Protection and Repatriation Act
8. Public Building Cooperative Use Act
9. Executive Order 11593, *Protection and Enhancement of the Cultural Environment*
10. Executive Order 13006, *Locating Federal Facilities on Historic Properties in Our Nation's Central Cities*
11. Executive Order 13007, *Indian Sacred Sites*
12. Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*
13. DOT Order 5650.1, Protection and Enhancement of the Cultural Environment
14. Executive Memorandum, Government-to-Government Relations with Native American Tribal Governments
15. Executive Memorandum on Tribal Consultation

3.8.2 AFFECTED ENVIRONMENT

The Site is located approximately one mile south of MEM at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State Line, in Memphis, Shelby County, Tennessee (Figure 1). A physical address does not exist for the Site, which comprises three tax parcels (09440000107, 09440000128, and 09440000129) totaling 245.8 acres. The project Site coordinates and surrounding area uses are depicted on Figure 2.

The Site is predominantly wooded and vacant. The Phase I ESA completed for the Proposed Action Site identified past uses of the Site as including a farmstead, a sand/gravel quarry, and utility easements (EnSafe 2020). The current use of the Site is for utility easements. A Texas Gas Company natural gas pipeline transects the north portion of the Site (parcels 09440000128 and 09440000129). A TVA power line easement crosses the south Site parcel (09440000107) and a Valero and MLGW gas line easement is along the west and south Site boundaries. Aerial photographs, topographic maps, and recent photographs of the Site are included in Attachment 5 and in the Phase I Cultural Resources Survey (Cultural Survey) completed at the Proposed Action Site in May 2020 (Panamerican 2020).

The Cultural Survey resulted in the identification of 5 twentieth-century Historic loci at the Proposed Action Site: four former house or farmstead sites and a breached earthen dam. The Cultural Survey is included in Attachment 6. The following list includes a description of the five cultural resources identified at the Proposed Action Site and recommendations for National Register of Historic Places (NRHP) eligibility for each resource:

- Locus 1 is a newly identified former historic house site located in the northwestern part of the Proposed Action Site, near

Swinnea Road, north of the Texas Gas Company pipeline. Locus 1 is recommended not eligible for the NRHP.

- Locus 2 is a newly identified historic house site located in the northern part of the Proposed Action Site, south of Holmes Road. Locus 2 is recommended not eligible for the NRHP.
- Locus 3 is a newly identified historic farmstead, later used by a quarry operation, located in the northern part of the Proposed Action Site. Locus 3 is recommended not eligible for the NRHP.
- Locus 4 is a historic farmstead that appears to have been later used as part of a quarry operation. It is located in the western portion of the Proposed Action Site where the THC recorded two structures (SY-31607A and SY-31708A). See Attachment 4, Panamerican Phase I Cultural Survey Report, Figure 4-02. Locus 4 is recommended not eligible for the NRHP.
- Locus 5 is a newly identified historic earthen dam located in the southern part of the Proposed Action Site, south of the TVA power lines and east of Swinnea Road. Locus 5 is recommended not eligible for the NRHP.

The Cultural Survey also included a review of the online THC database, which identified the aforementioned Locus 4 standing structures at the Site (SY-31607A and SY-31708A), as not eligible for the NRHP. Three additional THC records are identified on Figure 4-02 of the Cultural Survey, as near the Proposed Action Site (property SY-31606A and structures SY-31707A and SY-31705A). Property SY-31606A is the circa 1920 Brown Missionary Baptist Church Cemetery, located opposite the southwest corner of the Proposed Action Site on Swinnea Road. Structure SY 31707A is a circa 1940 traditional single-family rectangular residence, and its windows were missing when recorded. The residence is located south of the auto salvage property on Swinnea Road. Structure SY-31705A is recorded at 1920 Tchulahoma Road. It is a 1920 traditional single-family rectangular residence. There is not a line of sight to this structure from the Proposed Action Site. A review of Tennessee Department of Archeology records revealed that there are no previous archaeological sites within the Proposed Action Site. The Cultural Survey included a finding that the Proposed Action Site has a moderate to low probability of containing archaeological resources.

3.8.3 ENVIRONMENTAL CONSEQUENCES

3.8.3.1 PROPOSED ACTION

The purpose of the Proposed Action is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. A preliminary site plan identifies the potential for approximately 1.5 million sf of facility space at the Site with approximately 300,000 sf of additional space allotted for future growth, as needed (Figure 3). The project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with MEM operations. The airspace above the Proposed Action Site is located within a main MEM aircraft flight path. Future redevelopment and long-term lease of the Site will provide economic opportunities to the MEM area, while maintaining use that is compatible with aircraft noise. A reasonably foreseeable connected action includes construction of facilities by a private developer(s) and the long-term operation of future facilities by a long-term MEM tenant(s).

Approximately 32% (77 acres) of the Proposed Action Site is proposed for development as new impervious surfaces. Site preparation activities will include tree removal, grading, filling, utility main extensions, and stream crossings to allow for future site pad development by private companies. The MSCAA proposes to oversee the extension

of sanitary sewer and water services, installation of gas and electrical services and meters, installation of stream crossings, and placement of fill to bring future building pads, parking lots, and driveways to required elevations. Approximately 220,000 cubic yards of soil will be required to prepare the Site for the proposed buildings, driveways, and parking lots. It is anticipated that the fill material would come from the Proposed Action Site, resulting in a balance of material at the Site (Figure 7). Two stream crossings are proposed in connection with the haul routes. One temporary stream crossing is proposed for construction purposes and one permanent steam crossing is proposed at the southernmost facility at the Proposed Action Site (Figure 8).

Consultation with the State Historic Preservation Office was initiated by the FAA to determine the Area of Potential Effects (APE). The APE was determined to include the entire approximate 245-acre Proposed Action Site, with the exception of a 50-foot buffer of trees along Holmes Road and Swinnea Road. The APE buffer was proposed to mitigate for any potential visual impacts to the THC-identified resources (see Figure 3).

In correspondence dated December 4, 2020, the SHPO determined that no historic properties eligible for listing in the National Register of Historic Places will be affected by the Proposed Action (Attachment 1). As is expected for all site development, if human remains are discovered during ground-disturbing activities, all work will cease within 100 feet of the discovery, and the SHPO must be notified within 24 hours. Ground-disturbing work should not resume until proper authorization is granted.

3.8.3.2 NO ACTION ALTERNATIVE

There would be no changes to historical, architectural, archeological, or cultural resources under the No Action Alternative.

3.8.4 MITIGATION

Based on a lack of identified impacts to historical, architectural, archeological, or cultural resources, mitigation is not proposed. Design planning to reduce potential impacts associated with visual effects and water resources are discussed further in Sections 3.13 and 3.14.

3.9 LAND USE

3.9.1 REGULATORY SETTING

Land Use is discussed and analyzed in this Draft EA Report with respect to consistency with state and local plans, as required by the FAA Airport Improvement Program. This section documents that appropriate actions, including the adoption of zoning laws, have been or will be taken, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with airport operations (FAA 2020).

The primary statutes, regulations, Executive Orders, and other requirements related to land use considered in this Draft EA Report are as follows:

1. Airport and Airway Improvement Act of 1982, and subsequent amendments
2. American Antiquities Act of 1906
3. Airport Improvement Program (see FAA Order 5100.38D)
4. Airport Safety, Protection of Environment, Criteria for Municipal Solid Waste Landfills
5. Memphis 3.0 Comprehensive Plan
6. *Memphis and Shelby County Unified Development Code*
7. FAA Noise Buyout Grant Assurances (Obligations)

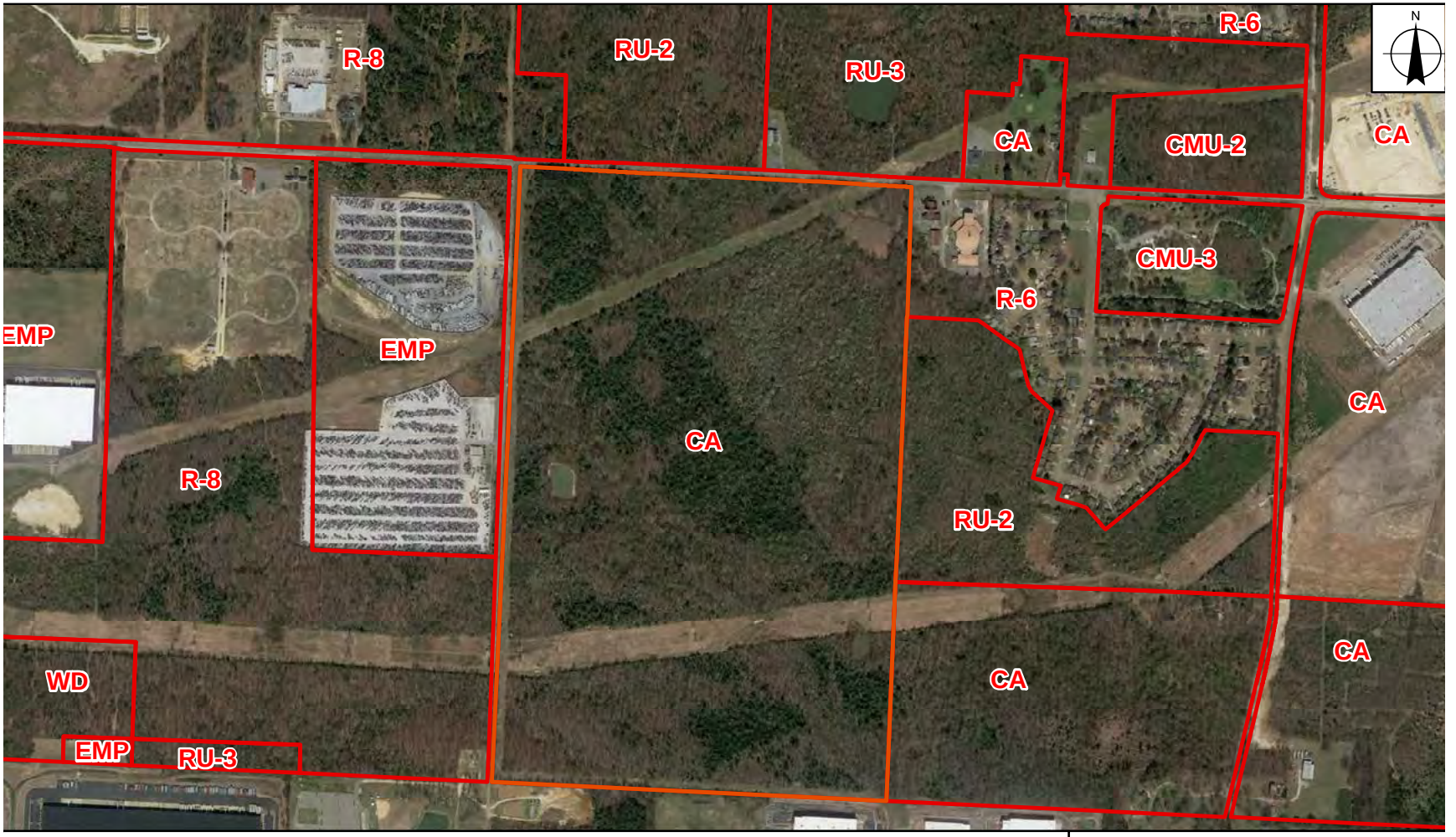
3.9.2 AFFECTED ENVIRONMENT

The affected environment evaluated for land use includes the Proposed Action Site and surrounding land uses described in the Memphis Airport Area Land Use Study Final Report, adopted by the City of Memphis and Shelby County in 1992. The study was the result of a multi-year land use planning effort involving the MSCAA and five local governments: the City of Memphis, Tennessee; Shelby County, Tennessee; the city of Southaven, Mississippi; the city of Horn Lake, Mississippi; and DeSoto County, Mississippi. Public involvement included meetings, workshops, and mailings reaching approximately 15,000 citizens within the 90-square-mile study area. The implementation program described in the *Memphis Airport Area Land Use Study Final Report* has been successful to date. The goal of the study was to carry out or facilitate the recommended noise mitigation actions that required the adoption of plans, land use policies, and ordinances by units of local government, including changes in zoning.

The Proposed Action Site is currently zoned Conservation Agriculture (Figure 9). A change in zoning will be required for the Site to a zoning designation that is compatible with the long-term operation of cargo holding or distribution facilities, such as Employment District (EMP). The EMP zoning designation is intended to accommodate office, light manufacturing, research and development, warehousing, wholesale, processing, and commercial uses in order promote economic viability, encourage employment growth, and limit the encroachment of non-industrial development within established industrial areas (Memphis 2010).

The MSCAA intends to enter the zoning entitlement process with the City of Memphis to seek approval for a change in zoning and planned development. Approval by the LUCB and Memphis City Council will allow for the appropriate zoning entitlements for the future private developers. Public notice requirements will be observed in accordance with Sub Section 9.3.4A of the *Memphis and Shelby County Unified Development Code* (Memphis 2010).

Figure 9 - Land Use Zoning Map



GEND

SHELBY COUNTY ZONING

APPROXIMATE SUBJECT PROPERTY BOUNDARY

A - OPEN - CONSERVATION AGRICULTURE

MU-2 - COMMERCIAL MIXED USE - 2

MU-3 - COMMERCIAL MIXED USE - 3

MP - INDUSTRIAL - EMPLOYMENT

-6 - RESIDENTIAL SINGLE FAMILY - 6

-8 - RESIDENTIAL SINGLE FAMILY - 8

RU-2 - RESIDENTIAL URBAN - 2

RU-3 - RESIDENTIAL URBAN - 3

WD - INDUSTRIAL - WAREHOUSE AND DISTRIBUTION

NAD 1983 STATE PLANE TENNESSEE FEET

0 500 1,000

SCALE IN FEET

FIGURE 9
LAND USE ZONING MAP
EAST HOLMES ROAD ENVIRONMENTAL ASSESSMENT
MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY
MEMPHIS, SHELBY COUNTY, TENNESSEE

REQUESTED BY:	KL
DRAWN BY:	RK
DATE:	12/17/2020
PROJECT:	0888821806

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The LUCB will determine the appropriate zoning designation for the Proposed Action Site to ensure compatibility with the surrounding zoning and land uses. The LUCB hearings are open to the public and include opportunities for the public to comment on the proposal.

Should the LUCB approve to send the request to the Memphis City Council, the Council will hear the request at three required meetings. The first of two readings of the proposal will be heard as part of the Memphis City Council Committee Meeting consent agendas. Public discussion of consent agenda items does not occur during committee readings; any vote will be perfunctory at the first two readings. The third and final reading is the public hearing for the Memphis City Council to consider the proposal. The public will have an opportunity to comment on the proposal prior to the Memphis City Council vote.

3.9.3 ENVIRONMENTAL CONSEQUENCES

3.9.3.1 PROPOSED ACTION

There would be a change to land use under the Proposed Action from Conservation Agriculture likely to Employment District. The change in land use would result in a minor long-term impact to the land use. The purpose of the Proposed Action is to return the Site to productive economic use while maintaining compatibility with surrounding land uses and MEM operations, including aircraft noise. By accepting FAA grant funds to purchase the Site, MSCAA is obligated to certain grant assurances. For reference, FAA Grant Assurance #31a relates to the disposal (release) of land as stated below:

"For land purchased under a grant for airport noise compatibility purposes, including land serving as a noise buffer, it will dispose of the land, when the land is no longer needed for such purposes, at fair market value, at the earliest practicable time. That portion of the proceeds of such disposition which is proportionate to the United States' share of acquisition of such land will be, at the discretion of the Secretary, (1) reinvested in another project at the airport, or (2) transferred to another eligible airport as prescribed by the Secretary. The Secretary shall give preference to the following, in descending order, (1) Airport Sponsor Assurances 2/2020 Page 16 of 18 reinvestment in an approved noise compatibility project, (2) reinvestment in an approved project that is eligible for grant funding under Section 47117(e) of title 49 United States Code, (3) reinvestment in an approved airport development project that is eligible for grant funding under Sections 47114, 47115, or 47117 of title 49 United States Code, (4) transferred to an eligible sponsor of another public airport to be reinvested in an approved noise compatibility project at that airport, and (5) paid to the Secretary for deposit in the Airport and Airway Trust Fund. If land acquired under a grant for noise compatibility purposes is leased at fair market value and consistent with noise buffering purposes, the lease will not be considered a disposal of the land. Revenues derived from such a lease may be used for an approved airport development project that would otherwise be eligible for grant funding or any permitted use of airport revenue."

The Proposed Action is consistent with the *Memphis Airport Area Land Use Study Final Report* (Memphis 1992) and the Master Plan (Memphis 2014). The Master Plan describes Airport City as an area that "faces pervasive blight, obsolescence, commercial disinvestment, and an oversupply of unproductive, vacant and underutilized land" (Memphis 2014).

Preparation of the Proposed Action Site will adhere to the *Memphis and Shelby County Unified Development Code* (Memphis 2010). The Proposed Action is not in conflict with the objectives of federal, regional, state, or local land use plans, policies, or controls for the area. The construction and long-term operation of cargo holding or distribution facilities will follow local zoning ordinances and permitting processes of City of Memphis and Shelby County government.

3.9.3.2 NO ACTION ALTERNATIVE

There would be no changes to land use under the No Action Alternative. Under this alternative, the MSCAA would not prepare the Proposed Action Site for future development as a cargo holding or distribution facility. Under the No Action Alternative, the Site would not meet the need of the Proposed Action. The Site would remain unproductive vacant land and would not contribute to operational efficiency or economic benefit, or be developed under a land use compatible with aircraft noise.

3.9.4 MITIGATION

Mitigation for a change in land use at the Proposed Action Site is not proposed.

3.10 NATURAL RESOURCES AND ENERGY SUPPLY

3.10.1 REGULATORY SETTING

Consumption of natural resources and use of energy supplies may result from construction and operation of a distribution facility. It is the policy of the FAA to encourage the development of FAA facilities that exemplify the highest standards of design, including sustainability principles (FAA 2020). It should be noted that the Proposed Action will not result in an FAA-owned facility. The Proposed Action does not involve the new construction or major renovation of an FAA-owned building or built-to-suit lease. The Federal action is limited to the release of land. However, following the land release, a reasonably foreseeable action includes redevelopment of the Proposed Action Site by a private entity. Therefore, a general discussion of the consumption of natural resources and use of energy supplies by the Proposed Action is included in this section.

The primary statutes, Executive Orders, and other requirements related to natural resources and energy supply considered in this Draft EA Report are as follows:

1. Energy Independence and Security Act
2. Energy Policy Act
3. Executive Order 13834, *Efficient Federal Operations*

3.10.2 AFFECTED ENVIRONMENT

The Proposed Action Site is approximately 245 acres located in Memphis, Tennessee (Figures 1 and 2). The affected environment considered for natural resources and energy supply includes the suppliers of Memphis-Shelby County energy resources such as power plants, water supply and sewage disposal utilities, and suppliers of natural gas. In addition, the affected environment for this resource area includes the amount of other consumable resources, such as water and asphalt, anticipated for the Proposed Action

The primary energy supplier for the Proposed Action Site is MLGW. MLGW is a multi-service municipal utility, serving more than 429,000 Memphis and Shelby County customers by delivering electricity, natural gas, and potable wa-

ter services. MLGW supplies electricity sourced from the Tennessee Valley Authority.

The City of Memphis is the primary provider of sanitary and storm sewer services for the Proposed Action Site. The City of Memphis Public Works Division is responsible for operating and maintaining streets, sanitary sewers, and storm drains. The Environmental Engineering Division operates and maintains two large wastewater treatment facilities that treat over 60 billion gallons of wastewater and dispose of more than 215 million pounds of biosolids annually, in accordance with state and federal water quality regulations.

The Proposed Action will not involve an onsite batch plant, where aggregate, sand, and water are combined to create concrete or asphalt, as is common for large scale construction projects. Consumable resources such as asphalt and aggregate will not be manufactured for use onsite during the construction phases of the Proposed Action. Future construction of facilities will utilize typical building techniques such tilt up panels to form exterior walls

3.10.3 ENVIRONMENTAL CONSEQUENCES

3.10.3.1 PROPOSED ACTION

Preparation of the Site will involve clearing and grading portions of the Site to allow for approximately 1.5 million sf of facility space at the Site, with approximately 300,000 sf of additional space allotted for future growth, if needed (Figure 3). The Proposed Action will result in approximately 72.5 acres of impervious surface at the Site (Figure 4). The proposed Site preparation includes tree removal, grading, utility main extensions, and construction of stream crossings to allow for future site pad development by private companies. The MSCAA proposed to oversee the extension of sanitary sewer and water services, gas and electrical services and meters, installation of stream crossings, and placement of fill to bring future building pads, parking lots, and driveways to required elevations.

Approximately 220,000 cubic yards of soil will be required to prepare the Site for the proposed buildings, driveways, and parking lots. It is anticipated that the fill material would come from the Site, resulting in a balance of material at the Site. Figure 7 depicts the areas where site fill is anticipated. Haul routes are proposed to minimize impacts to onsite water resources. Two stream crossings are proposed in connection with the haul routes. One temporary stream crossing is proposed for construction purposes and one permanent steam crossing is proposed at the Site. The permanent stream crossing will provide a route to the southernmost future facility. Figure 8 depicts the proposed haul routes in connection with the Proposed Action.

The Proposed Action will result in minor short-term and long-term adverse impacts on natural resources and energy supply, when compared to the No Action Alternative. The anticipated impacts to natural resources and energy supply relate to consumption of fuel for equipment, and consumable resources such as energy, water, asphalt, and concrete.

The Site preparation and future facility construction will utilize conventional methods and will require the consumption of fuel for equipment, and consumable resources such as water, asphalt, and concrete. Examples of onsite engine-powered construction equipment utilized during the Proposed Action include road graders, dump trucks, loaders, roller-compacters, excavators, backhoes, bulldozers, and paving equipment.

Routine operation of future cargo holding, or distribution facilities, is anticipated to include movement of approximately 240 delivery trucks and approximately 200 vehicles for employees accessing the facility. The long-term operation of future facilities will require fleet fuel consumption and consumption of fuel by employee vehicles or public transportation. Overall, the incremental impact of increased fuel consumption and consumable materials such as water, asphalt, and concrete due to construction and operation of future facilities is considered minor, as it is reasonably foreseeable that the amount of fuel and consumable material needed for construction and long-term operation of the Proposed Action is available from Shelby County suppliers.

The amount of energy consumed per gross sf for operation of future facilities is estimated at 20,000 British Thermal Units (or 5.8 kilowatt hours) based on estimates of a similar sized project proposed by the MSCAA on Ketchum Road. The amount of potable water consumed per gross sf for operation of the future facilities is estimated at 3 gallons based on estimates of a similar sized project proposed by the MSCAA on Ketchum Road. Consideration of the energy and utility needs for Proposed Action will also be evaluated by City of Memphis LUCB. The scope of this project is not anticipated to exceed the current regional demand for those resources or result in significant adverse impacts to natural resources or energy supply.

Electrical, natural gas, and potable water utility construction will be coordinated through MLGW's Customer Engineering Department. The utility service connection process will follow MLGW's multi step approval process to assess the capacity to support construction and operation of proposed future cargo holding or distribution facilities. Once technical specifications of the utility service needs are verified, Memphis Code Enforcement will make various inspections throughout construction of the facility and make a final inspection before MLGW can set any meters or provide other utilities. Attachment 1 includes correspondence with MLGW regarding the Proposed Action and MLGW design protocols for pre-construction.

MLGW and Shelby County have processes in place to permit and accommodate the amount of energy and water resources that will be required for the future cargo holding or distribution facilities. A large volume of water/water treatment is not anticipated for the construction or operation of future cargo holding or distribution facilities. Further, especially scarce or unusual materials are not anticipated to be used in the construction or operation of future cargo holding or distribution facilities. The energy demands and other natural resources consumed through construction and operation of the future cargo holding or distribution facilities is not anticipated to exceed supplies or result in significant impacts to natural resources or energy supplies. Overall, the impact on natural resources and energy supplies due to construction phases (short-term) and operation (long-term) of the Proposed Action is considered minor.

3.10.3.2 NO ACTION ALTERNATIVE

There would be no changes to natural resources and energy supply under the No Action Alternative.

3.10.4 MITIGATION

Based on the lack of significant adverse impacts to natural resources and energy supply from the Proposed Action, mitigation is not proposed.

3.11 NOISE AND NOISE COMPATIBLE LAND USE

3.11.1 REGULATORY SETTING

Noise is considered unwanted sound that can disturb routine activities and can cause annoyance (FAA 2020). The compatibility of existing and planned land uses with proposed aviation actions is typically determined in relation to the level of aircraft noise. However, based on a lack of proposed aviation activities and an airport action occurring outside the airport SIDA, this Draft EA Report considers primary noise sources other than aircraft operations. Per 49 U.S.C. § 47107(a)(10), documentation is provided to demonstrate that the Proposed Action is consistent with the City of Memphis' existing plans of public agencies for development.

The following statutes, regulations, and guidance related to noise and noise-compatible land use considered in this Draft EA Report are as follows:

1. Airport and Airway Improvement Act of 1982
2. Airport Noise and Capacity Act of 1990
3. Aviation Safety and Noise Abatement Act of 1979
4. Section 506 of the FAA Modernization and Reform Act of 2012
5. The Control and Abatement of Aircraft Noise and Sonic Boom Act of 1968
6. The Noise Control Act of 1972
7. FAA Advisory Circular 150/5020-1, *Noise Control and Compatibility Planning for Airports*

3.11.2 AFFECTED ENVIRONMENT

The Site is located on the south side of East Holmes Road and the west side of Swinnea Road in Memphis, Tennessee, approximately 1 mile south of MEM, at the Tennessee/Mississippi state line. The Site is not contiguous with the airport Security Identification Display Area. The surrounding land uses consist of a mix of vacant, forested land, commercial industrial development, and places of worship. The Site and surrounding area are shown on Figures 1 and 2.

The affected environment is also included as part of the Memphis Airport Area Land Use Study Final Report, adopted by the City of Memphis and Shelby County in 1992. Excerpted maps from the MEM *Part 150 Study Update* depicting the Proposed Action Site, with respect to current MEM noise exposure, are included in Attachment 7.

Noise mitigation and the implementation of programs described in the *Memphis Airport Area Land Use Study Final Report* has been successful to date. To mitigate for previously unacceptable aircraft noise, the Site, was purchased using federal grant funds as part of an Airport Improvement Program, (noise buyout program) from the late 1980s to the early 2000s. Due to measures taken to reduce aircraft noise, a portion of the Site is located outside of the 65-decibel noise contour (Attachment 7). Approximately half of the Proposed Action Site is located within the 65-decible noise contour. The northwest portion of the Site remains within the 70-decibel noise contour (Attachment 7).

By accepting federal grant funds to purchase the Site and mitigate for unacceptable aircraft noise, MSCAA is obligated to certain grant assurances. FAA Grant Assurance #31c relates to the financial self-sufficiency of the airport. It indicates that

land shall be considered to be needed for airport purposes under this assurance if (1) it may be needed for aeronautical purposes (including runway protection zones) or serve as noise buffer land, and (2) the revenue from interim uses of such land contributes to the financial self-sufficiency of the airport (85 FR 12048).

3.11.3 ENVIRONMENTAL CONSEQUENCES

3.11.3.1 PROPOSED ACTION

The Proposed Action consists of preparing the Site for future development and leasing the Site for construction and operation of cargo holding or distribution facilities. The purpose of the Proposed Action is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. A Proposed Site Plan identifies the potential for approximately 1.5 million sf of facility space at the Site with approximately 300,000 sf of additional space allotted for future growth, if needed (Figure 3).

Site preparation will include tree removal, grading, filling, utility main extensions, and construction of stream crossings to allow for future site pad development by private companies. MSCAA proposed to oversee the extension of sanitary sewer and water services, gas and electrical services and meters, installation of stream crossings and placement of fill to bring future building pads, parking lots, and driveways to required elevations.

The construction phases associated with Site preparation and future development activities are estimated to last approximately 6 to 9 months each. Construction is anticipated to occur only during daytime hours. Conventional use of heavy construction vehicles and equipment is anticipated during the construction phases of the Proposed Action. Examples of conventional construction equipment include road graders, dump trucks, loaders, roller-compacters, excavators, backhoes, bulldozers, and paving equipment. The construction phases of the Proposed Action are anticipated to result in a minor, short-term adverse increase in noise when compared to the No Action Alternative. The resulting construction noise is considered temporary and will not result in significant impacts to surrounding land uses. Vehicular traffic resulting from the operation of the Proposed Action is the long-term noise source, when compared to the No Action Alternative.

Operation of future cargo holding or distribution facilities is anticipated to result in an increase in traffic and traffic-related noise, when compared to the No Action Alternative. The assumptions for routine operation of future cargo holding or distribution facilities include movement of approximately 240 distribution trucks and approximately 200 employee vehicles accessing the facility 24 hours per day. A Noise Assessment was conducted as part of the EA to evaluate the context and intensity of noise associated with an increase in fleet traffic, due the operation of future facilities. The Noise Assessment is included in Attachment 7. The U.S. DOT Federal Highway Administration Traffic Noise Model (TNM) was approved for use to predict future sound levels (in decibels) based on fleet assumptions for routine operation of the Proposed Action (Edwards Pitman 2021).

The Noise Assessment includes a field-verified accuracy check of the TNM inputs. First, sound measurements were collected at three locations along East Holmes Road while real-time traffic counts were recorded. The accuracy of the TNM sound levels was verified by comparing the field-collected sound levels with the THM sound levels for the same time using the real-time traffic counts and the posted speed limit as model inputs. On May 29, 2020, three field measurements were collected at two locations along East Holmes Road (Attachment 7). The measurement locations were selected based on proximity to areas of human use and clear line-of-sight to the

traffic noise source (Edwards Pitman 2021). Field measurements were recorded during 15-minute intervals, at the four the locations using a laboratory calibrated Bruel & Kjær Model 2238 sound level meter (Edwards Pitman 2021). During the field measurement events, East Holmes Road traffic counts by vehicle type (cars, medium trucks, and heavy trucks) were recorded. The posted vehicle speeds of 40 miles per hour were observed at all field measurement locations (Edwards Pitman 2021). According to the Noise Assessment on May 29, 2020, the three field-collected sound levels ranged between 60.0 and 63.2 decibels. The TNM results for the same time indicated sound levels between 58.0 and 63.2 decibels. The TNM was deemed appropriate for use in analysis of noise levels within the study area, based on the similarities between the field and modeled sound levels (Edwards Pitman 2021).

According to the Noise Assessment, the predicted outdoor noise contours for the Proposed Action do not exceed 65 decibels (Edwards Pitman 2021). As shown on Figure 5 of the Noise Assessment (Attachment 7), the 65-decibel outdoor sound contour is limited to East Holmes Road and areas immediately north and south of the East Holmes Road right-of-way. The modeled noise contours represent a worst-case Proposed Action traffic scenario, including the daytime hourly movement of 1,328 vehicles (1,074 cars, 56 medium trucks, and 198 heavy trucks) along the eastbound and westbound lanes of East Holmes Road. Under the No Action Alternative (termed "No-Build" in the Nose Assessment), the hourly movement of 1,108 vehicles (974 cars, 56 medium trucks, and 78 heavy trucks) was modeled along the eastbound and westbound lanes of East Holmes Road. As shown on Figure 4 of the attached Noise Assessment, the outdoor sound contour for the No-Build scenario does not exceed 60 decibels (Attachment 7).

The operation of the Proposed Action is anticipated to result in a minor long-term adverse increase in traffic and traffic-related noise, when compared to the No Action Alternative. However, the modeled outdoor sound contours representing a worst-case operation scenario do not exceed 65 decibels, a noise level considered generally acceptable for outdoor areas. The Proposed Action would not have a significant impact with respect to noise and surrounding land use.

The City of Memphis requirements for initial project review are subject to the *City of Memphis Division of Engineering Design and Policy Review Manual* (Memphis 2018). Section 210 — Traffic Impact Policy for Land Development outlines the process for evaluating potential projects with regard to traffic impact. The first step in the review process is completion of a Traffic Generation Report, which determines if a Traffic Impact Study (TIS) will be required (Memphis 2018). *The East Holmes Road Site Preparation Trip Generation Report and Traffic Analysis Memorandum* is included in Attachment 7 and indicates that a TIS will be required during the Plan Review process, based on the expected vehicle trip generation (Barge 2021). The square footage estimates for Proposed Action are conceptual planning stage estimates, and future facilities will likely be constructed in stages, potentially by different developers. Once a site plan is finalized, the proposed project will be required to go through a Plan Review process with the City of Memphis. The City of Memphis Plans Coordinator will distribute the final site plan to the appropriate Engineering Departments for review. A TIS will be reviewed by the Traffic Engineering Department as part of that process.

The East Holmes Road Site Preparation Trip Generation Report and Traffic Analysis Memorandum also evaluated potential impacts to the future Level of Service (LOS) to the segment of East

Holmes Road adjacent to the Proposed Action site. LOS corresponds to traffic density and is expressed as a letter grade from A (best) to F (worst) (Barge 2021). *The East Holmes Road Site Preparation Trip Generation Report and Traffic Analysis Memorandum* indicates that the East Holmes Road segment is presently calculated to operate at LOS D in one or both directions during both weekday peak hours. However, according to the MPO, and as discussed in Section 3.1, the segment of East Holmes Road between Mill Branch Road and Tchulahoma Road is planned to be widened from two lanes to seven lanes by 2035 (PIN 107040.00) (Attachment 2). According to the City of Memphis, the widening project is currently in the design phase and construction is not anticipated to begin before 2023. Following the road widening, East Holmes Road will operate at LOS A, and will continue to operate at a LOS A with the addition of site-generated trips assumed from the Proposed Action at full capacity (Barge 2021). The widened roadway is projected to have ample capacity to accommodate site-generated trips and will not result in significant adverse impact to neighborhood or regional traffic (Barge 2021).

3.11.3.2 NO ACTION ALTERNATIVE

TThere would be no changes to noise or noise-compatible land use under the No Action Alternative. Under the No Action Alternative, the MSCAA would not prepare the Site for future development. The Site would remain unproductive vacant land and would not contribute to operational efficiency or economic benefit, or be developed under a land use compatible with aircraft noise.

3.11.4 MITIGATION

Based on a lack of significant noise impacts associated with the Proposed Action, mitigation is not proposed. Previous mitigation to offset previously unacceptable aircraft noise is referenced throughout the Draft EA Report as the Airport Improvement Plan (noise buyout program).

3.12 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

3.12.1 REGULATORY SETTING

Socioeconomics is an umbrella term used to describe aspects of a project that are either social or economic in nature, or a combination of the two (FAA 2020). A socioeconomic analysis evaluates how elements of the human environment such as population, employment, housing, and public services might be affected by the Proposed Action (FAA 2020).

The primary FAA statute relating to socioeconomic impacts is the Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970 (the Act). The Act sets out requirements, under 49 CFR Part 24, for federal project or projects involving federal funding that acquire real property or involve the displacement of people. Additionally, the Act directs FAA, to the fullest extent possible, to observe all state and local laws, regulations, and ordinances concerning zoning, transportation, economic development, housing, etc., when planning, assessing, or implementing a Proposed Action.

The FAA cites the U.S. EPA definition of environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (FAA 2020). The term "fair treatment" implies that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies (FAA 2020). In addition, FAA Order 1050.1F and U.S. DOT Order 5610.2(a) establish requirements for meaningful public involvement by minority and low-income populations. Should significant impacts resulting

from the Proposed Action be identified in any environmental resource category, the potential for disproportionately high and adverse effects on minority or low-income populations must be further examined pursuant to U.S. DOT Order 5610.2(a). This EA did not identify significant impacts for any of the environmental resource categories.

Pursuant to Executive Order 13045, the FAA is encouraged to identify and assess environmental health risks and safety risks that the FAA has reason to believe could disproportionately affect children (FAA 2020). Environmental health risks and safety risks include risks to health or safety that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, and soil, or products they might use or to which they might be exposed. The Task Force on Environmental Health Risks and Safety Risks to Children (Task Force), created by Executive Order 13045, identified four priority areas of impacts to children for attention:

- Asthma
- Unintentional injuries
- Developmental disorders (including lead poisoning)
- Cancer

This Draft EA Report provides context on whether the Proposed Action would create new or exacerbate existing adverse impacts to children in any of the four priority areas identified by the Task Force.

The following statutes, regulations, Executive Orders, and other guidance related to socioeconomics, environmental justice, and children's environmental health and safety risks considered in this Draft EA Report are as follows:

1. Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
2. Title VI of the Civil Rights Act of 1964, as amended
3. Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*
4. Memorandum of Understanding on Environmental Justice and Executive Order 12898
5. The Council on Environmental Quality Guidance: *Environmental Justice: Guidance Under the National Environmental Policy Act*
6. U.S. DOT Environmental Justice Strategy
7. U.S. DOT Order 5610.2(a), *Environmental Justice in Minority and Low-Income Populations*
8. *Promising Practices for EJ Methodologies in NEPA Reviews*, Report of the Federal Interagency Working Group on Environmental Justice & NEPA Committee
9. Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*

3.12.2 AFFECTED ENVIRONMENT

3.12.2.1 SOCIOECONOMICS

The affected environment for socioeconomics includes a population of 5,466 within a 5.96-square-mile area surrounding the Proposed Action Site. The following sources include the aggregated data for Proposed Action Site and portions of the surrounding Census Tracts that are within one mile of the Proposed Action Site:

1. The U.S. EPA Environmental Justice Screening and Mapping Tool, EJSCREEN Report

2. The Census Bureau, American Community Survey (ACS) Summary Report for 2013-2017
3. The Census Bureau 2010 Census Summary Report
4. The U.S. EPA NEPAssist Report

The socioeconomic output reports are included in Attachment 8. A summary of the socioeconomic statistics for the affected environment is provide in Table 4.

Table 4 - Summary of Socioeconomic Statistics in Affected Environment

Socioeconomic Category	American Community Survey Population Estimate	Percentage (%)
Total Population	5,761	Not Applicable
Minority Population	3,581	62
Population Reporting One Race	5,705	99
Total Black Population	3,323	58
Total White Population	2,205	38
Total Hispanic Population	140	2
Adult Population (age 18-65)	4,392	76
Child Population (age 0-17)	2,074	36
Language – English only	5,479	100
Educational Attainment – college degree (associates/ bachelor combined)	884	25
Total Households	1,788	Not Applicable
Household Income Range (<$15,000 - $25,000)	382	21

Source: Census Bureau, American Community Survey (ACS) Summary Report for 2013-2017

According to the EJSCREEN Report, the percentage of low-income persons living with a 1-mile radius of the Proposed Action Site is 67% (Attachment 9). EJSCREEN defines low-income individuals as those with incomes at or below 200 percent of the United States Department of Health and Human Services (HHS) poverty guidelines, which differs from the U.S. DOT definition used by the FAA. Per U.S. DOT Order 5610.2(a), a low-income population includes those individuals whose median household income is at or below the HHS poverty guidelines. For reference, the HHS 2020 poverty guidelines are $12,760 for a one-person household, or $26,200 for a four-person household (HHS 2020).

3.12.2.2 ENVIRONMENTAL JUSTICE

The affected environment is located in the MEM flight path. To mitigate for airport flight path noise, the Site and other properties north of the Site were purchased by the MSCAA as part of a FAA-funded noise buyout program during the late 1990s to the early 2000s. The U.S. EPA EJSCREEN Report summarizes information specifically relating to the affected environment, including a comparison of 11 environmental indexes for the State of Tennessee, U.S. EPA Region 4, and the nation (Attachment 8). The EJ Indexes are expressed in percentiles to provide perspective on how the affected area compares to Tennessee, U.S. EPA Region 4, and the nation. The EJSCREEN Report indicates the EJ Indexes for the State of Tennessee are higher than those reported for U.S. EPA Region 4 and the nation. The EJSCREEN Report includes values associated with the environmental indicators and an overall demographic index for the affected environment (Attachment 8). A comparison of the values and demographic index from the affected environmental area show elevated values when compared to averages for Tennessee, U.S. EPA Region 4, and the nation. For example, the EJSCREEN Report indicates a higher percentage of minority and low-income populations within a 1-mile radius of the Proposed Action Site when compared to Tennessee, U.S. EPA Region 4, and national percentages.

The EJSCREEN Report does not, by itself, determine the existence or absence of environmental justice concerns. The report output is taken into consideration when evaluating the context and intensity of the overall impacts associated with the Proposed Action.

3.12.2.3 CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISK

According to the ACS Summary Report for 2013-2017, approximately 36% of the population within the affected environment are under the age of 17. According to the Census data reported in the NEPAssist Report, there are no schools located within one mile of the Proposed Action Site.

Section 3.12.3.3 includes consideration of whether the Proposed Action creates new or exacerbates existing adverse impacts to children in any of the four priority areas (asthma, unintentional injuries, developmental disorders, and cancer) identified by the Task Force.

3.12.3 ENVIRONMENTAL CONSEQUENCES

The Proposed Action consists of Site preparation for future development by private companies with an interest in constructing cargo holding or distribution facilities. The Proposed Site Plan identifies the potential for approximately 1.5 million sf of facility space at the Site with approximately 300,000 sf of additional space allotted for future growth, if needed (Figure 3). The purpose of the Proposed Action is to return the Site to productive economic use while maintaining compatibility with surrounding land uses and MEM operations, including aircraft noise.

The following subsections include a discussion of impacts to socioeconomics, environmental justice, and children's environmental health and safety risk resulting from the Proposed Action.

3.12.3.1 SOCIOECONOMICS

The Proposed Action may result in minor short-term and long-term beneficial impacts with respect to socioeconomics. The beneficial impacts could be realized through an increase in job availability during the short-term construction phases of the Proposed Action. Factors associated with the Proposed Action have been discussed in the Draft EA Report and include the following conclusions regarding socioeconomics. The Proposed Action:

- Will increase economic growth at a vacant site purchased to mitigate excessive aircraft noise
- Will not disrupt or divide the physical arrangement of an established community
- Will not result in relocation of local businesses, public services, or housing units
- Will produce a beneficial change in the community tax base due to development of vacant land
- Will allow for development consistent with the *Memphis Airport Area Land Use Study Final Report*

3.12.3.2 ENVIRONMENTAL JUSTICE

An environmental justice analysis considers the potential of federal actions to cause disproportionately high and adverse effects on low-income or minority populations (FAA 2020). U.S. DOT Order 5610.2(a) provides the following definition for a "disproportionately high and adverse impact" that was used to assess impacts to environmental justice populations (FAA 2020). Disproportionately high and adverse effects on minority and low-income populations means an adverse effect that:

1. Is predominately borne by a minority population and/or a low-income population
2. Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population

The overall context for the Proposed Action originates in the late 1990s through the acquisition of the Site by MSCAA. Disproportionately high and adverse effects in the form of unacceptable aircraft noise impacts were identified at that time. Mitigation, long-range planning, and community outreach involving the Site has occurred since that time. In the early 1990s, the Site was identified as part of the Memphis Airport Area Land Use Study Final Report.

The Proposed Action Site is located in an area with a larger percentage of minority and low-income populations, when compared to Tennessee, U.S. EPA Region 4, and national percentages. Therefore, identified adverse impacts are further considered through the lens of environmental justice. This Draft EA Report has identified minor short-term and long-term adverse impacts to resources areas, when compared to the No Action Alternative. However, no significant adverse impacts have been identified in this Draft EA Report. Disproportionately high and adverse effects, in the form of unacceptable aircraft noise impacts, have been previously mitigated as part of a noise buyout program. The context and intensity of the identified short-term and long-term minor adverse impacts associated with the Proposed Action have been evaluated. The Proposed Action is not anticipated to lead to a disproportionately high and adverse impact to an environmental justice population due to:

- Significant adverse impacts in resource areas evaluated in this Draft EA Report

- Impacts to the physical or natural environment in a way that is unique to the environmental justice population

3.12.3.3 CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISK

Environmental health and safety impacts to children are evaluated as a separate resource area because children may experience the intensity of these impacts differently, when compared to adults exposed to the same Proposed Action (FAA 2020). Children are more heavily exposed to toxins in proportion to their body weight and are more likely to exhibit behaviors that put them at a greater risk for exposure to hazards (FAA 2020).

The Proposed Action Site is not located near a school (Attachment 8). According to the Phase I ESA, the Proposed Action is not associated with environmental health risks attributable to substances that a child is likely to come in contact with or ingest, such as toxic products, soil, drinking water, or other recreational waters. While not considered recreational waters, the Proposed Action Site includes a storm water detention pond (Figure 3). In addition, air emissions associated with the Proposed Action are anticipated to have minor adverse impacts on air quality based on mobile source emissions related to the construction and long-term operation of the facility.

Consideration is also given to pedestrians, cyclists, and other vehicles in the vicinity of the Proposed Action Site. The assumptions for routine long-term operation of the Proposed Action include movement of approximately 240 delivery trucks and approximately 200 employee vehicles accessing the facility 24 hours per day. *The East Holmes Road Site Preparation Trip Generation Report and Traffic Analysis Memorandum* indicates that the proposed Site development activities will have a significant adverse impact on neighborhood traffic along East Holmes Road (Barge 2021).

All vehicles associated with the Proposed Action will be required to the uphold speed limit. The posted speed limit along East Holmes Road is 40 miles per hour and Swinnea Road is 35 miles per hour. Based on operation assumptions, the Proposed Action would result in an increase in traffic on East Holmes when compared to the No Action Alternative. The operation assumptions for fleet and employee vehicle movement is not considered a significant contributor to injuries to children.

This Draft EA Report has identified minor, short-term and long-term adverse impacts to resource areas that relate to children's environmental health and safety risks, when compared to the No Action Alternative. The context and intensity of factors associated with children's environmental health and safety risks have been evaluated in this Draft EA Report. The Proposed Action is not anticipated to lead to a disproportionate health or safety risk to children, relating to asthma, unintentional injuries, developmental disorders, or cancer.

3.12.3.4 NO ACTION ALTERNATIVE

There would be no changes to socioeconomics, environmental justice, or children's environmental health risks and safety risks under the No Action Alternative. The Site would remain vacant and underutilized.

3.12.4 MITIGATION

Based on the findings in this Draft EA Report, mitigation for socioeconomics, environmental justice, and children's environmental health and safety risks is not proposed.

3.13 VISUAL EFFECTS

3.13.1 REGULATORY SETTING

Visual effects deal broadly with the extent to which the Proposed Action would either (1) produce light emissions that create annoyance or

interfere with activities or (2) contrast with, or detract from, the visual resources and/or the visual character of the existing environment (FAA 2020). Visual effects in this Draft EA Report are discussed in two categories: (1) light emissions and (2) visual resources and visual character (FAA 2020).

Light emissions include any light that emanates from a light source into the surrounding environment (FAA 2020). Visual resources include buildings, sites, traditional cultural properties, and other natural or manmade landscape features that are visually important or have unique characteristics (FAA 2020). Visual character refers to the overall visual makeup of the existing environment where the proposed action is located (FAA 2020). For example, areas in close proximity to densely populated areas generally have a visual character that could be defined as urban versus areas having a visual character defined by open grass fields, forests, mountains, or deserts (FAA 2020).

Although there are no federal special purpose laws or requirements specific to light emissions and visual effects, there are special purpose laws and requirements relevant to other resource areas such as Section 106 of the National Historic Preservation Act, U.S. DOT Act Section 4(f), the Wild and Scenic Rivers Act, and the Coastal Zone Management Act (FAA 2020). In addition, state and local regulations, policies, and zoning ordinances apply to visual effects, as discussed below.

3.13.2 AFFECTED ENVIRONMENT

The affected environment considered for this resource area includes both the visual resources and visual character effects. The 245.8-acre Site is located on the south side of East Holmes Road and the west side of Swinnea Road in Memphis, Tennessee, approximately 1 mile south of MEM, at the Tennessee/Mississippi state line (Figure 1). The Site is predominantly wooded and contains jurisdictional wetlands and streams. A Texas Gas Company natural gas pipeline transects the north portion of the Site. A TVA power line easement crosses the south Site parcel and a Valero and MLGW gas line easement is along the west and south Site boundaries (Figure 2). The surrounding land uses consist of a mix of vacant, forested land, commercial industrial development, and places of worship.

Light Emissions

The current level of light emissions at the Proposed Action Site includes glare emanating primarily from street and vehicle lighting along East Holmes Road and Swinnea Road. Frequent overhead aircraft traffic also contributes to the light emissions at the Site.

Visual Resources and Visual Character

The visual character of the Proposed Action Site is characterized by forested areas, open grass covered areas, and two utility easement access roads that bisect the Site. The wetlands and ponds at the Site are primarily located in densely wooded areas. Attachment 3 includes representative photos of the Proposed Action Site.

3.13.3 ENVIRONMENTAL CONSEQUENCES

3.13.3.1 PROPOSED ACTION

A portion of the Proposed Action Site would be visible from East Holmes Road and the Tennessee/Mississippi state line (Figure 3). The Proposed Site Plan reflects the consideration of wetlands, streams, THC-surveyed sites, and adjacent parcels. The Site design includes setbacks from Swinnea Road and east-adjacent parcels.

The presence of future cargo holding or distribution facilities at the Proposed Action Site will permanently alter the Site and viewshed from East Holmes Road and the Tennessee/Mississippi state line (Figure 3). Visual character and visual effect impacts from the Proposed Action will be minimized through design planning and compliance

with FAA lighting regulations and the *Memphis and Shelby County Unified Development Code* to reduce the potential for significant adverse impacts.

Light Emissions

The Proposed Action will result in minor long-term adverse impacts due to light emissions when compared to the No Action Alternative. The Proposed Action will result in sources of nighttime light emissions, including exterior/interior security lighting and vehicle lighting associated with the movement of fleet and employee vehicles during non-daylight hours. Exterior security lighting would remain directional and focus on exterior entrances, bay doors, and parking lots to minimize adverse offsite impacts of lighting such as light trespass and obtrusive light. Lighting will comply with Article 4 – *General Development Standards of the Memphis and Shelby County Unified Development Code* for outdoor site lighting and FAA requirements for lighting within a flight path. A lighting plan example, based on a similar project recently completed by the developer of the MSCAA land release for the Ketchum Road property, is included in Figure 10. The exterior lighting elements will be similar to those proposed for the Ketchum Road distribution/e-commerce fulfillment facility.

The conceptual design planning includes siting the proposed facilities to allow for the greatest distance between the proposed facilities and adjacent parcels, while avoiding impacts to onsite water resources (Figure 3). In addition, vegetation along the perimeter of the Site, will reduce the potential for significant adverse impacts of light emissions encroachment into the surrounding parcels.

Figure 10 - Engineering Site Plan

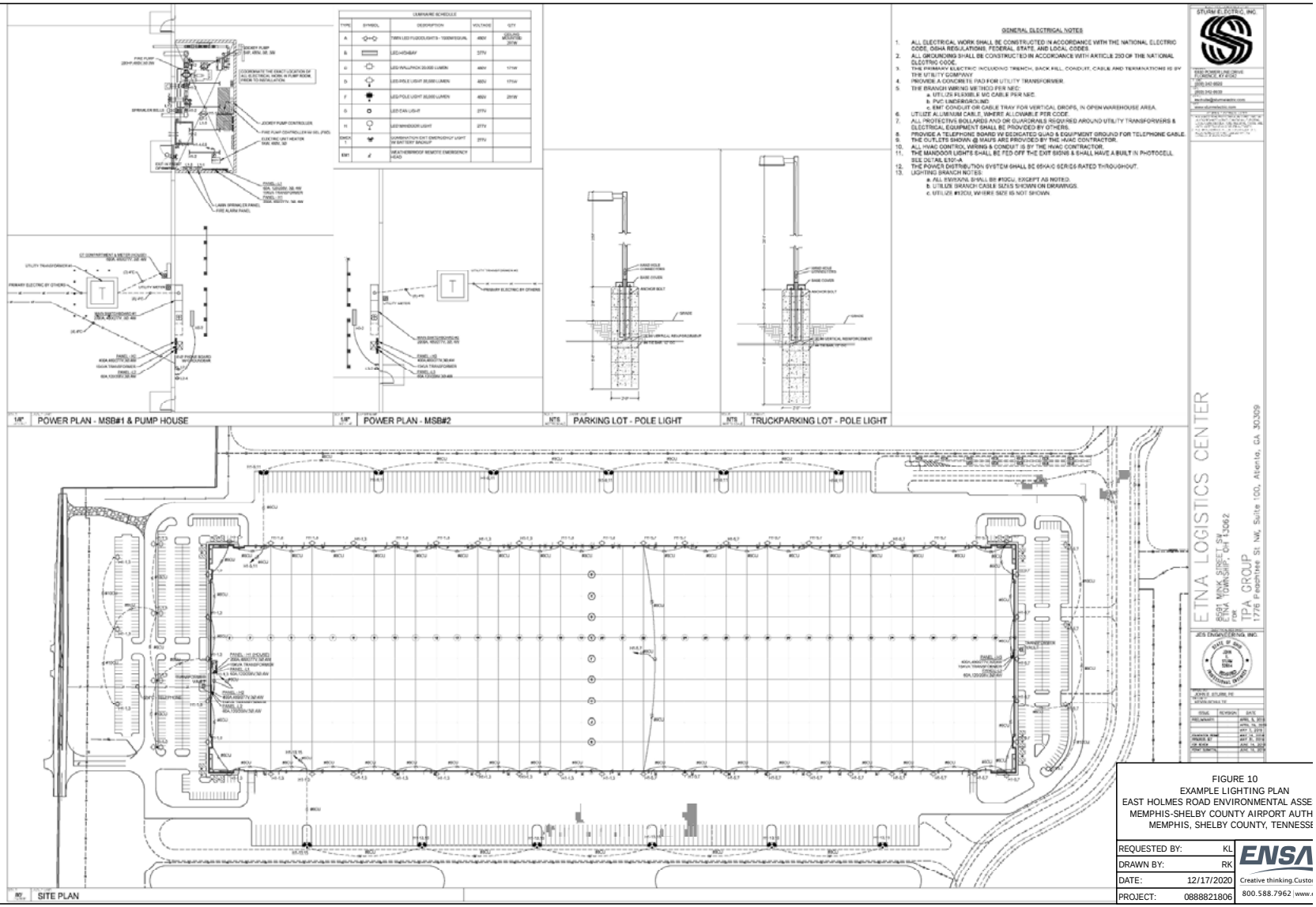

FIGURE 10
EXAMPLE LIGHTING PLAN
EAST HOLMES ROAD ENVIRONMENTAL ASSE
MEMPHIS-SHELBY COUNTY AIRPORT AUTH
MEMPHIS, SHELBY COUNTY, TENNESSE

REQUESTED BY:	KL
DRAWN BY:	RK
DATE:	12/17/2020
PROJECT:	0888821806

Source: City of Memphis and Shelby County (Memphis). Memphis and Shelby County Unified Development Code. August 10, 2010, Amended 2013. Access: https://www.shelbycountytn.gov/DocumentCenter/View/13413/ZTA-13-002-Complete-UDC-as-ap

Visual Character

The Proposed Action will result in minor short-term and long-term adverse impacts to visual character when compared to the No Action Alternative. Short-term impacts to visual character relate to the construction phases of the Proposed Action. The haul routes proposed for the Proposed Action begin and terminate at East Holmes Road (Figure 8). The Site preparation construction and future facilities construction will be most visible at the north west portion of the Site, near the intersection of East Holmes Road and Swinnea Road. There is not a direct line of sight from the proposed haul routes to occupied adjacent parcels. The nearest occupied parcel to the haul routes is the Pentecostal Praise Church of God in Christ located at 2922 East Holmes Road. The heavily wooded area and approximately 500 feet of distance between the church and the nearest proposed haul route will interrupt sight lines to the construction site. The short-term impacts to visual character resulting from the construction phases of the Proposed Action will not rise to the level of significant adverse impacts.

Long-term impacts to visual character relate to the operation of future cargo holding or distribution facilities. Proposed design planning includes vegetative buffers at the Proposed Action Site to interrupt sight lines from adjacent properties (Figure 3). Based on design planning and compliance with the Memphis and Shelby County Unified Development Code, the long-term impacts to visual character resulting from the operation of the Proposed Action will not rise to the level of significant adverse impacts.

3.13.3.2 NO ACTION ALTERNATIVE

There would be no changes to visual effects under the No Action Alternative.

3.13.4 MITIGATION

Based on the lack of significant adverse impacts to visual effects associated with the Proposed Action, mitigation is not proposed.

3.14 WATER RESOURCES

3.14.1 REGULATORY SETTING

According to FAA Order 1050.1F, water resources are surface waters and groundwater that are important in providing drinking water and in supporting recreation, transportation, commerce, industry, agriculture, and aquatic ecosystems (FAA 2020). This Draft EA Report includes analysis of the potential for disruption of water systems as well as potential impacts to the quality of water resources (FAA 2020). This section includes analysis of the following: wetlands, floodplains, surface waters, groundwater, and Wild and Scenic Rivers.

The primary statutes, Executive Order, and guidance related to the protection of water resources considered in this Draft EA Report are as follows:

1. Clean Water Act
2. Fish and Wildlife Coordination Act
3. Executive Order 11990, *Protection of Wetlands*
4. The U.S. EPA Navigable Waters Protection Rule
5. U.S. DOT Order 5660.1A, *Preservation of the Nation's Wetlands*
6. 2010 Tennessee Code 69-3-108 — Permits

3.14.2 AFFECTED ENVIRONMENT

The approximately 245-acre Site is located on a local drainage divide. The principal drainage on the Site is Hurricane Creek, which flows northeasterly into Nonconnah Creek, and the Nonconnah Creek Watershed, located in northwest Mississippi and southwest Tennessee. The southwestern portion of the Site is drained by a southwesterly flowing unnamed tributary that feeds into Rocky Creek in DeSoto County, Mississippi. Rocky Creek flows west then northwest, emptying into Horn Lake Creek in Shelby County, Tennessee.

3.14.2.1 WETLANDS AND SURFACE WATERS

In the *Aquatic Resource Assessment Report* submitted to the TDEC Division of Water Resources (DWR) and the United States Army Corps of Engineers (USACE), six streams, ten wetlands, nine wet weather conveyances (WWC), and seven pond features were identified at the Proposed Action Site (EnSafe 2020b) (Attachment 9). The regulated aquatic features at the Proposed Action Site are depicted on Figure 4. Agency concurrence regarding the Hydrologic Determination of the aquatic features of the Proposed Action Site is included in Attachment 1.

According to the Aquatic Resource Assessment Report, six streams are identified on the Proposed Action Site, totaling 9,461 linear feet (Attachment 9). Stream 1, also identified as Hurricane Creek, is approximately 3,395 linear feet in length. Stream 1 flows in a northwesterly direction across much of the Site and is located within the Lower Nonconnah Creek watershed (Figure 4). WWCs 1, 2, 3, 4, 5, 7, and 8 drain into Stream 1. Streams 2 and 3 both flow roughly parallel in a northerly direction in the northeast quadrant of the Site within the Lower Nonconnah Creek watershed (EnSafe 2020b). Both streams drain into Stream 4, which flows in a northwesterly direction. Streams 2 and 3 measure approximately 1961 and 1521 linear feet, respectively, while the onsite portion of Stream 4 measures approximately 699 linear feet. Streams 5 and 6 both flow in a generally westerly direction and meet at a confluence near the Site's west property boundary. Stream 5 receives hydrologic input from Wetland 10. Streams 5 and 6 are within the Horn Lake Creek watershed, and measure 675 and 1210 linear feet, respectively (EnSafe 2020b). The USACE and TDEC DWR review of the *Aquatic Resource Assessment Report* concurred with the Hydrologic Determination with respect to steams (Attachment 1).

According to the Aquatic Resource Assessment Report, there are ten wetlands identified on the Proposed Action Site, totaling 2.93 acres (Attachment 9). The wetlands are depicted on Figure 4. Wetland 1 measures approximately 1.61 acres in size and receives drainage from Stream 1. Wetland 2 measures approximately 0.35 acre in size and is hydraulically fed by seepage through the Pond 3. Wetland 3 measures approximately 0.13 acre in size and drains eastward into WWC 6. Wetland 4 measures approximately 0.19 acre in size and drains into Stream 2. Wetland 5 measures approximately 0.25 acre in size and drains into Stream 3. Wetlands 6 and 7 measure approximately 0.04 acre and 0.17 acre in size, respectively. Though not adjacent to each other, Wetlands 6 and 7 are connected to each other, and to Wetland 5, through Stream 3. Wetland 8 measures approximately 0.01 acre in size and is not connected to any streams or WWC. Wetland 9 measures approximately 0.03 acre in size and is connected to WWC 9 and Wetland 10. Wetland 10 measures approximately 0.15 acre in size and is connected to WWC 9 and Stream 5. The USACE and TDEC DWR review of the *Aquatic Resource Assessment Report* concurred with the Hydrologic Determination with respect to wetlands (Attachment 1).

According to the Aquatic Resource Assessment Report, nine WWCs are identified on the Proposed Action Site, totaling 1,846 linear feet (Attachment 9). WWCs are not considered jurisdictional by the USACE, nor do they require permits for alteration by TDEC. However, they are regulated under the requirements of 2010 Tennessee Code Title 69 — Waters, Waterways, Drains and Levees, Chapter 3 Water Pollution Control, Part 1 Water Quality Control Act § 69-3-108(q) which states that (1) The alteration of a WWC shall require no notice or approval provided that it is done in accordance with all of the following conditions:

A. (The activity may not result in the discharge of waste or other substances that may be harmful to humans or wildlife;

B. Material may not be placed in a location or manner so as to impair surface water flow into or out of any wetland area;

*C. Sediment shall be prevented from entering other waters of the s*tate;

i. Erosion and sediment controls shall be designed according to the size and slope of disturbed or drainage areas to detain runoff and trap sediment and shall be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices;

ii. Erosion and sediment control measures shall be in place and functional before earth moving operations begin, and shall be constructed and maintained throughout the construction period. Temporary measures may be removed at the beginning of the work day, but shall be replaced at the end of the work day;

iii. Checkdams shall be utilized where runoff is concentrated. Clean rock, log, sandbag or straw bale checkdams shall be properly constructed to detain runoff and trap sediment. Checkdams or other erosion control devices are not to be constructed in stream. Clean rock can be of various type and size, depending on the application. Clean rock shall not contain fines, soils or other wastes or contaminants; and

D. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the state. All spills shall be reported to the appropriate emergency management agency and to the division. In the event of a spill, measures shall be taken immediately to prevent pollution of waters of the state, including groundwater.

(2) There shall be no additional conditions upon a person's activity within a wet weather conveyance. This subdivision (q)(2) does not apply to national pollutant discharge elimination system permits.

According to the Aquatic Resource Assessment Report, seven ponds are identified on the Proposed Action Site, totaling 2.96 acres. Ponds are not considered jurisdictional by the TDEC DWR. However, the USACE review of the report concurred with the Hydrologic Determination with respect to ponds (Attachment 1).

3.14.2.2 FLOODPLAINS

A review of the Federal Emergency Management Agency, National Flood Hazard Layer (Panels 47157C0440F and 47157C0580F) indicates the Proposed Action Site is in unshaded Zone X, an area of minimal flood hazard. Zone X is an area determined to be outside the 500-year flood zone and protected by levee from the 100-year flood. The Flood Hazard Layers are included in Attachment 9.

3.14.2.3 GROUNDWATER

According to the Phase I ESA, groundwater flows south toward Nonconnah Creek, located approximately 0.4 mile south of the Proposed Action Site (ECS 2019). The Phase I ESA did not identify evidence of RECs in connection with the Site, including contaminated sites within or in the immediate vicinity of the Proposed Action area. (ECS 2019).

3.14.2.4 WILD AND SCENIC RIVERS

Based on a review of the National Park Service, Nationwide Rivers Inventory, there are no wild or scenic rivers in the Memphis, Tennessee, area. The Obed River is the only federally designated Wild and Scenic River in Tennessee. The Obed River is

part of the Cumberland Plateau in Tennessee, approximately 350 miles east of the Site. The Proposed Action does not occur in an area that would impact a federally designated Wild and Scenic River. The Nationwide Rivers Inventory map is included in Attachment 9.

3.14.3 ENVIRONMENTAL CONSEQUENCES

The Proposed Action is located in an area that will impact some of the aquatic resources identified at the Site. Proposed Site preparation activities are anticipated to reflect the conceptual design depicted in Figure 3. However, should changes occur to the Proposed Site design, additional impacts will be addressed through the applicable permitting and processes. Figure 4 depicts the conceptual site plan including approximately 1.8 million sf of facility space at the Site, and the identified aquatic features of the Site. USACE Nationwide permits, and TDEC General Aquatic Resource Alteration Permits (ARAP) will be required for Site preparation activities.

Pollution prevention measures associated with the Proposed Action include compliance with the NPDES Stormwater Permitting Program. The Proposed Action will involve redevelopment of approximately 75 acres, including clearing, grading, and excavation, resulting in an area of disturbance of greater than one acre. Overall, approximately 100 acres of the 245-acre Site will be disturbed. The proposed onsite stormwater detention pond will be regulated under NPDES permits for common pollutants found in industrial settings, such as petroleum in stormwater runoff from impervious surfaces. The Proposed Action will require a construction stormwater general permit, issued by the TDEC DWR. The proposed activity for the Site also falls under the requirement for Tennessee NPDES Multi-Sector Stormwater Permit for Industrial Activities and the U.S. EPA Sector P: Freight Transportation Facilities regulations. As a part of the permit, a site-specific SWPPP must be developed.

3.14.3.1 WETLANDS AND SURFACE WATERS

The Proposed Site design was developed to minimize, to the greatest extent, the impact to onsite aquatic resources. The Proposed Action, in its current configuration, is anticipated to impact Stream 1, WWCs 1, 2, 3, and 9, Wetlands 8 and 9, and Pond 1.

The Proposed Action would result in one permanent and one temporary impact to Stream 1 (Figure 8). The proposed impact includes the installation of two, approximately 30-foot stream crossings: one permanent and one temporary, construction-related stream crossing. The sections of new road would require a diversion of Stream 1 into a culvert beneath the portion of proposed new road. The stream crossing installed during construction as a haul route would be removed after construction is completed. Impacts to the other identified aquatic resources will result from the placement of fill at the Proposed Action Site.

Alteration of the identified aquatic resources will require USACE notification, a USACE Nationwide permit, and two General ARAPs from TDEC. However, based on the acreages and linear feet impacted by the Proposed Action, mitigation is not anticipated based on USACE and TDEC regulatory thresholds. A CWA 404 USACE Nationwide Permit 39 for Commercial and Institutional Developments is anticipated for impacts relating to Stream 1, Wetlands 8 and 9, and Pond 1. The estimated impacts include 30.56 linear feet at Stream 1, associated with a permanent stream crossing, the combined total acreage of Wetlands 8 and 9 (0.04 acres), and the Pond 1 acreage (0.13 acres). Thresholds for the USACE Nationwide Permit 39 for Commercial and Institutional Developments include stream impacts not greater than 300 linear feet and wetland/other water (e.g., ponds) impacts not greater than 0.5 acre. The impacts to aquatic resources resulting from the Proposed Action, in its current

configuration, does not trigger the USACE permit thresholds. Prior to the start of construction, a USACE Nationwide Permit 30 Pre-Construction Notification would be required.

In addition, two CWA 401 TDEC General ARAPs are anticipated based on the impacts to Stream 1 and Wetlands 8 and 9. A TDEC General ARAP for construction or removal of minor road crossings is anticipated for impacts relating to Stream 1. A TDEC General ARAP for minor alterations to wetlands is anticipated for impacts relating to Wetlands 8 and 9 (combined 0.04 acres). Thresholds for ARAP include stream impacts not greater than 200 linear feet and wetland impacts not greater than 0.1 acre for medium quality wetlands and 0.25 acre for low-quality wetlands. The impacts to aquatic resources resulting from the Proposed Action, in its current configuration, does not trigger the TDEC General ARAP permit thresholds. Initial coordination with TDEC regarding permitting costs confirmed the lack of mitigation required for the both the permanent and temporary stream crossings. Email correspondence from TDEC, dated November 24, 2020, is included in Attachment 1.

The State of Tennessee, under § 69-3-108(q), states that the alteration of a WWC shall require no notice or approval provided that it is done in accordance with the conditions previously mentioned. The Proposed Action would be subject to the conditions laid out in Section 3.14.2.1 based on the proposed impact to WWCs 1,2,3, and 9.

Further, the Proposed Action is anticipated to result in approximately 72.5 acres of new impervious surface at the Site. Overall, approximately 77 acres of the 245-acre Site will be disturbed (Figure 8). An approximately 4-acre stormwater detention pond is proposed to capture the anticipated increase in stormwater runoff at the Proposed Action Site (Figure 8). The proposed detention pond would be designed to handle typical stormwater retention. However, an emergency outfall with capacity to handle added stormwater during a 50-year storm event may be included in the final design.

Prior to commencement of construction activities, a Notice of Intent for Construction Activity Stormwater Discharges would be sent to TDEC DWR. In addition, installation of sediment controls such as filter berms and silt fences will be required to capture and retain mobilized debris and sediment during construction. Following construction activities, a site-specific SWPPP and the Notice of Intent will be required for TDEC review. Preliminary coordination with the TDEC DWR with respect to stormwater at the Proposed Action Site is included in Attachment 1.

Requirements for coverage under an industrial stormwater permit include development of a written SWPPP, implementation of control measures, and submittal of a request for permit coverage, usually referred to as the Notice of Intent. The SWPPP will provide an assessment of potential sources of pollutants in stormwater runoff, such as petroleum, and control measures that will be implemented at the facility to minimize the discharge of these pollutants in runoff from the Proposed Action Site. These control measures include site-specific best management practices, maintenance plans, inspections, employee training, and reporting.

Minor short-term and long-term adverse impacts to water quality are associated with the Proposed Action when compared to the No Action Alternative. The impacts to water resources relate to Site disturbances associated with the proposed construction, the permanent alteration of streams and wetlands, and an increase in impervious surfaces at the Site. The impacts to water resources will be minimized though compliance with existing regulations, alternation of steam and wetland permitting, design planning, and best management practices to minimize the impacts to the fullest extent possible.

3.14.3.2 FLOODPLAINS

The Proposed Action Site is not located within a 100-year or 500-year flood zone. Impacts to floodplains are not anticipated by the Proposed Action. Zone X is an area determined to be outside the 500-year flood and protected by levee from a 100-year flood.

3.14.3.3 GROUNDWATER

Impacts to groundwater are not anticipated by the Proposed Action. Extraction of groundwater for use as irrigation is not proposed and is prohibited by Shelby County Groundwater Quality Control Board for potable, irrigation, or other uses (Shelby County 2018.)

3.14.3.4 WILD AND SCENIC RIVERS

The Proposed Action does not occur in an area that would impact a federally designated Wild and Scenic River.

3.14.4 NO ACTION ALTERNATIVE

There would be no changes to water resources under the No Action Alternative.

3.14.5 MITIGATION

Based on a lack of impacts to water resources that trigger regulatory thresholds, mitigation is not anticipated for the Proposed Action in its current configuration. However, should changes occur to the Proposed Site design, additional impacts will be addressed through the applicable USACE and TDEC permitting and processes.

SECTIONS 4.0 AND 5.0

Conclusions and Preparers

4.0 CONCLUSIONS

This Draft EA Report has been prepared pursuant to NEPA to evaluate the environmental impacts associated with the Proposed Action. The Proposed Action comprises the preparation of approximately 245 acres of MSCAA-owned land (the Site) in Memphis, Shelby County, Tennessee, for development by private companies with an interest in constructing cargo holding or distribution facilities.

This Draft EA Report describes the following resource areas and assesses the potential for the Proposed Action to affect these resources areas: air quality; biological resources; climate; coastal resources; U.S. DOT Act, Section 4(f); farmlands; hazardous materials; historical, architectural, and cultural resources; land use; natural resources and energy supply; noise and noise-compatible land use; socioeconomics, environmental justice, and children's environmental health and safety risks; visual effects; and water resources. The Proposed Action would result in some minor short-term and long-term impacts to resources. However, no significant impacts to resource areas are anticipated.

Table 5 includes a summary of the short-term and long-term impacts resulting from the Proposed Action. Based on the analysis presented in this Draft EA Report and on the coordination to date with project agencies, the impacts associated with the Proposed Action are not expected to have significant impacts to the assessed resource areas. This Draft EA Report concludes an EIS is not required and a Finding of No Significant Impact is appropriate.

Table 5 - Summary of Short-Term and Long-Term Impacts

Resource Area	Short-Term Impacts	Long-Term Impacts
Air Quality	✓	✓
Biological Resources	✓	✓
Climate	✓	✓
Farmlands	✓	✓
Hazardous Materials, Solid Waste, and Pollution Prevention	✓	✓
Land Use		✓
Natural Resources and Energy Supply	✓	✓
Noise and Noise-Compatible Land Use	✓	✓
Socioeconomics*	✓	✓
Visual Effects	✓	✓
Water Quality	✓	✓

Note: * Impacts to socioeconomics are identified as beneficial due to the potential for job creation.

5.0 LIST OF PREPARERS (In alphabetical order)

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Russ Danser, A.I.C.P. Edwards Pitman	David Pearce Edwards Pitman	Andrew Zimmerman, GISP EnSafe

5.1 LIST OF AGENCIES AND PERSONS CONSULTED

Name	Department	Division	Title
Chee Yen Chew	City of Memphis		Engineering Administrator
Jeffrey Penzes	Memphis and Shelby County	Office of Planning and Development	Principal Planner
James Elcan	Memphis District Corps of Engineers		Biologist
E. Patrick McIntyre, Jr.	State Historic Preservation Officer		Executive Director
Kendra Abkowitz, PhD	Tennessee Department of Environment and Conservation		Director of Policy and Sustainable Practices
Benjamin Almassi	Tennessee Department of Environment and Conservation	Division of Solid Waste Management	Environmental Consultant
Lew Hoffman	Tennessee Department of Environment and Conservation	Division of Water Resources	Environmental Consultant
Patrick Lemons	Tennessee Department of Environment and Conservation	Tennessee Wildlife Resource Agency	Wildlife Manager
Tom Moss, P.G.	Tennessee Department of Environment and Conservation	Division of Water Resources	Environmental Review Coordinator
Tom Word	Memphis Light, Gas and Water Division		Utility Coordinator
Amy Hume	Tennessee Department of Transportation	Environmental Division, NEPA Special Projects	Local Programs Coordinator
Jackie Marie Reed	United States Department of Agriculture		Resource Soil Scientist
Robbie Sykes	United States Fish and Wildlife Service		Supervisory Fish and Wildlife Biologist

SECTION 6.0

Abbreviations and Acronyms

6.0 ABBREVIATIONS AND ACRONYMS

-A-A-	
ACS	American Community Survey
APE	Area of Potential Effects
AQI	Air Quality Index
ARAP	Aquatic Resource Alteration Permit
ASTM	ASTM International
-C-C-	
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
-E-E-	
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMP	Employment District
ESA	Environmental Site Assessment
-F-F-	
FAA	Federal Aviation Administration
FR	Federal Register
-G-G-	
GHG	Greenhouse Gas
GHGRP	Greenhouse Gas Reporting Program
-H-H-	
HHS	United States Department of Human and Health Services
-I-I-	
IPaC	Information for Planning and Conservation
-K-K-	
K-8	Kindergarten through 8th
-L-L-	
LOS	Level of Service
LUCB	Land Use Control Board
-M-M-	
MEM	Memphis International Airport
MLGW	Memphis Light, Gas and Water
MOVES	Motor Vehicle Emission Simulator

MPO	Metropolitan Planning Organization
MSCAA	Memphis Shelby County Airport Authority
-N-N-	
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
-P-P-	
PM2.5	Particulate matter less than 2.5 microns in diameter
PM10	Particulate matter less than 10 microns in diameter
-R-R-	
REC	Recognized Environmental Condition
-S-S-	
sf	Square feet
SHPO	State Historic Preservation Office
SIDA	Security Identification Display Area
SIP	State Implementation Plan
SWPPP	Stormwater Pollution Prevention Plan
-T-T-	
TC	Tennessee Historical Commission
TDEC	Tennessee Department of Environment and Conservation
TIP	Transportation Improvement Program
TIS	Traffic Impact Study
TNM	Traffic Noise Model
TVA	Tennessee Valley Authority
-U-U-	
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
U.S. DOT	United States Department of Transportation
U.S. EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
-W-W-	
WWC	Wet Weather Conveyance

SECTION 7.0

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ATTACHMENT 1

Agency Coordination and Scoping Letters Correspondence

ENSAFE
creative thinking. **custom solutions.** ®

December 14, 2020

Robbie Sykes
Supervisory Fish and Wildlife Biologist
United States Fish and Wildlife Service
446 Neal Street
Cookeville, Tennessee 38501

Email: robbie_sykes@fws.org

Re: Memphis-Shelby County Airport Authority — Holmes Road Development Project
245-acre Tract at the Southeast Corner of East Holmes Road and Swinnea Road
Memphis, Shelby County, Tennessee

Dear Mr. Sykes:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 250-acre tract of vacant MSCAA-owned property for future light industrial development. The lead federal agency for the undertaking is the Federal Aviation Administration. The project consists of preparation of approximately 250 acres (the Site), development construction, and operation of future light industrial facilities. On behalf of the MSCAA, EnSafe Inc. seeks concurrence that no federally protected species or designated critical habitat will be affected by the project.

The Site is located approximately one mile south of the Memphis International Airport (MEM) at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State Line, in Memphis, Shelby County, Tennessee (Figure 1). A physical address does not exist for the entire Site; it is comprised of three tax parcels (09440000107, 09440000128, and 09440000129) totaling 245.8 acres. The project Site coordinates and surrounding area uses are depicted on Figure 2. The Site is vacant and predominantly wooded. A Tennessee Valley Authority power line easement is located within the south parcel, a Texas Gas Company natural gas pipeline easement crosses the north parcels, and a Valero and Memphis Light, Gas and Water easement traverses along the south and west Site boundaries (Figure 2). Representative Site photos and aerial photographs are included in Attachment 1.

The purpose of the project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. A preliminary site plan identifies the potential for approximately 1.5 million square feet of facility space at the Site with approximately 300,000 square feet of additional space allotted for future growth, if needed (Figure 3).

Site preparation will include tree removal, grading, filling, utility main extensions, and stream crossings to allow for future site pad development by private companies. The MSCAA proposes to oversee the extension of sanitary sewer and water services, installation of gas and electrical services and meters, installation of stream crossings, construction of new streams, and placement of fill to bring future building pads, parking lots, and driveways to required elevations. A reasonably foreseeable connected action includes the construction of facilities by a private developer(s) and the long-term operation of future facilities by a long-term MEM tenant(s). Site developers and tenants have not been identified at this time.

The Site is located on a local drainage divide. The principal drainage on the Site is Hurricane Creek, which flows northeasterly into Nonconnah Creek, and the Nonconnah Creek Watershed, located in northwest Mississippi and southwest Tennessee. The southwestern portion of the Site is drained by a southwesterly flowing unnamed tributary that feeds into Rocky Creek in DeSoto County, Mississippi. Rocky Creek flows

west then northwest, emptying into Horn Lake Creek in Shelby County, Tennessee. Horn Lake Creek was a tributary of the Mississippi River, but its hydrogeology has been highly modified.

EnSafe submitted an Aquatic Resource Assessment Report to the Tennessee Department of Environment and Conservation (TDEC) and the United States Army Corps of Engineers identifying the following water resources at the Site: six streams, nine wet weather conveyances, ten wetlands, and seven pond features. Agency concurrence letters regarding the determinations and mapped water resources are included in Attachment 2.

Any alterations to wet weather conveyances must be made in accordance with the requirements of Tennessee Code Annotated § 69-3-108(q). Any alterations to streams or wetlands would require authorization under an Aquatic Resource Alteration Permit. The conceptual site design includes consideration of water resources. To minimize the impacts to water resources, the proposed buildings on the Site have been positioned to avoid onsite water resources, to the extent possible.

The United States Fish and Wildlife Service (USFWS), Information for Planning and Consultation (IPaC) website was reviewed for a list of federally protected species and migratory birds with the potential to occur in Shelby County (Attachment 3). In addition, the TDEC, Division of Natural Areas, Interactive Rare Species Database was reviewed. Output from the IPaC website and TDEC database list are included in Attachment 3.

During a site visit on April 15-16, 2020, EnSafe biologists identified herbaceous and aquatic habitat at the Site. The site inspection did not reveal any critical habitat of listed species or any of the threatened, endangered, or migratory birds with the potential to exist in Shelby County listed on the TDEC database or IPaC output. Dominant plants include a mix of grasses and herbaceous plants in the open areas (e.g., power line and gas pipeline easements) and hardwood forested areas dominated by maple (*Acer rubrum and Acer negundo*), Hickory species (*Carya glabra*), Hackberry (*Celtis laevigata*), cottonwood (*Populus deltoides*), Sweetgum (*Liquidambar styraciflua*), Oak (*Quercus*) species, and American elm (*Ulmus americana*).

The USFWS bat occurrence maps included in Attachment 3, indicate the Indiana Bat and Northern Long-Eared Bat species do not occur in Shelby County. However, during the April 15-16, 2020, site visit, EnSafe biologists conducted a habitat suitability survey for the Indiana Bat and Northern Long-Eared Bat, according to procedures outlined in the 2019 USFWS Range-Wide Indiana Bat Summer Survey Guidelines. Several snags were identified during the survey, but the snags did not generally exhibit a sufficient degree of peeling or shaggy bark, or any major cavities that would serve as suitable bat roosting habitat. The majority of snags observed were willow (*Salix nigra*) trees, and shagbark hickory (*Carya ovata*). The observed snags and aquatic resources were located within densely forested areas of the Site, considered unsuitable as flyway corridors for bats. Some portions of the larger streams in the northeast quadrant of the Site traverse cleared, open utility line easements, but these altered patches of land function as low resource value habitats. Representative photographs of the snags identified during the survey are included in Attachment 1.

A review of a Phase I Environmental Site Assessment completed by EnSafe in June 2020 indicates the Site has experienced significant disturbance. Based on information reviewed, the Site was developed for residential use as early as the 1930s. A review of aerial photographs and other historical sources indicates portions of the Site were utilized for sand and gravel mining from around 1950 until 1979 (Attachment 1). Based on the substantial disturbance of the property and lack of suitable habitat, it is anticipated that no federally protected species or designated critical habitat will be affected by the preparation of the Site for

future development and operation of industrial facilities. We request your concurrence of the current property condition and request a finding of no further action regarding fish and wildlife resources.

The preparation of the Site and future development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The USFWS is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at klehman@ensafe.com or by phone at (901) 937-4378.

Sincerely,

EnSafe Inc.

By: Kristin J. Lehman
Senior Project Manager

Enclosures: Figures; Attachments

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Shelby County, Tennessee

Local office

Tennessee Ecological Services Field Office

(931) 528-6481
(931) 528-7075

446 Neal Street
Cookeville, TN 38501-4027

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Indiana Bat Myotis sodalis — Endangered
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/5949

Northern Long-eared Bat Myotis septentrionalis — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9045

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the

Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird Euphagus carolinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be

used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

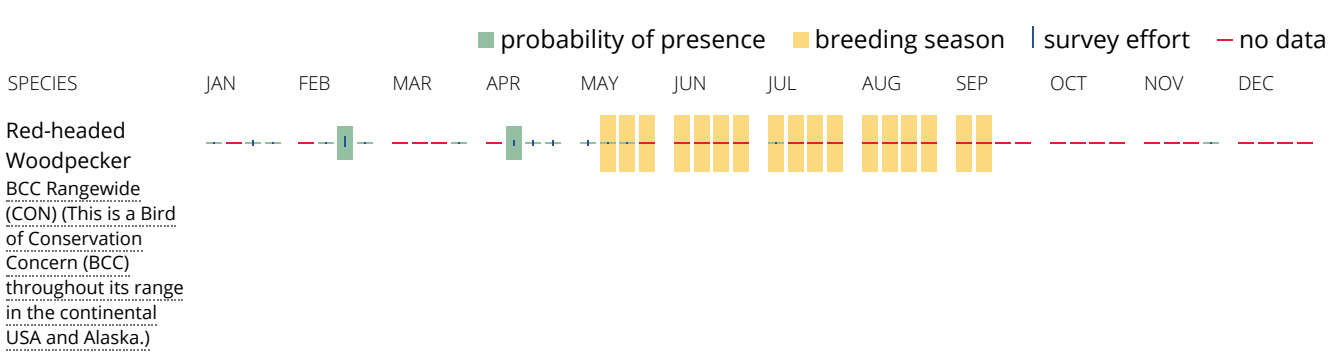
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

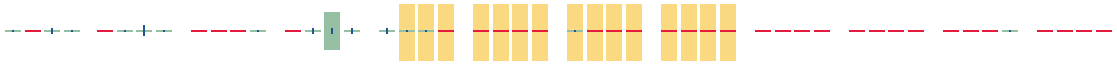
No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Rusty Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Wood Thrush
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds

guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize

potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

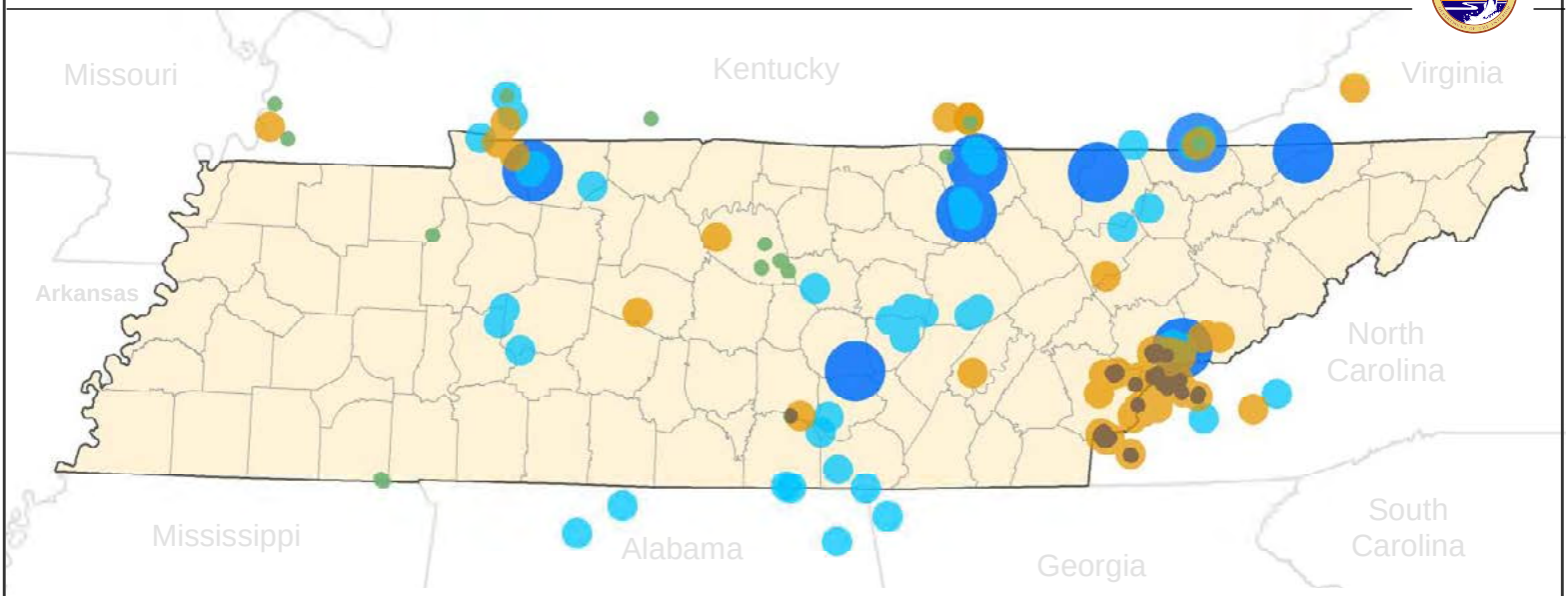
Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Indiana Bat Sites inTennessee



* This map is based on species occurrence information for Tennessee and areas within twenty miles of its border. It is subject to change as new data become available. Please view our website at http://cookeville.fws.gov for the most current version.

0 50 100 Miles

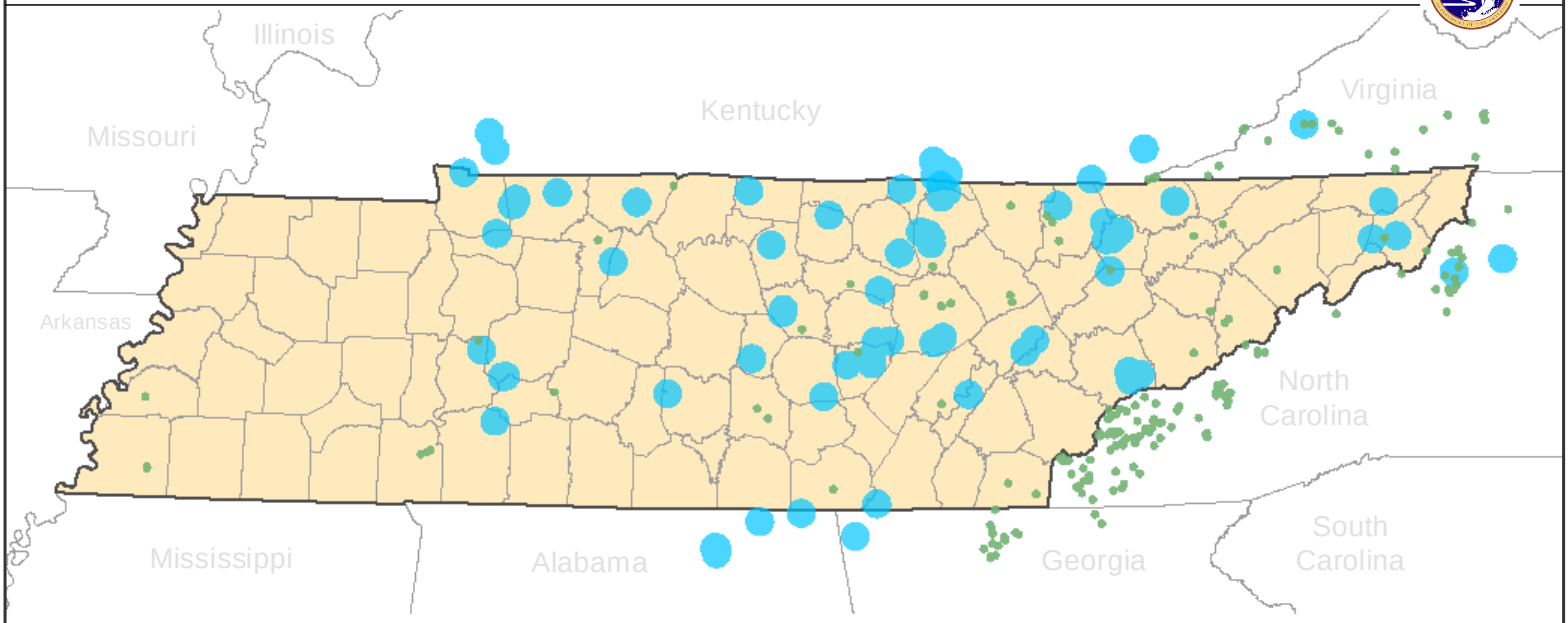
0 50 100 Kilometers

Map production date: June 28, 2018

Habitat Types

- Hibernacula-Priority 3 - 4 Caves
- Hibernacula-Priority 1 - 2 Caves
- Maternity and Non-Maternity
- Maternity
- Non-Maternity

Northern Long-eared Bat Sites in Tennessee



* This map is based on species occurrence information and is subject to change as new data become available. Please view our website at http://cookeville.fws.gov for the most current version.

0 50 100 Miles

0 50 100 Kilometers

Map production date: August 15, 2019

Habitat Types

- Summer 1
- Swarming 2

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, Tennessee 38501
(931) 528-6481

January 27, 2021

Ms. Kristin Lehman
Senior Project Manager
EnSafe, Inc.
5724 Summer Trees Drive
Memphis, Tennessee 38134

Subject: FWS 2021-CPA-0078. Memphis-Shelby County Airport Authority – Holmes Road Development Project in Memphis, Shelby County, Tennessee.

Dear Ms. Lehman:

Thank you for your correspondence dated December 14, 2020, regarding the Memphis-Shelby County Airport Authority's (MSCAA) proposal to prepare approximately 250 acres of MSCAA-owned property in Memphis for future light industrial development. The site is located approximately one mile south of the Memphis International Airport. The Phase I Environmental Site Assessment completed by EnSafe in June 2020 indicated that the site has experienced significant disturbance. Based on information submitted, the site was developed for residential use as early as the 1930s, and aerial imagery and other historical sources indicate portions of the site were utilized for sand and gravel mining from around 1950 until 1979.

The United States Fish and Wildlife Service, Information for Planning and Consultation (IPaC) website was reviewed for a list of federally protected species and migratory birds with the potential to occur in Shelby County. IPaC indicated that the federally listed Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*) may occur in the area. EnSafe biologists conducted an assessment on April 15-16, 2020, to evaluate habitat suitability for these two species at the property. EnSafe determined that some snags were identified, but they did not generally exhibit a sufficient degree of peeling or shaggy bark, or any major cavities that would serve as suitable bat roosting habitat. You have also submitted a 2017 mist net survey from the adjacent property that resulted in no captures of rare bats. Based on past disturbance of the property, lack of suitable bat roosting habitat, and recent negative bat survey results on the adjacent property, you have determined that no federally protected species or designated critical habitat would be affected by future development of the property or operations of industrial facilities.

Our database does not indicate any federally listed species as occurring near the site. We note, however, that collection records available to the Service may not be all-inclusive. Our database is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitat and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality. However, based on the current property condition and best information available at this time, we would not anticipate federally listed species occurring at the site. No further coordination is needed with our agency, unless the size or scope of the project changes, or a lead federal agency requests concurrence on species determinations.

Please contact Robbie Sykes of my staff at 931/525-4979 or *robbie_sykes@fws.gov* if you have questions regarding the information provided in this letter.

Sincerely,

DANIEL ELBERT

Digitally signed by DANIEL ELBERT
Date: 2021.01.27 13:12:28 -05'00'

Daniel Elbert
Field Supervisor

ENSAFE
creative thinking. **custom solutions.** ®

December 28, 2021

Tennessee Wildlife Resources Agency
Wildlife Manager
Patrick Lemons
200 Lowell Thomas Drive
Jackson, Tennessee 38301

email: Patrick.Lemons@tn.gov

Re: Memphis-Shelby County Airport Authority — Holmes Road Development Project
245-acre Tract at the Southeast Corner of East Holmes Road and Swinnea Road
Memphis, Shelby County, Tennessee

Dear Mr. Lemons:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 250-acre tract of vacant MSCAA-owned property for development as cargo holding or distribution facilities. The lead federal agency for the undertaking is the Federal Aviation Administration. On behalf of the MSCAA, EnSafe Inc. seeks concurrence that no state protected species will be affected by the project.

The Site is located approximately one mile south of the Memphis International Airport (MEM) at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State Line, in Memphis, Shelby County, Tennessee (Figure 1). A physical address does not exist for the entire Site; it is comprised of three tax parcels (09440000107, 09440000128, and 09440000129) totaling 245.8 acres. The project Site coordinates and surrounding area uses are depicted on Figure 2. The Site is vacant and predominantly wooded. A Tennessee Valley Authority power line easement is located within the south parcel, a Texas Gas Company natural gas pipeline easement crosses the north parcels, and a Valero and Memphis Light, Gas and Water easement traverses along the south and west Site boundaries (Figure 2). Representative Site photos and aerial photographs are included in Attachment 1.

The purpose of the project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. A preliminary site plan identifies the potential for approximately 1.5 million square feet of facility space at the Site with approximately 300,000 square feet of additional space allotted for future growth, if needed (Figure 3).

Site preparation will include tree removal, grading, filling, utility main extensions, and stream crossings to allow for future site pad development by private companies. The MSCAA proposes to oversee the extension of sanitary sewer and water services, installation of gas and electrical services and meters, installation of stream crossings, construction of new streams, and placement of fill to bring future building pads, parking lots, and driveways to required elevations. A reasonably foreseeable connected action includes the construction of facilities by a private developer(s) and the long-term operation of future facilities by a long-term MEM tenant(s). Site developers and tenants have not been identified at this time.

The Site is located on a local drainage divide. The principal drainage on the Site is Hurricane Creek, which flows northeasterly into Nonconnah Creek, and the Nonconnah Creek Watershed, located in northwest Mississippi and southwest Tennessee. The southwestern portion of the Site is drained by a southwesterly flowing unnamed tributary that feeds into Rocky Creek in DeSoto County, Mississippi. Rocky Creek flows west then northwest, emptying into Horn Lake Creek in Shelby County, Tennessee. Horn Lake Creek was a

tributary of the Mississippi River, but its hydrogeology has been highly modified. The conceptual site design includes consideration of water resources (Figure 3)

EnSafe submitted an Aquatic Resource Assessment Report to the Tennessee Department of Environment and Conservation (TDEC) and the United States Army Corps of Engineers identifying the following water resources at the Site: six streams, nine wet weather conveyances, ten wetlands, and seven pond features. Agency concurrence letters regarding the determinations and mapped water resources are included in Attachment 2. Any alterations to wet weather conveyances will be made in accordance with the requirements of Tennessee Code Annotated § 69-3-108(q). Any alterations to streams or wetlands would require authorization under an Aquatic Resource Alteration Permit.

The TDEC, Division of Natural Areas, Interactive Rare Species Database was reviewed. Output from the TDEC database list are included in Attachment 3. During a site visit on April 15-16, 2020, EnSafe biologists identified herbaceous and aquatic habitat at the Site. The site inspection did not reveal any state listed species with the potential to exist in Shelby County listed on the TDEC database. Dominant plants include a mix of grasses and herbaceous plants in the open areas (e.g., power line and gas pipeline easements) and hardwood forested areas dominated by maple (*Acer rubrum and Acer negundo*), Hickory species (*Carya glabra*), Hackberry (*Celtis laevigata*), cottonwood (*Populus deltoides*), Sweetgum (*Liquidambar styraciflua*), Oak (*Quercus*) species, and American elm (*Ulmus americana*).

A review of a Phase I Environmental Site Assessment completed by EnSafe in June 2020 indicates the Site has experienced significant disturbance. Based on information reviewed, the Site was developed for residential use as early as the 1930s. A review of aerial photographs and other historical sources indicates portions of the Site were utilized for sand and gravel mining from around 1950 until 1979 (Attachment 1). Based on the substantial disturbance of the property and lack of suitable habitat, it is anticipated that no state listed species will be affected by the preparation of the Site for future development and operation of cargo holding or distribution facilities. We request your concurrence of the current property condition and request a finding of no further action regarding wildlife resources.

The preparation of the Site and future development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The TWRA is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at klehman@ensafe.com or by phone at (901) 937-4378.

Sincerely,
EnSafe Inc.

By: Kristin J. Lehman
Senior Project Manager

Enclosures: Figures; Attachments

TN Department of Environment & Conservation

Rare Species by Watershed | **Rare Species by County** | Rare Species by Quadrangle | Stormwater Programs

Help

- Download Status and Ranks

Key to Status and Ranks

Rare Species by County

Data is refreshed on or around January and July each year.

Go Rows 25 Actions

County

1 - 25 of 27

County	Type	Category	Scientific Name	Common Name	Global Rank	State Rank	Fed. Status	State Status	Habitat	Wet Habitat Flag
Shelby	Animal Assemblage	No Data	Rookery	Heron Rookery	G5	SNR	--	Rare, Not State Listed	No Data	No Data
Shelby	Invertebrate Animal	Insect	Lycaena hyllus	Bronze Copper	G5	S3	--	Rare, Not State Listed	Marshes, sedge meadows, moist to wet grassy meadows, ditches, fens, streamside or pondshore wetlands, or roads and right of ways through marshlands. West TN.	Possible
Shelby	Invertebrate Animal	Mollusc	Lampsilis siliquoidea	Fatmucket	G5	S2	--	Rare, Not State Listed	Slackwater with mud subst; Wolf R (Miss R trib); west TN; may occur at Reelfoot Lk; also rept Drakes Ck (Cumb R), Sumner Co.	Aquatic
Shelby	Invertebrate Animal	Mollusc	Obovaria jacksoniana	Southern Hickorynut	G2	S1	--	Rare, Not State Listed	Rivers with medium-sized gravel substrates and low-mod current; Wolf & Hatchie rivers; Mississippi River watershed; west Tennessee.	Aquatic
Shelby	Invertebrate Animal	Mollusc	Webbhelix multilineata	Striped Whitelip	G5	S2	--	Rare, Not State Listed	Low wet habitats, marshes, floodplains, meadows; lake margins; under leaf litter or drift; Mississippi River floodplain.	Possible
Shelby	Vascular Plant	Flowering Plant	Rhynchospora harveyi	Harvey's Beakrush	G4	S1	--	T	Barrens And Other Open Areas	Possible
Shelby	Vascular Plant	Flowering Plant	Iris fulva	Copper Iris	G5	S2	--	T	Bottomlands	Possible
Shelby	Vascular Plant	Flowering Plant	Hottonia inflata	Featherfoil	G4	S2	--	S	Wet Sloughs And Ditches	Aquatic
Shelby	Vascular Plant	Flowering Plant	Heteranthera multiflora	Multiflowered Mud-plantain	G4	S1	--	S	Shallow Water, Mud Flats	Possible
Shelby	Vascular Plant	Flowering Plant	Silene ovata	Ovate Catchfly	G3	S2	--	E	Open Oak Woods	Upland
Shelby	Vascular Plant	Flowering Plant	Schisandra glabra	Red Starvine	G3	S2	--	T	Rich Mesic Woods, Bluffs	Possible
Shelby	Vascular Plant	Flowering Plant	Panax quinquefolius	American Ginseng	G3G4	S3S4	--	S-CE	Rich Woods	Possible
Shelby	Vascular Plant	Flowering Plant	Magnolia virginiana	Sweetbay Magnolia	G5	S2	--	T	Forested Acidic Wetlands	Possible
Shelby	Vascular Plant	Flowering Plant	Symphyotrichum praealtum	Willow Aster	G5	S1	--	E	Moist Prairies And Marshes	Possible
Shelby	Vascular Plant	Flowering Plant	Ulmus crassifolia	Cedar Elm	G5	S2	--	S	Swamps	Possible
Shelby	Vertebrate Animal	Bird	Haliaeetus leucocephalus	Bald Eagle	G5	S3	--	D	Areas close to large bodies of water; roosts in sheltered sites in winter; communal roost sites common.	Aquatic
Shelby	Vertebrate Animal	Mammal	Neotoma floridana illinoensis	Eastern Woodrat	G5T5	S3	--	D	Forested areas, caves & outcrops; west Tennessee generally.	Upland
Shelby	Vertebrate Animal	Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	G4T4	S3	--	T	Well-drained sandy soils in pine/pine-oak woods; dry mountain ridges; E portions of west TN, E to lower elev of the Appalachians.	Upland
Shelby	Vertebrate Animal	Bird	Limnothlypis swainsonii	Swainson's Warbler	G4	S3	--	D	Mature, rich, damp, deciduous floodplain and swamp forests.	Possible
Shelby	Vertebrate Animal	Fish	Ammocrypta beani	Naked Sand Darter	G5	S2	--	D	Shifting sand bottoms & sandy runs; Hatchie & Wolf rivers & their larger tribs.	Aquatic

Shelby	Vertebrate Animal	Fish	Noturus gladiator	Piebald Madtom	G3	S3	--	D	Large creeks & rivers in moderate-swift currents with clean sand or gravel substrates; Mississippi River tributaries.	Aquatic
Shelby	Vertebrate Animal	Amphibian	Acris gryllus	Southern Cricket Frog	G5	S2S3	--	Rare, Not State Listed	Grassy margins of swamps, marshes, lakes, ponds, streams, ditches, and nearby temporary pools; far SW Tennessee.	Aquatic
Shelby	Vertebrate Animal	Bird	Setophaga cerulea	Cerulean Warbler	G4	S3B	--	D	Mature deciduous forest, particularly in floodplains or mesic conditions.	Upland
Shelby	Vertebrate Animal	Fish	Cycleptus elongatus	Blue Sucker	G3G4	S2	--	T	Swift waters over firm substrates in big rivers.	Aquatic
Shelby	Vertebrate Animal	Bird	Vireo bellii	Bell's Vireo	G5	S1B	No Status	Rare, Not State Listed	Thickets adjacent to water, bottomlands; west Tennessee and one confirmed location in Western Highland Rim.	Possible

1 - 25 of 27

Kristin Lehman

From: Rob Todd <Rob.Todd@tn.gov>
Sent: Thursday, January 28, 2021 5:42 PM
To: Kristin Lehman
Cc: Patrick Lemons
Subject: Memphis-Shelby County Airport Authority

Ms. Lehman:

The review request was referred to me for response. The Tennessee Wildlife Resources Agency has reviewed the information that you provided regarding the Memphis-Shelby County Airport Authority property development project for cargo holding facilities on a 250-acre tract of vacant land and we do not anticipate adverse impacts to state listed species under our authority due to the proposed project; provided that best management practices to address erosion and sediment are implemented and maintained during construction activities. Thank you for the opportunity to review and comment on this proposed project. If I may be of further assistance, please contact me.

Robert Todd
Fish & Wildlife Environmentalist
Tennessee Wildlife Resources Agency
Ellington Agricultural Center
5107 Edmondson Pike
Nashville, TN 37211
Office: 615-781-6572
Cell: 931-881-8240
Fax: 615-781-6667
Email: rob.todd@tn.gov

ENSAFE
creative thinking. **custom solutions.** ®

December 8, 2020

Mr. Matthew Denton
State of Tennessee
United States Department of Agriculture Area 1
235 Oil Well Road
Jackson, Tennessee 38305-7914

Email: matthew.denton@ usda.gov

Re: Farmland Protection Policy Act Determination
245-acre Tract at the Southeast Corner of East Holmes Road and Swinnea Road
Memphis, Shelby County, Tennessee

Dear Mr. Denton:

The Federal Aviation Administration and Memphis-Shelby County Airport Authority (MSCAA) are engaged in the scoping stages of a project that will require a Farmland Protection Policy Act determination. On behalf of the MSCAA, EnSafe Inc., seeks your input regarding whether the project may convert Prime Farmland, as defined in the Farmland Protection Policy Act, to nonagricultural uses.

The proposed project consists of preparing approximately 248 acres of vacant, MSCAA-owned land (the Site) for future light industrial development. The Site is located approximately 1 mile south of the Memphis International Airport (MEM), at the southeast corner of East Holmes Road and Swinnea Road in Memphis, Shelby County, Tennessee (Figures 1 and 2). The Site is comprised of three tax parcels (09440000107, 09440000128, and 09440000129), totaling 245.8 acres. The project Site coordinates and surrounding area uses are depicted on Figure 2. The Site coordinates are also provided as digital shape files.

According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey, the Site is comprised of six soil types: Collins, Falaya, Grenada, Gullied land, Loring, and Memphis (Attachment 1). Four of the onsite soil types (Collins, Falaya, Loring, and Memphis) are considered Prime Farmland in Shelby County, Tennessee. Figure 3 depicts the Site soil map overlain by the conceptual site plan. Attachment 2 includes the form AD-1006, for USDA NRCS review.

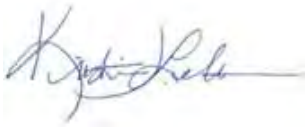
Site preparation will include tree removal, grading, filling, utility main extensions, and stream crossings to allow for future site pad development by private companies. The MSCAA proposes to oversee the extension of sanitary sewer and water services, installation of gas and electrical services and meters, installation of stream crossings, construction of new streams, and placement of fill to bring future building pads, parking lots, and driveways to required elevations. A reasonably foreseeable connected action includes the construction of facilities by a private developer(s) and the long-term operation of future facilities by a long-term MEM tenant(s). Site developers and tenants have not been identified at this time.

The preparation of the Site and future development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The USDA is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at klehman@ensafe.com or by phone at (901) 937-4378.

Sincerely,

EnSafe Inc.



By: Kristin J. Lehman
Senior Project Manager

USDA United States Department of Agriculture

December 08, 2020

Kristin J. Lehman
Senior Project Manager, ENSAVE
5724 Summer Trees Drive
Memphis, TN 38134

RE: **Farmland Protection Policy Act Determination**
245-acre Tract at the Southeast Corner of East Holmes Road and Swinnea Road
Memphis, Shelby County, Tennessee

Dear Ms. Lehman:

Attached is the completed AD-1006 form for the proposed 245-acrea MSCAA- owned land (future light industrial development) project in Shelby County, TN. The project under evaluation contains prime farmland and/or farmland of statewide importance. However, it is our finding that the proposed project does not significantly impact prime farmland and/or farmland of statewide importance in the county since only 0.0656% will be converted.

For your reference, NRCS policy and procedures on prime and unique farmlands are published in the Code of Federal Regulations 7 CFR 657. The website is https://www.ecfr.gov/cgi-bin/text-idx?SID=f8f1d0a62e9f8aef7093eaf8058bbebc&mc=true&tpl=/ecfrbrowse/Title07/7cfr657_main_02.tpl

Please let me know if you have any questions.

Sincerely,

Jackie M Reed

Jackie Marie Reed
TN-Area 2
Resource Soil Scientist

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request		
Name of Project East Holmes Road Environmental Asses	Federal Agency Involved Federal Aviation Authority		
Proposed Land Use Light industrial	County and State Shelby County, Tennessee		
PART II *(To be completed by NRCS)*	Date Request Received By NRCS 12/08/2020	Person Completing Form: Jackie Reed-A2 RSS	
Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)* YES ☑ NO ☐	Acres Irrigated 2,806	Average Farm Size 189	
Major Crop(s) Soybean	Farmable Land In Govt. Jurisdiction Acres: 60 % 203,860	Amount of Farmland As Defined in FPPA Acres: 58 % 198,088	
Name of Land Evaluation System Used LESA_Shelby	Name of State or Local Site Assessment System NA	Date Land Evaluation Returned by NRCS 12/08/2020	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	75			
B. Total Acres To Be Converted Indirectly	170.8			
C. Total Acres In Site	245.8			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	130			
B. Total Acres Statewide Important or Local Important Farmland	0			
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	0.0656			
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	57			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)	62			

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)	0			
2. Perimeter In Non-urban Use	(10)	0			
3. Percent Of Site Being Farmed	(20)	0			
4. Protection Provided By State and Local Government	(20)	0			
5. Distance From Urban Built-up Area	(15)	0			
6. Distance To Urban Support Services	(15)	0			
7. Size Of Present Farm Unit Compared To Average	(10)	0			
8. Creation Of Non-farmable Farmland	(10)	10			
9. Availability Of Farm Support Services	(5)	0			
10. On-Farm Investments	(20)	0			
11. Effects Of Conversion On Farm Support Services	(10)	0			
12. Compatibility With Existing Agricultural Use	(10)	5			
TOTAL SITE ASSESSMENT POINTS	160	15	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	62	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	15	0	0	0
TOTAL POINTS ***(Total of above 2 lines)***	260	77	0	0	0

Site Selected: Site A	Date Of Selection 2020	Was A Local Site Assessment Used? YES ☐ NO ☑

Reason For Selection:

The MSCAA selected a Site based on the following site evaluation factors:

1. Sites that are owned by the MSCAA and available for development compatible with MEM operations, including aircraft noise.

Name of Federal agency representative completing this form: Federal Aviation Authority	Date: 12/4/20

(See Instructions on reverse side) **Form AD-1006 (03-02)**

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

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(For Federal Agency)

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1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

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Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

U.S. Department
of Transportation
**Federal Aviation
Administration**

Memphis Airports District Office
2600 Thousand Oaks Blvd., Suite 2250
Memphis, TN 38118

Phone (901) 322-8180

December 3, 2020

E. Patrick McIntyre, Jr.
Executive Director
State Historic Preservation Office
2941 Lebanon Road
Nashville, Tennessee 37243

RE: Section 106 Consultation
Holmes Road Site Preparation Environmental Assessment
Memphis International Airport (MEM)
Memphis Shelby County Airport Authority

Dear Mr. McIntyre:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, MSCAA-owned property for future light industrial development. The lead federal agency for the undertaking is the Federal Aviation Administration (FAA). The project consists of preparation of approximately 245 acres (the Site) development, construction, and operation of future light industrial facilities.

The Site is located approximately one (1) mile south of the Memphis International Airport (MEM) at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State Line, in Memphis, Shelby County, Tennessee (Figure 1). A physical address does not exist for the Site, which comprises three tax parcels (09440000107, 09440000128, and 09440000129) totaling 245.8 acres. The project Site coordinates and surrounding area uses are depicted on Figure 2. Shapefiles depicting the boundary of the Site are included with this submittal.

The purpose of the project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. Approximately 30% (75 acres) of the Site is proposed for development as new impervious surfaces. A preliminary site plan identifies the potential for approximately 1.5 million square feet of facility space at the Site with approximately 300,000 square feet of additional space allotted for future growth, as needed (Figure 3). The project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with MEM operations. The airspace above the Site is located within a main MEM aircraft flight path

(Attachment 1). Future redevelopment and long-term lease of the Site will provide economic opportunities to the MEM area, while maintaining use that is compatible with aircraft noise.

Site preparation activities will include tree removal, grading, filling, utility main extensions, and stream crossings to allow for future site pad development by private companies. Once the Site is cleared of trees, MSCAA proposes to oversee the extension of sanitary sewer and water services, installation of gas and electrical services and meters, installation of stream crossings, construction of new streams, and placement of fill to bring future building pads, parking lots, and driveways to required elevations. Construction associated with the Site preparation is estimated to last between 6 and 9 months. A reasonably foreseeable connected action includes construction of facilities by a private developer(s) and the long-term operation of future facilities by a long-term MEM tenant(s). Construction associated with future facilities at the Site is estimated to last between 6 and 9 months. Site developers and tenants have not been identified at this time.

The Site is predominantly wooded and vacant. A Texas Gas Company natural gas pipeline transects the north portion of the Site (parcels 094400 00128 and 094400 00129). A Tennessee Valley Authority power line easement crosses the south Site parcel (094400 00107) and a Valero and Memphis Light, Gas and Water gas line easement is along the west and south Site boundaries. Aerial photographs, topographic maps, and recent photographs of the Site are included in Attachment 2.

The recommended archaeological Area of Potential Effect (APE) is the entire 245-acre Site, with the exception of a 50-foot buffer of trees along Holmes Road and Swinnea Road. Ground-disturbing activities would take place at the majority of the Site, resulting in approximately 75 acres of new impervious surfaces (see Figure 3). Measures to avoid existing wetlands and streams include design planning efforts to site future structures in upland areas. The remainder of the APE consists of areas where grading and flattening would occur for construction. The recommended APE for architectural and historic resources includes the Site boundaries.

A Phase I Environmental Site Assessment (ESA), completed by EnSafe in June 2020, identified past uses of the Site, which included a farmstead, a sand/gravel quarry, and utility easements. The current use of the Site is for utility easements. An excerpt of the Phase I ESA is included in Attachment 3.

A Phase I Cultural Resources Survey (Cultural Survey) was completed in May 2020 and resulted in the identification of five (5) twentieth-century Historic loci: four former house or farmstead sites and a breached earthen dam. The Cultural Survey is included in Attachment 4. The following list includes a description of the five cultural resources identified at the Site:

- Locus 1 is a newly identified former historic house site located in the northwestern part of the MSCAA Holmes Road tract, near Swinnea Road, north of the Texas Gas pipeline. Locus 1 is recommended not eligible for the NRHP.

- Locus 2 is a newly identified historic house site located in the northern part of the MSCAA Holmes Road tract, south of Holmes Road. Locus 2 is recommended not eligible for the NRHP.

- Locus 3 is a newly identified historic farmstead, later used by a quarry operation, located in the northern part of the MSCAA Holmes Road tract. Locus 3 is recommended not eligible for the NRHP.

- Locus 4 is a historic farmstead that appears to have been later used as part of a quarry operation. It is located in the western portion of the MSCAA Holmes Road tract where the Tennessee Historical Commission (THC) recorded two structures (SY-31607A and SY-31708A) (see Attachment 4, PanAmerican Cultural Survey Report, Figure 4-02). Locus 4 is recommended not eligible for the NRHP.

- Locus 5 is a newly identified historic earthen dam located in the southern part of the Holmes Road tract, south of the TVA power lines and east of Swinnea Road. Locus 5 is recommended not eligible for the NRHP.

The Cultural Survey also included a review of the online THC database, which identified the aforementioned Locus 4 standing structures at the Site (SY-31708A and SY-31607A), as not eligible for the NRHP (see Attachment 4).

Three additional THC records are identified on Figure 4-02 of the Cultural Survey, as near the Site (property SY-31606A and structures SY-31707A and SY-31705A). Property SY-31606A is the circa 1920 Brown Missionary Baptist Church Cemetery, located opposite the southwest corner of the Site on Swinnea Road. Structure SY-31707A is a circa 1940 traditional single-family rectangular residence, and its windows were missing when recorded. The residence is located south of the auto salvage property on Swinnea Road. A 50-foot buffer of trees is proposed between the Site and Swinnea Road to mitigate for any potential visual impacts to the THC-identified resources (see Figure 3). Structure SY-31705A is recorded at 1920 Tchulahoma Road. It is a 1920 traditional single-family rectangular residence. There is not a line of sight to this structure from the Site.

As noted above, we are seeking concurrence from your office for the APEs. In addition, we are asking for your concurrence to our eligibility assessments that are listed above. If you have any questions, please contact me at timothy.l.alexander@faa.gov or at (901) 322-8188.

Sincerely,

Tim Alexander

Tim Alexander
Environmental Protection Specialist
Memphis Airports District Office

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

December 4, 2020

Mr. Tim Alexander
Federal Aviation Administration
Memphis Airports District Office
2600 Thousand Oaks Blvd, Suite 2250
Memphis, TN 38118

RE: FAA / Federal Aviation Administration, Holmes Site Preparation, 245 Acres, Memphis International Airport, Memphis, Shelby County, TN

Dear Mr. Alexander:

In response to your request, we have reviewed the cultural resources survey report and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we find that no historic properties eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions or comments may be directed to Jennifer Barnett (615) 687-4780, Jennifer.Barnett@tn.gov.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

Kristin Lehman

From: Kristin Lehman
Sent: Tuesday, December 8, 2020 1:38 PM
To: Penzes, Jeffrey
Cc: Saliba, Norman
Subject: RE: Memphis Shelby County Airport Authority - project scoping

Thank you Jeffery

Kristin Lehman, CHMM
Senior Project Manager
(901) 937-4378 *direct*
(727) 348-1019 *cell*
ENSAFE creative thinking | custom solutions

From: Penzes, Jeffrey <jeffrey.penzes@memphistn.gov>
Sent: Tuesday, December 8, 2020 1:37 PM
To: Kristin Lehman <klehman@Ensafe.com>
Cc: Saliba, Norman <Norman.Saliba@memphistn.gov>
Subject: Re: Memphis Shelby County Airport Authority - project scoping

Kirstin,

Per our phone conversation, from the description, it does not sound like this project would be exempt from zoning since it would be a private development. That being said, the Airport Authority may go through the zoning entitlement process and, if approved, have the site ready with the appropriate zoning entitlements for the future private developers. The two options that immediately come to mind are the planned development and rezoning processes; both requests would go first to the Land Use Control Board and then to the Memphis City Council for final action. If you any other questions or need any additional information at this time let me know. Also, when they are ready our office is available to meet regarding the aforementioned zoning entitlement processes in further detail.

Thanks,

Jeffrey Penzes

Principal Planner

Land Use and Development Services

Division of Planning and Development

125 N. Main, Ste. 468 Memphis, TN 38103

MLGW
Hometown Energy Working for You

February 15, 2021

Mr. James A. Hay II
Director of Development
Memphis International Airport
2491 Winchester Road, Suite 113
Memphis, TN 38116

RE: East Holmes Road Site Preparation

Dear Mr. Hay:

Thank you for the advanced notice regarding the proposed site preparation for the East Holmes Road Site.

Based on the initial information you provided, coupled with a very preliminary review of our existing MLGW infrastructure, we have identified two (2) significant MLGW utility easements located on the property. MLGW has an existing transmission easement which includes electric lines and a gas pipeline. We also have a gas easement located immediately adjacent to and parallel with the south and west property lines, which includes two (2) pipelines.

MLGW will not allow any earth work, i.e., grading, cutting or filling, within the MLGW easement(s) without written approval from MLGW. The grading and drainage plans must be submitted to MLGW for review and approval.

Please note, regarding the safety and integrity of our existing gas pipelines, no repetitive, heavy construction equipment traffic will be allowed to cross over the existing MLGW gas pipeline easements. Any repetitive traffic will have to be channeled to one location, and the pipeline will need to be protected with oak matting, as required by MLGW Gas Construction.

Please note the following comments below:

- The subject property is encumbered by an existing utility right of way easement, which may include overhead and underground facilities. MLGW prohibits any development or improvements within the Easement, except as provided by the **MLGW Right of Way Encroachment Policy**.
- **It is the responsibility of the Airport Authority**, prior to any development, to contact Keith Ledbury, with MLGW – Property Management @ 901-528-4186 and obtain written approval for any improvements within the Easement(s).

MLGW
Hometown Energy Working for You

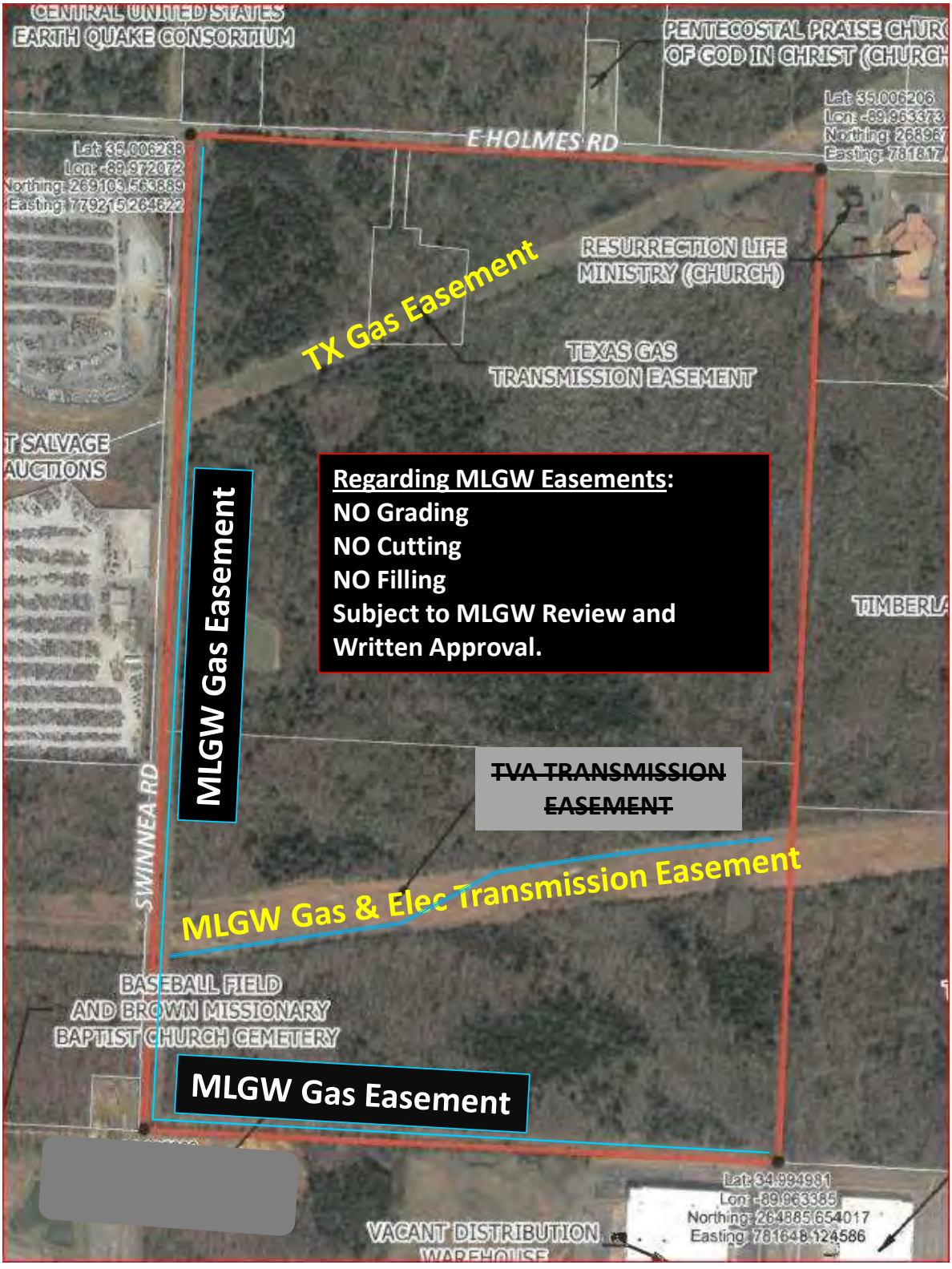
- **It is the responsibility of the Airport Authority** to identify any utility easements, whether dedicated or prescriptive (electric, gas, water, CATV, telephone, sewer, drainage, etc.), which may encumber the subject property, including underground and overhead facilities. No permanent structures will be allowed within any utility easements.
- **It is the responsibility of the Airport Authority** to contact **TN-1-CALL** @ 1.800.351.1111, before digging, and to determine the location of any underground utilities including electric, gas, water, CATV, telephone, etc.
- **It is the responsibility of the Airport Authority** to pay the cost of any work performed by MLGW to install, remove or relocate any facilities to accommodate the proposed development.
- **It is the responsibility of the Airport Authority** to comply with the **National Electric Safety Code (NESC)** and maintain minimum horizontal/vertical clearances between existing overhead electric facilities and any proposed structures.
- **Landscaping is prohibited** within any MLGW utility easement without prior MLGW approval.
- **It is the responsibility of the Airport Authority** to submit a detailed plan to MLGW Customer Engineering for the purposes of determining the availability and capacity of existing utility services to serve any proposed or future development(s). Please contact MLGW's Builder Services line at 729-8630 to initiate the utility application process.
- **It is the responsibility of the owner/applicant** to pay the cost of any utility system improvements necessary to serve the proposed development with electric, gas or water utilities.

Respectfully Submitted,
MEMPHIS LIGHT, GAS and WATER DIVISION

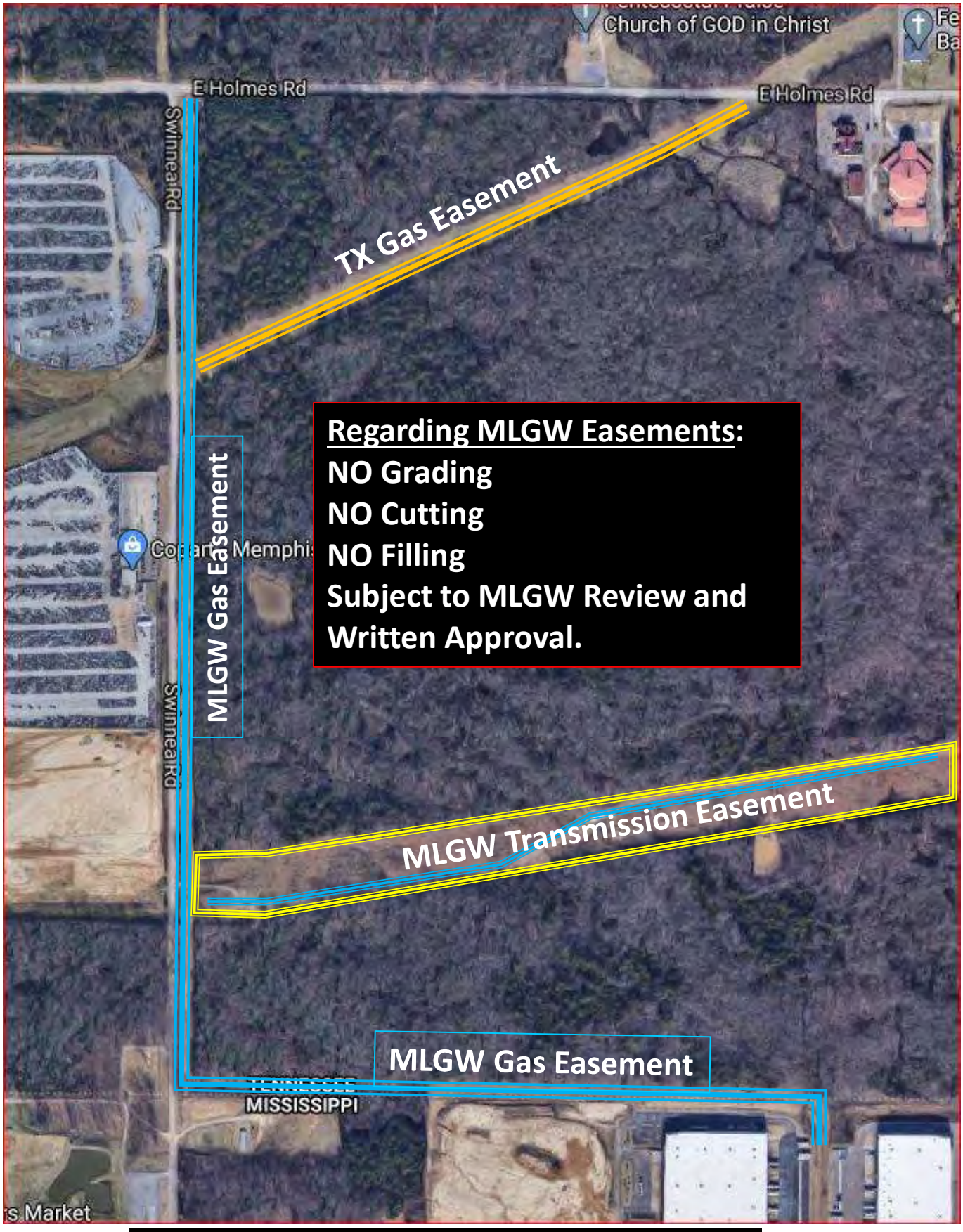
Tom Word

TOM WORD
Utility Coordinator
tword@mlgw.org


CENTRAL UNITED STATES EARTH QUAKE CONSORTIUM
PENTECOSTAL PRAISE CHUR
OF GOD IN CHRIST (CHURCH
Lat: 35.006206
Lon: -89.963373
Northing: 268967
Easting: 781817
E HOLMES RD
Lat: 35.006288
Lon: -89.972072
Northing: 269103.563889
Easting: 779215.264622
RESURRECTION LIFE
MINISTRY (CHURCH)
TEXAS GAS
TRANSMISSION EASEMENT
T SALVAGE
AUCTIONS
TIMBERLA
SWINNEA RD
TVA TRANSMISSION
EASEMENT
BASEBALL FIELD
AND BROWN MISSIONARY
BAPTIST CHURCH CEMETERY
PRIVATE PROPERTY
WITH GREENHOUSE
Lat: 34.994981
Lon: -89.963385
Northing: 264885.654017
Easting: 781648.124586
VACANT DISTRIBUTION
WAREHOUSE



NOT TO SCALE / NOT FOR CONSTRUCTION



NOT TO SCALE / NOT FOR CONSTRUCTION


HOLMES ROAD
SWINNEA ROAD

DEPARTMENT OF THE ARMY
MEMPHIS DISTRICT CORPS OF ENGINEERS
167 NORTH MAIN STREET B-202
MEMPHIS, TENNESSEE 38103-1894

June 26, 2020

Mr. Aaron Conti
EnSafe, Inc.
5724 Summer Trees Drive
Memphis, Tennessee 38134

Dear Mr. Conti:

This is in response to your correspondence, on behalf of Memphis Shelby County Airport Authority, in which you requested a preliminary jurisdictional determination (PJD) for a 250 acre tract of land located southeast of the intersection of Holmes Road and Swinnea Road in Memphis, Shelby County, Tennessee, as shown on the enclosed map. Based on the information submitted to our office, we concur with your determination. There are ten wetland areas on the property totaling approximately 5.89 acres in size, seven ponds totaling 2.96 acres in size and six streams totaling approximately 9,461 linear feet in length that may be considered waters of the United States. However, according to the new Navigable Waters Protection Rule, some of these wetland and stream features may not be considered jurisdictional. If you wish to provide additional information, you may request an approved jurisdictional determination.

The PJD is included for your concurrence. If you agree with this PJD please sign the form and return it to the address listed above. If the PJD is not returned within 30 days of the date of this letter we will assume your concurrence. A PJD cannot be appealed. If you object to this PJD, please see Section I.E. of the attached Notification of Administrative Appeal Options and the Process and Request for Appeal Form, on how to proceed or call the Memphis District Regulatory Branch for assistance at the number listed below.

The Memphis District Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, we invite you to complete a Customer Service Survey found on our web site at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey. Your comments, positive or negative, will not affect any current or future dealing with the Corps of Engineers.

If you have questions, please contact me at (901) 544-0737 and refer to File No. MVM-2020-171.

Sincerely,

James M. Elcan
Digitally signed by James M. Elcan
Date: 2020.06.26 12:52:53 -05'00'

James M. Elcan
Biologist
Regulatory Branch

Enclosures

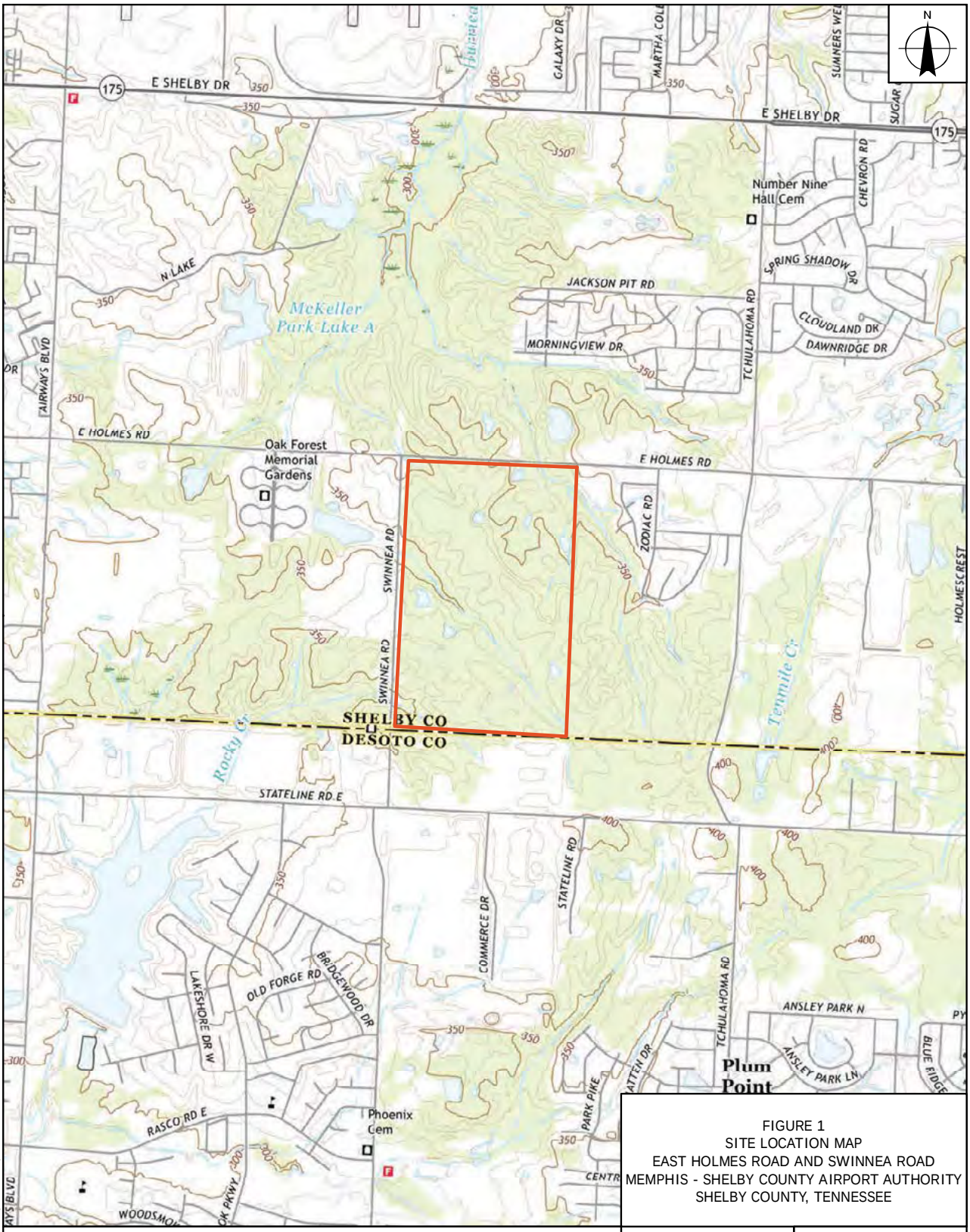


FIGURE 1
SITE LOCATION MAP
EAST HOLMES ROAD AND SWINNEA ROAD
MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY
SHELBY COUNTY, TENNESSEE

LEGEND

APPROXIMATE SUBJECT PROPERTY BOUNDARY

NAD 1983 STATE PLANE
TENNESSEE FEET

0 1,000 2,000

SCALE IN FEET

REQUESTED BY:	AC
DRAWN BY:	MS
DATE:	4/21/2020
PROJECT:	0888821806

ENSAFE
Creative thinking.Custom solutions.
800.588.7962 | www.ensafe.com

X:\ShelbyCoAirportAuthority\SiteLocMap.mxd

Source: U.S. Geological Survey. Pleasant Hill Quadrangle, Tennessee [Map]. Photorevised 2018. 1:24,000. 7.5 Minute Series.Southeast Memphis Quadrangle, Tennessee [Map]. Photorevised 2019. 1:24,000. 7.5 Minute Series.

Appendix 2 - PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PJD: June 25, 2020

B. NAME AND ADDRESS OF PERSON REQUESTING PJD: Aaron Conti, 5724 Summer Trees Dr.

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: Memphis, MVM-2020-171

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)

State: TN County/parish/borough: Shelby City: Memphis

Center coordinates of site (lat/long in degree decimal format):

Lat.: 35.001300° Long.: -89.968000°

Universal Transverse Mercator: 229127.61 E, 3877213.57 N, Zone 16S

Name of nearest waterbody: Hurricane Creek

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: June 25, 2020

☐ Field Determination. Date(s):

TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION.

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)
Wetland 1	34.997631	-89.965395	1.61 acre	Wetland	Section 404
Wetland 2	34.999768	-89.969078	0.35 acre	Wetland	Section 404
Wetland 3	35.004463	-89.966759	0.13 acre	Wetland	Section 404
Wetland 4	35.001613	-89.964715	0.19 acre	Wetland	Section 404
Wetland 5	35.001480	-89.964156	0.25 acre	Wetland	Section 404
Wetland 6	35.002069	-89.963553	0.04 acre	Wetland	Section 404

1) The Corps of Engineers believes that there may be jurisdictional aquatic resources in the review area, and the requestor of this PJD is hereby advised of his or her option to request and obtain an approved JD (AJD) for that review area based on an informed decision after having discussed the various types of JDs and their characteristics and circumstances when they may be appropriate.

2) In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an AJD for the activity, the permit applicant is hereby made aware that: (1) the permit applicant has elected to seek a permit authorization based on a PJD, which does not make an official determination of jurisdictional aquatic resources; (2) the applicant has the option to request an AJD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an AJD could possibly result in less compensatory mitigation being required or different special conditions; (3) the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) undertaking any activity in reliance upon the subject permit authorization without requesting an AJD constitutes the applicant's acceptance of the use of the PJD; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a PJD constitutes agreement that all aquatic resources in the review area affected in any way by that activity will be treated as jurisdictional, and waives any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an AJD or a PJD, the JD will be processed as soon as practicable. Further, an AJD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331. If, during an administrative appeal, it becomes appropriate to make an official determination whether geographic jurisdiction exists over aquatic resources in the review area, or to provide an official delineation of jurisdictional aquatic resources in the review area, the Corps will provide an AJD to accomplish that result, as soon as is practicable. This PJD finds that there *"may be"* waters of the U.S. and/or that there *"may be"* navigable waters of the U.S. on the subject review area, and identifies all aquatic features in the review area that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for PJD (check all that apply)

Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

- [x] Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:
  Map: Attachment A, Site Figures 1 through 7.
- [x] Data sheets prepared/submitted by or on behalf of the PJD requestor.
  - [x] Office concurs with data sheets/delineation report.
  - [ ] Office does not concur with data sheets/delineation report. Rationale: _____.
- [ ] Data sheets prepared by the Corps: _____.
- [ ] Corps navigable waters' study: _____.
- [ ] U.S. Geological Survey Hydrologic Atlas: _____.
  - [ ] USGS NHD data.
  - [ ] USGS 8 and 12 digit HUC maps.
- [x] U.S. Geological Survey map(s). Cite scale & quad name: Southeast Memphis, Tenn., SW/4 Bartlett 15' Quadrangle, 1:24,000.
- [x] Natural Resources Conservation Service Soil Survey. Citation: Natural Resources Conservation Service Soils.
- [x] National wetlands inventory map(s). Cite name: Wetlands Mapper.
- [ ] State/local wetland inventory map(s): _____.
- [x] FEMA/FIRM maps: FEMA Flood Map Service Center.
- [ ] 100-year Floodplain Elevation is: _____.(National Geodetic Vertical Datum of 1929)
- [x] Photographs: [x] Aerial (Name & Date): Google Earth Pro Imagery, March 14, 2018.
  or [x] Other (Name & Date): Attachment C, Photo Log, April 15 and 16, 2020.
- [ ] Previous determination(s). File no. and date of response letter: _____.
- [ ] Other information (please specify): _____.

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

James M. Elcan Digitally signed by James M. Elcan Date: 2020.06.26 12:53:52 -05'00'

Signature and date of Regulatory staff member completing PJD

Signature and date of person requesting PJD (REQUIRED, unless obtaining the signature is impracticable)[1]

[1] Districts may establish timeframes for requestor to return signed PJD forms. If the requestor does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Memphis-Shelby County Airport Authority		File Number: MVM-2020-171	Date: 06/26/2020
Attached is:			See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)		A
	PROFFERED PERMIT (Standard Permit or Letter of permission)		B
	PERMIT DENIAL		C
	APPROVED JURISDICTIONAL DETERMINATION		D
X	PRELIMINARY JURISDICTIONAL DETERMINATION		E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/cecw/pages/reg_materials.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
MEMPHIS ENVIRONMENTAL FIELD OFFICE
8383 WOLF LAKE DRIVE
BARTLETT, TN 38133
Phone 901-371-3000 Statewide 1-888-891-8332 Fax 901-371-3170

June 30, 2020

Lori Morris
Manager, Environmental Services
Memphis-Shelby County Airport Authority
2491 Winchester Road, Suite 113
Memphis, TN 38116

Re: Hydrologic Determination #QHP2005.009
MSCAA Holmes Swinnea Property
Memphis, Shelby County, TN

Dear Ms. Morris,

The Division of Water Resources has reviewed the documentation prepared by Aaron Conti and Velita Thornton with Ensafe, seeking concurrence with the report that was submitted in support of the Hydrologic Determinations conducted for the above referenced location in Shelby County, TN.

The Division is in concurrence with the following submitted assertions, which are also summarized on the attached Tables and on the attached map:

There are six channels on the property that were identified as streams. These channels are identified in Table 2 of the attached summary.

There are nine channels on the property that were identified as wet weather conveyances. These channels are identified in Table 3 of the attached summary.

There are ten wetlands, totaling 2.93 acres that were identified on the property. These wetlands are identified in Table 1 of the attached summary.

In addition to the wetlands, Table 1 also identifies seven non-regulated pond features on the property.

Any alterations to wet weather conveyances must be made in accordance with the requirements of Tenn. Code Ann. § 69-3-108(q). Alterations to streams and wetlands require authorization under an appropriate Aquatic Resource Alteration Permit (ARAP). You can download the ARAP

application form at the following web address: http://environment-online.state.tn.us/etdec/DownloadFile.aspx?row_id=CN-1091

If you have any questions, please feel free to contact me at (901) 371-3019 or at Lew.Hoffman@tn.gov.

Thank you,

Lew E. Hoffman

Lew E. Hoffman
Environmental Consultant
Division of Water Resources
Memphis Environmental Field Office

Copy: file
Aaron Conti, Environmental Scientist, Ensafe
Velita Thornton, Environmental Scientist, Ensafe

Table 1 Wetland and Other Water Acreage and Location		
Aquatic Resource	**Approximate Acreage**	**Approximate Location**
Wetland 1	1.61	34.997631°, -89.965395°
Wetland 2	0.35	34.999768°, -89.969078°
Wetland 3	0.13	35.004463°, -89.966759°
Wetland 4	0.19	35.001613°, -89.964715°
Wetland 5	0.25	35.001480°, -89.964156°
Wetland 6	0.04	35.002069°, -89.963553°
Wetland 7	0.17	35.003052°, -89.963711°
Wetland 8	0.01	35.004933°, -89.969684°
Wetland 9	0.03	34.996997°, -89.968801°
Wetland 10	0.15	34.996614°, -89.969313°
Pond 1	0.13	35.003108°, -89.969937°
Pond 2	0.82	35.000556°, -89.970864°
Pond 3	0.67	34.999141°, -89.969426°
Pond 4	0.14	34.996871°, -89.966122°
Pond 5	0.59	34.997747°, -89.964092°
Pond 6	0.02	35.000841°, -89.964221°
Pond 7	0.59	35.005780°, -89.966152°

Table 2 Stream Length and Termini			
Aquatic Resource	**Approximate Linear Feet**	**Onsite Upgradient Origin**	**Onsite Downgradient Terminus**
Stream 1	3395	34.995279°, -89.963291°	35.002212°, -89.971942°
Stream 2	1961	35.001832°, -89.965059°	35.005591°, -89.964569°
Stream 3	1521	35.001489°, -89.964020°	35.005405°, -89.963765°
Stream 4	699	35.005361°, -89.963375°	35.006217°, -89.965119°
Stream 5	675	34.996650°, -89.969974°	34.996083°, -89.972008°
Stream 6	1210	34.995170°, -89.969619°	34.996083°, -89.972008°

Table 3 Wet Weather Conveyances Length and Termini			
Aquatic Resource	**Approximate Linear Feet**	**Onsite Upgradient Origin**	**Onsite Downgradient Terminus**
WWC 1	173	35.003487°, -89.970504°	35.003232°, -89.970026°
WWC 2	107	35.002983°, -89.969892° 35.002871°, -89.970095°	35.00215°, -89.970845°
WWC 3	107	35.002288°, -89.970818°	35.002027°, -89.970936°
WWC 4	447	35.001167°, -89.970770°	35.001401°, -89.970594°
WWC 5	101	35.000789°, -89.970637°	35.001310°, -89.9705207
WWC 6	200	35.004703°, -89.96651°	35.004646°, -89.965310°
WWC 7	500	34.999400°, -89.969556°	34.999475°, -89.969554°
WWC 8	27	34.999307°, -89.968201°	34.999674°, -89.968162°
WWC 9	184	34.996992°, -89.968841°	34.996677°, -89.969229°

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

December 8, 2020

Ms. Kristin Lehman
ENSAFE
5724 Summer Trees Drive
Memphis. TN 38234

RE: Memphis Shelby County Airport Property Scoping Document

Dear Ms. Lehman:

Division staff have reviewed the proposed preparation of an approximately 245-acre tract of vacant land (the Site) for future light industrial development. The Site is located on the south side of East Holmes Road and the west side of Swinnea Road in Memphis, Tennessee, approximately 1.0 mile south of the Memphis International Airport, at the Tennessee/Mississippi state line. A Proposed Site Plan identifies the potential for approximately 1.5 million square feet of facility space at the Site with approximately 300,000 square feet of additional space allotted for future growth, if needed. The project will disturb well more than an acre of land, which will require a construction stormwater general permit (CGP). The proposed activity for the site will fall under one of the Industrial Activities Sectors for a Tennessee NPDES Multi-Sector Stormwater Permit (TMSP). As a part of the permit a site-specific Surface Water Pollution Prevention Plan must be developed. Owing to the onsite streams and wetlands, a hydrologic determination by a licensed professional needs to be made to determine what water resources/wetlands might be disturbed and whether an Aquatic Resources Alteration Permit (ARAP) will be necessary.

If you need further clarification, I will be glad to try to assist you. You may reach me at (615) 532-0170 or tom.moss@tn.gov.

Sincerely,

Thomas A. Moss
Environmental Review Coordinator
Compliance and Enforcement Unit

cc: Joellyn Brazile, DWR Manager, Memphis Environmental Field Office
Matthew K. Taylor, Office of Policy and Sustainable Practices

Kristin Lehman

From: Lew Hoffman <Lew.Hoffman@tn.gov>
Sent: Tuesday, November 24, 2020 9:53 AM
To: Aaron Conti
Subject: RE: stream crossing question

Aaron,

From your description, it seems the project would be able to be covered under the General ARAP for Construction and Removal of Minor Road Crossings. There would be no mitigation if the project is covered under that GP. Below is a link to the GP. Let me know if you have any questions.

https://www.tn.gov/content/dam/tn/environment/water/natural-resources-unit/water_permit_arap-gp_minor-road-crossings-2020-2025.pdf

Thank you,

Lew

Lew E. Hoffman
Division of Water Resources
Memphis Environmental Field Office
8383 Wolf Lake Drive
Bartlett, TN 38133
Office (901) 371-3019
Fax (901) 371-3170
Email: lew.hoffman@tn.gov

Tell us how we're doing! Please take 5-10 minutes to complete TDEC's Customer Service Survey.

From: Aaron Conti <aconti@Ensafe.com>
Sent: Monday, November 23, 2020 7:49 AM
To: Lew Hoffman <Lew.Hoffman@tn.gov>
Subject: [EXTERNAL] stream crossing question

Hi Lew, hope you're doing well.

I'm working on a site of proposed development with preliminary plans that would result in 1 permanent impact to a stream in the form of encapsulating an approximate 30' length of reach underneath a new road crossing. Additionally, the project would install 1 temporary stream crossing (same width) that would be removed after construction is completed.

I am tasked with estimating the anticipated CWA 404/401 costs, including mitigation. Would TDEC require stream mitigation for the scenario described above?

Memphis
INTERNATIONAL AIRPORT

2491 Winchester Road, Suite 113
Memphis, TN 38116-3856
P: 901-922-8301
F: 901-344-2487
flymemphis.com

January 12, 2021

Pastor David Brown
Pentecostal Praise Church of God in Christ
2922 East Holmes Road
Memphis, Tennessee 38118

Re: East Holmes Road Site Preparation - Adjacent Stakeholder Notice

Dear Rev. Brown:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, MSCAA-owned property (the Site) for future light industrial development. The proposed project consists of preparing the Site for future development and leasing the Site for construction and operation of light industrial facilities. A general overview of the proposed project is included herein.

The Site is located south of the Pentecostal Praise Church of God in Christ, at southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figure 1). The purpose of the proposed project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise. The airspace above the Site is located within a main MEM aircraft flight path.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies (Figure 2). Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The public is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

Memphis
INTERNATIONAL AIRPORT

2491 Winchester Road, Suite 113
Memphis, TN 38116-3856
P: 901-922-8301
F: 901-344-2487
flymemphis.com

January 12, 2021

Matthew and Jeremy Thacker-Rhodes
1164 Vickery Lane, Suite 200
Cordova, Tennessee 38016

Re: East Holmes Road Site Preparation - Adjacent Stakeholder Notice

Dear Sirs:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, MSCAA-owned property (the Site) for future light industrial development. The proposed project consists of preparing the Site for future development and leasing the Site for construction and operation of light industrial facilities. A general overview of the proposed project is included herein.

The Site is located south of your East Holmes Road property, at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figure 1). The purpose of the proposed project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise. The airspace above the Site is located within a main MEM aircraft flight path.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies (Figure 2). Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The public is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

Memphis
INTERNATIONAL AIRPORT

2491 Winchester Road, Suite 113
Memphis, TN 38116-3856
P: 901-922-8301
F: 901-344-2487
flymemphis.com

January 12, 2021

Pastor Leo Holt
Grace Christian Fellowship Church
3025 East Holmes Road
Memphis, Tennessee 38118

Re: East Holmes Road Site Preparation - Adjacent Stakeholder Notice

Dear Rev. Holt:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, MSCAA-owned property (the Site) for future light industrial development. The proposed project consists of preparing the Site for future development and leasing the Site for construction and operation of light industrial facilities. A general overview of the proposed project is included herein.

The Site is located adjacent to Grace Christian Fellowship Church, at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figure 1). The purpose of the proposed project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise. The airspace above the Site is located within a main MEM aircraft flight path.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies (Figure 2). Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The public is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
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flymemphis.com

January 12, 2021

Dunham and Yow Investments
799 Highway 332
Grenada, Mississippi 38901

Re: East Holmes Road Site Preparation - Adjacent Stakeholder Notice

To Whom It May Concern:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, MSCAA-owned property (the Site) for future light industrial development. The proposed project consists of preparing the Site for future development and leasing the Site for construction and operation of light industrial facilities. A general overview of the proposed project is included herein.

The Site is located adjacent to your property, at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figure 1). The purpose of the proposed project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise. The airspace above the Site is located within a main MEM aircraft flight path.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies (Figure 2). Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The public is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

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flymemphis.com

January 12, 2021

Sara M. Holmes and Eula Holmes Sanders
193 Azalea Garden Way
Memphis, Tennessee 38111-4756

Re: East Holmes Road Site Preparation - Adjacent Stakeholder Notice

Dear Ms. Holmes and Ms. Sanders:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, MSCAA-owned property (the Site) for future light industrial development. The proposed project consists of preparing the Site for future development and leasing the Site for construction and operation of light industrial facilities. A general overview of the proposed project is included herein.

The Site is located adjacent to your property, at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figure 1). The purpose of the proposed project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise. The airspace above the Site is located within a main MEM aircraft flight path.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies (Figure 2). Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The public is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

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flymemphis.com

January 12, 2021

Stateline J LLC and FRE Southaven MS Landlord LLC
1197 Peachtree Street, Suite 600
Atlanta, GA 30361

Re: East Holmes Road Site Preparation - Adjacent Stakeholder Notice

To Whom It May Concern:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, MSCAA-owned property (the Site) for future light industrial development. The proposed project consists of preparing the Site for future development and leasing the Site for construction and operation of light industrial facilities. A general overview of the proposed project is included herein.

The Site is located adjacent to your Stateline Business Park North properties, at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figure 1). The purpose of the proposed project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise. The airspace above the Site is located within a main MEM aircraft flight path.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies (Figure 2). Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The public is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

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F: 901-344-2487
flymemphis.com

January 12, 2021

GPT Stateline Road Owner LLC
c/o Gramercy Property Trust
130 Jefferson Street, Suite 300
Chicago, Illinois 60661

Re: East Holmes Road Site Preparation - Adjacent Stakeholder Notice

To Whom It May Concern:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, MSCAA-owned property (the Site) for future light industrial development. The proposed project consists of preparing the Site for future development and leasing the Site for construction and operation of light industrial facilities. A general overview of the proposed project is included herein.

The Site is located adjacent to your Stateline Business Park North property, at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figure 1). The purpose of the proposed project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise. The airspace above the Site is located within a main MEM aircraft flight path.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies (Figure 2). Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The public is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

Memphis
INTERNATIONAL AIRPORT

2491 Winchester Road, Suite 113
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flymemphis.com

January 12, 2021

Elmore Holmes III
193 Azalea Garden Way
Memphis, Tennessee 38111-4756

Re: East Holmes Road Site Preparation - Adjacent Stakeholder Notice

Dear Mr. Holmes:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, MSCAA-owned property (the Site) for future light industrial development. The proposed project consists of preparing the Site for future development and leasing the Site for construction and operation of light industrial facilities. A general overview of the proposed project is included herein.

The Site is located adjacent to your property, at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figure 1). The purpose of the proposed project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise. The airspace above the Site is located within a main MEM aircraft flight path.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies (Figure 2). Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The public is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

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January 12, 2021

Pastor Bartholomew Orr
Brown Missionary Baptist Church
980 Stateline Road
Southaven, Mississippi, 38671

Re: East Holmes Road Site Preparation - Adjacent Stakeholder Notice

Dear Rev. Orr:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, MSCAA-owned property (the Site) for future light industrial development. The proposed project consists of preparing the Site for future development and leasing the Site for construction and operation of light industrial facilities. A general overview of the proposed project is included herein.

The Site is located adjacent to the Brown Missionary Baptist Church Cemetery, at southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figure 1). The purpose of the proposed project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise. The airspace above the Site is located within a main MEM aircraft flight path.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies (Figure 2). Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The public is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

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F: 901-344-2487
flymemphis.com

January 12, 2021

Marsha Peek Moncrief
1165 Joann Drive
Southaven, Mississippi 38671

Re: East Holmes Road Site Preparation - Adjacent Stakeholder Notice

Dear Ms. Moncrief:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, MSCAA-owned property (the Site) for future light industrial development. The proposed project consists of preparing the Site for future development and leasing the Site for construction and operation of light industrial facilities. A general overview of the proposed project is included herein.

The Site is located adjacent to your property, at southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figure 1). The purpose of the proposed project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise. The airspace above the Site is located within a main MEM aircraft flight path.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies (Figure 2). Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The public is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

Memphis
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2491 Winchester Road, Suite 113
Memphis, TN 38116-3856
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flymemphis.com

January 12, 2021

Copart of Tennessee Inc.
14185 Dallas Parkway, Suite 300
Dallas, Texas 75254- 1327

Re: East Holmes Road Site Preparation - Adjacent Stakeholder Notice

To Whom It May Concern:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, MSCAA-owned property (the Site) for future light industrial development. The proposed project consists of preparing the Site for future development and leasing the Site for construction and operation of light industrial facilities. A general overview of the proposed project is included herein.

The Site is located adjacent to your property, at southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figure 1). The purpose of the proposed project is to prepare the Site for development by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise. The airspace above the Site is located within a main MEM aircraft flight path.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies (Figure 2). Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. The public is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

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flymemphis.com

January 12, 2021

Quinton Clark
Memphis Light, Gas and Water
220 South Main Street
Memphis, Tennessee 38103

Email: qclark@mlgw.org

Re: East Holmes Road Site Preparation - Stakeholder Notice

Dear Mr. Clark:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, property (the Site) for future development as a cargo holding or distribution facility. The Site is located at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figures 1 and 2). The Site is bordered to the west and south by a Memphis Light, Gas and Water (MLGW) easement, along Swinnea Road and the Tennessee/Mississippi State line.

The purpose of the proposed project is to prepare the Site for development and long-term lease by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies. Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. MLGW is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

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January 12, 2021

Forrest Frazier
Director of Environmental Compliance and Remediation
Boardwalk Pipeline Partners, LP.
9 Greenway Plaza, Suite 2800
Houston, Texas 77046

Email: forrest.frazier@bwpmlp.com

Re: East Holmes Road Site Preparation - Stakeholder Notice

Dear Ms. Frazier:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, property (the Site) for future development as a cargo holding or distribution facility. The Site is located at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figure 1). The northern portion of the Site is bisected by a Boardwalk Pipeline Partners subsidiary, Texas Gas Transmission, LLC easement (Figure 2).

The purpose of the proposed project is to prepare the Site for development and long-term lease by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies (Figure 2). Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. Texas Gas Transmission, LLC is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

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2491 Winchester Road, Suite 113
Memphis, TN 38116-3856
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flymemphis.com

January 12, 2021

Amanda Garrahan
Director Corporate Environmental and Safety Affairs
One Valero Way
San Antonio, Texas 78249-1616

Email: amanda.garrahan@valero.com

Re: East Holmes Road Site Preparation - Stakeholder Notice

Dear Ms. Garrahan:

The Memphis-Shelby County Airport Authority (MSCAA) proposes to prepare an approximately 245-acre tract of vacant, property (the Site) for future development as a cargo holding or distribution facility. The Site is located at the southeast corner of East Holmes Road and Swinnea Road, north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee (Figures 1 and 2). The Site is bordered to the west and south by the Valero Energy Partners LP (Valero) Collierville Pipeline easement, along Swinnea Road and the Tennessee/Mississippi State line.

The purpose of the proposed project is to prepare the Site for development and long-term lease by private companies with an interest in constructing cargo holding or distribution facilities. Figure 3 includes the conceptual site plan and identifies the potential for approximately 1.5 million square feet of facility space at the Site, with approximately 300,000 square feet of additional space allotted for future growth, if needed. The proposed project will meet MSCAA's need to productively utilize land holdings while maintaining compatibility with Memphis International Airport (MEM) operations, including aircraft noise.

Site preparation will include tree removal, site grading activities, utility main extensions, and construction of stream crossings to allow for future site development by private companies. Future site development activities are anticipated to last between 6 and 9 months. However, at this time no site developers or long-term tenants have been identified.

The preparation of the Site and development will comply with the requirements set forth in the provisions of the National Environmental Policy Act. Valero is invited to comment on the proposed project and will have an opportunity to review and comment on a forthcoming Environmental Assessment, addressing how the proposed project would potentially impact economic, social, and environmental resources.

Should you have any comments or questions regarding the proposed action, please contact me via email at jhay@flymemphis.com or by phone at (901) 922-8224.

Respectfully submitted,

James A. Hay II, C.M.
Director of Development
Memphis International Airport

ATTACHMENT 2

Air Quality Information

United States Environmental Protection Agency

De Minimis Tables

40 CFR 93.153(b)(1) - For purposes of paragraph (b) of this section the following rates apply in nonattainment areas (NAA's):	
	Tons/year
Ozone (VOC's or NOx):	
Serious NAA's	50
Severe NAA's	25
Extreme NAAs	10
Other ozone NAA's outside an ozone transport region:	100
Other ozone NAA's inside an ozone transport region:	
VOC	50
NOx	100
Carbon Monoxide: All maintenance areas	100
SO_2 or NO_2: All NAA's	100
PM_{10}:	
Moderate NAA's	100
Serious NAA's	70
$PM_{2.5}$ (direct emissions, SO_2, NOx, VOC, and Ammonia):	
Moderate NAA's	100
Serious NAA's	70
Pb: All NAA's	25

40 CFR 93.153(b)(2) - For purposes of paragraph (b) of this section the following rates apply in maintenance areas:	
	Tons/year
Ozone (NOx), SO_2 or NO_2:	
All maintenance areas	100
Ozone (VOC's)	
Maintenance areas inside an ozone transport region	50
Maintenance areas outside an ozone transport region	100
Carbon monoxide: All maintenance areas	100
PM_{10}: All maintenance areas	100
$PM_{2.5}$ (direct emissions, SO2, NOx, VOC, and Ammonia)	100
All maintenance areas	100
Pb: All maintenance areas	25

Air Quality Index Report

Geographic Area: Memphis, TN-MS-AR
Summary: by CBSA
Year: 2019

		Number of Days when Air Quality was...					AQI Statistics			Number of Days when AQI Pollutant was...					
CBSA	# Days with AQI	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy	Maximum	90th Percentile	Median	CO	NO2	O3	SO2	PM2.5	PM10
Memphis, TN-MS-AR	365	221	139	5	.	.	148	67	45	.	5	181	.	179	.

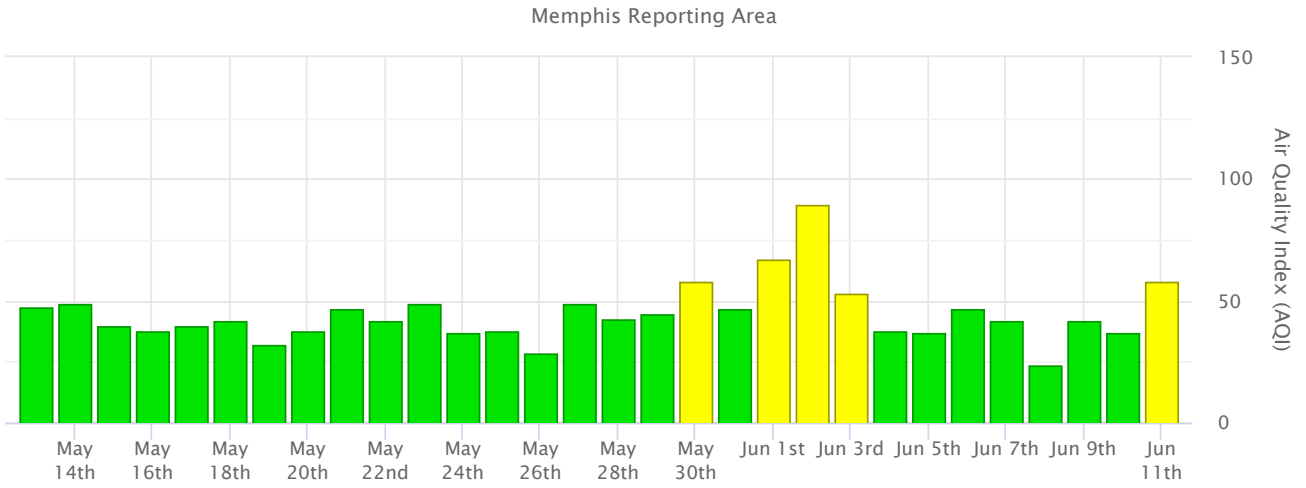
Get detailed information about this report, including column descriptions, at https://www.epa.gov/outdoor-air-quality-data/about-air-data-reports#aqi

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated by state, local, and tribal organizations who own and submit the data.

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: April 14, 2020

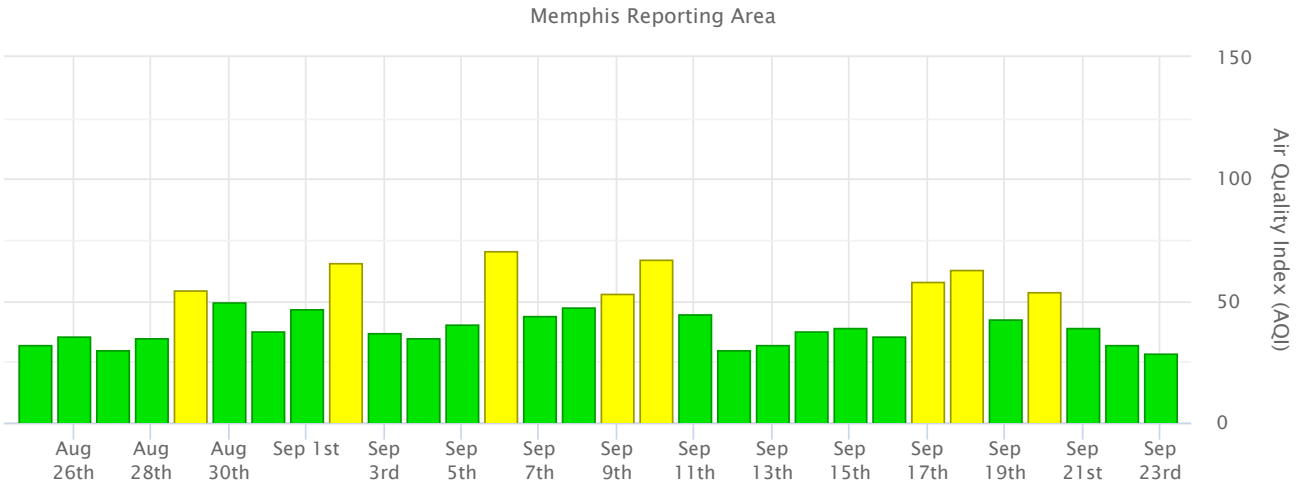
Month



This chart shows the daily AQI in your area for each of the last 30 days. Mouse over or tap a bar to see which pollutant (ozone or PM) was highest that day.

AirNow.gov

Month



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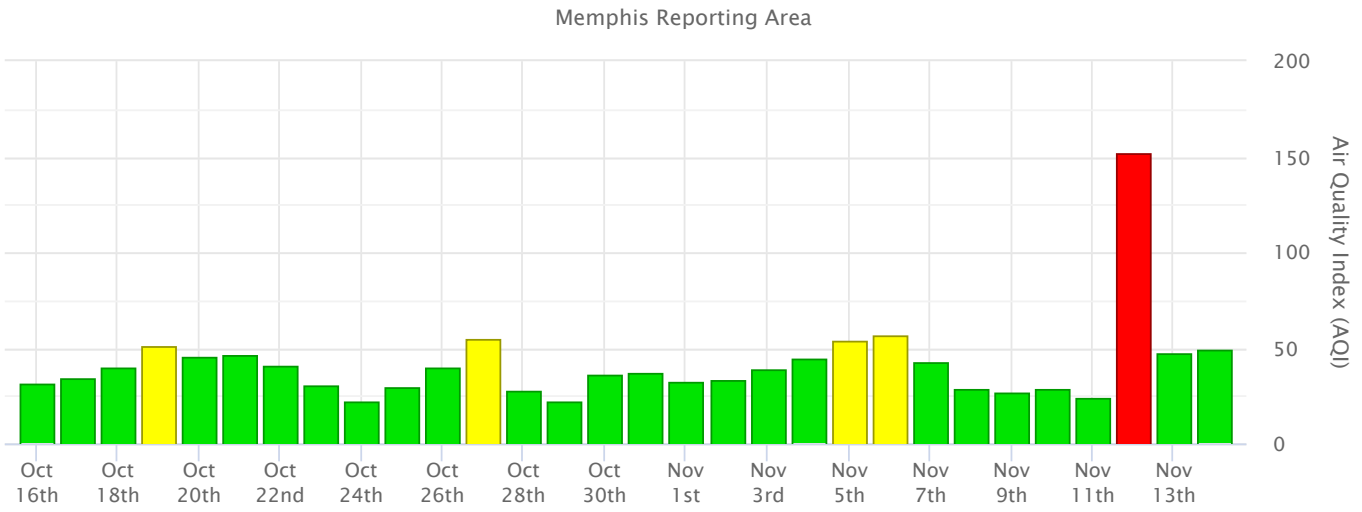
AirNow.gov

Month



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AirNow.gov

U.S. EPA Motor Vehicle Emission Simulator
Emission Model Output
Construction Equipment Emissions

Construction Equipment																	
CY 2021 (Apr-Dec)	**Cement & Mortar Mixers**	**Cranes**	**Dumpers/Tenders**	**Excavators**	**Graders**	**Off-highway Trucks**	**Pavers**	**Paving Equipment**	**Plate Compactors**	**Rollers**	**Rubber Tire Loaders**	**Signal Boards/Light Plants**	**Skid Steer Loaders**	**Surfacing Equipment**	**Tractors/Loaders/ backhoes**	**Trenchers**	**TOTAL**
Atmospheric CO2	6.72E-02	1.70E+00	8.69E-02	1.94E+00	2.03E+00	1.32E+01	1.08E+00	4.62E-01	3.00E-02	7.52E-01	1.91E+00	1.05E-01	2.12E-01	6.61E-01	4.81E-01	4.98E-01	**25.24**
Carbon Monoxide (CO)	2.39E-04	1.01E-03	6.46E-04	7.00E-04	7.46E-04	4.79E-03	7.17E-04	4.46E-04	1.18E-04	6.49E-04	1.57E-03	2.37E-04	1.51E-03	1.43E-03	2.50E-03	6.32E-04	**0.018**
Oxides of Nitrogen (NOx)	5.45E-04	4.20E-03	6.40E-04	2.49E-03	2.40E-03	3.90E-02	2.32E-03	1.21E-03	2.14E-04	1.88E-03	4.87E-03	6.50E-04	1.49E-03	3.59E-03	2.89E-03	1.98E-03	**0.070**
Primary Exhaust PM10 - Total	3.71E-05	1.78E-04	9.43E-05	1.34E-04	1.49E-04	8.57E-04	1.19E-04	6.90E-05	1.27E-05	1.03E-04	2.54E-04	3.04E-05	2.14E-04	1.87E-04	3.80E-04	8.63E-05	**0.0029**
Primary Exhaust PM2.5 - Total	3.60E-05	1.73E-04	9.15E-05	1.30E-04	1.44E-04	8.31E-04	1.15E-04	6.70E-05	1.23E-05	9.94E-05	2.47E-04	2.95E-05	2.07E-04	1.81E-04	3.69E-04	8.38E-05	**0.0028**
Sulfur Dioxide (SO2)	5.88E-07	1.24E-05	7.60E-07	1.33E-05	1.39E-05	9.03E-05	7.54E-06	3.33E-06	2.76E-07	5.34E-06	1.38E-05	9.00E-07	1.78E-06	5.29E-06	3.99E-06	3.57E-06	**0.00018**
Volatile Organic Compounds	5.53E-05	2.41E-04	1.41E-04	1.15E-04	1.23E-04	1.08E-03	1.15E-04	9.38E-05	3.49E-05	1.04E-04	2.64E-04	5.85E-05	2.98E-04	2.15E-04	5.42E-04	1.05E-04	**0.0036**
Methane (CH4)	2.38E-06	1.69E-05	5.28E-06	1.02E-05	1.14E-05	9.49E-05	1.09E-05	7.46E-06	2.82E-06	9.08E-06	1.71E-05	4.70E-06	1.14E-05	1.24E-05	2.84E-05	8.58E-06	**0.00025**

Year	**CO2**	**CO**	**NOx**	**PM10**	**PM2.5**	**SO2**	**VOC**	**N2O**	**CH4**
Threshold	25000	100	100	100	100	100	100	25000	25000
2021	**25.24**	**0.018**	**0.070**	**0.0029**	**0.0028**	**0.00018**	**0.0036**	**0**	**0.00025**

U.S. EPA Motor Vehicle Emission Simulator
Emission Model Output
Construction Vehicle Trip Emissions

Source	Number of Trips
Passenger Car	172
Passenger Truck	172
Single Unit Long-haul Truck	134

Passenger Car													
CY 2021	Running Exhaust	Start Exhaust	Evap Permeation	Evap Fuel Vapor Venting	Evap Fuel Leaks	Crankcase Running Exhaust	Crankcase Start Exhaust	Refueling Displacement Vapor Loss	Refueling Spillage Loss	Auxiliary Power Exhaust	Extended Idle Exhaust	Crankcase Extended Idle Exhaust	TOTAL
Atmospheric CO2	3.27E+02	1.35E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**461.65**
Carbon Monoxide (CO)	2.47E+00	9.78E+00	0.00E+00	0.00E+00	0.00E+00	1.29E-03	5.11E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**12.26**
Oxides of Nitrogen (NOx)	1.08E-01	8.29E-01	0.00E+00	0.00E+00	0.00E+00	4.37E-06	3.35E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.94**
Primary Exhaust PM10 - Total	4.54E-03	1.53E-02	0.00E+00	0.00E+00	0.00E+00	3.65E-05	1.23E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.020**
Primary Exhaust PM2.5 - Total	4.02E-03	1.36E-02	0.00E+00	0.00E+00	0.00E+00	3.23E-05	1.09E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.018**
Sulfur Dioxide (SO2)	2.18E-03	9.01E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.0031**
Volatile Organic Compounds	2.05E-02	1.10E+00	2.06E-01	4.47E-01	2.93E-01	2.70E-04	1.45E-02	1.02E-02	9.34E-03	0.00E+00	0.00E+00	0.00E+00	**2.10**
Nitrous Oxide (N2O)	1.33E-03	5.33E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.055**
Methane (CH4)	3.05E-03	4.37E-02	0.00E+00	0.00E+00	0.00E+00	3.91E-05	5.12E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.047**

Passenger Truck													
CY 2021	Running Exhaust	Start Exhaust	Evap Permeation	Evap Fuel Vapor Venting	Evap Fuel Leaks	Crankcase Running Exhaust	Crankcase Start Exhaust	Refueling Displacement Vapor Loss	Refueling Spillage Loss	Auxiliary Power Exhaust	Extended Idle Exhaust	Crankcase Extended Idle Exhaust	TOTAL
Atmospheric CO2	7.14E+01	1.70E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**241.01**
Carbon Monoxide (CO)	6.01E-01	1.37E+01	0.00E+00	0.00E+00	0.00E+00	3.22E-04	7.38E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**14.28**
Oxides of Nitrogen (NOx)	3.90E-02	1.30E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-06	5.53E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**1.34**
Primary Exhaust PM10 - Total	1.07E-03	2.22E-02	0.00E+00	0.00E+00	0.00E+00	1.08E-05	1.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.023**
Primary Exhaust PM2.5 - Total	9.51E-04	1.96E-02	0.00E+00	0.00E+00	0.00E+00	9.67E-06	1.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.021**
Sulfur Dioxide (SO2)	4.81E-04	1.14E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.0016**
Volatile Organic Compounds	7.65E-03	1.62E+00	2.06E-01	3.40E-01	2.95E-01	9.94E-05	2.14E-02	1.23E-02	4.98E-03	0.00E+00	0.00E+00	0.00E+00	**2.51**
Nitrous Oxide (N2O)	3.40E-04	8.64E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.087**
Methane (CH4)	8.74E-04	8.85E-02	0.00E+00	0.00E+00	0.00E+00	1.04E-05	1.09E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.091**

Single Unit Long-haul Truck													
CY 2021	Running Exhaust	Start Exhaust	Evap Permeation	Evap Fuel Vapor Venting	Evap Fuel Leaks	Crankcase Running Exhaust	Crankcase Start Exhaust	Refueling Displacement Vapor Loss	Refueling Spillage Loss	Auxiliary Power Exhaust	Extended Idle Exhaust	Crankcase Extended Idle Exhaust	TOTAL
Atmospheric CO2	7.81E+02	9.75E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**878.2**
Carbon Monoxide (CO)	1.02E+00	1.64E+01	0.00E+00	0.00E+00	0.00E+00	3.33E-03	1.85E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**17.4**
Oxides of Nitrogen (NOx)	1.16E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	4.84E-04	1.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**2.165**
Primary Exhaust PM10 - Total	3.55E-02	1.16E-02	0.00E+00	0.00E+00	0.00E+00	1.63E-02	1.45E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.065**
Primary Exhaust PM2.5 - Total	3.26E-02	1.05E-02	0.00E+00	0.00E+00	0.00E+00	1.50E-02	1.33E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.059**
Sulfur Dioxide (SO2)	6.52E-03	8.11E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.0073**
Volatile Organic Compounds	1.32E-01	7.58E-01	8.59E-02	2.62E-01	1.70E-01	3.21E-03	1.05E-02	1.73E-02	2.16E-02	0.00E+00	0.00E+00	0.00E+00	**1.461**
Nitrous Oxide (N2O)	2.38E-03	4.77E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.050**
Methane (CH4)	3.74E-02	1.38E-01	0.00E+00	0.00E+00	0.00E+00	1.34E-05	4.27E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.176**

Year	CO2	CO	NOx	PM10	PM2.5	SO2	VOC	N2O	CH4
Threshold	25000	100	100	100	100	100	100	25000	25000
2021	**1580.86**	**43.93**	**4.44**	**0.11**	**0.098**	**0.012**	**6.074**	**0.19**	**0.31**

U.S. EPA Motor Vehicle Emission Simulator

Emission Model Output

Construction Emission Summary

Building Contrustion Emissions (tons/yr)									
Year	**CO2**	**CO**	**NOx**	**PM10**	**PM2.5**	**SO2**	**VOC**	**N2O**	**CH4**
Threshold	**25000**	**100**	**100**	**100**	**100**	**100**	**100**	**25000**	**25000**
2021	1606.10	43.95	4.51	0.11	0.10	0.012	6.08	0.19	0.31

U.S. EPA Motor Vehicle Emission Simulator
Emission Model Output
Operation Emissions

Number of Trips
100
120

Passenger Car													
CY 2022	Running Exhaust	Start Exhaust	Evap Permeation	Evap Fuel Vapor Venting	Evap Fuel Leaks	Crankcase Running Exhaust	Crankcase Start Exhaust	Refueling Displacement Vapor Loss	Refueling Spillage Loss	Auxiliary Power Exhaust	Extended Idle Exhaust	Crankcase Extended Idle Exhaust	TOTAL
Atmospheric CO2	2.41E+02	1.55E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**395.83**
Carbon Monoxide (CO)	1.72E+00	1.06E+01	0.00E+00	0.00E+00	0.00E+00	8.98E-04	5.53E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**12.33**
Oxides of Nitrogen (NOx)	7.21E-02	8.03E-01	0.00E+00	0.00E+00	0.00E+00	2.92E-06	3.24E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.88**
Primary Exhaust PM10 - Total	3.37E-03	1.77E-02	0.00E+00	0.00E+00	0.00E+00	2.70E-05	1.42E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.021**
Primary Exhaust PM2.5 - Total	2.98E-03	1.57E-02	0.00E+00	0.00E+00	0.00E+00	2.39E-05	1.26E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.019**
Sulfur Dioxide (SO2)	1.61E-03	1.03E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.0026**
Volatile Organic Compounds	1.32E-02	1.13E+00	1.55E-01	3.88E-01	2.86E-01	1.73E-04	1.48E-02	7.55E-03	8.00E-03	0.00E+00	0.00E+00	0.00E+00	**2.00**
Nitrous Oxide (N2O)	9.93E-04	5.14E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.052**
Methane (CH4)	2.16E-03	4.82E-02	0.00E+00	0.00E+00	0.00E+00	2.76E-05	5.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.051**

Combination Long-haul Truck													
CY 2022	Running Exhaust	Start Exhaust	Evap Permeation	Evap Fuel Vapor Venting	Evap Fuel Leaks	Crankcase Running Exhaust	Crankcase Start Exhaust	Refueling Displacement Vapor Loss	Refueling Spillage Loss	Auxiliary Power Exhaust	Extended Idle Exhaust	Crankcase Extended Idle Exhaust	TOTAL
Atmospheric CO2	1.75E+03	1.67E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.97E+00	9.63E+01	0.00E+00	**2016.15**
Carbon Monoxide (CO)	9.51E-01	9.72E+00	0.00E+00	0.00E+00	0.00E+00	8.56E-03	4.34E-02	0.00E+00	0.00E+00	1.04E-01	9.45E-01	2.58E-03	**11.77**
Oxides of Nitrogen (NOx)	3.89E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.29E-03	0.00E+00	0.00E+00	0.00E+00	8.37E-02	2.25E+00	5.35E-04	**6.23**
Primary Exhaust PM10 - Total	1.30E-01	1.11E-02	0.00E+00	0.00E+00	0.00E+00	2.97E-02	2.73E-03	0.00E+00	0.00E+00	5.34E-03	1.55E-02	3.94E-03	**0.20**
Primary Exhaust PM2.5 - Total	1.19E-01	1.02E-02	0.00E+00	0.00E+00	0.00E+00	2.73E-02	2.51E-03	0.00E+00	0.00E+00	4.91E-03	1.42E-02	3.63E-03	**0.18**
Sulfur Dioxide (SO2)	1.48E-02	1.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.36E-05	8.16E-04	0.00E+00	**0.017**
Volatile Organic Compounds	1.70E-01	4.13E-01	0.00E+00	0.00E+00	0.00E+00	4.94E-03	7.93E-03	0.00E+00	6.22E-02	2.17E-02	3.73E-01	5.05E-03	**1.06**
Nitrous Oxide (N2O)	2.00E-03	8.64E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.011**
Methane (CH4)	4.01E-02	2.14E-01	0.00E+00	0.00E+00	0.00E+00	1.19E-05	1.92E-05	0.00E+00	0.00E+00	5.80E-05	2.55E-01	1.23E-05	**0.51**

Year	NOx	VOC	CO	PM10	PM2.5	SO2	CO2	CH4	N2O
Threshold	**100**	**100**	**100**	**100**	**100**	**100**	**25000**	**25000**	**25000**
2022	7.10	3.06	24.11	0.22	0.20	0.020	2411.98	0.56	0.063

U.S. Department of Transportation
Federal Highway Administration

Tennessee Division

404 BNA Drive, Suite 508
Nashville, Tennessee 37217
Phone (615) 781-5770

April 2, 2020

In Reply Refer To:
HPD-TN

Mr. Kwabena Aboagye
Assistant Director, Long Range Planning Division
Tennessee Department of Transportation
James K. Polk Building, Suite 900
Nashville, TN 37243

Subject: Air Quality Conformity Determination for Shelby County, Tennessee

Dear Mr. Aboagye:

The Federal Highway Administration (FHWA) Tennessee Division and Federal Transit Administration (FTA) Region IV Office, in coordination with the Environmental Protection Agency (EPA) Region IV Office, have reviewed the Air Quality Conformity Determination Report the Memphis Urban Area Metropolitan Planning Organization (MPO) Transportation Policy Board adopted on February 20, 2020.

The Air Quality Conformity Determination covers the Shelby County, TN maintenance area for the 2008 8-hour ozone standards and addresses the planned transportation improvements from the MPO's amended FY2020-2023 Transportation Improvement Program.

Based on our review, we find the document conforms to the National Ambient Air Quality Standards (NAAQS) for the 2008 8-hour ozone for Shelby County, Tennessee.

If you have any questions regarding this determination, please contact me at (615) 781-5775.

Sincerely,

ELIZABETH HERNANDEZ WATKINS

Digitally signed by ELIZABETH HERNANDEZ WATKINS
Date: 2020.04.02 13:08:58 -05'00'

Elizabeth Watkins, AICP
Transportation Planning Specialist

cc: Mayor Jim Strickland, Transportation Policy Board Chair, Memphis Urban Area MPO
Ms. Theresa Claxton, Program Development Team Leader, FHWA TN Division
Mr. Sean Santalla, Transportation Planning Specialist, FHWA TN Division
Mr. Andres Ramirez, Community Planner, FTA Region IV
Ms. Dianna Myers, Environmental Scientist, EPA Region IV
Mr. Stacy Morrison, OCT Planning Manager, TDOT
Mr. Antoine Hawkins, OCT Region 4 Planning Supervisor, TDOT
Ms. Pragati Srivastava, Administrator, Memphis Urban Area MPO

LIVABILITY 2050

connecting people & places

REGIONAL TRANSPORTATION PLAN UPDATE

Memphis MPO

METROPOLITAN PLANNING ORGANIZATION

RTP ID	TIP ID	Project Name	From	To	Project Description	Location	State	Project Scale	Project Cost (YOE)	Funding Source
1037		Bike/Ped/ Complete Streets	Varies	Varies	Greenways, sidewalks, bicycle facilities and amenities, streetscaping	MPO Planning Area	MS	Bike/Ped/ Complete Streets	$18,519,662	Varies
1067		Debt Service	N/A	N/A	This is the payback value for Debt Service associated with the GARVEE Bond.	MPO Planning Area	MS	Debt Service	$184,419,464	Varies
195		Pleasant Hill Road	Church Road	Nail Road	Widen from 2 to 5 lane boulevard	Olive Branch	MS	Town Centers	$7,025,783	STBG
519	MS-LSTBG-2020-01	Nail Road Extension	Interstate Boulevard	Pepper Chase Drive	New 3 lane road	Horn Lake	MS	Town Centers	$4,496,501	STBG
								2026-2030 Total	$458,106,957	
Livability 2050 Horizon Year: (Tier 3: 2031-2035)										
TENNESSEE										
1002		Roadway O&M	Varies	Varies	Road resurfacing and other preventative maintenance	Regionwide	TN	O&M	$206,755,773	Varies
1050		ITS/ Signalization	Varies	Varies	Traffic signals, optimization, communication, variable message signs	Regionwide	TN	O&M	$43,594,009	Varies
1008		Bridge O&M	Varies	Varies	Bridge replacement, rehabilitation, preservation, systematic repairs and seismic retrofit	Regionwide	TN	O&M	$49,470,316	Varies
1062		Local O&M	Varies	Varies	General maintenance for MS jurisdictions	Regionwide	TN	O&M	$90,919,646	Varies
1014		Bike/Ped/ Complete Streets/Safety	Varies	Varies	Greenways, sidewalks, bicycle facilities and amenities, streetscaping	Regionwide	TN	Bike/Ped/ Complete Streets/Safety	$75,045,831	Varies
1020		Transit O&M	Varies	Varies	The transit O&M costs equal the available Transit funds minus transit capital projects	Regionwide	TN	O&M	$260,732,434	Varies
90		Appling Road	Cordova Club Drive	Dusty Lane	New 4 lane road	Shelby County	TN	Town Centers	$5,829,820	STBG
6		Holmes Road	Weaver Road	Horn Lake Road	Widen from 2 to 5 lanes	Memphis	TN	Neighborhood Communities	$40,773,762	STBG

RTP ID	TIP ID	Project Name	From	To	Project Description	Location	State	Project Scale	Project Cost (YOE)	Funding Source
820	STP-M-2002-14	W Holmes Road	Mill Branch Road	Tchulahoma Road	Widen existing 4 and 2 lane to 7 lanes	Memphis	TN	Town Centers	$17,317,897	STBG
38	NHS-2006-10-A	I-40	SR-177 (Germantown Road)	1 mile east of Canada Road	Widen from 6 to 8 lanes	Memphis/ Lakeland	TN	Interregional	$78,286,156	NHPP
136	NHS-2006-10-B	I-40	1.0 mile east of Canada Road	SR-205 (Collierville-Arlington Road)	Widen from 4 to 6 lanes	Arlington/ Lakeland	TN	Interregional	$75,287,963	NHPP
12		I-40 at SR-3/ SR-4 (Second Street)	N/A	N/A	Modify interchange	Memphis	TN	Interregional	$24,057,169	NHPP
514		Paul R Lowry Road	Shelby Drive	Electrolux Drive	Widen from 2 and 3 lanes to 5 lanes	Memphis	TN	Regional Centers	$24,984,943	IMPROVE-County
515		Raines Road at SR-176 (Getwell Road)	N/A	N/A	Construct new interchange	Memphis	TN	Town Centers	$135,584,960	IMPROVE-State
95	TN-STBG-2020-01	SR-14 (Austin Peay Highway)	East of Kerrville-Rosemark Road	Tipton County line	Widen from 2 to 4 lanes (divided)	Shelby County	TN	Regional Centers	$83,283,145	STBG-S
516		U.S.-51	Chelsea Road	Frayser Blvd	Complete streets retrofit improving multi modal travel, ITS, and safety	Memphis	TN	Neighborhood Communities	$45,206,091	NHPP
517		U.S.-72/SR-57 (Poplar Avenue)	Poplar Estates Parkway	New Riverdale Road	Widen to 7 lanes	Germantown	TN	Regional Centers	$7,911,899	NHPP
71	STP-M-2000-16	Walnut Grove Road	Walnut Bend Road	Rocky Point Road	Widen 4 and 2 lane roadway to 6 lanes with median, realign Rocky Point Rd intersection	Shelby County	TN	Regional Centers	$38,000,433	STBG
								2031-2035 Total	$1,303,042,247	
MISSISSIPPI										
1026		Roadway O&M	Varies	Varies	Road resurfacing and other preventative maintenance	MPO Planning Area	MS	O&M	$288,694,350	Varies
1056		ITS/ Signalization	Varies	Varies	Traffic signals, optimization, communication, variable message signs	MPO Planning Area	MS	O&M	$24,910,862	Varies

ATTACHMENT 3

Biological Resources Information

Photo 1: View of metal roofing observed on the ground within the southwest portion of the subject property.

Photo 2: View of the broken concrete presumed to be from a former building structure in the north-central portion of the subject property.

Photo 3: Partial view of the former gravel pit area in the northeast portion of the subject property.

Photo 4: View of used tires observed along the west portion of the subject property.

Photo 5: View of livestock feeding trough/ring observed in the northwest portion of the subject property.

Photo 6: View of trash and debris observed in the north-central portion of the property. Materials observed suggest a residential building may have been located in the area.

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 1: View of Stream 1, facing northwest. (35.001349°, -89.970553°)

Photo 2: View of Stream 2 flowing out of the forested area, facing south. (35.005294°, -89.964738°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 3: View of Stream 3 taken from top of bank, facing southeast. (35.003539°, -89.963919°)

Photo 4: View of Stream 4, which receives drainage from Streams 2 and 3, facing south. (35.005933°, -89.965021°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 5: View of Stream 5, showing a reach with weak bed and bank demarcation, facing east. (34.996663°, -89.970313°)

Photo 6: View of Stream 6, showing a reach with strong bed and bank demarcation. (34.995628°, -89.970949°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 7: View of Pond 1, facing north. (35.002988°, -89.969974°)

Photo 8: View of Pond 2, which drains via a seep into non-WOTUS linear drainage feature, facing south. (35.000748°, -89.970652°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 9: View of Pond 3 and berm, which drains via a breach into non-WOTUS linear drainage feature, facing southwest. (34.99942°, -89.969566°)

Photo 10: View of breach in Pond 3 berm, which drains into a non-WOTUS linear drainage feature, facing south toward the pond. (34.99942°, -89.969566°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 11: View of Pond 7, which appears to lack hydrologic connection. (35.005481°, -89.966365°)

Photo 12: Overview of Wetland 1, facing south. Wetland 1 is located within a drainageway absent of stream morphology. (34.99763°, -89.965424°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 13: Overview of Upland 1, taken within the wetland/upland mosaic area, facing south. (34.997301°, -89.965408°)

Photo 14: Overview of Wetland 2, which receives hydrologic input from a non-WOTUS linear drainage feature and then drains into Stream 1, facing south. (34.99977°, -89.969094°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 15: Overview of upland "island" (Upland 2) within Wetland 2, facing south. (34.999704°, -89.969185°)

Photo 16: Overview of Wetland 3, facing north. (35.004463°, -89.96676°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 17: Overview of Upland 3, taken from Pond 1 south berm, facing south. Pond 1 seepage drains into a non-WOTUS linear drainage feature and eventually Stream 1. (35.004463°, -89.96676°)

Photo 18: Overview of Wetland 4, a 60%/40% wetland/upland mosaic wetland, which drains into Stream 2, facing north. (35.001611°, -89.964722°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 19: View of Upland 4, taken adjacent to a small puddle (left) near a non-WOTUS linear drainage feature, facing southeast. (35.004841°, -89.965494°)

Photo 20: Overview of Wetland 5, which drains into Stream 3, facing east. (35.001478°, -89.964156°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 21: Overview of Wetland 6, in a drainageway lacking stream morphology, facing south. (35.002064°, -89.963546°)

Photo 22: Overview of Wetland 7, located within a drainageway lacking stream morphology, facing north. (35.00305°, -89.963707°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 23: Overview of Wetland 8, located near the toe of a slope to the east, facing north. No hydrologic connection to any other feature was observed. (35.00305°, -89.963707°)

Photo 24: Overview of Wetland 9, which drains westward into non-WOTUS linear drainage feature, facing east. (34.996997°, -89.968798°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 25: View of Wetland 10, which drains into Stream 5, facing east. (34.996613°, -89.969307°)

Photo 26: View of the berm (Upland 6) that Wetland 10 bisects to drain west. (34.996672°, -89.969509°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 27: View of no stream feature at northwest corner of Site, facing south. The topographic map shows a blue line stream leaving the Site in the northwest corner, but the stream feature is no longer present. (35.006216°, -89.972039°)

Photo 28: View of Stream 1 historical impact, entering culvert at the southern utility line easement and continuing on as a buried reach for approximately 200 feet, facing south. (34.997768°, -89.96608°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 29: Snag located at 34.998618°, -89.966856°.

Photo 30: Snag located at 34.998653°, -89.967028°.

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 31: Snag located at 35.004437°, -89.966784°.

Photo 32: Another view of the snag located at 35.004437°, -89.966784°.

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 33: Snag located at 35.004715°, -89.966861°.

Photo 34: Another view of the snag located at 35.004715°, -89.966861°.

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Shelby County, Tennessee

Local office

Tennessee Ecological Services Field Office

(931) 528-6481
(931) 528-7075

446 Neal Street
Cookeville, TN 38501-4027

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Indiana Bat Myotis sodalis — Endangered
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/5949

Northern Long-eared Bat Myotis septentrionalis — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9045

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the

Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird Euphagus carolinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be

used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

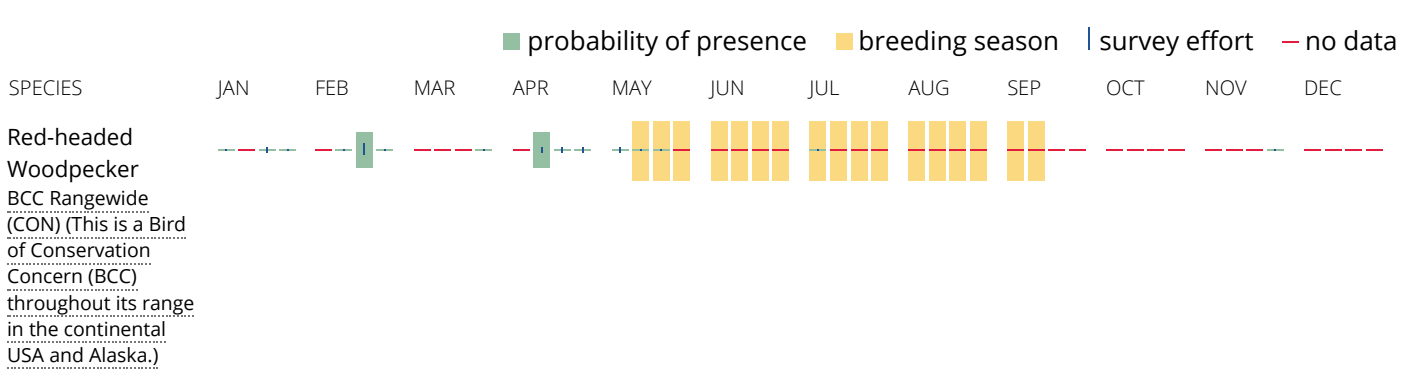
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Rusty Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Wood Thrush
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds

guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize

potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

TN Department of Environment & Conservation

Help

Key to Status and Ranks

- Download Status and Ranks

Rare Species by County

Data is refreshed on or around January and July each year.

Go Rows 25 Actions

County

1 - 25 of 27

County	Type	Category	Scientific Name	Common Name	Global Rank	State Rank	Fed. Status	State Status	Habitat	Wet Habitat Flag
Shelby	Animal Assemblage	No Data	Rookery	Heron Rookery	G5	SNR	--	Rare, Not State Listed	No Data	No Data
Shelby	Invertebrate Animal	Insect	Lycaena hyllus	Bronze Copper	G5	S3	--	Rare, Not State Listed	Marshes, sedge meadows, moist to wet grassy meadows, ditches, fens, streamside or pondshore wetlands, or roads and right of ways through marshlands. West TN.	Possible
Shelby	Invertebrate Animal	Mollusc	Lampsilis siliquoidea	Fatmucket	G5	S2	--	Rare, Not State Listed	Slackwater with mud subst; Wolf R (Miss R trib); west TN; may occur at Reelfoot Lk; also rept Drakes Ck (Cumb R), Sumner Co.	Aquatic
Shelby	Invertebrate Animal	Mollusc	Obovaria jacksoniana	Southern Hickorynut	G2	S1	--	Rare, Not State Listed	Rivers with medium-sized gravel substrates and low-mod current; Wolf & Hatchie rivers; Mississippi River watershed; west Tennessee.	Aquatic
Shelby	Invertebrate Animal	Mollusc	Webbhelix multilineata	Striped Whitelip	G5	S2	--	Rare, Not State Listed	Low wet habitats, marshes, floodplains, meadows; lake margins; under leaf litter or drift; Mississippi River floodplain.	Possible
Shelby	Vascular Plant	Flowering Plant	Rhynchospora harveyi	Harvey's Beakrush	G4	S1	--	T	Barrens And Other Open Areas	Possible
Shelby	Vascular Plant	Flowering Plant	Iris fulva	Copper Iris	G5	S2	--	T	Bottomlands	Possible
Shelby	Vascular Plant	Flowering Plant	Hottonia inflata	Featherfoil	G4	S2	--	S	Wet Sloughs And Ditches	Aquatic
Shelby	Vascular Plant	Flowering Plant	Heteranthera multiflora	Multiflowered Mud-plantain	G4	S1	--	S	Shallow Water, Mud Flats	Possible
Shelby	Vascular Plant	Flowering Plant	Silene ovata	Ovate Catchfly	G3	S2	--	E	Open Oak Woods	Upland
Shelby	Vascular Plant	Flowering Plant	Schisandra glabra	Red Starvine	G3	S2	--	T	Rich Mesic Woods, Bluffs	Possible
Shelby	Vascular Plant	Flowering Plant	Panax quinquefolius	American Ginseng	G3G4	S3S4	--	S-CE	Rich Woods	Possible
Shelby	Vascular Plant	Flowering Plant	Magnolia virginiana	Sweetbay Magnolia	G5	S2	--	T	Forested Acidic Wetlands	Possible
Shelby	Vascular Plant	Flowering Plant	Symphyotrichum praealtum	Willow Aster	G5	S1	--	E	Moist Prairies And Marshes	Possible
Shelby	Vascular Plant	Flowering Plant	Ulmus crassifolia	Cedar Elm	G5	S2	--	S	Swamps	Possible
Shelby	Vertebrate Animal	Bird	Haliaeetus leucocephalus	Bald Eagle	G5	S3	--	D	Areas close to large bodies of water; roosts in sheltered sites in winter; communal roost sites common.	Aquatic
Shelby	Vertebrate Animal	Mammal	Neotoma floridana illinoensis	Eastern Woodrat	G5T5	S3	--	D	Forested areas, caves & outcrops; west Tennessee generally.	Upland
Shelby	Vertebrate Animal	Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	G4T4	S3	--	T	Well-drained sandy soils in pine/pine-oak woods; dry mountain ridges; E portions of west TN, E to lower elev of the Appalachians.	Upland
Shelby	Vertebrate Animal	Bird	Limnothlypis swainsonii	Swainson's Warbler	G4	S3	--	D	Mature, rich, damp, deciduous floodplain and swamp forests.	Possible
Shelby	Vertebrate Animal	Fish	Ammocrypta beani	Naked Sand Darter	G5	S2	--	D	Shifting sand bottoms & sandy runs; Hatchie & Wolf rivers & their larger tribs.	Aquatic

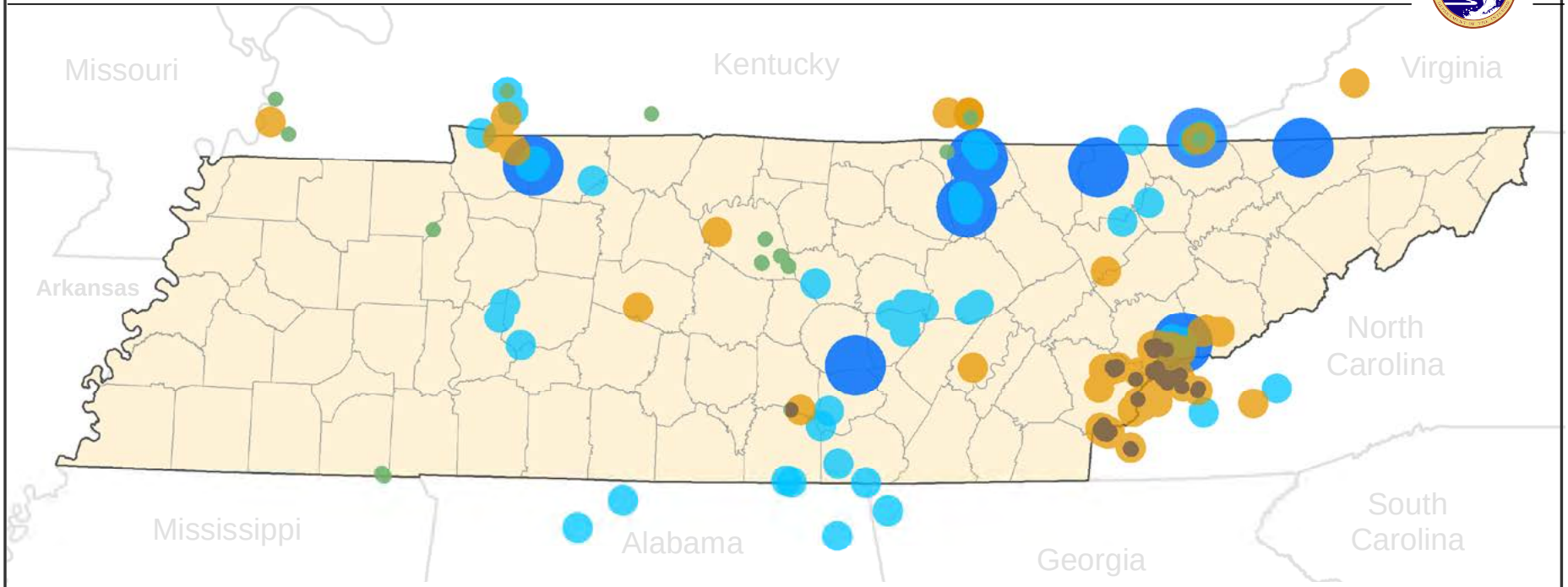
Shelby	Vertebrate Animal	Fish	Noturus gladiator	Piebald Madtom	G3	S3	--	D	Large creeks & rivers in moderate-swift currents with clean sand or gravel substrates; Mississippi River tributaries.	Aquatic
Shelby	Vertebrate Animal	Amphibian	Acris gryllus	Southern Cricket Frog	G5	S2S3	--	Rare, Not State Listed	Grassy margins of swamps, marshes, lakes, ponds, streams, ditches, and nearby temporary pools; far SW Tennessee.	Aquatic
Shelby	Vertebrate Animal	Bird	Setophaga cerulea	Cerulean Warbler	G4	S3B	--	D	Mature deciduous forest, particularly in floodplains or mesic conditions.	Upland
Shelby	Vertebrate Animal	Fish	Cycleptus elongatus	Blue Sucker	G3G4	S2	--	T	Swift waters over firm substrates in big rivers.	Aquatic
Shelby	Vertebrate Animal	Bird	Vireo bellii	Bell's Vireo	G5	S1B	No Status	Rare, Not State Listed	Thickets adjacent to water, bottomlands; west Tennessee and one confirmed location in Western Highland Rim.	Possible

1 - 25 of 27

If you have any questions or comments, Email ask.tdec@tn.gov or call at (888) 891-TDEC (8332).

TN Department of Environment & Conservation

Indiana Bat Sites inTennessee



✱ This map is based on species occurrence information for Tennessee and areas within twenty miles of its border. It is subject to change as new data become available. Please view our website at http://cookeville.fws.gov for the most current version.

0 50 100 Miles

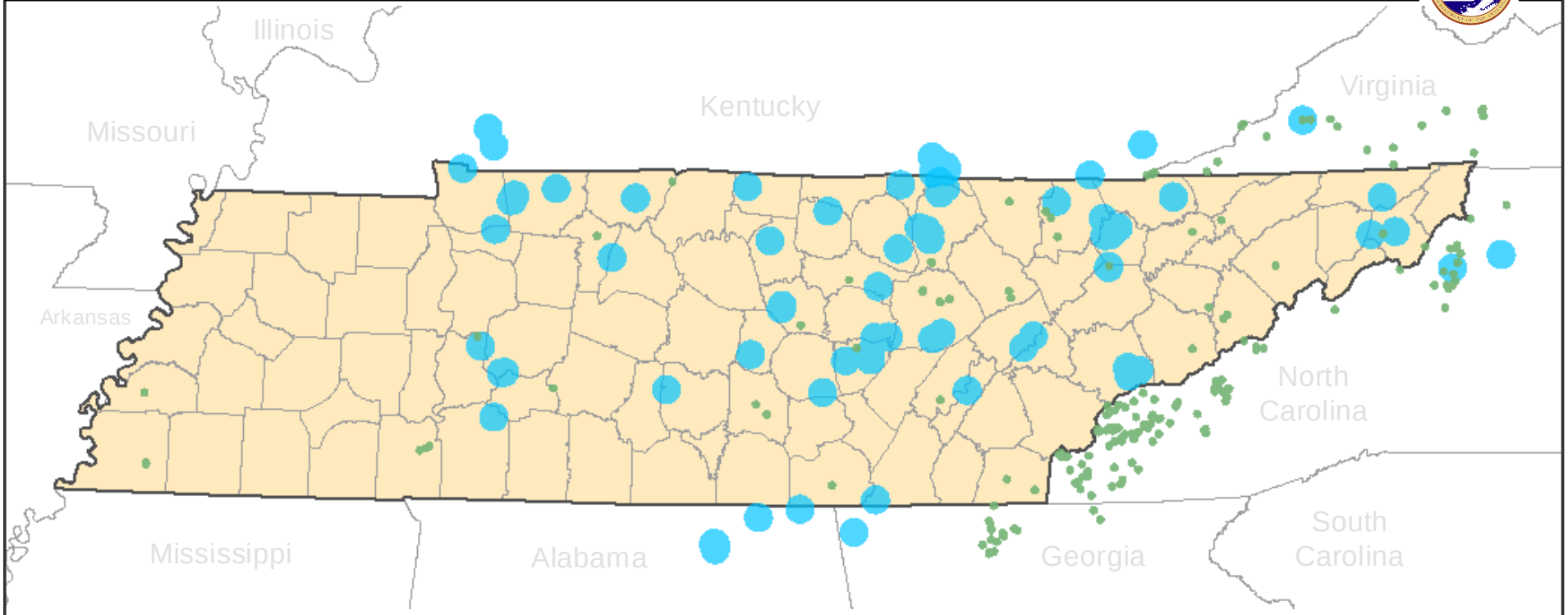
0 50 100 Kilometers

Map production date: June 28, 2018

Habitat Types

- Hibernacula-Priority 3 - 4 Caves
- Hibernacula-Priority 1 - 2 Caves
- Maternity and Non-Maternity
- Maternity
- Non-Maternity

Northern Long-eared Bat Sites in Tennessee



* This map is based on species occurrence information and is subject to change as new data become available. Please view our website at http://cookeville.fws.gov for the most current version.

0 50 100 Miles

0 50 100 Kilometers

Habitat Types

Summer 1

Swarming 2

Map production date: August 15, 2019

ATTACHMENT 4
Farmlands Information

United States Department of Agriculture

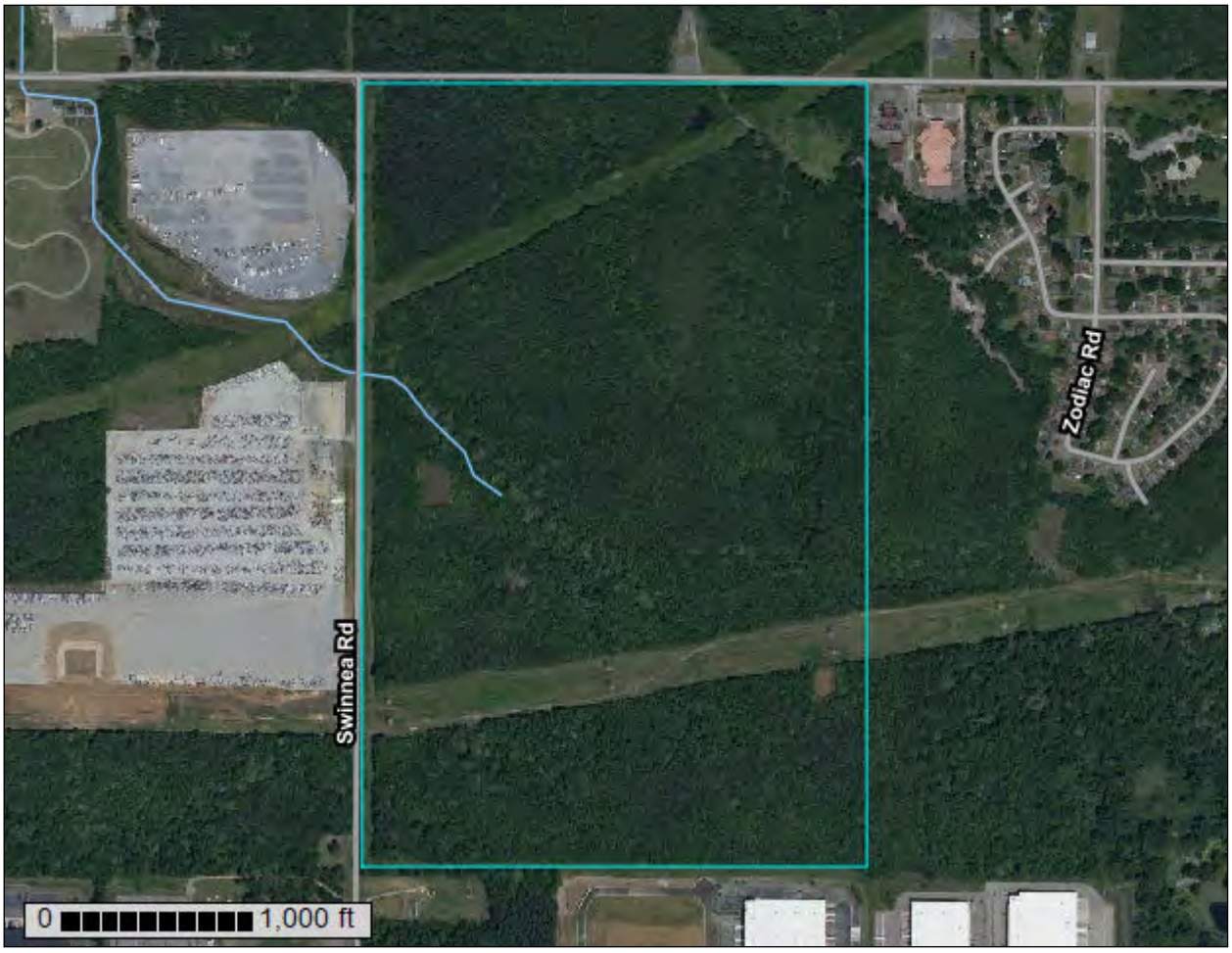
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Shelby County, Tennessee

East Holmes Rd Soil Map



September 11, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

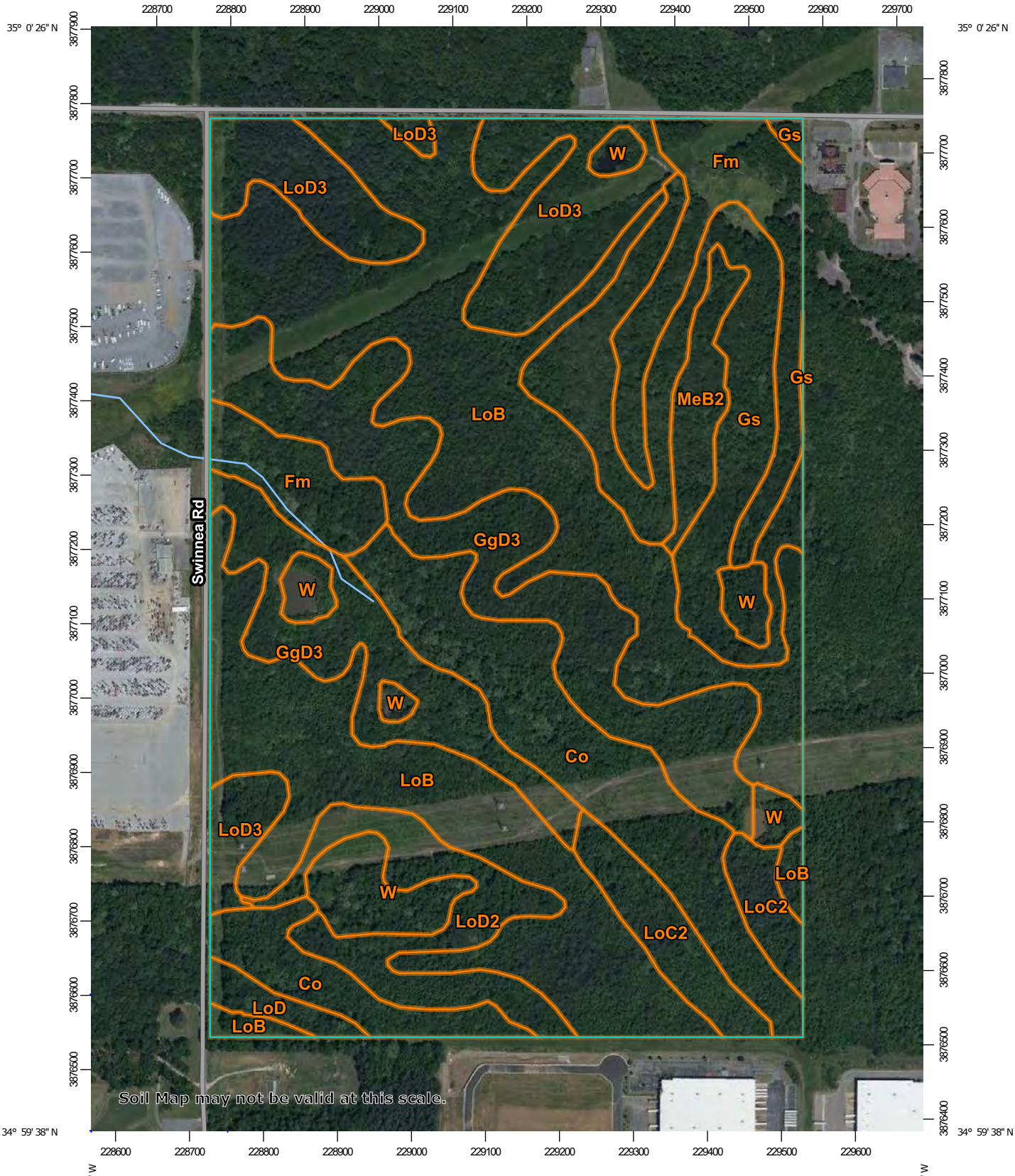
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:7,250 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Shelby County, Tennessee
Survey Area Data: Version 15, Jun 1, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 1, 2020—May 9, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Co	Collins silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration	27.1	11.0%
Fm	Falaya silt loam	19.4	7.9%
GgD3	Grenada complex, 5 to 12 percent slopes, severely eroded	37.4	15.2%
Gs	Gullied land, silty(udorthent, silty)	23.5	9.6%
LoB	Loring silt loam, 2 to 5 percent slopes	78.7	32.1%
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	8.8	3.6%
LoD	Loring silt loam, 8 to 12 percent slopes, east	2.1	0.9%
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	11.6	4.7%
LoD3	Loring silt loam, 5 to 12 percent slopes, severely eroded	22.1	9.0%
MeB2	Memphis silt loam, 2 to 5 percent slopes, moderately eroded, northern phase	4.8	2.0%
W	Water	9.9	4.0%
Totals for Area of Interest		**245.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion

of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Shelby County, Tennessee

Co—Collins silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration

Map Unit Setting

National map unit symbol: 2t23l
Elevation: 160 to 570 feet
Mean annual precipitation: 50 to 53 inches
Mean annual air temperature: 47 to 71 degrees F
Frost-free period: 193 to 242 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Collins and similar soils: 89 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Collins

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-silty alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 8 inches: silt loam
C - 8 to 62 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 24 to 60 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water capacity: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F134XY014AL - Northern Non-Acid Floodplain - PROVISIONAL
Hydric soil rating: No

Fm—Falaya silt loam

Map Unit Setting

National map unit symbol: m19n
Elevation: 250 to 450 feet
Mean annual precipitation: 46 to 63 inches
Mean annual air temperature: 53 to 72 degrees F
Frost-free period: 226 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Falaya and similar soils: 91 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Falaya

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Parent material: Silty alluvium

Typical profile

H1 - 0 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water capacity: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Waverly

Percent of map unit: 9 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Hydric soil rating: Yes

GgD3—Grenada complex, 5 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: m19z
Elevation: 210 to 490 feet
Mean annual precipitation: 46 to 63 inches
Mean annual air temperature: 53 to 72 degrees F
Frost-free period: 226 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Grenada and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grenada

Setting

Landform: Loess hills
Landform position (three-dimensional): Base slope
Parent material: Loess

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 22 inches: silt loam
H3 - 22 to 26 inches: silt loam
H4 - 26 to 40 inches: silt loam
H5 - 40 to 60 inches: silt loam

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Gs—Gullied land, silty(udorthent, silty)

Map Unit Setting

National map unit symbol: m1b1
Mean annual precipitation: 46 to 63 inches
Mean annual air temperature: 53 to 72 degrees F
Frost-free period: 226 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Gullied land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gullied Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F134XY001TN - Northern Deep Loess Backslope Mesophytic Forest
Hydric soil rating: No

LoB—Loring silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2v7sn
Elevation: 260 to 410 feet
Mean annual precipitation: 35 to 63 inches
Mean annual air temperature: 47 to 71 degrees F
Frost-free period: 189 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Loring and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loring

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loess

Typical profile

Ap - 0 to 5 inches: silt loam
Bt - 5 to 30 inches: silt loam
Btx - 30 to 48 inches: silt loam
C - 48 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 26 to 35 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 21 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

LoC2—Loring silt loam, 5 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: m1b7
Elevation: 210 to 410 feet
Mean annual precipitation: 46 to 63 inches
Mean annual air temperature: 53 to 72 degrees F
Frost-free period: 226 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Loring and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loring

Setting

Landform: Loess hills
Landform position (three-dimensional): Side slope
Parent material: Loess

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 28 inches: silt loam
H3 - 28 to 50 inches: silt loam
H4 - 50 to 60 inches: silt loam

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 28 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Hydric soil rating: No

LoD—Loring silt loam, 8 to 12 percent slopes, east

Map Unit Setting

National map unit symbol: 2wn6d
Elevation: 240 to 410 feet
Mean annual precipitation: 52 to 55 inches
Mean annual air temperature: 47 to 72 degrees F
Frost-free period: 226 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Loring and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loring

Setting

Landform: Loess hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 7 inches: silt loam
Bt - 7 to 28 inches: silt loam
Btx - 28 to 50 inches: silt loam
C - 50 to 65 inches: silt loam

Properties and qualities

Slope: 8 to 12 percent
Depth to restrictive feature: 16 to 41 inches to fragipan
Drainage class: Moderately well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 28 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 5.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Ecological site: F134XY012AL - Northern Loess Fragipan Upland - PROVISIONAL
Hydric soil rating: No

LoD2—Loring silt loam, 8 to 12 percent slopes, eroded

Map Unit Setting
National map unit symbol: m1b9
Elevation: 230 to 410 feet
Mean annual precipitation: 46 to 63 inches
Mean annual air temperature: 53 to 72 degrees F
Frost-free period: 226 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition
Loring and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loring

Setting
Landform: Loess hills
Landform position (three-dimensional): Side slope
Parent material: Loess

Typical profile
H1 - 0 to 7 inches: silt loam
H2 - 7 to 28 inches: silt loam
H3 - 28 to 50 inches: silt loam
H4 - 50 to 60 inches: silt loam

Properties and qualities
Slope: 8 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 28 inches
Frequency of flooding: None
Frequency of ponding: None

Available water capacity: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Hydric soil rating: No

LoD3—Loring silt loam, 5 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: m1bb
Elevation: 230 to 410 feet
Mean annual precipitation: 46 to 63 inches
Mean annual air temperature: 53 to 72 degrees F
Frost-free period: 226 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Loring and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loring

Setting

Landform: Loess hills
Landform position (three-dimensional): Side slope
Parent material: Loess

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 28 inches: silt loam
H3 - 28 to 50 inches: silt loam
H4 - 50 to 60 inches: silt loam

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 28 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C/D
Hydric soil rating: No

MeB2—Memphis silt loam, 2 to 5 percent slopes, moderately eroded, northern phase

Map Unit Setting

National map unit symbol: 2t23z
Elevation: 300 to 540 feet
Mean annual precipitation: 50 to 54 inches
Mean annual air temperature: 47 to 71 degrees F
Frost-free period: 182 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Memphis, eroded, north, and similar soils: 88 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Memphis, Eroded, North

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty noncalcareous loess

Typical profile

Ap - 0 to 6 inches: silt loam
Bt1 - 6 to 18 inches: silty clay loam
Bt2 - 18 to 74 inches: silt loam
C - 74 to 80 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very high (about 13.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F134XY002AL - Northern Deep Loess Summit - PROVISIONAL
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

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Soil Data Access (SDA) Prime and other Important Farmlands

An SDA-populated select list is used to pick a state and SSA which enables creation of a "Prime and other Important Farmlands" based upon those selections. The data is not static; it hits Soil Data Access Live. To reset the table hit F5 on the keyboard. Once a survey is selected and table appears, if a new survey is selected it will append to the table at the bottom. For more information about the table,

Tennessee ▼

selected stateId = TN

Shelby County, Tennessee ▼

selected SSA areasymbol = TN157

State_Sym	Area_Symbol	Area_Name	mukey	Mapunit_SYM	Mapunit_Name	Farm_Class
TN	TN157	Shelby County, Tennessee	567280	Ad	Adler silt loam	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567281	Bo	Bonn silt loam	Not prime farmland
TN	TN157	Shelby County, Tennessee	567282	Bw	Bowdre silty clay	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567283	Ca	Calloway silt loam, 0 to 2 percent slopes	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567284	Co	Collins silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567285	Cr	Commerce silt loam	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567286	Cs	Convent silt loam	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567287	Cu	Crevasse fine sand	Not prime farmland
TN	TN157	Shelby County, Tennessee	567288	Cv	Crevasse silt loam (bruno overwash)	Not prime farmland
TN	TN157	Shelby County, Tennessee	567289	Fm	Falaya silt loam	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567290	Fs	Filled land, silty (udorthent, silty)	Not prime farmland
TN	TN157	Shelby County,	567291	Fy	Filled land, sandy (udorthent, loamy)	Not prime farmland

		Tennessee				
TN	TN157	Shelby County, Tennessee	567292	GaA	Grenada silt loam, 0 to 2 percent slopes	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567293	GaB	Grenada silt loam, 2 to 5 percent slopes	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567294	GaB2	Grenada silt loam, 2 to 5 percent slopes, eroded	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567295	GaC	Grenada silt loam, 5 to 8 percent slopes	Not prime farmland
TN	TN157	Shelby County, Tennessee	567296	GaC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	Not prime farmland
TN	TN157	Shelby County, Tennessee	567297	GaD	Grenada silt loam, 8 to 12 percent slopes	Not prime farmland
TN	TN157	Shelby County, Tennessee	567298	GaD2	Grenada silt loam, 8 to 12 percent slopes, eroded	Not prime farmland
TN	TN157	Shelby County, Tennessee	567299	GgD3	Grenada complex, 5 to 12 percent slopes, severely eroded	Not prime farmland
TN	TN157	Shelby County, Tennessee	567300	Gr	Graded land, silty materials(udorthent, silty)	Not prime farmland
TN	TN157	Shelby County, Tennessee	567301	Gs	Gullied land, silty(udorthent, silty)	Not prime farmland
TN	TN157	Shelby County, Tennessee	567302	He	Henry silt loam	Not prime farmland
TN	TN157	Shelby County, Tennessee	567303	Ib	Iberia silty clay loam	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567304	Lb	Levees and borrow pits (udorthents, silty)	Not prime farmland
TN	TN157	Shelby County, Tennessee	567305	LoB	Loring silt loam, 2 to 5 percent slopes	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567306	LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567307	LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	Not prime farmland
TN	TN157	Shelby County,	567308	LoD	Loring silt loam, 8 to 12 percent slopes, east	Not prime farmland

		Tennessee				
TN	TN157	Shelby County, Tennessee	567309	LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	Not prime farmland
TN	TN157	Shelby County, Tennessee	567310	LoD3	Loring silt loam, 5 to 12 percent slopes, severely eroded	Not prime farmland
TN	TN157	Shelby County, Tennessee	1405377	MP	Mines and Gravel Pits	Not prime farmland
TN	TN157	Shelby County, Tennessee	567311	MeB	Memphis silt loam, 2 to 5 percent slopes, northern phase	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567312	MeB2	Memphis silt loam, 2 to 5 percent slopes, moderately eroded, northern phase	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567313	MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded	Not prime farmland
TN	TN157	Shelby County, Tennessee	567314	MeD2	Memphis silt loam, 8 to 12 percent slopes, eroded	Not prime farmland
TN	TN157	Shelby County, Tennessee	567315	MeD3	Memphis silt loam, 5 to 12 percent slopes, severely eroded	Not prime farmland
TN	TN157	Shelby County, Tennessee	567316	MeE	Memphis silt loam, 12 to 20 percent slopes	Not prime farmland
TN	TN157	Shelby County, Tennessee	567317	MeF3	Memphis silt loam, 12 to 30 percent slopes, severely eroded	Not prime farmland
TN	TN157	Shelby County, Tennessee	567318	MeG	Memphis silt loam, 30 to 65 percent slopes	Not prime farmland
TN	TN157	Shelby County, Tennessee	2548231	NOTCOM	No Digital Data Available	Not prime farmland
TN	TN157	Shelby County, Tennessee	567319	Rb	Robinsonville fine sandy loam	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567320	Rn	Robinsonville silt loam	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567321	Sh	Sharkey clay, 0 to 2 percent slopes, occasionally flooded	All areas are prime farmland
TN	TN157	Shelby County, Tennessee	567322	Sw	Swamp (rosebloom, ponded)	Not prime farmland
TN	TN157	Shelby County, Tennessee	567323	Tu	Tunica silty clay	All areas are prime

		Tennessee				farmland
TN	TN157	Shelby County, Tennessee	567324	W	Water	Not prime farmland
TN	TN157	Shelby County, Tennessee	567325	Wv	Waverly silt loam, 0 to 2 percent slopes, occasionally flooded, long duration	Not prime farmland

Report Metadata: Back to top

- **Area_Symbol:** A symbol that uniquely identifies a single occurrence of a particular type of area (e.g. Dane Co., Wisconsin is WI025).
- **Area_Name:** The name given to the specified geographic area.
- **mukey:** A non-connotative string of characters used to uniquely identify a record in the Mapunit table.
- **Mapunit_SYM:** The symbol used to uniquely identify the soil mapunit in the soil survey.
- **Mapunit_Name:** Correlated name of the mapunit (recommended name or field name for surveys in progress).
- **Prime and other Important Farmlands:** Identification of map units as prime farmland, farmland of statewide importance, or farmland of local importance.

Prime and other Important Farmlands Description:

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be farmland of local importance for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

ATTACHMENT 5

Hazardous Materials, Solid Waste, and Pollution Prevention Information

PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT

HOLMES ROAD DEVELOPMENT PROJECT PROPERTY
SOUTHEAST CORNER OF EAST HOLMES ROAD AND SWINNEA ROAD
SHELBY COUNTY, TENNESSEE

EnSafe Project Number:
0888821806

Prepared for:

Memphis - Shelby County Airport Authority
4225 Airways Boulevard
Memphis, Tennessee 38116

Issue Date: June 26, 2020

Dean A. Stoker
Project Manager

Signature

Environmental Professional Statement:
We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Prepared by:

EnSafe Inc.
5724 summer Trees Drive
Memphis, Tennessee 38134
901-372-7962
800-588-7962
www.ensafe.com

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TABLES

APPENDICES

EXECUTIVE SUMMARY

EnSafe Inc. performed a Phase I Environmental Site Assessment (ESA) of an approximately 250-acre tract of land referred to as the "Holmes Road Development Project Property," which is located on the southeast corner of East Holmes Road and Swinnea Road and north of the Tennessee/Mississippi State line, all of which are currently owned by the Memphis-Shelby County Airport Authority (MSCAA) and being in Memphis, Shelby County, Tennessee (subject property) in general conformance with the ASTM International (ASTM) *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* Designation E1527-13 (ASTM 2013). The goal of this Phase I ESA is to identify evidence of *recognized environmental conditions*.[1] The findings, conclusions, and environmental professional opinion in this Phase I ESA report result from interviews, an environmental records search, historical and regulatory research, and a site visit on April 15 and 16, 2020.

This environmental assessment has identified the following associated with the subject property:

- The subject property is currently vacant and predominantly covered with timber. One generally cleared area in the northeast portion of the property is thought to be a former construction sand and gravel mining area. A Tennessee Valley Authority high-voltage electric transmission line easement is located within the south portion of the property, a Texas Gas natural gas line easement is within the northwest portion, and a Valero and Memphis Light Gas & Water gas line (presumed to convey various petroleum products) easement is along the west and south property boundaries. Various water features (creeks, streams, drainageways, wet weather conveyances, gullies, and ponds) are present throughout the property. Several building footprints and other evidence of historical development was observed in various areas of the property at the time of the site visit; however, active current development of the property was not identified. Materials observed (linoleum floorings, brick, roofing shingles, concrete, etc.) in the north-central and west portions of the subject property would suggest historical building structures; however, it is unknown if these structures represent former residential (homestead) dwellings or structures associated with historical mining operations. Scattered debris (concrete, plastic, metal roofing, used tires, a livestock feeding trough/ring with no bottom, etc.) was observed throughout these portions of the property. Although some of the debris was observed in presumed historical residential/mining operation areas, it was not determined if all the debris was the result of previous onsite activities or from more recent illegal dumping activities. Recreational vehicle use was evident on trails throughout the property.

- Based on information reviewed, the subject property is thought to have been under residential and/or homestead use as early as the 1930s. Historical information reviewed indicates at least portions of the subject property were repurposed for use in surface mining of construction sand and gravel from around 1950 until the mining operation was abandoned on April 4, 1979. Building structures and presumed operation areas are evident on various portions of the property on historical sources reviewed; however, actual site use and operations are not known. MSCAA acquired the subject property parcels from individuals from the late 1980s through the mid-1990s. The subject property has reportedly not been

[1] ASTM defines a *recognized environmental condition* as "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: due to any release to the environment; under conditions indicative of a release to the environment; or under conditions that pose a material threat of a future release to the environment."

utilized commercially since MSCAA ownership. Evidence of possible former surface mining operation areas, former building structures, and open ponds (some presumably from previous mining activities), streams, gullies, and wet-weather conveyances were noted throughout the subject property at the time of the site reconnaissance.

- The subject property was inspected in 1980 by the United States Environmental Protection Agency and a site description on the inspection report indicated the site as an "old gravel pit, now overgrown, no sign of stain, leachate, or disturbance". Shovel test data generated during a recent cultural resources survey did not appear to identify artifacts that would be indicative of subsurface landfilling; however, surface trash and debris was noted at a number of the test locations. In addition, evidence of subsurface landfilling was not observed during the Phase I ESA site reconnaissance, but surface trash and debris was observed.

- Several adjoining and surrounding area sites were identified with environmental records. Regulatory records reviewed do not suggest that possible releases at the identified sites have had the potential to migrate to subject property soil, soil vapor, or groundwater.

This assessment has revealed no evidence of *recognized environmental conditions, controlled recognized environmental conditions, or historical recognized environmental conditions* in connection with the subject property. [2,3]

EnSafe identified the following *business environmental risk*. [4,]

- The presence of remaining former building materials, surface debris and trash scattered throughout the subject property, and the presence of wetlands, wet-weather conveyances, and gullies is considered a *business environmental risk* due to potential costs associated with offsite disposal of building materials and trash/debris, and limitations due to site features requiring modification prior to planned future use of the property.

The following data gaps and limitations limited EnSafe's ability to identify *recognized environmental conditions* in connection with the subject property:

- Former owners and operators of the subject property were not identified or interviewed. Internet research was conducted; however, information on former operators was not found.

- It is unknown if potential landfilling was conducted onsite in association with backfilling and/or site grading of former mining excavation areas.

- City directories reviewed by the environmental database provider did not include any returns for the subject property or nearby addresses.

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[2] ASTM defines a *historical recognized environmental condition* as "a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls)."

[3] ASTM defines a *de minimis condition* as "a condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies."

[4] ASTM defines a *business environmental risk* as an environmental condition that "can have a material environmental or environmentally driven impact on the business associated with the current or planned use of a parcel of commercial real estate."

- Some portions of the subject property were covered with dense vegetation, which limited visual and physical observation.

- The quality and scale of some aerial photographs limited the ability to make observations related to subject property development and/or site-specific activities.

- Portions of the subject property were outside the field of view on some of the historical topographic maps reviewed.

This executive summary is an excerpt of a detailed Phase I ESA report that includes elements necessary for proper interpretation, including any limitations, exceptions, and deletions to ASTM 2013 and established scope of work. As such, the executive summary should not be used independently of the Phase I ESA report and its supporting documentation.

1.0 INTRODUCTION

EnSafe Inc. was retained by Memphis-Shelby County Airport Authority (MSCAA) to conduct a Phase I Environmental Site Assessment (ESA) of an approximately 250-acre tract of land referred to as the "Holmes Road Development Project Property," which is located on the southeast corner of East Holmes Road and Swinnea Road and north of the Tennessee/Mississippi State line, all being in Memphis, Shelby County, Tennessee (Figure 1, Appendix A). The subject property is comprised of three individual parcels owned by the MSCAA. Table 1 summarizes the parcels comprising the subject property.

Table 1
Subject Property Parcels

Shelby County Parcel ID	Address	Size (acres)
094400 00129	2845 East Holmes Road	4.3
094400 00128	2853 East Holmes Road	143.02
094400 00107	9200 Swinnea Road	98.52

Notes:
Information obtained from the Shelby County Assessor of Property website, tax parcel information presented in the environmental database report, and project-specific documents provided by MSCAA.
MSCAA = Memphis-Shelby County Airport Authority

The subject property is currently vacant, unused, and predominantly covered with timber. A Tennessee Valley Authority (TVA) high-voltage electric transmission line easement is located within the south portion of the property, a Texas Gas natural gas pipeline easement is within the north portion, and a Valero and Memphis Light Gas & Water (MLGW) gas line easement (presumed to convey various petroleum products) is along the west and south property boundaries. Various water features (creeks, streams, drainageways, gullies, wet-weather conveyances, and ponds) are present throughout the property. Figure 2 (Appendix A) is the Site Layout and Vicinity Map, which shows the overall layout of the subject property as well as the subject property's relation to adjoining and surrounding area properties .

1.1 Purpose

The subject property was assessed with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and petroleum products. This assessment is intended to constitute all appropriate inquiries (AAI) into the previous ownership and uses of the property consistent with good commercial and customary practice as defined in 42 U.S. Code Section 9601 (35)(B) and promulgated at 40 Code of Federal Regulations Part 312 (AAI Final Rule). As such, the assessment is intended to permit the designated *user* to satisfy one of the requirements to qualify for the innocent landowner, bona fide prospective

purchaser, or contiguous property owner limitations on CERCLA liability (hereinafter, the Landowner Liability Protections).

The ASTM International (ASTM) *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* Designation E1527-13 (ASTM 2013) is the current industry standard used to define good commercial and customary practice for conducting an environmental site assessment of a parcel of commercial real estate. The goal of a Phase I ESA is to identify evidence of *recognized environmental conditions,* defined by ASTM as, "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment."

In accordance with ASTM 2013, this Phase I ESA was also intended to identify the following:

- *Controlled recognized environmental condition:* "a *recognized environmental condition* resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls)."

- *Historical recognized environmental condition:* "a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls)."

- *Business environmental risk:* "a risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of a parcel of commercial real estate, not necessarily limited to those environmental issues required to be investigated in this practice."

- *De minimis condition:* "a condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies." A condition found to be *de minimis* is not a *recognized environmental condition* or *controlled recognized environmental condition*.

1.2 Scope of Services

The Phase I ESA includes the following:

- Visual assessment of the subject property on April 15 and 16, 2020 by Velita Thornton of EnSafe; a resume is included in Appendix B.

- Interviews with personnel discussed in Section 3.1.

- Review of standard and additional federal, state, and local environmental records sources for the subject property and properties within ASTM 2013 approximate minimum search distances. Database search information is provided in Appendix C.

- Review of the following historical and land-use documents; select copies and printed information is provided in Appendix D:

  — United States (U.S.) Geological Survey topographic maps
  — Aerial photographs
  — Sanborn/fire insurance maps (no coverage)
  — City directories (no address listings)

- Review of physical setting information provided in the environmental database report (Appendix C).

- Review of regulatory information available from the U.S. Environmental Protection Agency (U.S. EPA) Envirofacts and Enforcement and Compliance History Online (ECHO), U.S. Geological Survey Mineral Resources Data System (MRDS), U.S. Department of Labor Mine Safety and Health Administration (MSHA), Tennessee Department of Environment and Conservation (TDEC), and Mississippi Department of Environmental Quality (MDEQ) websites, and files obtained from the TDEC and MDEQ through a Freedom of Information Act (FOIA) request. Select information is provided in Appendix E.

- Review of the user questionnaire provided to the Client and information provided by Ms. Lori Morris, Manager of Environmental Services, Memphis International Airport, as documented in Appendix F.

- Review of property information obtained from review of the Shelby County Assessor of Property website. Select information is provided in Appendix F.

- Review of the following documents prepared in association with an ongoing National Environmental Protection Act (NEPA) Environmental Assessment concurrently being conducted for the subject property: "Wetlands and Jurisdictional Features Evaluation" prepared by Tioga Environmental Consultants and dated June 29, 2019; "Summary of Findings of Approximately 250 Acres of Vacant Property Located on the Southeast Corner of Holmes & Swinnea Road, Memphis, Shelby County, Tennessee" prepared by Real Estate Appraisers & Land Surveyors and dated March 8, 2007; "Phase I Cultural Resources Survey for the Memphis Shelby County Airport Authority Holmes Road Environmental Assessment, Shelby County, Tennessee" prepared by Panamerican Consultants, Inc. and dated May 2020; and "Exhibit A — Property Map, Holmes and Swinnea Area, Memphis International Airport," prepared by THY, Inc. and dated November 1, 2016. Copies of these site-specific documents are included in Appendix F.

1.3 Client Information and User Responsibilities

EnSafe was retained by MSCAA to conduct the Phase I ESA. According to ASTM, the *user* shall make known the reason for the Phase I ESA. In contracting EnSafe for the Phase I ESA, Ms. Morris indicated the Phase I ESA was being conducted to establish baseline conditions at the property, to identify potential business environmental risks associated with the property, and as part of a NEPA Assessment that is being conducted for the subject property.

The AAI Final Rule and Section 6.0 of ASTM 2013 describe tasks to be performed by the *user* that are required to qualify for an Landowner Liability Protections to CERCLA liability. The information that results from those tasks should be provided to the environmental professional to consider with respect to identifying *recognized environmental conditions*. Appendix F contains a questionnaire provided to the *user* outlining those tasks. Ms. Morris indicated there is an aviation easement on the property, the property cannot be residentially developed, and the purchase price paid for the property reflects the fair market value of the property. She did not indicate having any specialized knowledge or experience related to chemicals and processes used on the subject property, she was not aware of commonly known or reasonably ascertainable information about the property that would help the

environmental professional to identify conditions indicative of releases or threatened releases, and she was not aware of any obvious indicators that point to the presence or likely presence of releases at the property

1.4 Non-Scope Items

At the request of Ms. Morris, and as documented in Appendix F, EnSafe's Phase I ESA scope of work was not expanded to include consideration of environmental issues or considerations that are beyond the scope of ASTM 2013. However, wetland and flood zone information presented in the environmental database report and other referenced sources is summarized in Section 2.

2.0 PHYSICAL SETTING

Table 2 summarizes information obtained from review of physical setting sources and other sources reviewed during the Phase I ESA listed in Section 1.2.

Table 2
Physical Setting Summary

Topography	
Elevation (feet above mean sea level)	330 to 390
Topography	Generally west-northwest, as affected by a ridgeline present within the south portion of the property.
Evidence of landfilling or excavation	Portions of the subject property were historically used for surfacing mining of construction sand and gravel. Partially cleared areas presumedly from reported historical soil and gravel mining activities were noted during the site visit and during review of historic aerial photographs. Historical topographic maps denote areas within the east portion of the property as "gravel pits." It is unknown if landfilling was conducted at the subject property in association with the backfilling of mining pits or operation areas. Tennessee Department of Environmental Conservation (TDEC) officials indicated it was typical for mining pits to have been backfilled with debris historically, particularly those backfilled prior to 1970.
Adjoining — higher elevation	South
Adjoining — lower elevation	North
Surface Water and Subject Property Drainage	
Subject property surface water features	Multiple streams are present on the subject property. First order streams enter the property from the south and a second order stream enters the property from the east. Multiple open water ponds (possibly former mining pits or operation areas), wet weather conveyances, gullies, and other drainage ways are present throughout the property.
Adjoining surface water features	Open water ponds adjoining the subject property to the north and west. Rocky Creek and associated tributaries are southwest of the property. Unnamed creeks and drainage ways are east of the property.
Nearest water body	Greenbrook Lake and McKeller Park Lake A.
Direction and approximate distance to nearest water body	Greenbrook Lake is approximately 3,200 feet southeast and McKeller Park Lake A is approximately 3,300 feet northeast.
Storm Water management	Storm water would likely sheet flow across the property from higher areas (south) and either infiltrate surface soils or enter open water ponds, wet weather conveyances, gullies, or onsite streams.
Flood zone (summarized from Appendix C)	Subject property not identified within flood hazard areas.
Wetlands (summarized from Appendix C and F)	Environmental database report identified three small areas within the northeast, west, and southeast portions of the subject property as being included in the National Wetland Inventory. Project-specific documents indicate the second order stream on the property is a freshwater forested/shrub linear wetland (Appendix F).

Table 2 **Physical Setting Summary**			
Geology			
Soil types (and estimated depths/thickness)	Environmental database report identifies 7 soil types across the subject property: Collins, Grenada, Loring, Water, Falaya, Gullied Land, and Memphis. Each of these soil types is predominately comprised of silt loam extending up to 96 inches below ground surface. Falaya soils are considered partially hydric; others are not considered hydric.		
Bedrock (depth and type)	Reported at depths greater than 46 inches below ground surface.		
Additional information	None		
Hydrogeology			
Wells on subject property	None identified.		
Approximate depth to groundwater (feet) at the subject property	Unknown	to	
Reported direction of groundwater flow at the subject property	Unknown		
Relevant surrounding property wells	Five groundwater monitoring wells on nearby property (approximately 1,500 feet northwest) in association with underground storage tank system closure.		
Approximate depth to groundwater	2.58	to	7.09
Reported direction of groundwater flow	Westerly		

3.0 SUBJECT PROPERTY

Subject property information discussed below was obtained from interviews and sources identified in Section 1.2 and referenced in Section 6.

3.1 Interviews

Table 3 lists personnel interviewed, indicates their association with the subject property or this Phase I ESA, and summarizes topics discussed and information provided.

Table 3
Summary of Interviews

Name	Affiliation	Association with Subject Property	Time[(1)]	Information Provided/Section Discussed
Lori Morris	Manager of Environmental Services, Memphis International Airport	Key Site Manager/Current Owner	9	Ms. Morris was interviewed about current and known historical uses of the subject property and surrounding area. Ms. Morris also completed the user question providing limited information relating to current and historical site use. Information obtained is discussed throughout this report.
NA	NA	Current Occupant/Operator	NA	The site is not currently occupied or under operation.
NA	NA	Former Owner/Operator	NA	Based on available information, the subject property parcels were owned by individuals prior to ownership by MSCAA, and at least portions of the property may have historically been utilized for construction sand and gravel mining. At least two separate entities have been identified as potential former owners or operators, but definitive contact information has not become available.
Mr. Brown	City of Memphis Fire Department — Station #52	Local Official	NA	Telephone call to local fire department was answered by Mr. Brown. Mr. Brown indicated he had no personal knowledge of environmental issues in the subject property area. Mr. Brown indicated the department lieutenant may be able to provide more information and that he would have him return call. A return call has yet to be received.
Mr. John Boatright	TDEC Memphis Field Office Solid Waste Inspector	State Official	NA	Conducted telephone interview in an attempt to obtain information about landfilling on the subject property. Information is discussed in Section 3.6.
Mr. Jordon English	TDEC Field Office DoR Manager	State Official	NA	Conducted a telephone interview in an attempt to obtain current regulatory status of surrounding area properties. Mr. English provided information relating to the surrounding area sites listed with environmental records, particularly Memphis Public Works/Jackson Pit. Information is discussed in Section 4.2.

Table 3 Summary of Interviews				
Name	**Affiliation**	**Association with Subject Property**	**Time(1)**	**Information Provided/Section Discussed**
Summary of Records Requests				
Name	**Agency**			**Result of Inquiry/Section Discussed**
Edwin Gray, Administrative Secretary	TDEC Memphis Environmental Field Office			Provided available regulatory records for nearby properties listed in the environmental database report.
Daisy Crary	TDEC Division of Solid Waste Management			Provided available regulatory records for surrounding area properties.
Melanie Vanderloop, Executive Administrative Assistant	TDEC Office of the Commissioner			Email correspondence pertaining to TDEC Division of Remediation records request. Numerous regulatory records were identified for one surrounding area site (Memphis Public Works/Jackson Pits), however site regulatory records review was limited due to the ongoing COVID-19 pandemic and anticipated costs for obtaining records under current limited access due to the pandemic. EnSafe contacted TDEC Memphis EFO personnel to discuss surrounding areas sites of interest and reviewed in-house records obtained from previous projects.
Scott Morgan and Phillip Davis	City of Memphis Public Works Department			Submitted a request for records for the subject property (sanitary sewer availability) and the nearby Memphis Public Works/Jackson Pits site. Mr. Morgan indicated the majority of the site is not currently served with city sewer service and would require a 4,000 linear foot sewer extension; however, he did indicate that city sewer became available to an area near the northeast corner of the property in 1972. Mr. Davis recommended a TDEC file review to obtain information relating the regulatory status of the nearby Memphis Public Works/Jackson Pits site.
NA	Mississippi Department of Environmental Quality			Submitted FOIA request for regulatory records. Available regulatory records for surrounding area sites were provided to EnSafe via email.

Notes:
(1) = Length of time or number of years the person has been affiliated or familiar with the subject property or surrounding area.
NA = Not applicable or not available.
TDEC = Tennessee Department of Conservation
EFO = Environmental Field Office
FOIA = Freedom of Information Act
MSCAA = Memphis-Shelby County Airport Authority
DoR = Division of Remediation

3.2 Prior Environmental Assessments

Ms. Morris was not aware of any prior environmental reports for the subject property. EnSafe did review various documents generated in association with a NEPA Environmental Assessment that is being conducted concurrently with this Phase I ESA, as cited throughout this report.

3.3 Historical Development and Uses

The historical document review and interviews were conducted to identify evidence of *recognized environmental conditions* in connection with past uses of the subject property.

3.3.1 Historical Development

Table 4 is a summary of information relating to subject property development as obtained from review of historical sources, including those provided by the environmental database report provider and information obtained from review of historical sources included in the Panamerican Consultants report.

Table 4
Historical Subject Property Development Summary

Date	Historical Source	Property Development Description
1835	General Land Office Map[1]	Property appears to be a part of a larger tract of land appearing in Section 17, Township 1 North, Range 7 West of the Chickasaw Meridian of Mississippi. Reported surveying error caused the state line to be input in the wrong location and the property to be erroneously mapped in Mississippi rather than Tennessee.
1888	W.T. Williamson Map of Shelby County[1]	State line had been resurveyed by this time and the state line now appears along the south boundary of the subject property. Property appears to remain as part of larger tract that is reportedly owned by Francis Holmes.
1927 (revised 1932)	Shelby County Commissioner's Map[1]	Holmes Road first appears along the north property boundary and Swinnea Road first appears along the west boundary. Only identified site feature is a tributary of Hurricane Creek that enters the property in the northeast corner and meanders southward along the east property boundary.
1937	Aerial Photograph	Shows the subject property mostly cleared with areas of possible surface mining. Although this aerial photograph is not of sufficient quality to discern specific site features, what appears to be possible building structures are within the north-central portion of the property and sporadic vegetation (timber) is visible throughout, along with apparent streams, ponds, and/or drainage areas.
1939	Highway and Transportation Map[1]	Five structures are identified on the property. Three structures are located near the northeast corner (south of Holmes Road and west of a tributary of Hurricane Creek). Two structures are located on the west portion of the property (near Swinnea Road and south of another tributary of Hurricane Creek).
1944	Topographic Map	Only shows the south half of the subject property; several building structures are present along the west property boundary.
1953	Aerial Photograph	Shows numerous apparent building structures in the north-central and southwest portions of the property and one building structure is apparent along the west property boundary. A utility easement (current Texas Gas natural gas pipeline) footprint appears to traverse the north portion of the property.
1956	County Engineering Department Map of Shelby County[1]	Natural gas pipeline easement that traverses the north portion of the property is present (pipeline denoted as having two 26-inch pipelines) At lease one tributary of Hurricane Creek crosses the property.

Table 4
Historical Subject Property Development Summary

Date	Historical Source	Property Development Description
1957	Aerial Photograph	Similar site features to that observed on the 1953 aerial photograph; however, the north utility easement does not appear as pronounced.
1960 and 1961	Topographic Maps	Show the north two-thirds of the property; building structures are apparent within the north-central portion of the property and along the west property boundary.
1961	Bartlett 15-Minute Quadrangle Map[1]	Seven structures, a road, and two ponds are identified. Four structures are present near the north-central portion of the property and three are present along Swinnea Road on the west side of the property. An unimproved road enters the property from Swinnea Road and traverses southeastward (one road branches off and terminates near the location of the north-central building structures).
1963	Aerial Photograph	Property devoid of the apparent building structures within the north-central portion of the property; however, apparent building structures remain in the southwest portion of the property along with increased apparent building structures appearing along the west property boundary. The north utility easement is not apparent.
1965	Aerial Photograph	Apparent building structures appear again in the north-central portion of the property along with the apparent building structures within the southwest portion, but the building structures previously apparent along the west property boundary are no longer visible. Portions of the north utility easement are again visible.
1965 and 1997	Southeast Memphis 7.5-Minute Quadrangle Maps[1]	The 1965 topographic map indicates nine structures, the gas pipeline easement, several ponds, an unimproved road, and a gravel pit on the property. The unimproved road enters the property from Holmes Road near the central portion of the property and meanders southwestward and terminates south of the gas pipeline easement. Five of the structures appear as residences (two along Holmes Road and three along Swinnea Road). The remaining structures appear to be outbuildings and are located within the north-central portion of the property adjacent to the unimproved road and north of the gas pipeline easement. The gravel pit is located in the east-central portion of the property. The 1997 map shows only two structures remain, both being within the northwest portion.
1971, 1973, and 1980	Aerial Photographs	Increased site activities are apparent in the north-central portion of the property on the 1971 aerial photograph and the utility easement in the north portion of the property appears much like current day. A defined area of clearing (presumed surface mining area) is southeast of the north-central building structures (south of the utility easement) and a network of unimproved roads extend southward from this area. Although building structures still appear in the north-central and southwest portions of the property on the 1973 aerial photograph, overall site activities appear to have decreased and the north utility easement is again not as pronounced as in previous aerial photographs. The 1980 aerial photograph continues to show building structures in the north-central portion of the property, the southwest portion, and along the west property boundary. The possible surface mining area southeast of the north-central building structures is still apparent; other portions of the property appear to be unused on this aerial photograph.
1982 and 1996	Pleasant Hill 7.5-Minute Quadrangle Map[1]	Two structures and two outbuildings are present on the west side of the property. Several ponds are noted scattered across the property.

Table 4
Historical Subject Property Development Summary

Date	Historical Source	Property Development Description
1975	Earth Explorer Aerial Photograph[1]	Most of the northern portion of the property appears cleared and possibly is being used as part of a mining operation. An apparent operation area is in the north-central portion of the property with an adjacent "quarry-like" area to the southeast. An unidentified oval-shaped features is visible in the northwest portion of the property. What appears to be a farmstead is in the west-central portion of the property along Swinnea Road.
1990	Earth Explorer Aerial Photograph[1]	The northeast portion of the property remains cleared; however, the apparent operational area identified on the 1975 aerial does not appear as pronounced, and what appears to be an eroded gully now traverses the area. The apparent farmstead area identified on the 1975 aerial photograph appears to be more cleared on this aerial photograph, possibly indicting an operation area and adjacent "quarry-like" area. The unidentified oval-shaped features identified in the northwest corner of the property in the 1975 aerial photograph is not present.
1991	Aerial Photograph	The subject property does not appear to be under active operation, with no apparent building structures present. Vegetation (timber) appears in previous apparent operation areas, and a utility easement (current TVA high-voltage electric line transmission easement) first appears in the south portion of the property.
1992 and 1996	Aerial Photographs	Aerial photographs are not of sufficient quality to discern site activities; however, portions of the property appear with less vegetation than on the 1991 aerial photograph.
1993 and 1997	Topographic Maps	Show less buildings on the property and the east portion is no longer denoted as a gravel pit.
2008	Aerial Photograph	With the exception of the utility easements and one small cleared area within the extreme northeast portion of the property, the subject property appears covered with timber. Unidentified structures are evident along the west end of the current Texas Gas natural gas pipeline easement and one small structure is present on the west end of the current TVA high-voltage electric line transmission easement.
2012	Aerial Photograph	The unidentified structures on the west end of the current Texas Gas natural gas pipeline easement are no longer present, otherwise the property appears much like that observed on the 2008 aerial photograph.
2012	Topographic Map	Shows property devoid of structures.
2016	Aerial Photograph	Shows the subject property generally covered with trees and similar to that observed on the 2012 aerial photograph.

Notes:
[1] = Historical source included in the Panamerican Consultants. Inc. report titled "Phase I Cultural Resources Survey For The Memphis Shelby County Airport Authority Holmes Road Environmental Assessment Shelby County, Tennessee" (draft report), dated May 2020.
TVA = Tennessee Valley Authority

Sanborn fire insurance maps were not available for the subject property area through Environmental Database Report (EDR) who reportedly maintains the largest private collection of fire insurance maps. Sanborn no coverage documentation is provided in Appendix D.

3.3.2 Historical Uses and Operations

Based on interviews and review of historical sources and recently completed assessments, the subject property is thought to have been under residential and/or farmstead use as early as circa the mid-1930s or 1940s. Panamerican Consultants' recent survey of the property revealed five former twentieth-century residences and/or farmsteads within the north and west portions of the property. Evidence suggests that areas of the property may have been repurposed as possible quarry areas where construction sand and gravel were mined. Regulatory information reviewed on federal agency websites indicates mining operations were conducted by Al Crosby Construction Company under the name Dudley Anderson Pit from 1950 through the mid-1970s. A Modification of Right of Way Agreement provided by Ms. Morris indicates that Dudley Anderson and Nellie A. Anderson granted a right of way and easement to Texas Gas Transmission Corporation in October 1967. This is presumed to correspond to the current easement that transects the north portion of the subject property and confirms the previous Anderson ownership of the property. Regulatory records received from TDEC included a 1980 U.S. EPA Potential Hazardous Waste Site Preliminary Assessment conducted at the subject property that reported the site as inactive (site described as "old gravel pit, now overgrown, no sign of stain, leachate, or disturbance") and owned by W.S. Jordon and Sons Sand and Gravel (further discussed in Section 3.6). Ms. Morris of MSCAA (and others with MSCAA whom she consulted) nor Mr. Boatright with TDEC Memphis Environmental Field Office (EFO) were familiar with these entity names. EnSafe attempted to contact W.S Jordon and Sons Sand and Gravel at a telephone number provided on the U.S. EPA Preliminary Assessment and another telephone number obtained through internet research; however, the numbers were not operational. Contact information for Al Crosby Construction Company or Dudley Anderson Pit were not identified in records reviewed or through internet research.

Based on information provided by Ms. Morris, the MSCAA acquired the subject property parcels from individuals from the late 1980s through the mid-1990s. The subject property has reportedly not been utilized commercially since MSCAA ownership. Evidence of possible former surface mining operation areas, former building structures, and open ponds (some presumably from previous mining activities), an erosion gully, and streams and wet-weather conveyances were noted throughout the subject property at the time of the site reconnaissance.

Based on historical sources reviewed, interviews, and site reconnaissance, areas of suspected mining operations on the property may have been graded and or backfilled sometime after operations were terminated. Areas of clearing noted on historical sources reviewed later appeared more natural and mostly covered with tress and vegetation; however, some ponds and an erosion gully were noted in some of these areas at the time of the site visit. It is unknown if potential landfilling was conducted

onsite in association with backfilling and/or site grading of former mining excavation areas; however, Mr. Boatright of TDEC Memphis EFO indicated such practices were common, especially in mining pits backfilled prior to 1970.

EDR searched city directories for East Holmes Road for the years 1921 through 2017. No records were identified through the city directory search.

3.4 Current Uses

The subject property was visually assessed on April 15 and 16, 2020 by Velita Thornton of EnSafe. The purpose of the site reconnaissance was to determine current uses and to identify evidence of *recognized environmental conditions* in connection with the subject property. Photographs taken during the site visit are in Appendix G. EnSafe personnel walked the property perimeter, along wet weather conveyances, around ponds, along streams, and across easements, trails, and other accessible areas of the property. Adjacent and surrounding area properties were observed from the subject property boundaries and from nearby roads and driveways.

The subject property is currently vacant and predominantly covered with timber. One generally cleared area in the northeast portion of the property is thought to be a former construction sand and gravel mining area. A TVA high-voltage electric transmission line easement is located within the south portion of the property, a Texas Gas natural gas pipeline easement is within the northwest portion, and a Valero and MLGW gas line (presumed to convey various petroleum products) easement is along the west and south property boundaries. Various water features (creeks, streams, drainageways, wet weather conveyances, gullies, and ponds) are present throughout the property. Several building footprints and other evidence of historical development were observed in various areas of the property at the time of the site visit; however, active development of the property was not identified. Materials observed (linoleum floorings, brick, roofing shingles, concrete, etc.) in the north-central and west portions of the subject property would suggest historical building structures; however, it is unknown if these structures represent former residential (homestead) dwellings or structures associated with historical mining operations. Scattered debris (concrete, plastic, metal roofing, used tires, a livestock feeding trough/ring with no bottom, etc.) was observed throughout these portions of the property. Although some of the debris was observed in presumed historical residential/mining operation areas, it was not determined if the debris was the result of previous onsite activities or from illegal dumping. Recreational vehicle use was evident on trails throughout the property.

A recent survey of the site by Panamerican Consultants concluded that the only evidence of utilization of the property consisted of five twentieth-century historic resources, including four former residences or farmsteads and one breached earthen dam. Three of the residences were reported as razed and poorly preserved. A farmstead exhibited a concrete foundation/basement with a free-standing chimney. The report indicates the farmstead was occupied late into the twentieth century and was possibly reused as a quarry operation. Shovel test data generated as part of the survey, which ranged in depths up to 40 centimeters, did not appear to identify evidence of subsurface artifacts that would be indicative of landfilling; however, surface trash and debris was encountered at a number of the test locations.

According to the Real Estate Appraisers & Land Surveyors "Summary of Findings" (March 2007) obtained as part of the NEPA Environmental Assessment, all public utilities are available in the area of the subject property. Potable water, gas, and electricity are reportedly provided by MLGW and sanitary sewer is reportedly provided by the City of Memphis. Information obtained from the City of Memphis Public Works Department indicates sanitary sewer became available in 1979 for the area near the northeast corner of the subject property; however remaining portions of the property would reportedly require sewer line extensions prior to sewer service becoming available. With the reported historical and mining use prior to the time at which sewer service became available in the area, it is likely portions of the property would have been serviced by private septic systems; however, no confirmatory information has been obtained.

3.5 Interior and Exterior Observations

Table 5 lists environmental issues and identifies those present or applicable to the subject property, based upon EnSafe's visual observations of the interior and exterior, interviews, review of environmental records sources, regulatory research, and other publicly available and reasonably ascertainable information. Each environmental issue present or applicable is discussed in sections as noted in the table.

Table 5
Subject Property Observations

Current or Past Use	Present or Applicable	Comment/Report Section
Hazardous Substances and Petroleum Products	**Yes**	3.5.1
Storage Tanks	**Yes**	3.5.1
Odors (strong, pungent, or noxious)	**No**	—
Pools of Liquids	**No**	—
Drums (5 gallons and larger)	**No**	—
Unidentified Substance Containers	**No**	—

Table 5
Subject Property Observations

Current or Past Use	Present or Applicable	Comment/Report Section
Polychlorinated Biphenyls (associated with electric or hydraulic equipment)	**No**	—
Fuel Source for Heating and Cooling Systems	**No**	—
Stains or Corrosion (on building walls, floor, and ceilings)	**No**	—
Floor Drains, Sumps, and Pits	**No**	—
Pits, Ponds, or Lagoons	**Yes**	3.5.2
Stained Soil or Pavement	**No**	—
Stressed Vegetation	**No**	—
Solid Waste	**Yes**	Various areas of solid waste debris (plastic, concrete, wood, used tires, floor materials, bricks, etc.) were observed throughout the subject property (Section 3.4).
Hazardous Waste	**No**	—
Wastewater	**No**	—
Wells	**Unknown**	Possible due to property development prior to time when city water became available.
Septic Systems or Cesspools	**Unknown**	Possible due to property development prior to city sanitary sewer service becoming available (Section 3.4).

3.5.1 Hazardous Substances and Petroleum Products and Storage Tanks

A Texas Gas Company natural gas pipeline transects the north portion of the property. A Valero and MLGW gas line easement (presumed to convey various petroleum products) is along the west and south property boundaries.

One livestock feeding trough/ring was observed within the northwest portion of the property. The trough/ring did not have a bottom that would allow accumulation of rainwater or other liquids. No staining was noted on the trough/ring or on adjacent soil, and no stressed vegetation was noted in the area.

3.5.2 Pits, Ponds, or Lagoons

As previously mentioned, and as detailed in the July 29, 2019 letter prepared by Tioga Environmental Consultants, numerous wet weather conveyances, ponds, streams, gullies, and wetlands are present throughout the property. Some of these features may be associated with former mining operations.

3.6 Environmental Records Review

EnSafe obtained standard environmental record source information directly from a commercial service; U.S. EPA Envirofacts and ECHO, United States Geological Survey (USGS) MRDS, and U.S. Department of Labor MSHA, TDEC, and MDEQ websites, and regulatory files provided by TDEC and MDEQ through a FOIA request. The subject property was listed with environmental records.

Dudley Anderson Pit and Al Crosby Construction Company, which are mapped on the east-central portion of the subject property, are listed in the USGS MRDS databases under Mine ID 4001451 and MRDS ID W022891. The environmental database report suggests the facility was a past producer of sand and gravel. A review of online USGS MRDS documents indicates the Dudley Anderson Pit facility was owned by Dudley Anderson and operated by Al Crosby Construction Company. The website further indicates a MSHA health and safety inspection was conducted at the property in August 1975; however, the property was not included on the 1980 or 1981 MSHA list, possibly indicating the mining operation was terminated by this time.

The site listed as "Extraction Area South of Holmes Road" is mapped in the north-central portion of the subject property and is listed on the Superfund Enterprise Management System Archive database under U.S. EPA ID TND980728182. Previous regulatory records received by EnSafe from TDEC include a U.S. EPA Preliminary Assessment conducted on the subject property in August 1980. This assessment indicates the facility was owned by W.S. Jordon (presumed to be Jordon W.S. and Sons Sand and Gravel, Inc. based on internet research), was inactive at the time of the assessment, and not known potential hazard to the environment was identified. A January 1994 letter from Black & Veatch Science and Technology Corporation to U.S. EPA Region 4 suggests this site and the east-adjoining site (SES-31) are one and the same. Additional U.S. EPA records indicate the site was archived in 1994 and that the site reportedly did not qualify for the National Priorities List.

Mr. English with TDEC Memphis EFO was contacted about current regulatory status of this site. Mr. English did not have first-hand knowledge of the site or its current regulatory status. Mr. Boatright with TDEC Memphis EFO was also contacted to obtain information about any known landfilling operations at the subject property. Mr. Boatright also did not have first-hand knowledge of the property or knowledge of any authorized or unauthorized landfilling activities in the general area of the subject property. Mr. Boatright did indicate backfilling of historical gravel pits with debris was a common historical practice, especially pits backfilled prior to 1970.

4.0 AREA RECONNAISSANCE

The current and historical uses of adjoining and surrounding area properties described below are based upon visual observations during the site reconnaissance and information obtained from interviews, historical research, and regulatory research conducted for the subject property. A commercial environmental database company provided a database search report that made environmental records for surrounding area properties within the ASTM-defined search distances reasonably ascertainable. Sites listed in the environmental records search within the ASTM-defined search distances for the databases on which they appear are discussed in Sections 4.1 through 4.3.

4.1 Adjoining Properties

The subject property is adjoined on the north by East Holmes Road, then a church and timberland; on the east by a church, residences, and timberland; on the south by (from west to east) a church, a multi-tenant building, Servpro, a vacant distribution warehouse, and PFS Web; and on the west by Copart Salvage Auto Sales.

Based on review of historical sources, adjoining properties appear as rural and covered with timber or under agricultural use from the late 1930s through the 1970s when development is evident to the north (church building first appears) and northwest (unknown operation). The church and residential area east of the subject property first appears in the early 1980s. The properties to the south and west first appear commercially developed in the late 2000s, with increased development noted through present day.

Adjoining properties listed with environmental records are discussed below.

East

The SES-31/SES-31 Extraction Area site (address reported as South of 3025 East Holmes Road and South of Holmes/East of Swinnea/West of Tchulahoma) is listed in the Tennessee State Remediation Program (SRP) (now Division of Remediation or DoR) database with site IDs 79-765 and 79-768, and is also listed with an U.S. EPA ID of TND980728182.

Based on information reviewed, this site thought to be the same as the "Extraction Area South of Homes Road" site on the subject property and is discussed in Section 3.6.

South

Trane Climate Solutions located at 1560 East Stateline Road is listed in the environmental database report as a Resource Conservation and Recovery Act (RCRA) Non-Generator/No Longer Regulated

facility as of August 2016. The facility is listed as a previous small-quantity generator of hazardous waste with the following waste codes reported: ignitable waste (D001), corrosive waste (D002), barium (D005), methyl ethyl ketone (D035), tetrachloroethylene (D039), and trichloroethylene (D040). No violations were reported for the facility in the environmental database report or on the U.S. EPA ECHO website. Information received from FOIA requested submitted to MDEQ included a June 2016 Hazardous Waste Compliance Inspection Report. This inspection report indicates the facility was closed at the time of the inspection and the facility grounds were well maintained, and there was no evidence of any hazardous waste violations. The report further states that supplemental research suggests Trane Climate Solutions is closed with no immediate intention to reopen ether at this location or in the state.

Watsons Family Cleaners is mapped on the south-adjoining property at 1545 Stateline Road and is listed in the RCRA-Very Small Quantity Generator database. Based on area reconnaissance and internet research, this facility is thought to be located at 1545 Main Street, which is located over 2.5 miles southwest of the subject property and is therefore outside of the approximate minimum search distance for the database on which it appears.

Northwest

MLGW is mapped on the northwest-adjoining property at 2686 East Holmes Road and is listed in the RCRA Non-Generator/ No Longer Regulated database under U.S. EPA ID TNR000028761. The environmental database report indicates the facility was a previous small quantity generator of hazardous waste with corrosive waste (D002) being the only reported waste stream. No violations were reported for the facility in the environmental database report. Information obtained through the TDEC records request indicates the small quantity generator status was for a one-time generation of approximately 1,010 pounds of hydrogen peroxide (40 – 60%) in November 2009 by "MLGW — ASR Well Lot." Regulatory records received also included a September 2013 hazardous waste inspection report. This inspection report indicates no hazardous waste, universal waste, or used oil was observed and that no violations were cited during the inspection.

The former City of Memphis McKellar Nursery property listed as "Park Commission McKellar Nursery" is located on the northwest-adjoining property at 2684 Holmes Road and is listed in the underground storage tank (UST) and Historical UST databases under facility ID 9-791182. According to the environmental database report, the facility is registered with a 1,000-gallon diesel UST and a 1,000-gallon gasoline UST that are listed as permanently out of use as of June 15, 1990. Regulatory records obtained from TDEC indicates total petroleum hydrocarbon contamination was identified in soil at the time of UST closure at concentrations exceeding applicable standards. A letter from the

Tennessee Department of Health and Environment, Bureau of Environment (now TDEC), dated November 5, 1990, obtained through a TDEC FOIA request states "…it appears that all appropriate measures have been taken to remediate the release and to prevent future releases…at this time, the Division does not see the necessity for further investigation or enforcement…". Based on a local westerly groundwater flow direction determined at a nearby property (see discussion of site in Section 4.2), it is not anticipated that a petroleum product release to soil at this site has had the potential to migrate to soil, soil vapor, or groundwater on the subject property.

4.2 Surrounding Area Properties

The area surrounding the subject property is mixed residential, agricultural, timberland, commercial, and light industrial. The environmental database search identified a total of 3 sites with environmental records beyond the subject property and adjoining properties. Of these sites, 2 are within the ASTM-defined approximate minimum search distances, as discussed below.

OMS #15 is approximately 0.35-mile northwest of the northwest corner of the subject property at 2610 East Holmes Road and is listed in the UST, Historical UST, and Leaking UST databases under facility ID 790983. The facility is registered with a 6,000-gallon diesel UST and a 6,000-gallon gasoline UST. The environmental database report indicates both USTs were installed in 1982 and removed in May 1997. Regulatory files provided by TDEC includes a Permanent Closure Report submitted in May 1997 which reports total petroleum hydrocarbon-Diesel Range Organics was detected in a water sample collected from the tank pit at the time of tank closure at a concentration of 595 parts per million, which was above the 1.0 parts per million cleanup level for non-drinking water. Based on this detection above regulatory clean up levels a site characterization was performed. The site characterization report concluded that soil and groundwater beneath the property had not been impacted by hydrocarbons at concentrations exceeding applicable regulatory cleanup levels. Also, this report indicated a westerly groundwater flow direction (away from the subject property). TDEC issued case closure for the site in May 1999. Based on regulatory status and reported groundwater flow direction (away from the subject), it is not anticipated that contamination from this site has had the potential to migrate to soil, soil vapor, or groundwater at the subject property.

Memphis Public Works/Jackson Pit site is located approximately 0.5-mile north-northeast of the subject property. The site is listed in the State Hazardous Waste Sites, SRP/DoR, and Vapor databases under Facility ID/SRP Number 79-604 and U.S. EPA ID TND980709455. The site is reported as active on the environmental database report. The vapor database listing indicates soil and groundwater at the facility is impacted with volatile organic compounds/semivolatile organic

compounds (specifically tetrachloroethylene). The TDEC DoR website reports engineering controls have been implemented at the site.

TDEC records historically obtained by EnSafe indicate the Memphis Public Works/Jackson Pits site is a state hazardous waste site under investigation because of its prior use as a municipal and industrial waste landfill by Shelby County from 1961 to the early 1970s. Contaminants of concern at the site in soil and groundwater include volatile and semivolatile organic compounds, pesticides, herbicides, and heavy metals. Since at least 2000, the groundwater flow direction at the site has been to the west, away from the subject property. The landfill was closed in 2003 and a cap cover was installed along with 10 monitoring wells. Groundwater samples have been collected and analyzed for contaminants of concern. Records reviewed stated that the gradient at the site is west/northwest. EnSafe contacted Mr. Boatright of TDEC Memphis EFO to obtain current regulatory status of the site; however, Mr. Boatright referred EnSafe to the DoR. Mr. Jordon English with TDEC Memphis EFO indicated the site has basically remained idle since the early 2000s. He did indicate that TDEC is working with the property owner to complete additional soil and groundwater assessment offsite to the north-northwest, which he confirmed is the presumed general groundwater flow direction.

Based on information obtained, it is not anticipated that releases at this property have migrated to soil, soil vapor, or groundwater at the subject property, based on the site's distance from the subject property, the reported groundwater flow direction (not directed to the subject property), and the existing engineering controls at the site.

4.3 Unmapped Sites

The environmental database search identified 9 sites with environmental records which it could not map due to poor or inadequate address information. One of these sites (Watson's Cleaners) appears to correspond to the erroneously mapped south-adjoining property discussed in Section 4.1. The remaining sites were determined to be outside the ASTM-defined search distance for the database on which they appear or do not appear to have had releases with the potential to migrate to subject property soil, soil vapor, or groundwater.

5.0 RESULTS OF THE ENVIRONMENTAL PROFESSIONAL INQUIRY

EnSafe performed a Phase I ESA of the Holmes Road Development Project Property located at the southeast corner of East Holmes Road and Swinnea Road and north of the Tennessee/Mississippi state line, all being within Memphis, Shelby County Tennessee, in general conformance with the scope and limitations of ASTM 2013. Any exceptions to, or deletions from, this practice mentioned throughout the report are discussed in Sections 5.3 and 5.4.

5.1 Summary of Findings and Conclusions

- The subject property is currently vacant and predominantly covered with timber. One generally cleared area in the northeast portion of the property is thought to be a former construction sand and gravel mining operation area. A TVA high-voltage electric powerline transmission easement is located within the south portion of the property, a Texas Gas natural gas pipeline transmission easement is within the northwest portion, and a Valero and MLGW easement runs along the west and south property boundaries. Various water features (creeks, streams, drainageways, wet weather conveyances, gullies, and ponds) are present throughout the property. Several building footprints and other evidence of historical development was observed in various areas of the property at the time of the site visit; however, active development of the property was not identified. Materials observed (linoleum floorings, brick, roofing shingles, concrete, etc.) in the north-central and west portions of the subject property would suggest historical building structures; however, it is unknown if these structures represent former residential (homestead) dwellings or structures associated with historical mining operations. Scattered debris (concrete, plastic, metal roofing, used tires, a livestock feeding trough/ring with no bottom, etc.) was observed throughout these portions of the property. Although some of the debris was observed in presumed historical residential/mining operation areas, it was not determined if all of the debris was the result of previous onsite activities or from illegal dumping. Recreational vehicle use was evident on trails throughout the property.

- Based on information reviewed, the subject property is thought to have been under residential and/or farmstead use as early as the 1930s. Historical information reviewed indicates at least portions of the subject property were repurposed for use in mining of construction sand and gravel from around 1950 until the mining operation was abandoned on April 4, 1979. Building structures and presumed operation areas are evident on various portions of the property on historical sources reviewed; however, actual site use and operations are not known. MSCAA reportedly acquired the subject property parcels from individuals from the late 1980s through the mid-1990s. The subject property has reportedly not been utilized

commercially since MSCAA ownership. Evidence of possible former mining operation areas, former building structures, and open ponds (some presumably from previous mining activities), streams, gullies, and wet-weather conveyances were noted throughout the subject property at the time of the site reconnaissance.

- The subject property was inspected in 1980 by the United States Environmental Protection Agency and a site description on the inspection report indicated the site as an "old gravel pit, now overgrown, no sign of stain, leachate, or disturbance." Shovel test data generated during a recent cultural resources survey did not appear to identify artifacts that would be indicative of subsurface landfilling; however, surface trash and debris was noted at a number of the test locations. In addition, evidence of subsurface landfilling was not observed during the Phase I ESA site reconnaissance, but surface trash and debris was observed.

- Several adjoining and surrounding area sites were identified with environmental records. Regulatory records reviewed do not suggest that possible releases at the identified sites have had the potential to migrate to subject property soil, soil vapor, or groundwater.

5.2 Environmental Professional Opinion

This assessment has revealed no evidence of *recognized environmental conditions, controlled recognized environmental conditions, or historical recognized environmental conditions* in connection with the subject property.

The following *business environmental risk* was identified:

- The presence of remaining former building materials, surface debris and trash scattered throughout the subject property, and the presence of wetlands, wet-weather conveyances, and gullies is considered a *business environmental risk* due to potential costs associated with offsite disposal of building materials and trash/debris, and limitations due to site features requiring modification prior to planned future use of the property.

5.3 Data Gaps

The following data gaps were encountered that limited EnSafe's ability to identify *recognized environmental conditions*.

- Former owners and operators of the subject property were not identified or interviewed. Internet research was conducted; however, information on former operators was not found.

- It is unknown if potential landfilling was conducted onsite in association with backfilling and/or site grading of former mining excavation areas.

- City directories reviewed by the environmental database provider did not include any returns for the subject property or nearby addresses.

Limitations and exceptions detailed in Section 5.4 are also considered data gaps that may have limited EnSafe's ability to identify *recognized environmental conditions.*

5.4 Limitations and Exceptions

EnSafe's Phase I ESA generally conforms to ASTM 2013. EnSafe did not sample soil, soil vapor, groundwater, or surface water as part of the Phase I ESA. Assessment of these items is based upon visual observations and sources as referenced throughout the report. This report should not be construed as verifying the present property owner or operator's compliance with federal, state, and local regulations or as a recommendation to purchase, sell, or develop the subject property. The following specific limitations and exceptions apply to this Phase I ESA:

- Some portions of the subject property were covered with dense vegetation, which limited visual and physical observation.

- The quality and scale of some aerial photographs limited the ability to make observations related to subject property development and/or site-specific activities.

- Portions of the subject property were outside the field of view on some of the historical topographic maps reviewed.

5.5 Significant Assumptions

This report is a prudent, reasonable evaluation of the subject property's observed environmental condition. EnSafe assumes no responsibility for conditions or information not practically reviewable, or information not accurately disseminated by any party. The following significant assumptions were used to formulate the conclusions and opinions contained in this report:

- Environmental database information is accurate and complete.

- Conditions at the time of the site visit were representative of ordinary conditions at the subject property.

- The subject property boundaries depicted on figures and described herein are accurate.

5.6 User Reliance

The assessment was prepared under contract for the exclusive use of MSCAA. Any other party's reliance on this report is at risk unless EnSafe grants authorization. In accordance with ASTM 2013, this Phase I ESA is presumed to be valid for 180 days from the date of completion. A Phase I ESA that meets or exceeds this practice and was completed more than 180 days previously may be used to the extent allowed in Sections 4.7 and 4.8 of ASTM 2013.

6.0 REFERENCES

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Appendix A
Figures

Appendix B
Resumes

DEAN A. STOKER
ENVIRONMENTAL SCIENTIST

EDUCATION
BS, Biology, University of Arkansas, 1996

CERTIFICATIONS
- OSHA 40-Hour Hazardous Waste Operations
- Asbestos Hazard Emergency Response Act Asbestos Inspector Certification — Arkansas
- Fundamentals of Industrial Hygiene

Dean has expertise providing technology-based solutions for environmentally impacted sites and has completed complex due diligence and merger/acquisition projects (Phase I and Phase II ESAs); soil and groundwater investigations; regulatory compliance audits; and provided outside environmental, health and safety services. He has prepared and completed Comprehensive Site Assessments (CSA) and Environmental Assessments (EA) for Brownfields investigations for the Arkansas Department of Environmental Quality (ADEQ) and the Mississippi Department of Environmental Quality (MDEQ). Dean has in-depth experience managing projects relating to the redevelopment of environmentally impacted properties.

RELEVANT EXPERIENCE

SITE INVESTIGATION/BROWNFIELDS PROJECTS

Weyerhaeuser Co.; Philadelphia, MS
Project manager and team member conducting quarterly groundwater, surface water, and sediment sampling. Responsible for validating/managing analytical data, preparing quarterly reports, and constructing potentiometric maps and isoconcentration contour maps. Also involved in extensive groundwater and subsurface soil investigations and conducted routine sampling for various permits maintained by the facility.

Rixey Iron and Metal Co.; North Little Rock, AR
Team member during the remedial investigation at this State Superfund site. Duties included groundwater and soil sampling, perimeter air monitoring, and risk assessment. Removal action supervisor for removal action activities at the facility and was responsible for supervising removal action activities that included excavation of PCB- and lead-contaminated media; transportation and disposal of impacted hazardous and non-hazardous soil, ash, and sediment; PCB decontamination (pressure washing) and decommissioning of several onsite structures; and packaging, removal, and disposal of containerized hazardous and non-hazardous liquid and miscellaneous solid waste stored on site.

Brownfields Projects, Arkansas and Mississippi
Team member for Brownfields projects through ADEQ and the MDEQ. Duties involved assisting in the development of work plans, soil and groundwater sampling, evaluation of analytical data with respect to human risk-based levels and assisting with preparation of characterization reports.

Smarthouse Way, North Little Rock, AR
Field supervisor for this U.S. EPA Brownfields Cleanup Grant project. This project was the first Brownfields project funded by the Pulaski County loan project. Duties included managing day-to-day soil removal activities, conducting soil confirmation sampling, storm water management, and project reporting.

Whetstone Manufacturing Facility; Hot Springs, AR
Assessor for the Phase I ESA, which resulted in the identification of a number of recognized environmental conditions (REC), as defined by ASTM. A cost-savings Phase II ESA was recommended to further assess the potential environmental issues identified during the Phase I ESA. The Phase II ESA included sampling surface soils and trench excavations near the possible UST and the historical disposal pit. The trench excavations were considered a cost-savings measure, as Phase III ESA activities could be initiated immediately rather than having to conduct costly drilling activities to identify subsurface environmental hazards. The project was immediately pushed to a Phase III ESA to minimize the human health and ecological hazards identified during

the Phase II ESA. Served as the key field personnel in all phases of this project. Also authored all project-related reports, served as liaison among the attorneys, the current owner, and the potential purchaser. Following successful completion of all phases of the project, the ownership transaction was successfully completed.

Former Aermotor, Inc.; Conway, AR

Project manager for corrective actions at the site. Helped facility apply to the ADEQ Corrective Action Strategy (CAS) program for cleanup of petroleum-impacted surface and subsurface soils. Prepared CAS Wok Plan for planned corrective actions at the site. Upon acceptance of Work Plan by ADEQ, corrective actions were conducted. A Post-Corrective Action Risk Evaluation Plan, which documents the corrective actions completed at the site and evaluates future risk to human health and the environment, was submitted to and approved by ADEQ.

Jimelco Inc. Site, Little Rock, AR

Project manager for this CSA project at an approximately 14.7-acre parcel. At the request of ADEQ, a proposed Scope of Work (SOW) was prepared to determine the nature and extent of hazardous substances released into the environment, to determine the potential for additional releases of hazardous substances, and to determine the human health and environmental risk from hazardous substance releases at the site. The SOW was designed to investigate each of these particular concerns and included a site survey to establish site features as well as environmental media sampling to investigate the above potential concerns. The proposed SOW was subsequently approved by the ADEQ and a Work Plan (WP) was requested. Authored a WP that included the collection of 19 surface soil samples from eight Areas of Concern (AOCs), the installation of six subsurface soil borings, the installation of groundwater monitoring wells in five of the subsurface soil borings, the collection of six sediment samples from three onsite features and three sediment samples from two offsite features, the collection nine surface water samples from onsite and offsite features, the collection of five surface wipe samples from non-porous building surfaces, and the collection of one liquid and one sludge sample from an open pit inside an onsite building. His WP also included a complete human health and ecological risk assessment. The WP was approved by ADEQ with minimal or no requested modifications. Dean subsequently scheduled and managed all field activities, assisted contract personnel in requesting and awarding contracts to subcontractors, tracked project objectives and milestones, and prepared and submitted periodic project updates to the client. Following completion of field activities, Dean authored a CSA Report, which summarized and discussed all field activities, analytical results, and resulting human health and ecological risks for the site. The CSA Report was also approved by the ADEQ with minimal requested modifications.

Environmental Site Assessments, Multiple Locations

Conducted numerous Phase I and Phase II site assessments at numerous locations throughout the southeastern US. Projects involved site visit, personnel interviews, and record reviews to assess potential environmental liabilities at the site and surrounding properties. In addition to American Society for Testing and Materials (ASTM) requirements, many of these assessments have included expanded services, such as limited regulatory compliance audits, soil and/or groundwater screening, and AHERA asbestos inspections.

Comprehensive Site Assessments, ADEQ, Multiple Locations

Managed and performed CSAs for Arkansas Department of Environmental Quality (ADEQ) under an on-call services contract. Projects included the Fort Smith Smelter, Jimelco, I-Can, Butler Elementary, and Martindale Clinic.

Solid Waste Services, ADEQ, Multiple Locations

Participated in solid waste services and construction oversight for ADEQ at two sites: the C&L Landfill and Thompson Scientific.

NEPA Environmental Assessments, Multiple Locations

Subject matter expert for noise, transportation, hazardous materials, and environmental restoration for several EAs evaluating alternatives for a 5-6 mile railway extension at the Port of Cates Landing in Dyersburg,

Tennessee; a pipe line repair and dock walk replacement near Charleston, South Carolina; construction of a multimodal rail expansion at the Port of Memphis; and for a State Emergency Operations Center for the Arkansas Department of Emergency Management at Camp Robinson in North Little Rock, Arkansas

VELITA THORNTON

BIOLOGIST/ ENVIRONMENTAL SCIENTIST

EDUCATION

BS, Biology, 2013, Christian Brothers University, Memphis, TN

CERTIFICATIONS

- 40-hour Health and Safety Training: OSHA (29 CFR 1910.120)
- Level 1 Tennessee Erosion Prevention and Sediment Control certified
- RCRA Solid, Hazardous, and Universal Waste certified
- 40-hour Wetland Delineation Training
- Tennessee Hydrologic Determination Training (Qualified Hydrologic Professional In-Training)
- Tennessee Asbestos Inspector
- First Aid/CPR/AED

Velita is a Biologist/ Environmental Scientist with over four years of diverse experience that includes field team management and supervision, endangered species assessments, wetland delineations, stream determinations, wetland monitoring, plant/vegetation surveys, bat mist netting and habitat assessment, stormwater sampling, U.S. Army Corps of Engineers (USACE) permitting, Tennessee Department of Environment Conservation (TDEC) permitting, National Environmental Policy Act (NEPA) technical writing. Velita has also been responsible for reporting as part of Toxic Release Inventory (TRI) and Tier II programs, asbestos survey, Phase I and II Environmental Site Assessments (ESAs), contractor construction oversight, lab work, data analysis, soil and groundwater investigations and remediations, well installation and monitoring, and plant, fish, insect, amphibian, and benthic invertebrate collection and identification.

RELEVANT EXPERIENCE

Tenaha Wood Treating State Superfund Site, TCEQ, Tenaha, TX (2018)

As Biologist/ Environmental Scientist, Sample Manager, Field Team Lead, and Health and Safety Officer, Velita was responsible for soil, water, fish, benthic invertebrates, and amphibian sampling, collection, and identification. Managing samples and shipment, communications with client, reporting, and leading field events and sampling. Maintaining a safe work environment, reviewing safe work practices every day with field team, and safety monitoring.

Wetland and Stream Mitigation, Delineations, Determinations, Assessments, and Monitoring, Various Locations (2016-present)

As Biologist/ Environmental Scientist, Velita's responsibilities include report, photo log, and map preparation, as well as knowledge of wetland vegetation, hydric soils, and hydrology within the USACE Atlantic and Gulf Coastal Plain region. Also conducted wetland assessments using TVA Rapid Assessment Method and used Wetland Rapid Assessment Procedure to calculate mitigation requirements. Helped prepare Jurisdictional Determination application materials for USACE Memphis and Hydrologic Determination report for Tennessee Department of Environment and Conservation. Met regulators onsite for a concurrence site visit. Stream determinations were made in accordance with TDEC's Hydrologic Determination Guidance. Assisted with annual monitoring which includes the assessment of hydrologic restoration and planted tree survival percentages, sample plots for vegetation surveys, and photo documentation. Performed hydrologic improvement design, conducted the annual monitoring, and wrote the monitoring report.

Bat Mist Netting, MSCAA-Memphis Shelby County Airport Authority, Memphis, Tennessee (2017)

As Biologist/ Environmental Scientist, Velita conducted habitat assessments for Indiana and northern long-eared bats (Myotis sodalis and M. septentrionalis) and assisted with formal coordination with USFWS to identify regulatory requirements regarding federally listed bats. Setting up nets, logging bats collected, monitoring nets, and photo documentation.

Bat Habitat Assessment for Houston Levee Widening, Shelby County (2019); Shelby County, Tennessee

As Environmental Scientist, conducted site visit to assess potential habitat for Indiana and northern long-eared bats (Myotis sodalis and M. septentrionalis) according to USFWS protocol. A letter report was submitted to the client.

Oak Hill Bat Habitat Assessment, Township Development Services (2017); Shelby County, Tennessee
As Environmental Scientist, conducted site visit to assess potential habitat for Indiana and northern long-eared bats (Myotis sodalis and M. septentrionalis) according to USFWS protocol. A letter report was submitted to the client.

Bat Habitat Assessment, ARCO Murray (2018 and 2019); DeSoto County, Mississippi
As Environmental Scientist, conducted site visit to assess potential habitat for Indiana and northern long-eared bats (Myotis sodalis and M. septentrionalis) according to USFWS protocol. A letter report was submitted to the client.

Stormwater Pollution Prevention Plan (2019-present)
As Environmental Scientist, creating and updating multiple facility SWPPPs in compliance with 40 CFR 122.26 (U.S EPA National Pollutant Discharge Elimination System requirements) and individual state storm water permit regulations for industrial clients nationwide.

TNEPSC Construction Inspections, Toyota Motor Manufacturing Tennessee (2019-present); Madison County, Tennessee
As Environmental Scientist, conducted bi-weekly erosion prevention and sediment control inspections of active construction site for compliance with TDEC General NPDES Permit for Stormwater Discharge from Construction Activities.

U.S. Navy, CLEAN, NAS Pensacola, Pensacola, FL (2016-present)
As Sample Manager, Field Team Lead, Health, and Safety Officer, Biologist/ Environmental Scientist, Velita assisted with soil, water, and fish sampling/collection, managing samples and sample shipment, and leading field events and sampling. Maintaining a safe work environment, reviewing safe work practices every day with field team, and safety monitoring.

U.S. Navy, CLEAN, NSA Mid-South, Millington, TN (2017-present)
As Sample Manager, Health and Safety Officer, and Environmental Scientist, Velita **s**ampled, managed, tracked and aided with semi-annual groundwater sampling event. Provided support to multiple environmental assessments conducted for Navy CLEAN.

Helena Chemical Company, West Helena, AR; Tampa, FL (2017-present)
As Sample Manager and Environmental Scientist, Velita sampled groundwater, managed samples, organized sampling schedule, assisted with managing field team and tasks and aided with semi-annual groundwater sampling event.

McKellar Lake and Cypress Creek Sewer Line Break, Black & Veatch, Memphis, TN (2016-2017)
As Environmental Scientist, Velita collected water samples several times weekly, examined sludge, analyzed for nitrates and nitrites in the field, and took water quality reading to combat sewer release. Maintained and calibrated field equipment.

Stormwater sampling, Various Locations (2016-present)
As Environmental Scientist, Velita set up samplers, visual inspections, sample collection and managing, and managing client relations.

Vollrath Site Remediation, Bass Berry & Sims, Gallaway, TN (2016)
As Environmental Scientist, Velita oversaw SRS injections to remediate chlorinated solvent contamination at this facility.

Due Diligence/Phase I & II Environmental Site Assessments
Phase I Environmental Site Assessments, Multiple Locations (2016—Present)
As Environmental Scientist, Velia conducted Phase I ESAs for Comprehensive Environmental Response, Compensation and Liability Act due-diligence pre-acquisition real estate transactions at multiple sites

throughout the United States. Phase I ESAs were performed in accordance with American Society for Testing and Materials (ASTM) standards or client-directed formats and include historical and regulatory research, evaluation of state and federal environmental databases, visual reconnaissance of the property to document indications of potential environmental impairment, and report preparation. Clients include landowners, prospective purchasers, developers, financial institutions, and attorneys.

Phase II Environmental Site Assessments, Memphis, TN (2016—Present)
As Environmental Scientist, Velita conducted multiple Phase II ESAs conducted for various clients. Each Phase II ESA included sampling one or all of the following media: soil gas, soil, sediment, and/or groundwater. The investigation also included report preparation and result analysis.

Transaction Screen Assessments; ALSAC/St. Jude Children's Research Hospital, Multiple Locations (2016—Present)
As Environmental Scientist, Velita conducted limited environmental due diligence assessments in accordance with ASTM International standards for Transaction Screen Assessments on proposed properties for St. Jude. Duties included historical research, interviews, site observations, project coordination, and report preparation.

Asbestos Inspections and Sampling (2017—Present); Multiple Locations
As Environmental Scientist, Velita conducted several asbestos inspections that included bulk sampling and reporting laboratory findings. Sites inspected included the University of Memphis and Pleasant View Apartments in Memphis, Tennessee.

*** Electron Microscopy Technician, St. Jude Children's Research Hospital, Memphis, TN (2010-2013, 2015)**
As Electron Microscopy Technician, Velita expanded a number of projects, increased number of samples, and reduced turnaround time by implementing strategic workflow, procedures, and processes. She assisted in daily meetings and maintained a positive working environment, trained staff in electron microscopy techniques and assisted creating PowerPoint presentation for Director and faculty; compiled and organized complex data to summarize facility operations and achievements. She ordered and inventoried materials to maintain supplies, processed tissue samples using microtomy, embedding, staining, specialty techniques, and imaging, and monitored product quality to ensure compliance with standards and specifications. She also set up and conducted chemical experiments, tests, and analyses, using techniques such as chromatography, spectroscopy, biochemistry, general molecular biology, PCR, physical or chemical separation techniques, or microscopy and maintained, cleaned, or sterilized laboratory instruments or equipment.

*** Biology Laboratory Assistant/ Teaching Assistant, Christian Brothers University, Memphis, TN (2009-2015)**
As Biology Laboratory Assistant/ Teaching Assistant, Velita set up, adjusted, calibrated, cleaned, maintained, and provided troubleshooting for laboratory and field equipment. She measured, weighed, and prepared compounds and solutions for use in laboratory classes, monitored laboratory work to ensure compliance with set standards and government organizations, maintained greenhouses and animals' safety, habitat, feeding schedules, and overall well-being and performed experiments in the laboratory with in vivo models. Velita also collected and analyzed biological data about relationships among and between organisms and their environment. She performed animal dissections and identified gross anatomy, trained new employees and recorded chemical and laboratory specimen inventories, prepared and cleaned laboratories for classes and supervised students' laboratory work. Velita assisted the professor, evaluate and grade students' laboratory work and assignments, initiated, facilitated, and moderated laboratory discussions, collaborated with colleagues to address teaching and research issues and assisted students with their coursework and laboratory work during class and in the field.

* indicates work for a previous employer

Appendix C
Environmental Database Search Report

MSCAA - Holmes Road EA
E Holmes Road
Memphis, TN 38118

Inquiry Number: 6034858.2s
April 08, 2020

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

E HOLMES ROAD
MEMPHIS, TN 38118

COORDINATES

Latitude (North):	34.9995730 - 34° 59' 58.46''
Longitude (West):	89.9679260 - 89° 58' 4.53''
Universal Tranverse Mercator:	Zone 16
UTM X (Meters):	229122.4
UTM Y (Meters):	3876824.2
Elevation:	356 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5944778 SOUTHEAST MEMPHIS, TN
Version Date:	2013
South Map:	5633941 PLEASANT HILL, MS
Version Date:	2012

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140827, 20140823
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
E HOLMES ROAD
MEMPHIS, TN 38118

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
A1	DUDLEY ANDERSON PIT		MINES MRDS	Lower	1 ft.
A2	DUDLEY ANDERSON PIT		MINES MRDS	Lower	1 ft.
3	EXTRACTION AREA	S OF HOLMES RD	SEMS-ARCHIVE	Higher	1 ft.
A4	CROSBY AL CONSTR CO		US MINES	Lower	1 ft.
B5	DUDLEY ANDERSON PIT		MINES MRDS	Higher	1 ft.
B6	ANDERSON PIT		MINES MRDS	Higher	1 ft.
C7	SES-31 EXTRACTION AR	SOUTH OF 3025 EAST H	TN SRP	Higher	431, 0.082, ENE
D8	MEMPHIS LIGHT, GAS A	2686 E. HOLMES ROAD	RCRA NonGen / NLR	Lower	450, 0.085, NW
D9	PARK COMM MCKELLAR N	2684 HOLMES ROAD	TN UST	Lower	457, 0.087, NW
D10	PARK COMM MCKELLAR N	2684 HOLMES ROAD	TN HIST UST	Lower	457, 0.087, NW
C11	SES -31	SOUTH OF HOLMES/EAST	TN SRP	Higher	464, 0.088, ENE
D12	OMS #15	2610 E HOLMES RD	TN LUST	Lower	721, 0.137, NW
D13	OMS #15	2610 EAST HOLEMS ROA	TN UST, TN HIST UST	Lower	721, 0.137, NW
D14	OMS #15	2610 EAST HOLEMS ROA	TN HIST UST	Lower	721, 0.137, NW
15	TRANE CLIMATE SOLUTI	1560 EAST STATELINE	RCRA NonGen / NLR, FINDS, ECHO	Higher	1197, 0.227, SSE
16	WATSONS FAMILY CLEAN	1545 STATELINE ROAD	RCRA-VSQG	Higher	1250, 0.237, SSE
17	ALVIN E GILLES	990 STATE LINE ROAD	MS LUST, MS UST	Higher	2210, 0.419, SSW
18	MEMPHIS PUBLIC WORKS	BLOCKS OF PITS RD	TN SHWS, TN SRP, TN VAPOR	Lower	3849, 0.729, NNE

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System
US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROLS ---------- Institutional Controls Sites List

Federal ERNS list

ERNS ---------- Emergency Response Notification System

EXECUTIVE SUMMARY

State- and tribal - equivalent CERCLIS

MS SHWS CERCLA/Uncontrolled Sites File List

State and tribal landfill and/or solid waste disposal site lists

TN SWF/LF Solid Waste Disposal Facilities
MS SWF/LF Solid Waste Landfills
TN SWM COMPLAINTS Solid Waste Management Complaints

State and tribal leaking storage tank lists

INDIAN LUST Leaking Underground Storage Tanks on Indian Land
TN LUST TRUST LUST TRUST Fund Database
TN HIST_LUST CO Leaking Underground Storage Tanks Sites

State and tribal registered storage tank lists

FEMA UST Underground Storage Tank Listing
TN AST Aboveground Storage Tanks
MS AST Aboveground Storage Tanks
INDIAN UST Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

TN ENG CONTROLS Engineering Control Sites
MS ENG CONTROLS Sites with Engineering Controls
TN INST CONTROL Institutional Control Sites
MS INST CONTROL Sites with Institutional Controls

State and tribal voluntary cleanup sites

TN VCP Voluntary Cleanup, Oversight and Assistance Program Sites
INDIAN VCP Voluntary Cleanup Priority Listing
MS VCP Voluntary Evaluation Program Sites

State and tribal Brownfields sites

TN BROWNFIELDS Superfund VOAP Listing
MS BROWNFIELDS Uncontrolled Sites List

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

TN SWRCY Recycling Facilities Listing
MS SWRCY Mississippi Recycling Directory
INDIAN ODI Report on the Status of Open Dumps on Indian Lands
ODI Open Dump Inventory

DEBRIS REGION 9 ---- Torres Martinez Reservation Illegal Dump Site Locations
IHS OPEN DUMPS ---- Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL ---- Delisted National Clandestine Laboratory Register
TN CDL ---- Registry of Contaminated Properties
TN PRIORITYCLEANERS ---- DCERP Remediation Sites Listing
TN DEL SHWS ---- Deleted State Hazardous Waste Sites
US CDL ---- National Clandestine Laboratory Register
TN PFAS ---- PFAS Contamination Site Location Listing

Local Land Records

TN LIENS ---- Liens Information
LIENS 2 ---- CERCLA Lien Information

Records of Emergency Release Reports

HMIRS ---- Hazardous Materials Information Reporting System
TN SPILLS ---- State Spills
TN SPILLS ---- State Spills

Other Ascertainable Records

FUDS ---- Formerly Used Defense Sites
DOD ---- Department of Defense Sites
SCRD DRYCLEANERS ---- State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR ---- Financial Assurance Information
EPA WATCH LIST ---- EPA WATCH LIST
2020 COR ACTION ---- 2020 Corrective Action Program List
TSCA ---- Toxic Substances Control Act
TRIS ---- Toxic Chemical Release Inventory System
SSTS ---- Section 7 Tracking Systems
ROD ---- Records Of Decision
RMP ---- Risk Management Plans
RAATS ---- RCRA Administrative Action Tracking System
PRP ---- Potentially Responsible Parties
PADS ---- PCB Activity Database System
ICIS ---- Integrated Compliance Information System
FTTS ---- FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS ---- Material Licensing Tracking System
COAL ASH DOE ---- Steam-Electric Plant Operation Data
COAL ASH EPA ---- Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER ---- PCB Transformer Registration Database
RADINFO ---- Radiation Information Database
HIST FTTS ---- FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS ---- Incident and Accident Data
CONSENT ---- Superfund (CERCLA) Consent Decrees
INDIAN RESERV ---- Indian Reservations
FUSRAP ---- Formerly Utilized Sites Remedial Action Program
UMTRA ---- Uranium Mill Tailings Sites
LEAD SMELTERS ---- Lead Smelter Sites
US AIRS ---- Aerometric Information Retrieval System Facility Subsystem

EXECUTIVE SUMMARY

ABANDONED MINES---- Abandoned Mines
UXO---- Unexploded Ordnance Sites
DOCKET HWC---- Hazardous Waste Compliance Docket Listing
FUELS PROGRAM---- EPA Fuels Program Registered Listing
TN AIRS---- Listing of Permitted Sources
MS AIRS---- Air Quality Information Listing
TN DRYCLEANERS---- Registered Facilities List
MS DRYCLEANERS---- Drycleaner Facilities Listing
TN LEAD---- Lead Safe Housing Registry
TN NPDES---- Permitted Facility Listing
MS NPDES---- Industrial & Municipal NPDES Facilities

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP---- EDR Proprietary Manufactured Gas Plants
EDR Hist Auto---- EDR Exclusive Historical Auto Stations
EDR Hist Cleaner---- EDR Exclusive Historical Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

TN RGA LF---- Recovered Government Archive Solid Waste Facilities List
MS RGA LF---- Recovered Government Archive Solid Waste Facilities List
TN RGA LUST---- Recovered Government Archive Leaking Underground Storage Tank
MS RGA LUST---- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes

available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

A review of the SEMS-ARCHIVE list, as provided by EDR, and dated 01/30/2020 has revealed that there is 1 SEMS-ARCHIVE site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
EXTRACTION AREA Site ID: 0403968 EPA Id: TND980728182	S OF HOLMES RD	0 - 1/8 (0.000 mi.)	3	10

Federal RCRA generators list

RCRA-VSQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

A review of the RCRA-VSQG list, as provided by EDR, and dated 12/16/2019 has revealed that there is 1 RCRA-VSQG site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
WATSONS FAMILY CLEAN EPA ID:: MSD985968544	1545 STATELINE ROAD	SSE 1/8 - 1/4 (0.237 mi.)	16	28

State- and tribal - equivalent NPL

TN SHWS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Department of Health & Environment's Promulgated Sites.

A review of the TN SHWS list, as provided by EDR, and dated 12/30/2019 has revealed that there is 1 TN SHWS site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
MEMPHIS PUBLIC WORKS Facility Id: 79604 Site Status: OPEN	***BLOCKS OF PITS RD***	***NNE 1/2 - 1 (0.729 mi.)***	***18***	***32***

EXECUTIVE SUMMARY

State and tribal leaking storage tank lists

TN LUST: A listing of leaking underground storage tank site locations.

A review of the TN LUST list, as provided by EDR, and dated 11/04/2019 has revealed that there is 1 TN LUST site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
OMS #15 Facility Id: 790983 Current Status: 8 Case Closed Current Status: 1a Completed Tank Closure	2610 E HOLMES RD	NW 1/8 - 1/4 (0.137 mi.)	D12	19

MS LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Environmental Quality's LUST Status Report.

A review of the MS LUST list, as provided by EDR, and dated 12/18/2019 has revealed that there is 1 MS LUST site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ALVIN E GILLES Status Code: Closed Facility Status: Inactive Facility Id: 2010	***990 STATE LINE ROAD***	***SSW 1/4 - 1/2 (0.419 mi.)***	***17***	***29***

State and tribal registered storage tank lists

TN UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Environment & Conservation's Facility and Tank Report.

A review of the TN UST list, as provided by EDR, and dated 11/04/2019 has revealed that there are 2 TN UST sites within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
PARK COMM MCKELLAR N Compartment Status: Permanently Out of Use Date Closed: 6/15/1990 Facility Id: 9791182	2684 HOLMES ROAD	NW 0 - 1/8 (0.087 mi.)	D9	15
OMS #15 Compartment Status: Permanently Out of Use Date Closed: 5/15/1997 Facility Id: 790983	***2610 EAST HOLEMS ROA***	***NW 1/8 - 1/4 (0.137 mi.)***	***D13***	***20***

State and tribal voluntary cleanup sites

TN SRP: The State Remediation Program (SRP) was established in 1994 within the Division of Solid Waste Management for the purpose of providing owners, prospective purchasers and other interested parties the means to voluntarily investigate, clean up or monitor contaminated sites not regulated under RCRA, CERCLA or the Tennessee Division of Underground Tanks (UST).

A review of the TN SRP list, as provided by EDR, and dated 12/30/2019 has revealed that there are 2 TN SRP sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
SES-31 EXTRACTION AR State Remediation Program Site Number: 79675 Active?: CLOSED	SOUTH OF 3025 EAST H	ENE 0 - 1/8 (0.082 mi.)	C7	14
SES -31 State Remediation Program Site Number: 79768 Active?: CLOSED	SOUTH OF HOLMES/EAST	ENE 0 - 1/8 (0.088 mi.)	C11	18

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Registered Storage Tanks

TN HIST UST: This database is no longer updated by the agency. It contains records and detail fields that the current UST database does not.

A review of the TN HIST UST list, as provided by EDR, and dated 11/04/2019 has revealed that there are 3 TN HIST UST sites within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
PARK COMM MCKELLAR N Tank Status: Permanently Out of Use Facility Id: 9-791182	2684 HOLMES ROAD	NW 0 - 1/8 (0.087 mi.)	D10	17
OMS #15 Facility Id: 790983 Facility Id: 0790983	***2610 EAST HOLEMS ROA***	***NW 1/8 - 1/4 (0.137 mi.)***	***D13***	***20***
OMS #15 Tank Status: Permanently Out of Use Facility Id: 0-790983	2610 EAST HOLEMS ROA	NW 1/8 - 1/4 (0.137 mi.)	D14	24

Other Ascertainable Records

RCRA NonGen / NLR: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA NonGen / NLR list, as provided by EDR, and dated 12/16/2019 has revealed that

there are 2 RCRA NonGen / NLR sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
TRANE CLIMATE SOLUTI EPA ID:: MSR000106542	***1560 EAST STATELINE***	***SSE 1/8 - 1/4 (0.227 mi.)***	***15***	***26***

Lower Elevation	Address	Direction / Distance	Map ID	Page
MEMPHIS LIGHT, GAS A EPA ID:: TNR000028761	2686 E. HOLMES ROAD	NW 0 - 1/8 (0.085 mi.)	D8	14

US MINES: Mines Master Index File. The source of this database is the Dept. of Labor, Mine Safety and Health Administration.

A review of the US MINES list, as provided by EDR, has revealed that there is 1 US MINES site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
CROSBY AL CONSTR CO Database: US MINES, Date of Government Version: 11/06/2019 Mine ID:: 4001451		0 - 1/8 (0.000 mi.)	A4	11

MINES MRDS: Mineral Resources Data System

A review of the MINES MRDS list, as provided by EDR, and dated 04/06/2018 has revealed that there are 4 MINES MRDS sites within approximately 0.001 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
DUDLEY ANDERSON PIT		0 - 1/8 (0.000 mi.)	B5	12
ANDERSON PIT		0 - 1/8 (0.000 mi.)	B6	13

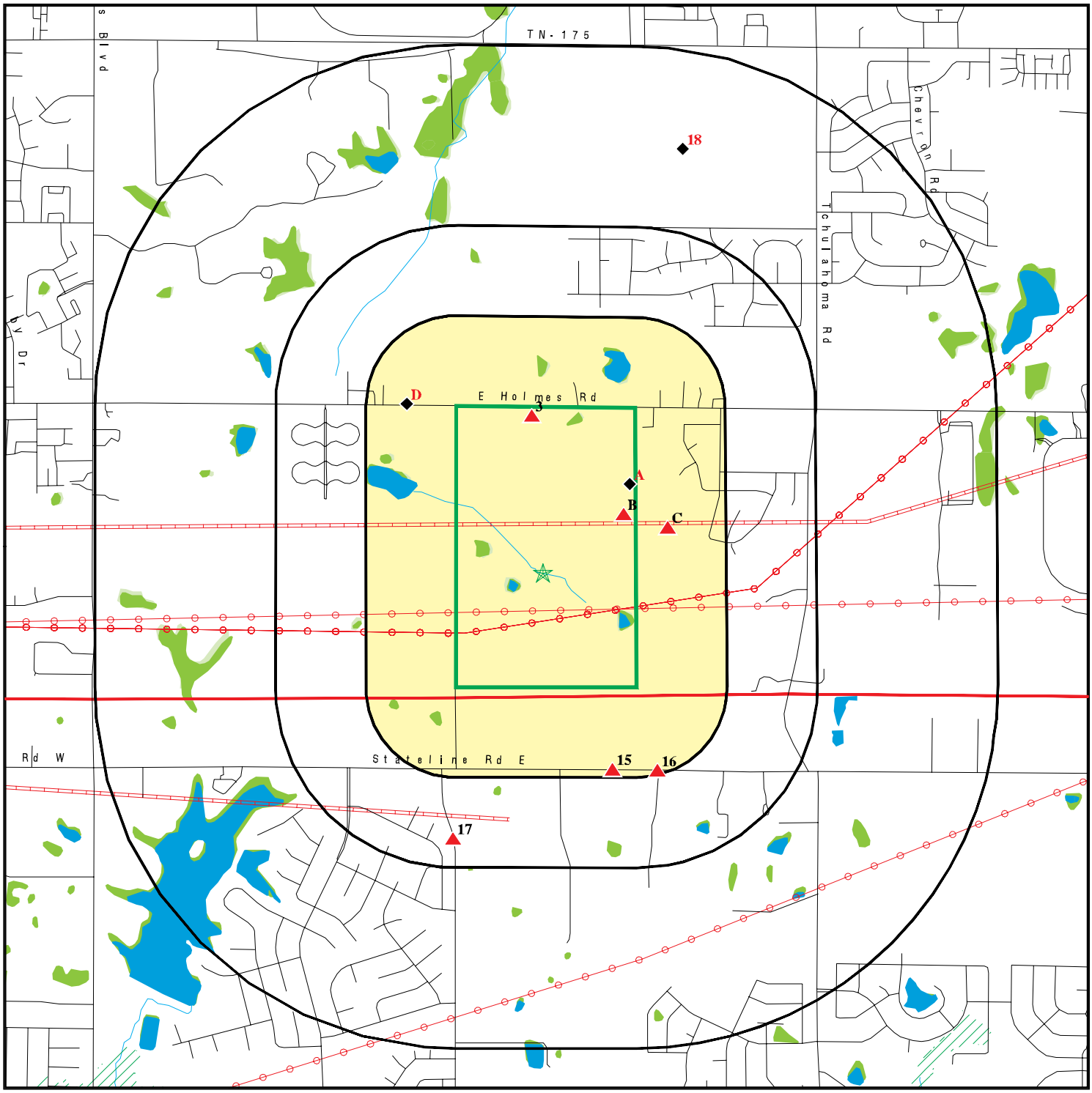
Lower Elevation	Address	Direction / Distance	Map ID	Page
DUDLEY ANDERSON PIT		0 - 1/8 (0.000 mi.)	A1	8
DUDLEY ANDERSON PIT		0 - 1/8 (0.000 mi.)	A2	9

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 11 records.

Site Name	Database(s)
THOMAS - AIRWAYS/HOLMES INDUSTRIAL	TN SWM COMPLAINTS
VACANT ROADSIDE PROPERTY	TN SWM COMPLAINTS
	TN SPILLS
	TN SPILLS
WATSON'S CLEANERS	MS DRYCLEANERS
MEMPHIS ABANDONED DRUM	SEMS
"MINCEY" HOLMES ROAD SUBDIVISION,	TN NPDES
HOLMES ROAD EXPANSION	TN NPDES
IMPROVEMENTS TO HOLMES ROAD	TN NPDES
HOLMES ROAD IMPROVEMENTS	TN NPDES
THIRD STREET AND HOLMES ROAD INTER	TN NPDES

OVERVIEW MAP - 6034858.2S

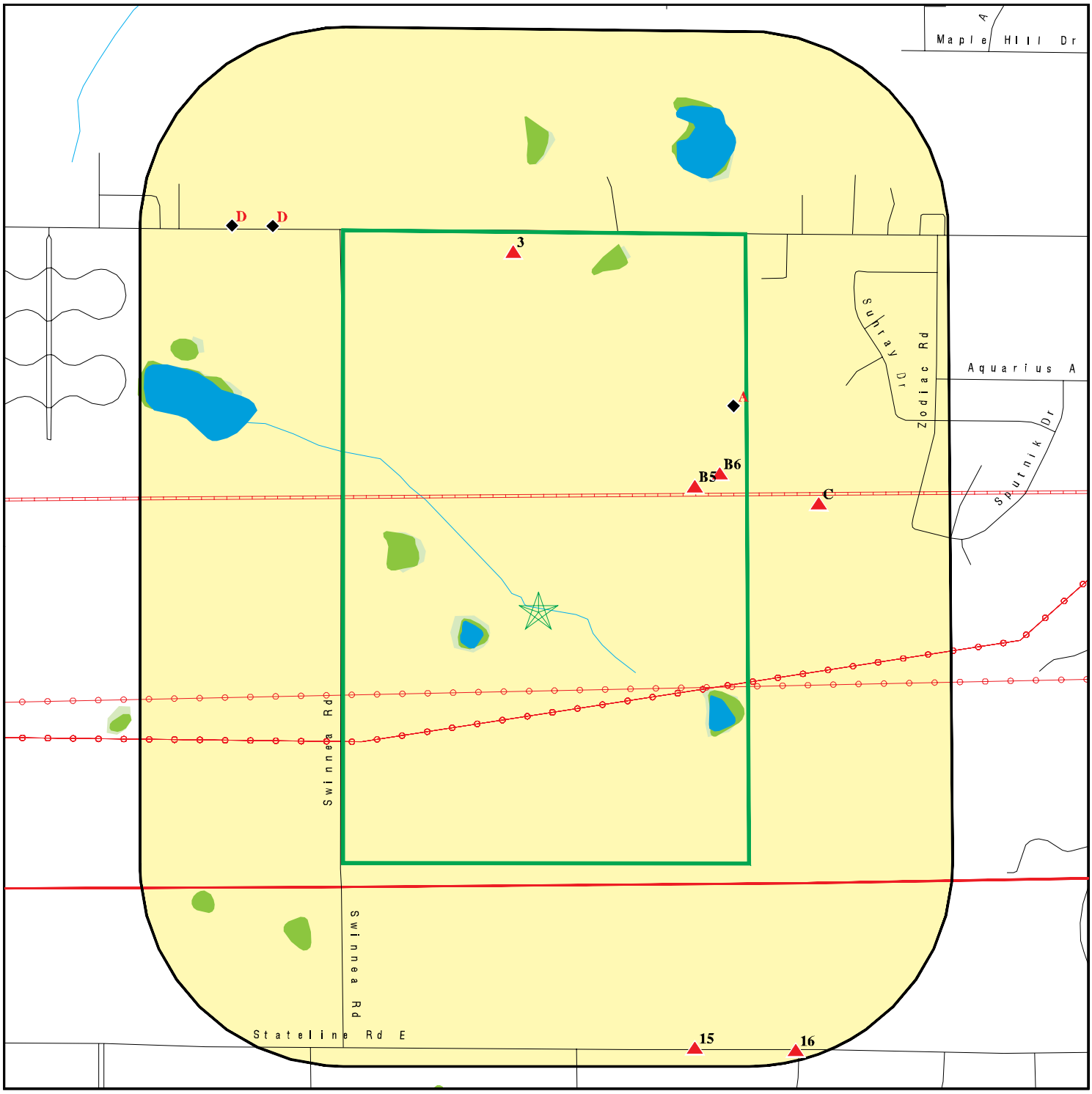


- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- County Boundary
- Power transmission lines
- Pipelines
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	MSCAA - Holmes Road EA	CLIENT:	ENSAFE
ADDRESS:	E Holmes Road Memphis TN 38118	CONTACT:	Velita Thornton
LAT/LONG:	34.999573 / 89.967926	INQUIRY #:	6034858.2s
		DATE:	April 08, 2020 9:16 am

DETAIL MAP - 6034858.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- County Boundary
- Power transmission lines
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- Special Flood Hazard Area (1%)
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- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: MSCAA - Holmes Road EA	CLIENT: ENSAFE
ADDRESS: E Holmes Road Memphis TN 38118	CONTACT: Velita Thornton
LAT/LONG: 34.999573 / 89.967926	INQUIRY #: 6034858.2s DATE: April 08, 2020 9:16 am

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		1	0	0	NR	NR	1
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-VSQG	0.250		0	1	NR	NR	NR	1
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROLS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	0.001		0	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
TN SHWS	1.000		0	0	0	1	NR	1
State- and tribal - equivalent CERCLIS								
MS SHWS	1.000		0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
TN SWF/LF	0.500		0	0	0	NR	NR	0
MS SWF/LF	0.500		0	0	0	NR	NR	0
TN SWM COMPLAINTS	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
TN LUST	0.500		0	1	0	NR	NR	1

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
MS LUST	0.500		0	0	1	NR	NR	1
INDIAN LUST	0.500		0	0	0	NR	NR	0
TN LUST TRUST	0.500		0	0	0	NR	NR	0
TN HIST_LUST CO	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
TN UST	0.250		1	1	NR	NR	NR	2
MS UST	0.250		0	0	NR	NR	NR	0
TN AST	0.250		0	0	NR	NR	NR	0
MS AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
TN ENG CONTROLS	0.500		0	0	0	NR	NR	0
MS ENG CONTROLS	0.500		0	0	0	NR	NR	0
TN INST CONTROL	0.500		0	0	0	NR	NR	0
MS INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
TN VCP	0.500		0	0	0	NR	NR	0
TN SRP	0.500		2	0	0	NR	NR	2
INDIAN VCP	0.500		0	0	0	NR	NR	0
MS VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
TN BROWNFIELDS	0.500		0	0	0	NR	NR	0
MS BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
TN SWRCY	0.500		0	0	0	NR	NR	0
MS SWRCY	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
TN CDL	0.001		0	NR	NR	NR	NR	0
TN PRIORITYCLEANERS	0.500		0	0	0	NR	NR	0
TN DEL SHWS	1.000		0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
US CDL	0.001		0	NR	NR	NR	NR	0
TN PFAS	0.500		0	0	0	NR	NR	0
Local Lists of Registered Storage Tanks								
TN HIST UST	0.250		1	2	NR	NR	NR	3
Local Land Records								
TN LIENS	0.001		0	NR	NR	NR	NR	0
LIENS 2	0.001		0	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0
TN SPILLS	0.001		0	NR	NR	NR	NR	0
TN SPILLS	0.001		0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		1	1	NR	NR	NR	2
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		1	0	NR	NR	NR	1
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0

Appendix F
Miscellaneous Supporting Documents

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
TN AIRS	0.001		0	NR	NR	NR	NR	0
MS AIRS	0.001		0	NR	NR	NR	NR	0
TN DRYCLEANERS	0.250		0	0	NR	NR	NR	0
MS DRYCLEANERS	0.250		0	0	NR	NR	NR	0
TN LEAD	0.001		0	NR	NR	NR	NR	0
TN NPDES	0.001		0	NR	NR	NR	NR	0
MS NPDES	0.001		0	NR	NR	NR	NR	0
TN VAPOR	0.500		0	0	0	NR	NR	0
MINES MRDS	0.001		4	NR	NR	NR	NR	4
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
TN RGA LF	0.001		0	NR	NR	NR	NR	0
MS RGA LF	0.001		0	NR	NR	NR	NR	0
TN RGA LUST	0.001		0	NR	NR	NR	NR	0
MS RGA LUST	0.001		0	NR	NR	NR	NR	0
- Totals --		0	11	6	1	1	0	19

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

A1 **DUDLEY ANDERSON PIT** **MINES MRDS** **1025568865**
N/A

< 1/8
1 ft. **MEMPHIS, TN 38118**

Site 1 of 3 in cluster A

Relative:
Lower

Actual:
345 ft.

MINES MRDS:

Name:	DUDLEY ANDERSON PIT
Address:	Not reported
Deposit identification Number:	10076012
City,State,Zip:	MEMPHIS, TENNESSEE 38118
URL:	https://mrdata.usgs.gov/mrds/show-mrds.php?dep_id=10076012
MRDS Identification Number:	W022891
MAS/MILS Identification Number:	Not reported
Region:	NA
Country:	United States
Primary Commodities:	Sand and Gravel, Construction
Secondary Commodities:	Not reported
Tertiary Commodities:	Not reported
Operation Type:	Unknown
Deposit Type:	Sedimentary
Production Size:	S - Small amount of material produced (we do not know what criteria are used to make this determination)
Development Status:	Past Producer
Ore Minerals or Materials:	Sand and Gravel
Gangue Minerals or Materials:	Not reported
Other Minerals or Materials:	Not reported
Ore Body Form:	Not reported
Workings Type:	Not reported
Mineral Deposit Model:	Not reported
Alteration Processes:	Not reported
Concentration Processes:	Not reported
Previous Names:	Not reported
Ore Controls:	Not reported
Reporter:	Unknown
Host Rock Unit Name:	Not reported
Host Rock Type:	Not reported
Associated Rock Unit Name:	Not reported
Associated Rock Type Code:	Not reported
Structural Characteristics:	Not reported
Tectonic Setting:	Not reported
References:	Not reported
First Production Year:	Not reported
Began Before/After FPY:	Not reported
Last Production Year:	Not reported
Ended Before/After LPY:	Not reported
Year Discovered:	Not reported
Found Before/After YD:	Not reported
Production History:	Not reported
Discovery Information:	Not reported
Latitude:	35.00317
Longitude:	-89.9637

A2 **DUDLEY ANDERSON PIT** **MINES MRDS** **1025704105**
N/A

< 1/8 **MEMPHIS, TN 38118**
1 ft.

Site 2 of 3 in cluster A

Relative: MINES MRDS:
Lower

Actual:
345 ft.

Name:	DUDLEY ANDERSON PIT
Address:	Not reported
Deposit identification Number:	10226902
City,State,Zip:	MEMPHIS, TENNESSEE 38118
URL:	https://mrdata.usgs.gov/mrds/show-mrds.php?dep_id=10226902
MRDS Identification Number:	W022891
MAS/MILS Identification Number:	0471570005
Region:	NA
Country:	United States
Primary Commodities:	Sand and Gravel, Construction
Secondary Commodities:	Not reported
Tertiary Commodities:	Not reported
Operation Type:	Surface
Deposit Type:	Not reported
Production Size:	Not reported
Development Status:	Past Producer
Ore Minerals or Materials:	Not reported
Gangue Minerals or Materials:	Not reported
Other Minerals or Materials:	Not reported
Ore Body Form:	Not reported
Workings Type:	Not reported
Mineral Deposit Model:	Not reported
Alteration Processes:	Not reported
Concentration Processes:	Not reported
Previous Names:	Al Crosby Construction Company
Ore Controls:	Not reported
Reporter:	Eastern Field Operations Center (EFOC)
Host Rock Unit Name:	Not reported
Host Rock Type:	Not reported
Associated Rock Unit Name:	Not reported
Associated Rock Type Code:	Not reported
Structural Characteristics:	Not reported
Tectonic Setting:	Not reported
References:	Not reported
First Production Year:	Not reported
Began Before/After FPY:	Not reported
Last Production Year:	Not reported
Ended Before/After LPY:	Not reported
Year Discovered:	Not reported
Found Before/After YD:	Not reported
Production History:	Not reported
Discovery Information:	Not reported
Latitude:	35.00321
Longitude:	-89.96369

3 **EXTRACTION AREA** **SEMS-ARCHIVE** **1003868632**
S OF HOLMES RD **TND980728182**
< 1/8 **MEMPHIS, TN 38111**
1 ft.

Relative:
Higher

Actual:
360 ft.

SEMS Archive:

Site ID:	0403968
EPA ID:	TND980728182
Name:	EXTRACTION AREA
Address:	S OF HOLMES RD
Address 2:	Not reported
City,State,Zip:	MEMPHIS, TN 38111
Cong District:	09
FIPS Code:	47157
FF:	N
NPL:	Not on the NPL
Non NPL Status:	NFRAP-Site does not qualify for the NPL based on existing information

SEMS Archive Detail:

Region:	04
Site ID:	0403968
EPA ID:	TND980728182
Site Name:	EXTRACTION AREA
NPL:	N
FF:	N
OU:	00
Action Code:	VS
Action Name:	ARCH SITE
SEQ:	1
Start Date:	Not reported
Finish Date:	1994-05-17 04:00:00
Qual:	Not reported
Current Action Lead:	EPA Perf In-Hse

Region:	04
Site ID:	0403968
EPA ID:	TND980728182
Site Name:	EXTRACTION AREA
NPL:	N
FF:	N
OU:	00
Action Code:	DS
Action Name:	DISCVRY
SEQ:	1
Start Date:	1980-04-01 05:00:00
Finish Date:	1980-04-01 05:00:00
Qual:	Not reported
Current Action Lead:	EPA Perf

Region:	04
Site ID:	0403968
EPA ID:	TND980728182
Site Name:	EXTRACTION AREA
NPL:	N
FF:	N
OU:	00
Action Code:	SI
Action Name:	SI
SEQ:	1
Start Date:	Not reported

EXTRACTION AREA (Continued) **1003868632**

Finish Date:	1980-09-01 04:00:00
Qual:	N
Current Action Lead:	EPA Perf
Region:	04
Site ID:	0403968
EPA ID:	TND980728182
Site Name:	EXTRACTION AREA
NPL:	N
FF:	N
OU:	00
Action Code:	PA
Action Name:	PA
SEQ:	1
Start Date:	Not reported
Finish Date:	1984-08-01 05:00:00
Qual:	L
Current Action Lead:	St Perf

A4 **CROSBY AL CONSTR CO** **US MINES** **1011223423**
N/A

< 1/8
1 ft.

SHELBY (County), TN

Site 3 of 3 in cluster A

Relative:
Lower

Actual:
349 ft.

US MINES:

Sic Code(s):	144200
Sic Code(s):	000000
Sic Code(s):	000000
Sic Code(s):	000000
Sic Code(s):	000000
Sic Code(s):	000000
Mine ID:	4001451
Entity Name:	DUDLEY ANDERSON PIT
Company:	CROSBY AL CONSTR CO
Status:	4
Status Date:	19790430
Operation Class:	2
Number of Shops:	0
Number of Plants:	0
Latitude Degree:	00
Longitude Degree:	000
Latitude Minute:	00
Latitude Seconds:	00
Longitude Minutes:	00
Longitude Seconds:	00
Number of Pits:	000

B5 **DUDLEY ANDERSON PIT** **MINES MRDS** **1025532214**
N/A

< 1/8 **MEMPHIS, TN 38118**
1 ft.

Site 1 of 2 in cluster B

Relative: **Higher**

Actual: **371 ft.**

MINES MRDS:

Name:	DUDLEY ANDERSON PIT
Address:	Not reported
Deposit identification Number:	10025661
City,State,Zip:	MEMPHIS, TENNESSEE 38118
URL:	https://mrdata.usgs.gov/mrds/show-mrds.php?dep_id=10025661
MRDS Identification Number:	K001575
MAS/MILS Identification Number:	Not reported
Region:	NA
Country:	United States
Primary Commodities:	Sand and Gravel, Construction
Secondary Commodities:	Not reported
Tertiary Commodities:	Not reported
Operation Type:	Unknown
Deposit Type:	Unconsolidated Sediments
Production Size:	Y - Yes, production has occurred
Development Status:	Producer
Ore Minerals or Materials:	Sand and Gravel
Gangue Minerals or Materials:	Not reported
Other Minerals or Materials:	Not reported
Ore Body Form:	Not reported
Workings Type:	Not reported
Mineral Deposit Model:	Not reported
Alteration Processes:	Not reported
Concentration Processes:	Not reported
Previous Names:	Not reported
Ore Controls:	Not reported
Reporter:	Fagan, James M.
Host Rock Unit Name:	Fluvial Deposits
Host Rock Type:	Alluvium
Associated Rock Unit Name:	Not reported
Associated Rock Type Code:	Not reported
Structural Characteristics:	Not reported
Tectonic Setting:	Not reported
References:	Not reported
First Production Year:	Not reported
Began Before/After FPY:	Not reported
Last Production Year:	Not reported
Ended Before/After LPY:	Not reported
Year Discovered:	Not reported
Found Before/After YD:	Not reported
Production History:	Not reported
Discovery Information:	Not reported
Latitude:	35.00178
Longitude:	-89.96453

B6 **ANDERSON PIT** **MINES MRDS** **1025771655**
N/A

< 1/8 **MEMPHIS, TN 38118**
1 ft.

Site 2 of 2 in cluster B

Relative: MINES MRDS:
Higher

Actual: Name: ANDERSON PIT
357 ft. Address: Not reported
Deposit identification Number: 10300075
City,State,Zip: MEMPHIS, TENNESSEE 38118
URL: https://mrdata.usgs.gov/mrds/show-mrds.php?dep_id=10300075
MRDS Identification Number: Not reported
MAS/MILS Identification Number: 0471570038
Region: NA
Country: United States
Primary Commodities: Sand and Gravel, Construction
Secondary Commodities: Not reported
Tertiary Commodities: Not reported
Operation Type: Surface
Deposit Type: Not reported
Production Size: Not reported
Development Status: Producer
Ore Minerals or Materials: Not reported
Gangue Minerals or Materials: Not reported
Other Minerals or Materials: Not reported
Ore Body Form: Not reported
Workings Type: Not reported
Mineral Deposit Model: Not reported
Alteration Processes: Not reported
Concentration Processes: Not reported
Previous Names: Not reported
Ore Controls: Not reported
Reporter: Eastern Field Operations Center (EFOC)
Host Rock Unit Name: Not reported
Host Rock Type: Not reported
Associated Rock Unit Name: Not reported
Associated Rock Type Code: Not reported
Structural Characteristics: Not reported
Tectonic Setting: Not reported
References: Not reported
First Production Year: Not reported
Began Before/After FPY: Not reported
Last Production Year: Not reported
Ended Before/After LPY: Not reported
Year Discovered: Not reported
Found Before/After YD: Not reported
Production History: Not reported
Discovery Information: Not reported
Latitude: 35.00201
Longitude: -89.96399

C7 **SES-31 EXTRACTION AREA** **TN SRP** **S123408914**
ENE **SOUTH OF 3025 EAST HOLMES ROAD** **N/A**
< 1/8 **MEMPHIS, TN**
0.082 mi.
431 ft. **Site 1 of 2 in cluster C**

Relative: **Higher**
Actual: **380 ft.**

SRP:

Name:	SES-31 EXTRACTION AREA
Address:	SOUTH OF 3025 EAST HOLMES ROAD
City,State,Zip:	MEMPHIS, TN
Site Control Number:	Not reported
EPAID:	TND980728182
State Remediation Program Site Number:	79675
Project Manager Initials:	Not reported
Field Office:	Not reported
Contaminants Of Concern:	Not reported
Active?:	CLOSED
Number Of Days In System:	Not reported
Program:	Not reported
Subprogram:	Not reported
Latitude:	35.001283
Longitude:	-89.961954
Acres:	Not reported

D8 **MEMPHIS LIGHT, GAS AND WATER DIVISION** **RCRA NonGen / NLR** **1012212108**
NW **2686 E. HOLMES ROAD** **TNR000028761**
< 1/8 **MEMPHIS, TN 38118**
0.085 mi.
450 ft. **Site 1 of 6 in cluster D**

Relative: **Lower**
Actual: **343 ft.**

RCRA NonGen / NLR:

Date form received by agency:	2017-10-19 00:00:00.0
Facility name:	MEMPHIS LIGHT, GAS AND WATER DIVISION
Facility address:	2686 E. HOLMES ROAD MEMPHIS, TN 38118
EPA ID:	TNR000028761
Mailing address:	P.O. BOX 430 MEMPHIS, TN 38118
Contact:	KERRY ROY
Contact address:	P.O. BOX 430 MEMPHIS, TN 38118
Contact country:	US
Contact telephone:	901-528-4194
Contact email:	Not reported
EPA Region:	04
Land type:	Municipal
Classification:	Non-Generator
Description:	Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:

Owner/operator name:	MLGW
Owner/operator address:	P.O.BOX 430 MEMPHIS, TN 38118
Owner/operator country:	US
Owner/operator telephone:	901-528-4194
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Municipal

MEMPHIS LIGHT, GAS AND WATER DIVISION (Continued) **1012212108**

Owner/Operator Type: Owner
Owner/Op start date: 1980-01-01 00:00:00.
Owner/Op end date: Not reported

Owner/operator name: MLGW
Owner/operator address: P.O.BOX 430
MEMPHIS, TN 38118
Owner/operator country: US
Owner/operator telephone: 901-528-4194
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Municipal
Owner/Operator Type: Operator
Owner/Op start date: 1980-01-01 00:00:00.
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 2009-11-23 00:00:00.0
Site name: MEMPHIS LIGHT, GAS AND WATER DIVISION
Classification: Small Quantity Generator

Hazardous Waste Summary:

. Waste code: D002
. Waste name: CORROSIVE WASTE

Violation Status: No violations found

D9 **PARK COMM MCKELLAR NURSERY** **TN UST** **U004174179**
NW **2684 HOLMES ROAD** **N/A**
< 1/8 **MEMPHIS, TN 38103**
0.087 mi.
457 ft. **Site 2 of 6 in cluster D**

Relative:
Lower

Actual:
344 ft.

UST:
Name: PARK COMM MCKELLAR NURSERY
Address: 2684 HOLMES ROAD
City,State,Zip: MEMPHIS, TN 38103
Facility ID: 9791182

PARK COMM MCKELLAR NURSERY (Continued) **U004174**

Facility Description:	Local Government
Owner ID:	308910
Owner Name:	CITY OF MEMPHIS/VEHICLE SERVICE CENTER
Owner Address:	ATTN: RUSSELL HEASTON
Owner Address 2:	671 ST. JUDE PLACE
Owner City,St,Zip:	MEMPHIS, TN 38105
Owner Description:	Local Government
Tank Number:	1
Tank ID:	50856
Tank Other Material:	Not reported
RSN Red Tagged:	Not reported
Fac Red Tagged:	N
Replacement:	Not reported
Compartment ID:	51599
Compartment Letter:	A
Compartment Status:	Permanently Out of Use
Compartment Capacity:	1000
Small Delivery:	Not reported
Tank RD:	Not reported
Substance Description:	Gasoline
Date Installed:	12/31/1899
Date Last Used:	6/15/1990
Date Closed:	6/15/1990
Regulated:	Not reported
Tank Material Desc:	Tank Construction Material Other or Unknown
Tank Mod Desc:	Inactive
Tank Emergency:	Tank LD No
Tank No Fee:	Not reported
Overfill Type:	Not reported
Overfill Device Installed:	Y
Spill Device Installed:	Y
Date Removed From Ground:	Not reported
Pipe Material Desc:	Hazardous Substance
Pipe Other Material:	Not reported
Pipe RD:	Not reported
Pipe Repaired:	Not reported
Flex Piping Type:	Not reported
Year Flex Piping Installed:	Not reported
Name:	PARK COMM MCKELLAR NURSERY
Address:	2684 HOLMES ROAD
City,State,Zip:	MEMPHIS, TN 38103
Tank Number:	2
Tank ID:	50857
Tank Other Material:	Not reported
RSN Red Tagged:	Not reported
Fac Red Tagged:	N
Replacement:	Not reported
Compartment ID:	51600
Compartment Letter:	A
Compartment Status:	Permanently Out of Use
Compartment Capacity:	1000
Small Delivery:	Not reported
Tank RD:	Not reported
Substance Description:	ULS Diesel

PARK COMM MCKELLAR NURSERY (Continued) **U004174179**

Date Installed:	12/31/1899
Date Last Used:	6/15/1990
Date Closed:	6/15/1990
Regulated:	Not reported
Tank Material Desc:	Tank Construction Material Other or Unknown
Tank Mod Desc:	Inactive
Tank Emergency:	Tank LD No
Tank No Fee:	Not reported
Overfill Type:	Not reported
Overfill Device Installed:	Y
Spill Device Installed:	Y
Date Removed From Ground:	Not reported
Pipe Material Desc:	Hazardous Substance
Pipe Other Material:	Not reported
Pipe RD:	Not reported
Pipe Repaired:	Not reported
Flex Piping Type:	Not reported
Year Flex Piping Installed:	Not reported

D10 **PARK COMM MCKELLAR NURSERY** **TN HIST UST** **U003618496**
NW **2684 HOLMES ROAD** **N/A**
< 1/8 **MEMPHIS, TN 38103**
0.087 mi.
457 ft. **Site 3 of 6 in cluster D**

Relative: HIST UST:
Lower

Actual:
344 ft.

Name:	PARK COMM MCKELLAR NURSERY
Address:	2684 HOLMES ROAD
City,State,Zip:	MEMPHIS, TN 38103
Facility ID:	9-791182
Facility Description:	Local Government
Owner ID:	1781
Owner Name:	CITY OF MEMPHIS/PROPERTY MAINT.
Owner Address:	281 East Pkwy. North
Owner City,St,Zip:	Memphis, TN 38112
Owner Telephone:	(901) 272-1360
Owner Description:	Local Government
Tank ID:	2
Tank Status:	**Permanently Out of Use**
Tank Capacity:	1000
Tank Contents:	Diesel
Tank Material:	Unknown
Tank 2ndary Trait:	None
Tank Manual Gauge:	False
Tank Tightness:	False
Tank Inventory Control:	False
Tank ATG:	False
Tank Vapor Monitor:	False
Tank Groundwater Monitor:	False
Tank Double Walled:	False
Tank 2nd Contained:	False
Tank SIR:	False
Overfill Installed:	False
Spill Installed:	False
Cathodic Protection:	False
Date Installed:	/ /
Tank Leak Detection Listed:	True

PARK COMM MCKELLAR NURSERY (Continued) **U003618496**

Pipe Material:	Unknown
Pipe Other Material:	None
Pipe Type:	Not Listed
Pipe Auto Line Leak Detect.:	False
Pipe Leak Detection Listed:	False
Pipe Vapor Monitor:	False
Pipe Groundwater Monitor:	False
Pipe Dbl Walled:	Not reported
Pipe 2nd Contained:	False
Pipe SIR:	False
Pipe Leak Detection Listed:	True

Tank ID:	1
Tank Status:	**Permanently Out of Use**
Tank Capacity:	1000
Tank Contents:	Gasoline
Tank Material:	Unknown
Tank 2ndary Trait:	None
Tank Manual Gauge:	False
Tank Tightness:	False
Tank Inventory Control:	False
Tank ATG:	False
Tank Vapor Monitor:	False
Tank Groundwater Monitor:	False
Tank Double Walled:	False
Tank 2nd Contained:	False
Tank SIR:	False
Overfill Installed:	False
Spill Installed:	False
Cathodic Protection:	False
Date Installed:	/ /
Tank Leak Detection Listed:	True
Pipe Material:	Unknown
Pipe Other Material:	None
Pipe Type:	Not Listed
Pipe Auto Line Leak Detect.:	False
Pipe Leak Detection Listed:	False
Pipe Vapor Monitor:	False
Pipe Groundwater Monitor:	False
Pipe Dbl Walled:	Not reported
Pipe 2nd Contained:	False
Pipe SIR:	False
Pipe Leak Detection Listed:	True

C11 **SES -31** **TN SRP** **S123408909**
ENE **SOUTH OF HOLMES/EAST OF SWINNEA/WEST OF TCHULAHOMA** **N/A**
< 1/8 **MEMPHIS, TN**
0.088 mi.
464 ft. **Site 2 of 2 in cluster C**

Relative:
Higher

Actual:
377 ft.

SRP:

Name:	SES -31
Address:	SOUTH OF HOLMES/EAST OF SWINNEA/WEST OF TCHULAHOMA
City,State,Zip:	MEMPHIS, TN
Site Control Number:	Not reported
EPAID:	TND051386258
State Remediation Program Site Number:	79768

SES -31 (Continued) **S123408909**

Project Manager Initials:	Not reported
Field Office:	Not reported
Contaminants Of Concern:	Not reported
Active?:	CLOSED
Number Of Days In System:	Not reported
Program:	Not reported
Subprogram:	Not reported
Latitude:	35.001471
Longitude:	-89.961846
Acres:	Not reported

D12 **OMS #15** **TN LUST** **S107464682**
NW **2610 E HOLMES RD** **N/A**
1/8-1/4 **MEMPHIS, TN 38118**
0.137 mi.
721 ft. **Site 4 of 6 in cluster D**

Relative: **Lower**

Actual: **350 ft.**

LUST:

Name:	OMS #15
Address:	2610 E HOLMES RD
City,State,Zip:	MEMPHIS, TN 38118
Region:	STATE
Facility Id:	790983
Current Status:	8 Case Closed
Product Released:	Not reported
Discovery Date:	MAR-13-1997
How Discovered:	1 At Closure
Cause:	7 Unknown
Case Manager:	Not reported
Case Description:	Active case from Closure.
Section:	Not reported
Priority:	Not reported
Company Name:	HEADQUARTERS (AGTN-CFMO)
Owner Address:	Not reported
Owner City:	Not reported
Owner State:	Not reported
Owner Zip Code:	Not reported
Owner Telephone:	Not reported
Owner Address 2:	Not reported
fadd2:	Not reported
Site Number:	1
Contact:	Not reported
Cac Contact:	Not reported
Contact Title:	Not reported
Consultant Address 1:	Not reported
Consultant Address 2:	Not reported
Contact City:	Not reported
Contact State:	Not reported
Contact Phone:	Not reported
Contact zip:	Not reported
Cac Type:	Not reported

Name:	OMS #15
Address:	2610 E HOLMES RD
City,State,Zip:	MEMPHIS, TN 38118
Region:	STATE
Facility Id:	790983
Current Status:	1a Completed Tank Closure

OMS #15 (Continued) **S107464682**

Product Released:	Not reported
Discovery Date:	Not reported
How Discovered:	1 At Closure
Cause:	7 Unknown
Case Manager:	Not reported
Case Description:	Tank Closure; See case No 1 for Active Case
Section:	Not reported
Priority:	Not reported
Company Name:	HEADQUARTERS TN ARMY
Owner Address:	Not reported
Owner City:	Not reported
Owner State:	Not reported
Owner Zip Code:	Not reported
Owner Telephone:	Not reported
Owner Address 2:	Not reported
fadd2:	Not reported
Site Number:	2
Contact:	Not reported
Cac Contact:	Not reported
Contact Title:	Not reported
Consultant Address 1:	Not reported
Consultant Address 2:	Not reported
Contact City:	Not reported
Contact State:	Not reported
Contact Phone:	Not reported
Contact zip:	Not reported
Cac Type:	Not reported

D13 **OMS #15** **TN UST** **U004162820**
NW **2610 EAST HOLEMS ROAD** **TN HIST UST** **N/A**
1/8-1/4 **MEMPHIS, TN 38118**
0.137 mi.
721 ft. **Site 5 of 6 in cluster D**

Relative: UST:
Lower

Actual:
350 ft.

Name:	OMS #15
Address:	2610 EAST HOLEMS ROAD
City,State,Zip:	MEMPHIS, TN 38118
Facility ID:	790983
Facility Description:	Federal Military
Owner ID:	300012
Owner Name:	HDQS TN ARMY NAT GUARD
Owner Address:	3041 SIDCO DRIVE
Owner Address 2:	ATT:AGTN-DFE, CPT. HOUSTON BARRACKS
Owner City,St,Zip:	NASHVILLE, TN 37204
Owner Description:	State Government
Tank Number:	1
Tank ID:	2144
Tank Other Material:	Not reported
RSN Red Tagged:	Not reported
Fac Red Tagged:	N
Replacement:	Not reported
Compartment ID:	2154
Compartment Letter:	A
Compartment Status:	Permanently Out of Use
Compartment Capacity:	6000
Small Delivery:	Not reported

OMS #15 (Continued) **U004162820**

Tank RD:	Not reported
Substance Description:	ULS Diesel
Date Installed:	4/30/1982
Date Last Used:	2/12/1997
Date Closed:	5/15/1997
Regulated:	Not reported
Tank Material Desc:	Fiberglass Reinforced Plastic
Tank Mod Desc:	Inactive
Tank Emergency:	Manual Tan
Tank No Fee:	Not reported
Overfill Type:	Not reported
Overfill Device Installed:	Y
Spill Device Installed:	Y
Date Removed From Ground:	Not reported
Pipe Material Desc:	Steel
Pipe Other Material:	Not reported
Pipe RD:	Not reported
Pipe Repaired:	Not reported
Flex Piping Type:	Not reported
Year Flex Piping Installed:	Not reported

Name:	OMS #15
Address:	2610 EAST HOLEMS ROAD
City,State,Zip:	MEMPHIS, TN 38118

Tank Number:	2
Tank ID:	2145
Tank Other Material:	Not reported
RSN Red Tagged:	Not reported
Fac Red Tagged:	N
Replacement:	Not reported
Compartment ID:	2155
Compartment Letter:	A
Compartment Status:	Permanently Out of Use
Compartment Capacity:	6000
Small Delivery:	Not reported
Tank RD:	Not reported
Substance Description:	Gasoline
Date Installed:	4/30/1982
Date Last Used:	2/12/1997
Date Closed:	5/15/1997
Regulated:	Not reported
Tank Material Desc:	Fiberglass Reinforced Plastic
Tank Mod Desc:	Inactive
Tank Emergency:	Manual Tan
Tank No Fee:	Not reported
Overfill Type:	Not reported
Overfill Device Installed:	Y
Spill Device Installed:	Y
Date Removed From Ground:	Not reported
Pipe Material Desc:	Steel
Pipe Other Material:	Not reported
Pipe RD:	Not reported
Pipe Repaired:	Not reported
Flex Piping Type:	Not reported
Year Flex Piping Installed:	Not reported

OMS #15 (Continued) **U004162820**

HIST UST:

Name:	OMS #15
Address:	2610 EAST HOLEMS ROAD
City,State,Zip:	MEMPHIS, TN 38118
Facility ID:	790983
Facility Description:	Federal Military
Owner ID:	300012
Owner Name:	HDQS TN ARMY NAT GUARD
Owner Address:	ATT:AGTN-DFE, CPT. HOUSTON BARRACKS
Owner City,St,Zip:	NASHVILLE, TN 37204
Owner Telephone:	Not reported
Owner Description:	State Government
Tank ID:	2144
Tank Status:	**Not reported**
Tank Capacity:	6000
Tank Contents:	Diesel
Tank Material:	Fiberglass Reinforced Plastic
Tank 2ndary Trait:	None
Tank Manual Gauge:	Not reported
Tank Tightness:	Not reported
Tank Inventory Control:	Not reported
Tank ATG:	Not reported
Tank Vapor Monitor:	Not reported
Tank Groundwater Monitor:	Not reported
Tank Double Walled:	Not reported
Tank 2nd Contained:	Not reported
Tank SIR:	Not reported
Overfill Installed:	Not reported
Spill Installed:	No
Cathodic Protection:	Not reported
Date Installed:	APR-30-1982
Tank Leak Detection Listed:	Not reported
Pipe Material:	Galvanized Steel
Pipe Other Material:	Not reported
Pipe Type:	Not reported
Pipe Auto Line Leak Detect.:	Not reported
Pipe Leak Detection Listed:	Not reported
Pipe Vapor Monitor:	Not reported
Pipe Groundwater Monitor:	Not reported
Pipe Dbl Walled:	Not reported
Pipe 2nd Contained:	Not reported
Pipe SIR:	Not reported
Pipe Leak Detection Listed:	Not reported

Tank ID:	2145
Tank Status:	**Not reported**
Tank Capacity:	6000
Tank Contents:	Gasoline
Tank Material:	Fiberglass Reinforced Plastic
Tank 2ndary Trait:	Lined Interior
Tank Manual Gauge:	Not reported
Tank Tightness:	Not reported
Tank Inventory Control:	Not reported
Tank ATG:	Not reported
Tank Vapor Monitor:	Not reported

OMS #15 (Continued) **U004162820**

Tank Groundwater Monitor:	Not reported
Tank Double Walled:	Not reported
Tank 2nd Contained:	Not reported
Tank SIR:	Not reported
Overfill Installed:	Not reported
Spill Installed:	No
Cathodic Protection:	Not reported
Date Installed:	APR-30-1982
Tank Leak Detection Listed:	Not reported
Pipe Material:	Galvanized Steel
Pipe Other Material:	Not reported
Pipe Type:	Not reported
Pipe Auto Line Leak Detect.:	Not reported
Pipe Leak Detection Listed:	Not reported
Pipe Vapor Monitor:	Not reported
Pipe Groundwater Monitor:	Not reported
Pipe Dbl Walled:	Not reported
Pipe 2nd Contained:	Not reported
Pipe SIR:	Not reported
Pipe Leak Detection Listed:	Not reported

Tank ID:	2144
Tank Status:	**Not reported**
Tank Capacity:	6000
Tank Contents:	Diesel
Tank Material:	Fiberglass Reinforced Plastic
Tank 2ndary Trait:	None
Tank Manual Gauge:	Not reported
Tank Tightness:	Not reported
Tank Inventory Control:	Not reported
Tank ATG:	Not reported
Tank Vapor Monitor:	Not reported
Tank Groundwater Monitor:	Not reported
Tank Double Walled:	Not reported
Tank 2nd Contained:	Not reported
Tank SIR:	Not reported
Overfill Installed:	Not reported
Spill Installed:	No
Cathodic Protection:	Not reported
Date Installed:	APR-30-1982
Tank Leak Detection Listed:	Not reported
Pipe Material:	Galvanized Steel
Pipe Other Material:	Not reported
Pipe Type:	Not reported
Pipe Auto Line Leak Detect.:	Not reported
Pipe Leak Detection Listed:	Not reported
Pipe Vapor Monitor:	Not reported
Pipe Groundwater Monitor:	Not reported
Pipe Dbl Walled:	Not reported
Pipe 2nd Contained:	Not reported
Pipe SIR:	Not reported
Pipe Leak Detection Listed:	Not reported

Tank ID:	2145
Tank Status:	**Not reported**

OMS #15 (Continued) **U004162820**

Tank Capacity:	6000
Tank Contents:	Gasoline
Tank Material:	Fiberglass Reinforced Plastic
Tank 2ndary Trait:	Lined Interior
Tank Manual Gauge:	Not reported
Tank Tightness:	Not reported
Tank Inventory Control:	Not reported
Tank ATG:	Not reported
Tank Vapor Monitor:	Not reported
Tank Groundwater Monitor:	Not reported
Tank Double Walled:	Not reported
Tank 2nd Contained:	Not reported
Tank SIR:	Not reported
Overfill Installed:	Not reported
Spill Installed:	No
Cathodic Protection:	Not reported
Date Installed:	APR-30-1982
Tank Leak Detection Listed:	Not reported
Pipe Material:	Galvanized Steel
Pipe Other Material:	Not reported
Pipe Type:	Not reported
Pipe Auto Line Leak Detect.:	Not reported
Pipe Leak Detection Listed:	Not reported
Pipe Vapor Monitor:	Not reported
Pipe Groundwater Monitor:	Not reported
Pipe Dbl Walled:	Not reported
Pipe 2nd Contained:	Not reported
Pipe SIR:	Not reported
Pipe Leak Detection Listed:	Not reported

D14 **OMS #15** **TN HIST UST** **U003608790**
NW **2610 EAST HOLEMS ROAD** **N/A**
1/8-1/4 **MEMPHIS, TN 38118**
0.137 mi.
721 ft. **Site 6 of 6 in cluster D**

Relative: **Lower**
Actual: **350 ft.**

HIST UST:

Name:	OMS #15
Address:	2610 EAST HOLEMS ROAD
City,State,Zip:	MEMPHIS, TN 38118
Facility ID:	0-790983
Facility Description:	Federal Military
Owner ID:	12491
Owner Name:	HDQS TN ARMY/NAT GUARD
Owner Address:	ATT:AGTN-DFE, Cpt. Houston Barracks 3041 Sidco Drive
Owner City,St,Zip:	Nashville, TN 37204
Owner Telephone:	(615) 532-3376
Owner Description:	State Government
Tank ID:	2
Tank Status:	**Permanently Out of Use**
Tank Capacity:	6000
Tank Contents:	Gasoline
Tank Material:	Fiberglass Reinforced Plastic
Tank 2ndary Trait:	Lined Interior
Tank Manual Gauge:	False
Tank Tightness:	True
Tank Inventory Control:	False

OMS #15 (Continued) **U003608790**

Tank ATG:	False
Tank Vapor Monitor:	False
Tank Groundwater Monitor:	False
Tank Double Walled:	False
Tank 2nd Contained:	False
Tank SIR:	False
Overfill Installed:	False
Spill Installed:	False
Cathodic Protection:	False
Date Installed:	04/30/1982
Tank Leak Detection Listed:	False
Pipe Material:	Galvanized Steel
Pipe Other Material:	None
Pipe Type:	Not Listed
Pipe Auto Line Leak Detect.:	False
Pipe Leak Detection Listed:	False
Pipe Vapor Monitor:	False
Pipe Groundwater Monitor:	False
Pipe Dbl Walled:	Not reported
Pipe 2nd Contained:	False
Pipe SIR:	False
Pipe Leak Detection Listed:	True

Tank ID:	1
Tank Status:	**Permanently Out of Use**
Tank Capacity:	6000
Tank Contents:	Diesel
Tank Material:	Fiberglass Reinforced Plastic
Tank 2ndary Trait:	None
Tank Manual Gauge:	False
Tank Tightness:	True
Tank Inventory Control:	False
Tank ATG:	False
Tank Vapor Monitor:	False
Tank Groundwater Monitor:	False
Tank Double Walled:	False
Tank 2nd Contained:	False
Tank SIR:	False
Overfill Installed:	False
Spill Installed:	False
Cathodic Protection:	False
Date Installed:	04/30/1982
Tank Leak Detection Listed:	False
Pipe Material:	Galvanized Steel
Pipe Other Material:	None
Pipe Type:	Not Listed
Pipe Auto Line Leak Detect.:	False
Pipe Leak Detection Listed:	False
Pipe Vapor Monitor:	False
Pipe Groundwater Monitor:	False
Pipe Dbl Walled:	Not reported
Pipe 2nd Contained:	False
Pipe SIR:	False
Pipe Leak Detection Listed:	True

15
SSE
1/8-1/4
0.227 mi.
1197 ft.

TRANE CLIMATE SOLUTIONS
1560 EAST STATELINE ROAD
SOUTHAVEN, MS 38671

RCRA NonGen / NLR
FINDS
ECHO

1016453781
MSR000106542

Relative:
Higher

Actual:
385 ft.

RCRA NonGen / NLR:

Date form received by agency:	2016-08-30 00:00:00.0
Facility name:	TRANE CLIMATE SOLUTIONS
Facility address:	1560 EAST STATELINE ROAD SOUTHAVEN, MS 38671
EPA ID:	MSR000106542
Contact:	JASON GROHOSKI
Contact address:	1560 EAST STATELINE ROAD SOUTHAVEN, MS 38671
Contact country:	US
Contact telephone:	662-470-2039
Contact email:	JASON.GROHOSKI@IRCO.COM
EPA Region:	04
Land type:	Private
Classification:	Non-Generator
Description:	Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:

Owner/operator name:	INGERSOLL RAND
Owner/operator address:	800 EAST BEATY STREET DAVIDSON, NC 28036
Owner/operator country:	US
Owner/operator telephone:	704-655-4000
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	2013-12-05 00:00:00.
Owner/Op end date:	Not reported

Owner/operator name:	TRANE CLIMATE SOLUTIONS
Owner/operator address:	1560 EAST STATELINE ROAD SOUTHAVEN, MS 38671
Owner/operator country:	US
Owner/operator telephone:	662-470-2039
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	2013-12-05 00:00:00.
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No

TRANE CLIMATE SOLUTIONS (Continued) **1016453781**

Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 2013-12-05 00:00:00.0
Site name: TRANE CLIMATE SOLUTIONS
Classification: Small Quantity Generator

Hazardous Waste Summary:

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D005
. Waste name: BARIUM

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: D039
. Waste name: TETRACHLOROETHYLENE

. Waste code: D040
. Waste name: TRICHLORETHYLENE

Violation Status: No violations found

FINDS:
Registry ID: 110056513651
Facility URL: http://ofmpub.epa.gov/enviro/fii_query_detail.disp_program_facility?p_registry_id=110056513651

Environmental Interest/Information System:
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

ECHO:
Envid: 1016453781
Registry ID: 110056513651
DFR URL: http://echo.epa.gov/detailed-facility-report?fid=110056513651
Name: TRANE CLIMATE SOLUTIONS
Address: 1560 EAST STATELINE ROAD

TRANE CLIMATE SOLUTIONS (Continued) **1016453781**

City,State,Zip: SOUTHAVEN, MS 38671

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16 **WATSONS FAMILY CLEANERS** **RCRA-VSQG** **1004743061**
SSE **1545 STATELINE ROAD** **MSD985968544**
1/8-1/4 **SOUTHAVEN, MS 38671**
0.237 mi.
1250 ft.

Relative:
Higher

Actual:
402 ft.

RCRA-VSQG:

Date form received by agency:	1990-09-19 00:00:00.0
Facility name:	WATSONS FAMILY CLEANERS
Facility address:	1545 STATELINE ROAD SOUTHAVEN, MS 38671
EPA ID:	MSD985968544
Mailing address:	STATELINE ROAD SOUTHAVEN, MS 38671
Contact:	GENE WATSON
Contact address:	1545 STATELINE ROAD SOUTHAVEN, MS 38671
Contact country:	US
Contact telephone:	601-393-6666
Contact email:	Not reported
EPA Region:	04
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name:	GENE WATSON
Owner/operator address:	1545 STATELINE ROAD SOUTHAVEN, MS 38671
Owner/operator country:	Not reported
Owner/operator telephone:	601-393-6666
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No

WATSONS FAMILY CLEANERS (Continued) **1004743061**

Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Hazardous Waste Summary:

. Waste code:	F002
. Waste name:	THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Violation Status:	No violations found

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17 **ALVIN E GILLES** **MS LUST U001298097**
SSW **990 STATE LINE ROAD** **MS UST N/A**
1/4-1/2 **SOUTHAVEN, MS 38671**
0.419 mi.
2210 ft.

Relative:
Higher

Actual:
366 ft.

LUST:

Name:	ALVIN E GILLES
Address:	990 STATE LINE ROAD
City,State,Zip:	SOUTHAVEN, MS 38671
Facility Id:	2010
Facility Satus:	Inactive
Lust Status:	Closed
AIID:	34101
Event #:	1
Project Manager:	Lynn Chambers
Date Of Report:	05/18/1988
Trust Fund Status:	NTFE
Confirmed On:	05/18/1988
NFA Date:	06/30/1998

UST:

Name:	Alvin E Gilles
Address:	990 State Line Road
City:	Southaven
Facility ID:	2010
Facility Status:	Inactive
Latitude:	34 59’ 30.9400"
Longitude:	89 58’ 20.3200"
Permanently Out of Use Tanks:	5

ALVIN E GILLES (Continued) **U001298097**

Active Tanks:	0
AIID:	34101
Owner Name:	Alvin E Gilles
Owner Address:	PO Box 205
Owner Tele:	(662)342-0989

Tank:

Tank No:	1
Tank ID:	4566
Tank Status:	**Permanently Out of Use**
Tank Capacity:	6000
Date Installed:	01/01/1970
Substance:	Gasoline
Reported Release:	Yes
Close Type:	Closed
Date Removed:	01/01/1988
Close Type:	01/01/1988
Tank Material:	Asphalt Coated or Bare Steel
2nd Containmnt:	None
Tank Lead Detection:	N/A
Overfill Protection:	No
Spill Prevention:	No

Pipe:

Tank No:	1
Tank Id:	4566
Pipe Id:	1
Pipe Status:	Permanently Out of Use
Type Of Closure:	Closed
Pipe Material Construction:	Bare/Galvanized Steel
Secondary Pipe Material:	None
Piping Type:	N/A
Pipe Leak Detection:	Not Listed

Tank:

Tank No:	2
Tank ID:	4567
Tank Status:	**Permanently Out of Use**
Tank Capacity:	6000
Date Installed:	01/01/1970
Substance:	Gasoline
Reported Release:	Yes
Close Type:	Closed
Date Removed:	01/01/1988
Close Type:	01/01/1988
Tank Material:	Asphalt Coated or Bare Steel
2nd Containmnt:	None
Tank Lead Detection:	N/A
Overfill Protection:	No
Spill Prevention:	No

Pipe:

Tank No:	2
Tank Id:	4567
Pipe Id:	2

ALVIN E GILLES (Continued) **U001298097**

Pipe Status:	Permanently Out of Use
Type Of Closure:	Closed
Pipe Material Construction:	Bare/Galvanized Steel
Secondary Pipe Material:	None
Piping Type:	N/A
Pipe Leak Detection:	Not Listed

Tank:

Tank No:	3
Tank ID:	4568
Tank Status:	**Permanently Out of Use**
Tank Capacity:	6000
Date Installed:	01/01/1970
Substance:	Gasoline
Reported Release:	Yes
Close Type:	Closed
Date Removed:	01/01/1988
Close Type:	01/01/1988
Tank Material:	Asphalt Coated or Bare Steel
2nd Containmnt:	None
Tank Lead Detection:	N/A
Overfill Protection:	No
Spill Prevention:	No

Pipe:

Tank No:	3
Tank Id:	4568
Pipe Id:	3
Pipe Status:	Permanently Out of Use
Type Of Closure:	Closed
Pipe Material Construction:	Bare/Galvanized Steel
Secondary Pipe Material:	None
Piping Type:	N/A
Pipe Leak Detection:	Not Listed

Tank:

Tank No:	4
Tank ID:	4569
Tank Status:	**Permanently Out of Use**
Tank Capacity:	6000
Date Installed:	01/01/1970
Substance:	Gasoline
Reported Release:	Yes
Close Type:	Closed
Date Removed:	01/01/1988
Close Type:	01/01/1988
Tank Material:	Asphalt Coated or Bare Steel
2nd Containmnt:	None
Tank Lead Detection:	N/A
Overfill Protection:	No
Spill Prevention:	No

Pipe:

ALVIN E GILLES (Continued) **U001298097**

Tank No:	4
Tank Id:	4569
Pipe Id:	4
Pipe Status:	Permanently Out of Use
Type Of Closure:	Closed
Pipe Material Construction:	Bare/Galvanized Steel
Secondary Pipe Material:	None
Piping Type:	N/A
Pipe Leak Detection:	Not Listed

Tank:

Tank No:	5
Tank ID:	4570
Tank Status:	**Permanently Out of Use**
Tank Capacity:	500
Date Installed:	Not reported
Substance:	Used Oil
Reported Release:	Yes
Close Type:	Closed
Date Removed:	08/25/1994
Close Type:	08/25/1994
Tank Material:	Unknown
2nd Containmnt:	None
Tank Lead Detection:	N/A
Overfill Protection:	No
Spill Prevention:	No

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18 **MEMPHIS PUBLIC WORKS/JACKSON PITS** **TN SHWS** **S122524184**
NNE **BLOCKS OF PITS RD** **TN SRP** **N/A**
1/2-1 **MEMPHIS, TN** **TN VAPOR**
0.729 mi.
3849 ft.

Relative:
Lower

Actual:
337 ft.

SHWS:

Name:	MEMPHIS PUBLIC WORKS/JACKSON PITS
Address:	BLOCKS OF PITS RD
City,State,Zip:	MEMPHIS, TN
Facility ID:	79604
Status:	**OPEN**
Federal:	No
Promulgated Date:	05/23/1985
Promulgated List:	Y
Acres:	120
DOR EFO:	MEMPHIS
Latitude:	35.01667
Longitude:	-89.96111

SRP:

Name:	MEMPHIS PUBLIC WORKS/JACKSON PITS
Address:	BLOCKS OF PITS RD
City,State,Zip:	MEMPHIS, TN
Site Control Number:	Not reported
EPAID:	TND980709455
State Remediation Program Site Number:	79604
Project Manager Initials:	Not reported

MEMPHIS PUBLIC WORKS/JACKSON PITS (Continued) **S122524184**

Field Office:	Not reported
Contaminants Of Concern:	Not reported
Active?:	OPEN
Number Of Days In System:	Not reported
Program:	Not reported
Subprogram:	Not reported
Latitude:	35.01667
Longitude:	-89.96111
Acres:	120

VAPOR:

Site Status:	Open
COC Type:	VOCs/SVOCs
Known COC:	TETRACHLOROETHYLENE (PCE)
COC Media:	Groundwater; Soil
Control Type:	Engineering
Control Description:	Engineering Controls
Section:	State
Monitoring Required:	Yes
Control Latitude:	35.017
Control Longitude:	-89.959
Latitude:	35.01667
Longitude:	-89.96111

Count: 11 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
MEMPHIS	S114526070	"MINCEY" HOLMES ROAD SUBDIVISION,	+/- 775 FEET EAST OF THE INTER	38118	TN NPDES
MEMPHIS	S108322417		FORREST HILL IRENE AT HOLMES		TN SPILLS
MEMPHIS	S123318999	THOMAS - AIRWAYS/HOLMES INDUSTRIAL	2353 EAST HOLES ROAD(FORMERLY)		TN SWM COMPLAINTS
MEMPHIS	S117556679	HOLMES ROAD EXPANSION	HOLMES RD BETWEEN TCHULAHOMA R		TN NPDES
MEMPHIS	S111817409	IMPROVEMENTS TO HOLMES ROAD	HOLMES RD FROM LAMAR AVE TO JU		TN NPDES
MEMPHIS	S111818655	HOLMES ROAD IMPROVEMENTS	HOLMES ROAD FROM EAST OF TCHUL		TN NPDES
MEMPHIS	S111819870	THIRD STREET AND HOLMES ROAD INTER	INTERSECTION OF SOUTH THIRD (U		TN NPDES
MEMPHIS	S123323219	VACANT ROADSIDE PROPERTY	NEAR INTERSECTION OF RAINES AN		TN SWM COMPLAINTS
MEMPHIS	1018149295	MEMPHIS ABANDONED DRUM	EAST RAINES ROAD/TCHULAHOMA RO	38118	SEMS
SHELBY COUNTY	S113741447		INTERSECTION OF HACKS CROSS &		TN SPILLS
SOUTHAVEN	S116237922	WATSON'S CLEANERS	1545 STATELINE RD.	38671	MS DRYCLEANERS

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

MSCAA - HOLMES ROAD EA
E HOLMES ROAD
MEMPHIS, TN 38118

TARGET PROPERTY COORDINATES

Latitude (North):	34.999573 - 34° 59' 58.46''
Longitude (West):	89.967926 - 89° 58' 4.53''
Universal Tranverse Mercator:	Zone 16
UTM X (Meters):	229122.4
UTM Y (Meters):	3876824.2
Elevation:	356 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5944778 SOUTHEAST MEMPHIS, TN
Version Date:	2013
South Map:	5633941 PLEASANT HILL, MS
Version Date:	2012

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

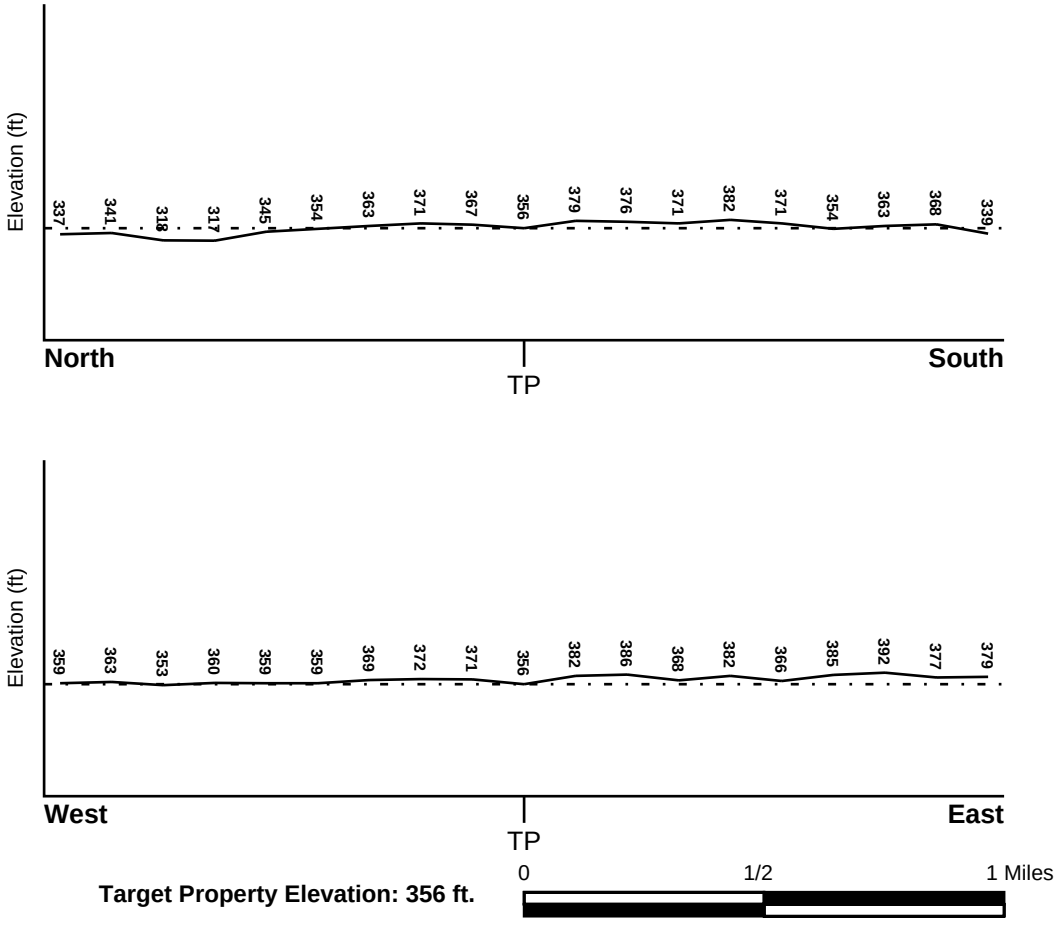
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General WNW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
28033C0077G	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
47157C0440F	FEMA FIRM Flood data
47157C0275E	FEMA Q3 Flood data
28033C0076G	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
PLEASANT HILL	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

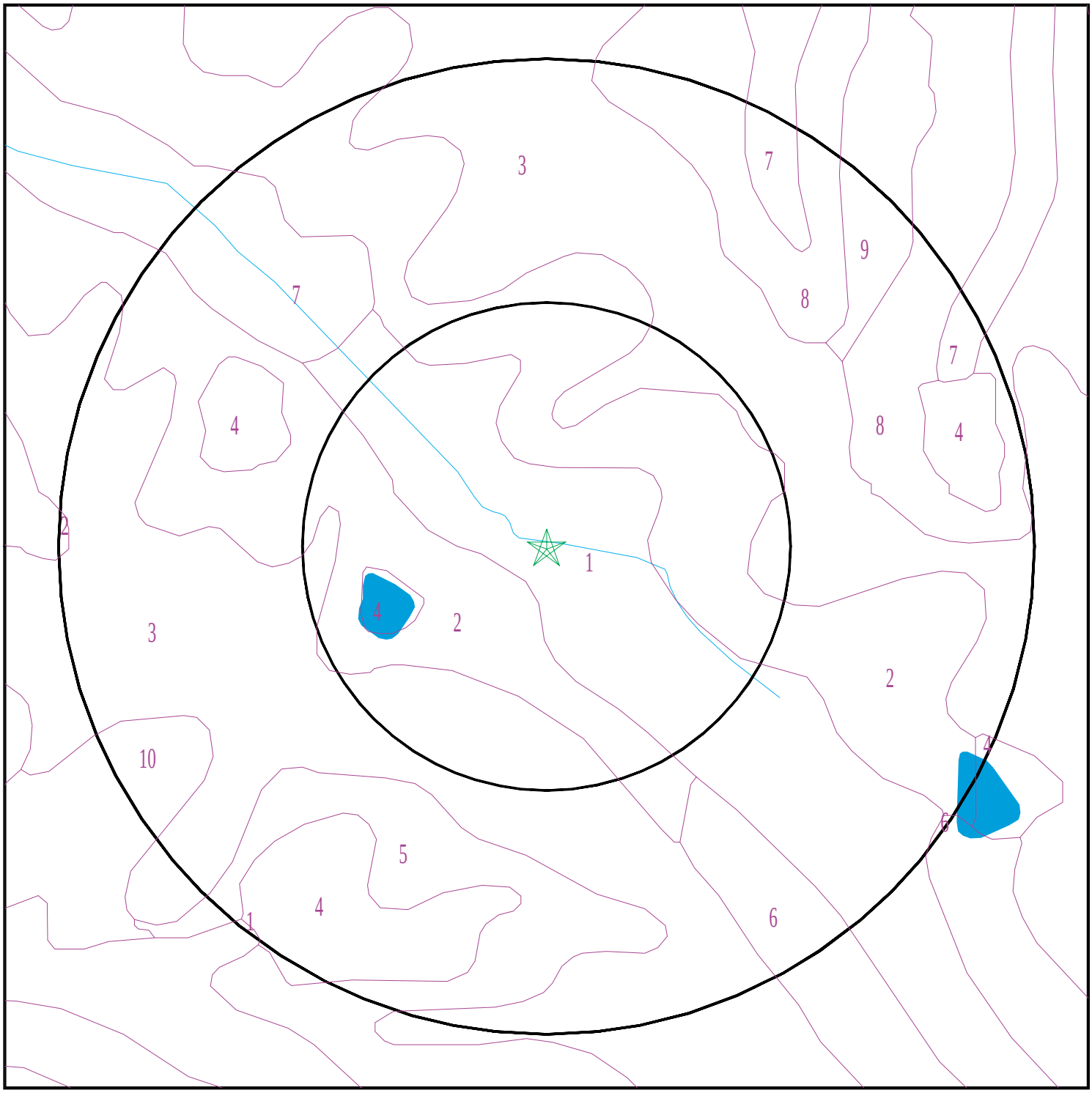
Era:	Cenozoic
System:	Tertiary
Series:	Eocene Claiborne Group
Code:	Te2 *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 6034858.2s



SITE NAME:	MSCAA - Holmes Road EA	CLIENT:	ENSAFE
ADDRESS:	E Holmes Road Memphis TN 38118	CONTACT:	Velita Thornton
LAT/LONG:	34.999573 / 89.967926	INQUIRY #:	6034858.2s
		DATE:	April 08, 2020 9:17 am

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: COLLINS

Soil Surface Texture: silt loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 107 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	silt loam	Not reported	Not reported	Max: 14 Min: 4	Max: 5.5 Min: 4.5
2	7 inches	50 inches	silt loam	Not reported	Not reported	Max: 14 Min: 4	Max: 5.5 Min: 4.5

Soil Map ID: 2

Soil Component Name: GRENADA

Soil Surface Texture: silt loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Moderately well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 46 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	5 inches	silt loam	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 7.3 Min: 5.1
2	5 inches	22 inches	silt loam	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 7.3 Min: 5.1
3	22 inches	25 inches	silt loam	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 7.3 Min: 5.1
4	25 inches	40 inches	silt loam	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 7.3 Min: 5.1
5	40 inches	59 inches	silt loam	Not reported	Not reported	Max: 1.4 Min: 0.42	Max: 7.3 Min: 5.1

Soil Map ID: 3

Soil Component Name: LORING

Soil Surface Texture: silt loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 46 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		Soil Reaction (pH)
1	0 inches	7 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5
2	7 inches	27 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5
3	27 inches	50 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5
4	50 inches	59 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5

Soil Map ID: 4

Soil Component Name: WATER

Soil Surface Texture: silt loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class:
Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

No Layer Information available.

Soil Map ID: 5

Soil Component Name: LORING

Soil Surface Texture: silt loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Moderately well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 46 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5
2	7 inches	27 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5
3	27 inches	50 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5
4	50 inches	59 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5

Soil Map ID: 6

Soil Component Name: LORING

Soil Surface Texture: silt loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 46 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	7 inches	27 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5
3	27 inches	50 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5
4	50 inches	59 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5

Soil Map ID: 7

Soil Component Name: FALAYA

Soil Surface Texture: silt loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Somewhat poorly drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 46 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	59 inches	silt loam	Not reported	Not reported	Max: 14 Min: 4	Max: 5.5 Min: 4.5

Soil Map ID: 8

Soil Component Name: GULLIED LAND

Soil Surface Texture: silt loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Unknown

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

No Layer Information available.

Soil Map ID: 9

Soil Component Name: MEMPHIS

Soil Surface Texture: silt loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	silt loam	Not reported	Not reported	Max: 14 Min: 4	Max: 6 Min: 4.5
2	7 inches	18 inches	silty clay loam	Not reported	Not reported	Max: 14 Min: 4	Max: 6 Min: 4.5
3	18 inches	98 inches	silt loam	Not reported	Not reported	Max: 14 Min: 4	Max: 6 Min: 4.5

Soil Map ID: 10

Soil Component Name: LORING

Soil Surface Texture: silt loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Moderately well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 46 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5
2	7 inches	27 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5
3	27 inches	50 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5
4	50 inches	59 inches	silt loam	Not reported	Not reported	Max: 14 Min: 1.4	Max: 6.5 Min: 4.5

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	USGS40001143130	1/4 - 1/2 Mile North
B5	USGS40001143138	1/2 - 1 Mile NW
B7	USGS40001143139	1/2 - 1 Mile NW
11	USGS40000681306	1/2 - 1 Mile South
D13	USGS40001143140	1/2 - 1 Mile NW
D14	USGS40001143136	1/2 - 1 Mile NW
16	USGS40000681305	1/2 - 1 Mile SE
E18	USGS40001143137	1/2 - 1 Mile ENE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

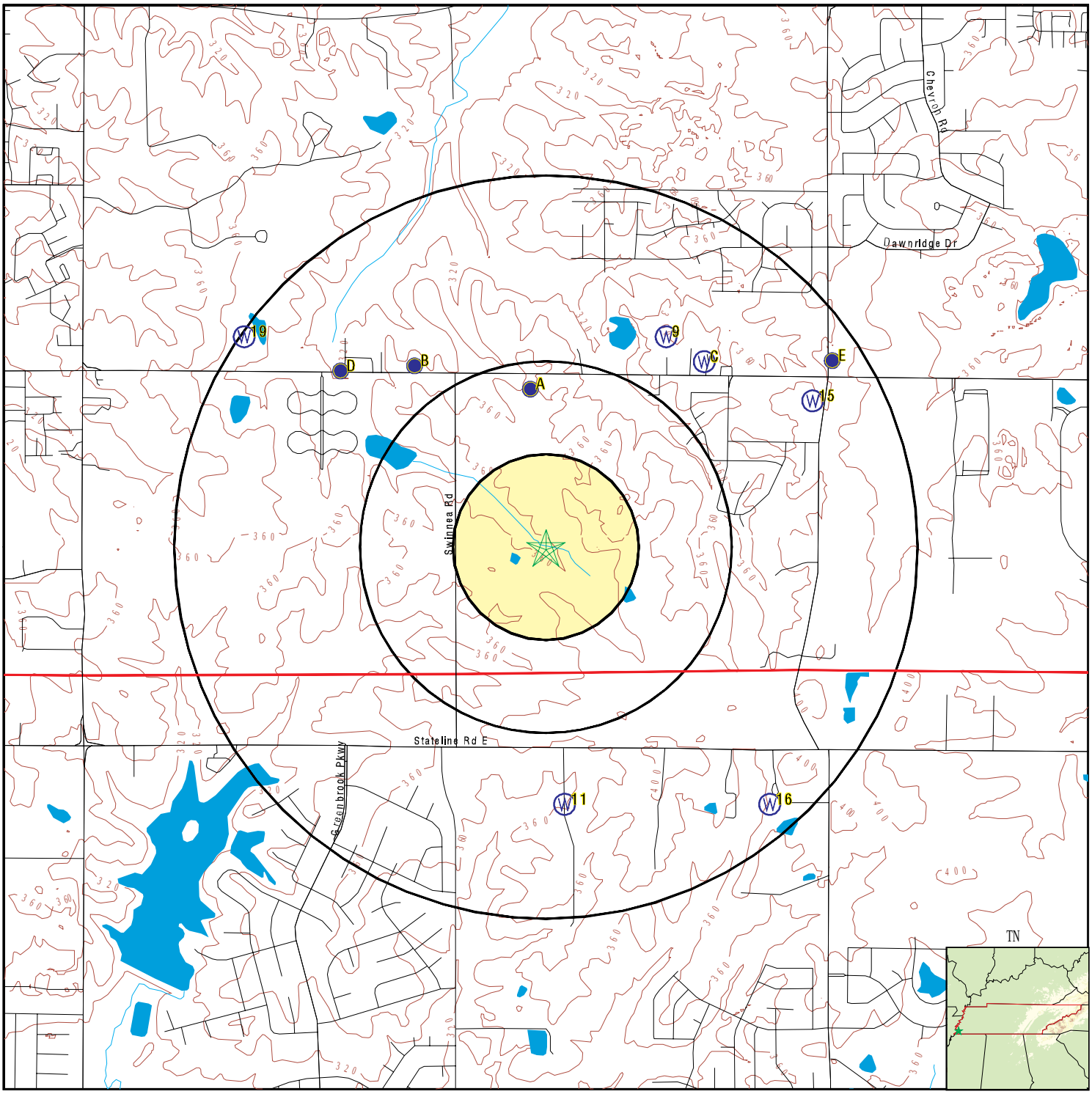
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A2	TN7000000068347	1/4 - 1/2 Mile North
B3	TN7000000069826	1/2 - 1 Mile NW
B4	TN7000000069818	1/2 - 1 Mile NW
B6	TN7000000068350	1/2 - 1 Mile NW
C8	TN7000000069008	1/2 - 1 Mile NE
9	TN7000000069099	1/2 - 1 Mile NNE
C10	TN7000000068399	1/2 - 1 Mile NE
D12	TN7000000068714	1/2 - 1 Mile NW
15	TN7000000068348	1/2 - 1 Mile ENE
E17	TN7000000068710	1/2 - 1 Mile ENE
19	TN7000000068839	1/2 - 1 Mile NW

PHYSICAL SETTING SOURCE MAP - 6034858.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons

- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location

SITE NAME:	MSCAA - Holmes Road EA	CLIENT:	ENSAFE
ADDRESS:	E Holmes Road Memphis TN 38118	CONTACT:	Velita Thornton
LAT/LONG:	34.999573 / 89.967926	INQUIRY #:	6034858.2s
		DATE:	April 08, 2020 9:17 am

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

A1
North
1/4 - 1/2 Mile
Higher | **FED USGS** | **USGS40001143130**

Organization ID:	USGS-TN	Organization Name:	USGS Tennessee Water Science Center
Monitor Location:	SH:K-146	Type:	Well
Description:	2853 HOLMES RD ASK LANDOWNER AT TIME OF VISIT		
HUC:	08010211	Drainage Area:	Not Reported
Drainage Area Units:	Not Reported	Contrib Drainage Area:	Not Reported
Contrib Drainage Area Unts:	Not Reported	Aquifer:	Other aquifers
Formation Type:	Terrace Deposits	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	56
Well Depth Units:	ft	Well Hole Depth:	56
Well Hole Depth Units:	ft		

Ground water levels,Number of Measurements:	1	Level reading date:	1988-10-17
Feet below surface:	47.71	Feet to sea level:	Not Reported
Note:	Not Reported		

A2
North
1/4 - 1/2 Mile
Higher | **TN WELLS** | **TN7000000068347**

Well #:	15700210	License Code:	108
Total Depth:	338	Est Yield:	0
Quad #:	0409SW7	Driller Tag #:	Not Reported
Casing Depth:	0	Depth to Water:	0
Intended Well Use:	Residential		

B3
NW
1/2 - 1 Mile
Lower | **TN WELLS** | **TN7000000069826**

Well #:	15709087	License Code:	30
Total Depth:	0	Est Yield:	400
Quad #:	0409SW7	Driller Tag #:	Not Reported
Casing Depth:	0	Depth to Water:	0
Intended Well Use:	Farm		

B4
NW
1/2 - 1 Mile
Lower | **TN WELLS** | **TN7000000069818**

Well #:	15709079	License Code:	30
Total Depth:	370	Est Yield:	0
Quad #:	0409SW7	Driller Tag #:	Not Reported
Casing Depth:	0	Depth to Water:	360
Intended Well Use:	Municipal		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database | EDR ID Number

B5
NW
1/2 - 1 Mile
Lower

FED USGS **USGS40001143138**

Organization ID:	USGS-TN	Organization Name:	USGS Tennessee Water Science Center
Monitor Location:	SH:K-087	Type:	Well
Description:	Not Reported	HUC:	Not Reported
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Mississippi embayment aquifer system		
Formation Type:	Memphis Sand	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	402
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

B6
NW
1/2 - 1 Mile
Lower

TN WELLS **TN7000000068350**

Well #:	15700213	License Code:	108
Total Depth:	347	Est Yield:	0
Quad #:	0409SW7	Driller Tag #:	Not Reported
Casing Depth:	0	Depth to Water:	0
Intended Well Use:	Municipal		

B7
NW
1/2 - 1 Mile
Lower

FED USGS **USGS40001143139**

Organization ID:	USGS-TN	Organization Name:	USGS Tennessee Water Science Center
Monitor Location:	SH:K-079	Type:	Well
Description:	INFORMATION COPIED FROM 1966 FORMS		
HUC:	Not Reported	Drainage Area:	Not Reported
Drainage Area Units:	Not Reported	Contrib Drainage Area:	Not Reported
Contrib Drainage Area Unts:	Not Reported		
Aquifer:	Mississippi embayment aquifer system		
Formation Type:	Memphis Sand	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	370
Well Depth Units:	ft	Well Hole Depth:	400
Well Hole Depth Units:	ft		

Ground water levels,Number of Measurements:	1	Level reading date:	1961-12-19
Feet below surface:	92	Feet to sea level:	Not Reported
Note:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
C8 **NE** **1/2 - 1 Mile** **Higher**	**TN WELLS**	**TN7000000069008**

Well #:	15700872	License Code:	108
Total Depth:	338	Est Yield:	15
Quad #:	0409SW7	Driller Tag #:	Not Reported
Casing Depth:	318	Depth to Water:	302
Intended Well Use:	Not Reported		

	Database	EDR ID Number
9 **NNE** **1/2 - 1 Mile** **Higher**	**TN WELLS**	**TN7000000069099**

Well #:	15700963	License Code:	198
Total Depth:	80	Est Yield:	0
Quad #:	0409SW7	Driller Tag #:	Not Reported
Casing Depth:	80	Depth to Water:	27
Intended Well Use:	Not Reported		

	Database	EDR ID Number
C10 **NE** **1/2 - 1 Mile** **Higher**	**TN WELLS**	**TN7000000068399**

Well #:	15700262	License Code:	286
Total Depth:	66	Est Yield:	3
Quad #:	0409SW7	Driller Tag #:	Not Reported
Casing Depth:	60	Depth to Water:	45
Intended Well Use:	Residential		

	Database	EDR ID Number
11 **South** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS40000681306**

Organization ID:	USGS-MS		
Organization Name:	USGS Mississippi Water Science Center		
Monitor Location:	C0001 DE SOTO	Type:	Well
Description:	Not Reported	HUC:	08010211
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	Not Reported
Well Depth:	Not Reported	Well Depth Units:	Not Reported
Well Hole Depth:	Not Reported	Well Hole Depth Units:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
D12 **NW** **1/2 - 1 Mile** **Lower**	**TN WELLS**	**TN7000000068714**

Well #:	15700577	License Code:	198
Total Depth:	43	Est Yield:	10
Quad #:	0409SW7	Driller Tag #:	Not Reported
Casing Depth:	43	Depth to Water:	10
Intended Well Use:	Commercial		

	Database	EDR ID Number
D13 **NW** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS40001143140**

Organization ID:	USGS-TN	Organization Name:	USGS Tennessee Water Science Center
Monitor Location:	SH:K-127	Type:	Well
Description:	Not Reported	HUC:	Not Reported
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	Not Reported
Well Depth:	Not Reported	Well Depth Units:	Not Reported
Well Hole Depth:	1251	Well Hole Depth Units:	ft

	Database	EDR ID Number
D14 **NW** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS40001143136**

Organization ID:	USGS-TN	Organization Name:	USGS Tennessee Water Science Center
Monitor Location:	SH:K-106	Type:	Well
Description:	Not Reported	HUC:	Not Reported
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Other aquifers	Formation Type:	Terrace Deposits
Aquifer Type:	Not Reported	Construction Date:	Not Reported
Well Depth:	43	Well Depth Units:	ft
Well Hole Depth:	Not Reported	Well Hole Depth Units:	Not Reported

---

	Database	EDR ID Number
15 **ENE** **1/2 - 1 Mile** **Higher**	**TN WELLS**	**TN7000000068348**

Well #:	15700211	License Code:	740
Total Depth:	0	Est Yield:	0
Quad #:	0409SW8	Driller Tag #:	Not Reported
Casing Depth:	0	Depth to Water:	0
Intended Well Use:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
16 **SE** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS40000681305**

Organization ID:	USGS-MS		
Organization Name:	USGS Mississippi Water Science Center		
Monitor Location:	C0026 DE SOTO	Type:	Well
Description:	Not Reported	HUC:	08010211
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Mississippi embayment aquifer system		
Formation Type:	Sparta Sand	Aquifer Type:	Not Reported
Construction Date:	20020405	Well Depth:	310
Well Depth Units:	ft	Well Hole Depth:	330
Well Hole Depth Units:	ft		

Ground water levels,Number of Measurements:	1	Level reading date:	2002-04-05
Feet below surface:	140.	Feet to sea level:	Not Reported
Note:	Not Reported		

	Database	EDR ID Number
E17 **ENE** **1/2 - 1 Mile** **Higher**	**TN WELLS**	**TN7000000068710**

Well #:	15700573	License Code:	198
Total Depth:	94	Est Yield:	10
Quad #:	0409SW8	Driller Tag #:	Not Reported
Casing Depth:	94	Depth to Water:	80
Intended Well Use:	Residential		

	Database	EDR ID Number
E18 **ENE** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS40001143137**

Organization ID:	USGS-TN	Organization Name:	USGS Tennessee Water Science Center
Monitor Location:	Sh:K-129	Type:	Well
Description:	Not Reported	HUC:	08010211
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Other aquifers	Formation Type:	Terrace Deposits
Aquifer Type:	Not Reported	Construction Date:	19670714
Well Depth:	94	Well Depth Units:	ft
Well Hole Depth:	Not Reported	Well Hole Depth Units:	Not Reported

Ground water levels,Number of Measurements:	1	Level reading date:	1967-07-14
Feet below surface:	80	Feet to sea level:	Not Reported
Note:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation			Database	EDR ID Number
19 **NW** **1/2 - 1 Mile** **Lower**			**TN WELLS**	**TN7000000068839**
Well #:	15700703	License Code:	286	
Total Depth:	82	Est Yield:	5	
Quad #:	0409SW7	Driller Tag #:	Not Reported	
Casing Depth:	72	Depth to Water:	61	
Intended Well Use:	Residential			

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: TN Radon

Radon Test Results

County	Total Sites	Avg	Max	<4 pCi/L	4-10 pCi/L	10-20 pCi/L	20-50 pCi/L	50-100 pCi/L	>100 pCi/L
SHELBY	31	1.1	2.5	31	0	0	0	0	0

Federal EPA Radon Zone for SHELBY County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 38118

Number of sites tested: 9

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.722 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Environment & Conservation
Telephone: 651-532-0052

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

County Water Wells in Tennessee
Source: Department of Environment and Conservation
Telephone: 615-532-0160
Water well locations for the entire state.

OTHER STATE DATABASE INFORMATION

RADON

State Database: TN Radon
Source: Department of Environment & Conservation
Telephone: 615-299-9725
Radon Test Results

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

Appendix D
Historical Documents

MSCAA - Holmes Road EA

E Holmes Road

Memphis, TN 38118

Inquiry Number: 6034858.8

April 08, 2020

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

04/08/20

Site Name:

MSCAA - Holmes Road EA
E Holmes Road
Memphis, TN 38118
EDR Inquiry # 6034858.8

Client Name:

ENSAFE
5724 Summer Trees Drive
Memphis, TN 38134
Contact: Velita Thornton

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

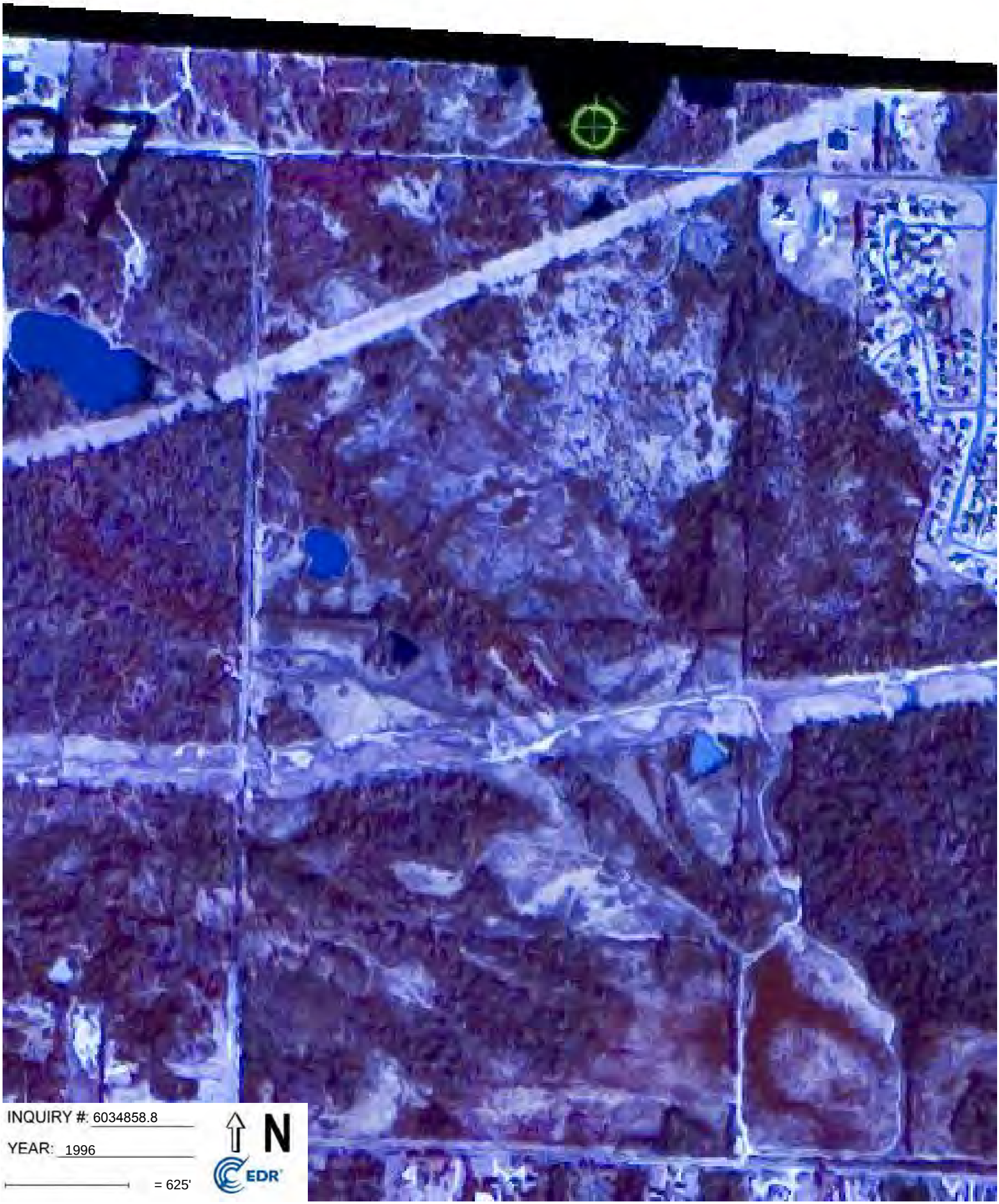
Year	Scale	Details	Source
2016	1"=625'	Flight Year: 2016	USDA/NAIP
2012	1"=625'	Flight Year: 2012	USDA/NAIP
2008	1"=625'	Flight Year: 2008	USDA/NAIP
1996	1"=625'	Flight Date: February 17, 1996	USGS
1992	1"=625'	Flight Date: February 29, 1992	USGS
1991	1"=625'	Acquisition Date: February 02, 1991	USGS/DOQQ
1980	1"=625'	Flight Date: November 01, 1980	USDA
1973	1"=625'	Flight Date: March 01, 1973	USGS
1971	1"=625'	Flight Date: November 07, 1971	USDA
1965	1"=625'	Flight Date: September 27, 1965	USDA
1963	1"=625'	Flight Date: March 06, 1963	USGS
1957	1"=625'	Flight Date: December 30, 1957	USDA
1953	1"=625'	Flight Date: October 11, 1953	USDA
1937	1"=625'	Flight Date: August 10, 1937	USDA

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.


INQUIRY #: 6034858.8
YEAR: 2016
= 625'
N
EDR


INQUIRY #: 6034858.8
YEAR: 2012
= 625'
N
EDR


INQUIRY #: 6034858.8
YEAR: 2008
= 625'
N
EDR



INQUIRY #: 6034858.8

YEAR: 1996

= 625'

N

EDR


INQUIRY #: 6034858.8
YEAR: 1992
= 625'
N
EDR


INQUIRY #: 6034858.8
YEAR: 1991
= 625'
N
EDR


INQUIRY #: 6034858.8
YEAR: 1980
= 625'
N
EDR


INQUIRY #: 6034858.8
YEAR: 1973
= 625'
N
EDR


INQUIRY #: 6034858.8
YEAR: 1971
= 625'
N
EDR

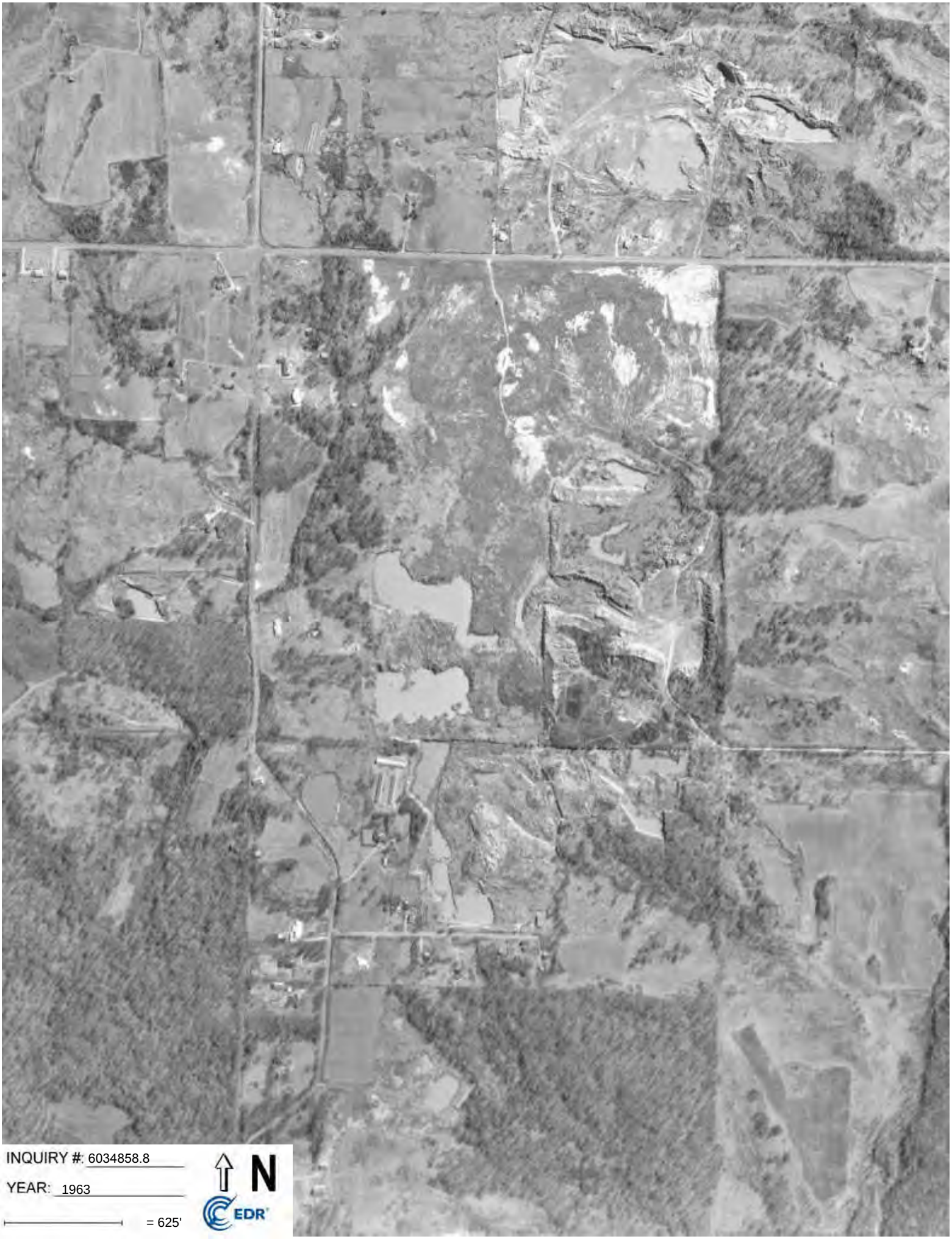
INQUIRY #: 6034858.8

YEAR: 1965

= 625'

N

EDR


INQUIRY #: 6034858.8
YEAR: 1963
= 625'
N
EDR


INQUIRY #: 6034858.8
YEAR: 1957
= 625'
N
EDR


INQUIRY #: 6034858.8
YEAR: 1953
= 625'
N
EDR


INQUIRY #: 6034858.8
YEAR: 1937
= 625'
N
EDR

MSCAA - Holmes Road EA

E Holmes Road

Memphis, TN 38118

Inquiry Number: 6034858.4

April 08, 2020

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

04/08/20

Site Name:	Client Name:
MSCAA - Holmes Road EA	ENSAFE
E Holmes Road	5724 Summer Trees Drive
Memphis, TN 38118	Memphis, TN 38134
EDR Inquiry # 6034858.4	Contact: Velita Thornton

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by ENSAFE were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.# NA

Project: MSCAA - E Holmes Road Phas

Coordinates:

Latitude:	34.999573 34° 59' 58" North
Longitude:	-89.967926 -89° 58' 5" West
UTM Zone:	Zone 16 North
UTM X Meters:	229128.67
UTM Y Meters:	3877021.77
Elevation:	355.63' above sea level

Maps Provided:

2012, 2013	1944
1997	
1993, 1996	
1982, 1983	
1973	
1965	
1961	
1960	

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2012, 2013 Source Sheets

Pleasant Hill
2012
7.5-minute, 24000

Southeast Memphis
2013
7.5-minute, 24000

1997 Source Sheets

Southeast Memphis
1997
7.5-minute, 24000
Aerial Photo Revised 1997

1993, 1996 Source Sheets

Southeast Memphis
1993
7.5-minute, 24000
Aerial Photo Revised 1990

Pleasant Hill
1996
7.5-minute, 24000
Aerial Photo Revised 1996

1982, 1983 Source Sheets

Pleasant Hill
1982
7.5-minute, 24000
Aerial Photo Revised 1975

Southeast Memphis
1983
7.5-minute, 24000
Aerial Photo Revised 1980

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1973 Source Sheets

Southeast Memphis
1973
7.5-minute, 24000
Aerial Photo Revised 1973

1965 Source Sheets

Southeast Memphis
1965
7.5-minute, 24000
Aerial Photo Revised 1963

1961 Source Sheets

Bartlett
1961
15-minute, 62500
Aerial Photo Revised 1958

1960 Source Sheets

Bartlett
1960
15-minute, 62500
Aerial Photo Revised 1958

Topo Sheet Key

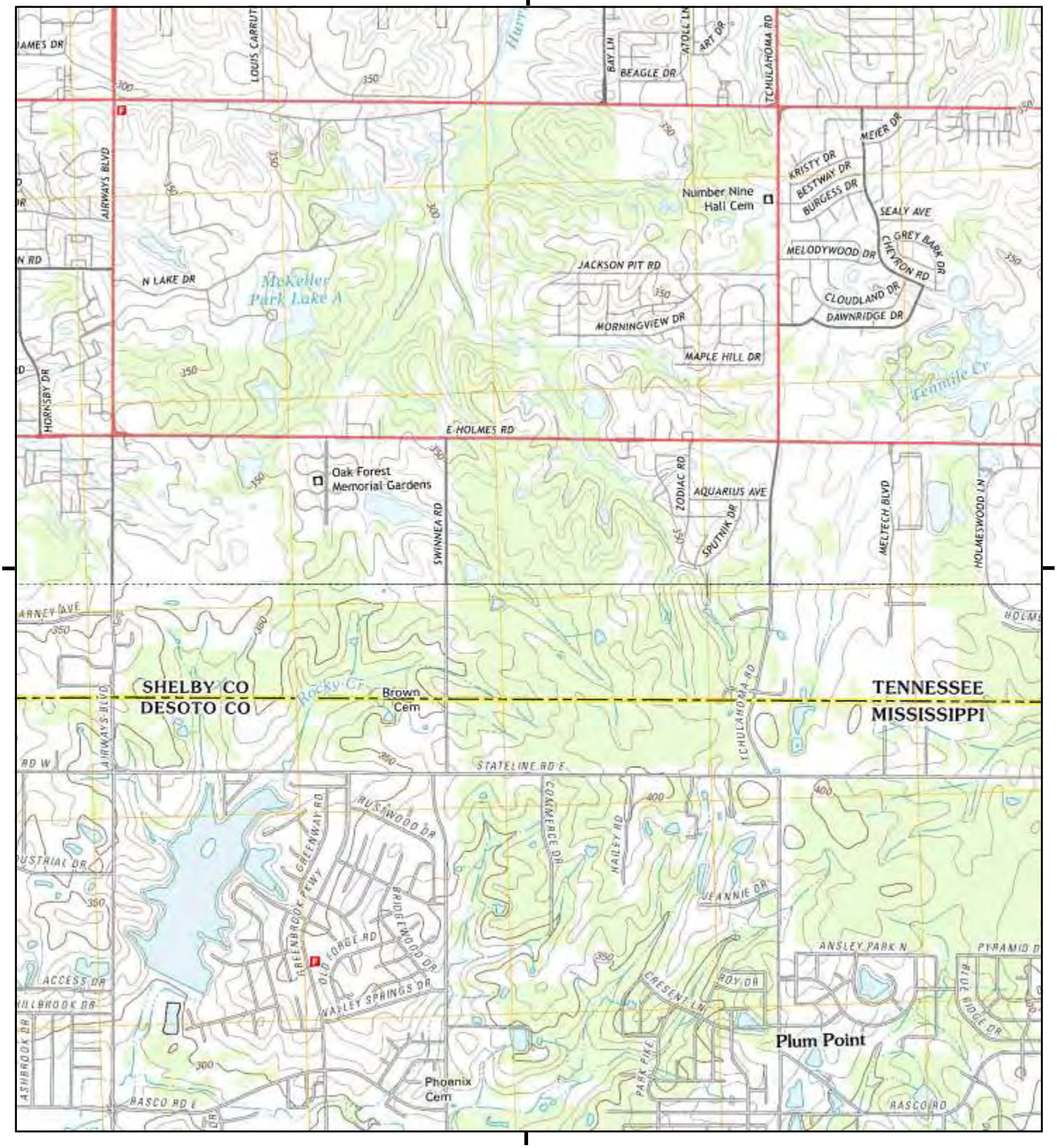
This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1944 Source Sheets

Hernando
1944
15-minute, 62500

Historical Topo Map

2012, 2013



This report includes information from the following map sheet(s).

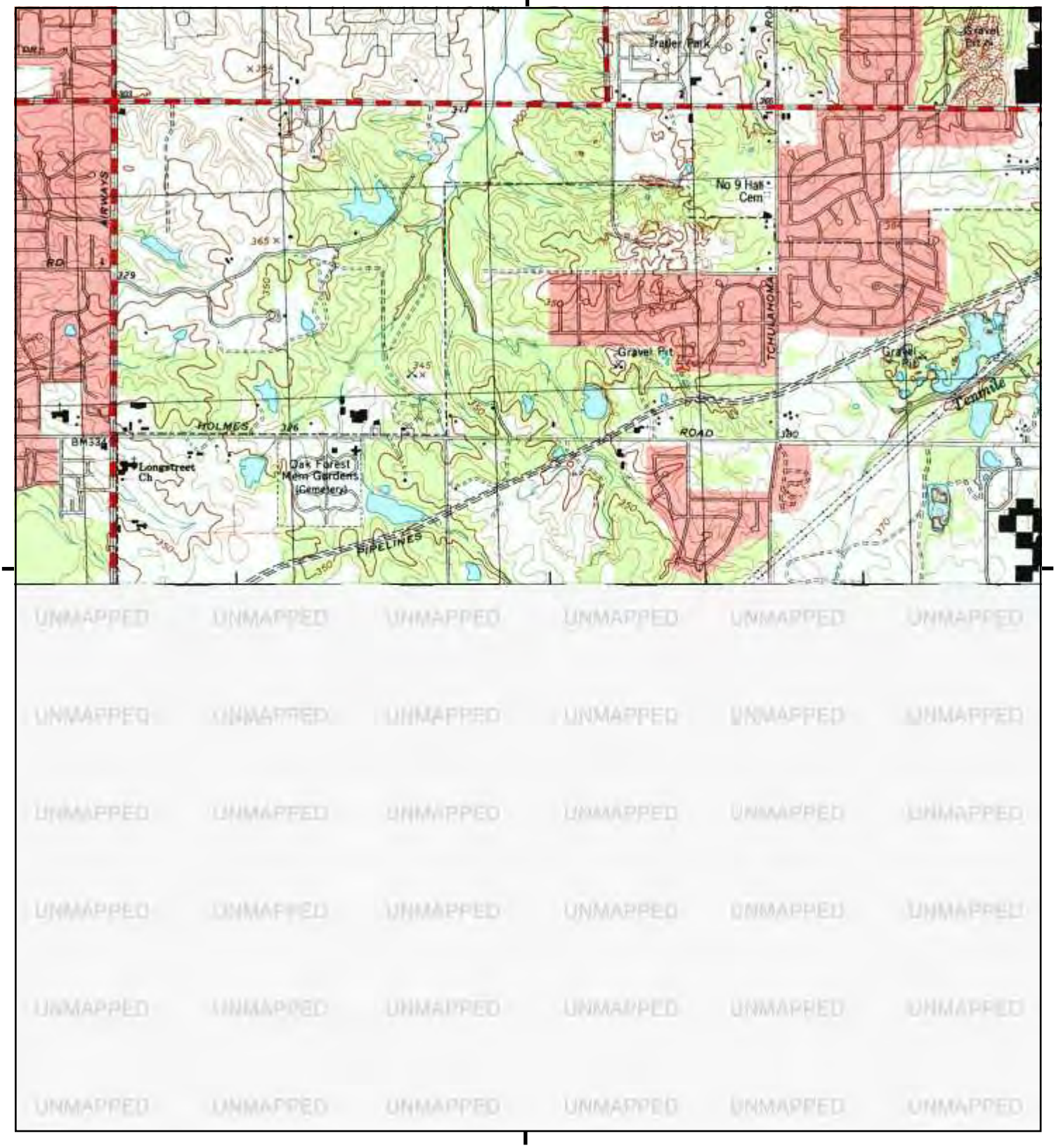
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Southeast Memphis, 2013, 7.5-minute
S, Pleasant Hill, 2012, 7.5-minute

SITE NAME: MSCAA - Holmes Road EA
ADDRESS: E Holmes Road
Memphis, TN 38118
CLIENT: ENSAFE

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

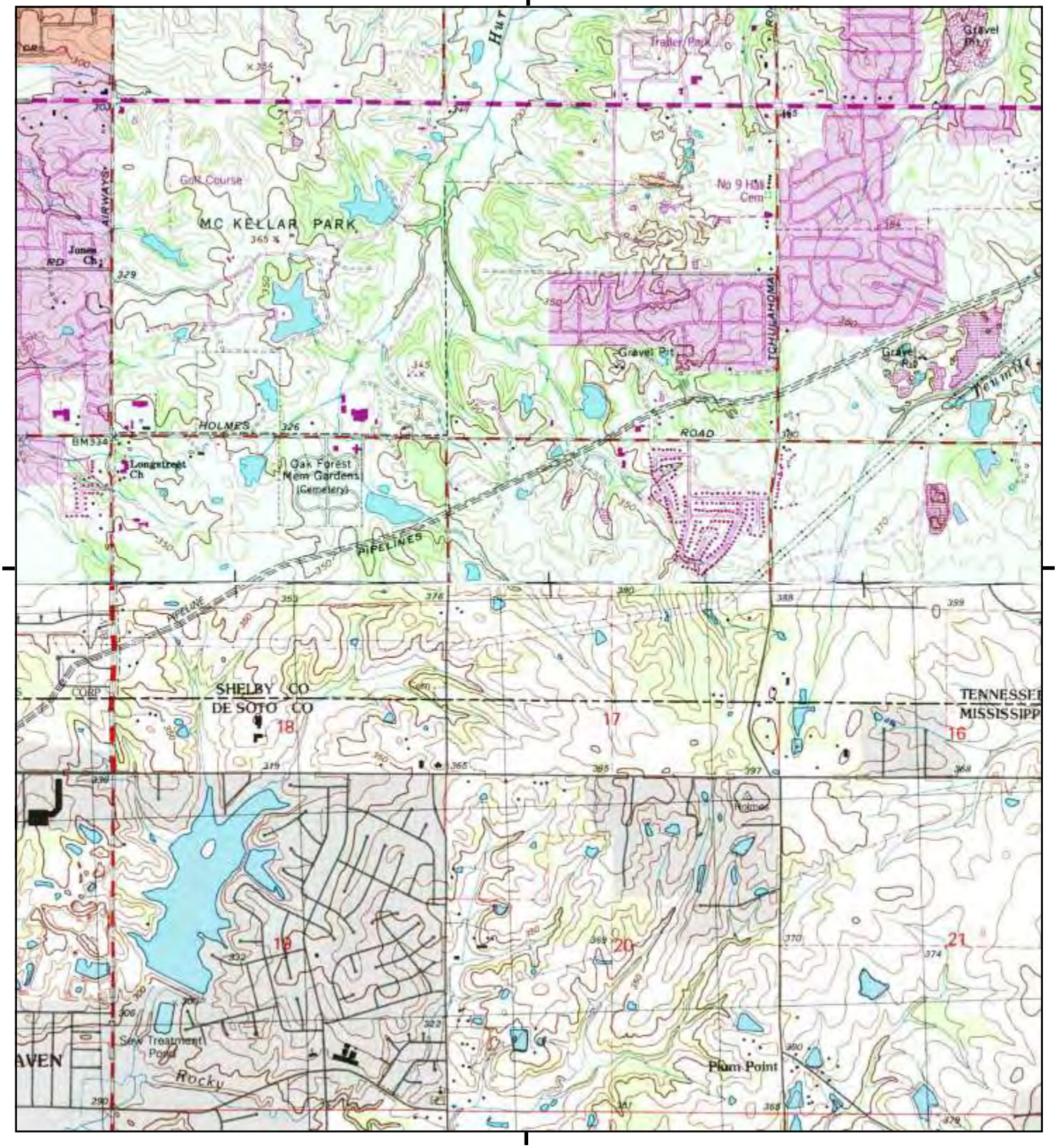
TP, Southeast Memphis, 1997, 7.5-minute

SITE NAME: MSCAA - Holmes Road EA
ADDRESS: E Holmes Road
Memphis, TN 38118
CLIENT: ENSAFE

N

Historical Topo Map

1993, 1996



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

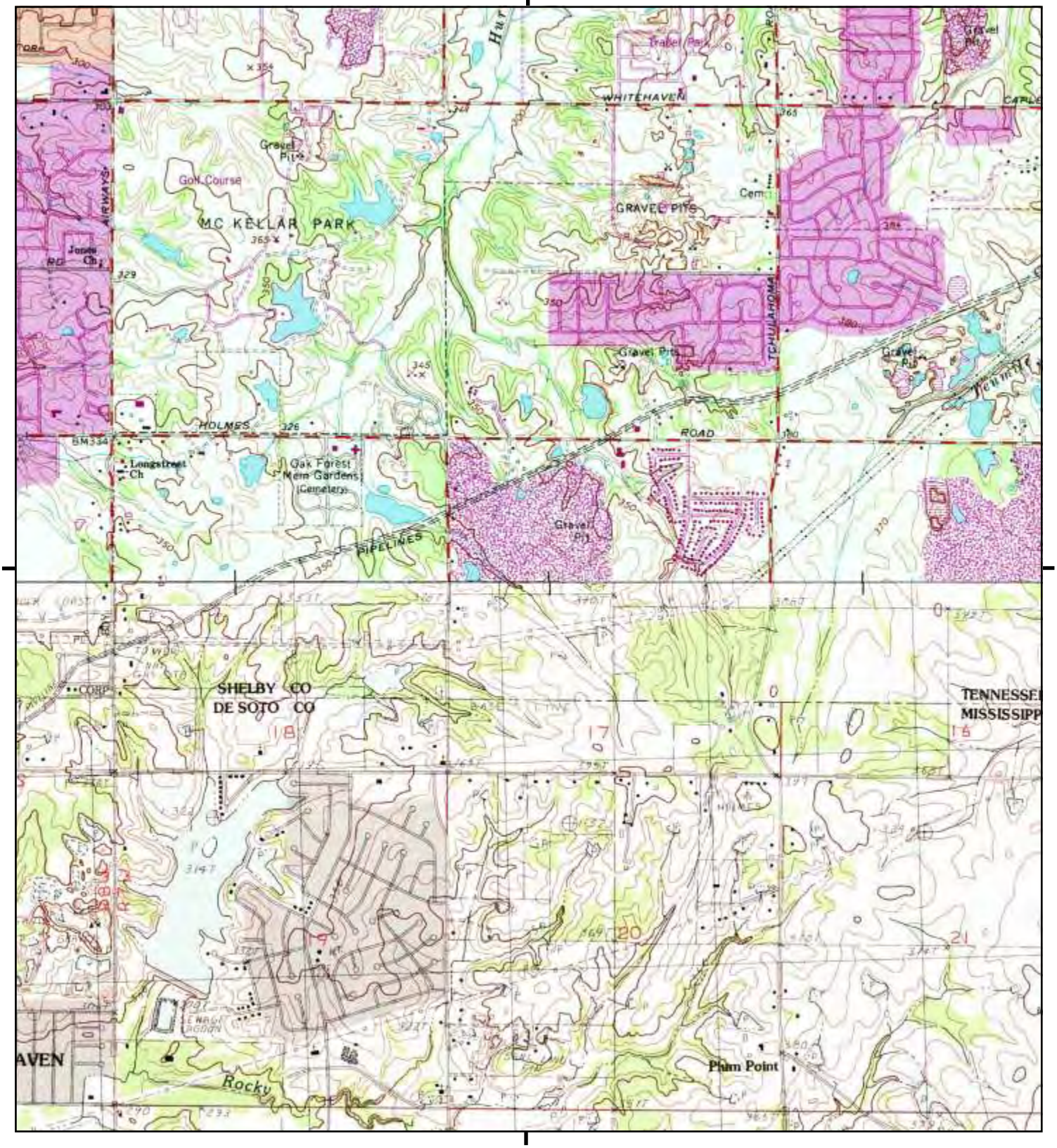
TP, Southeast Memphis, 1993, 7.5-minute
S, Pleasant Hill, 1996, 7.5-minute

SITE NAME: MSCAA - Holmes Road EA
ADDRESS: E Holmes Road
Memphis, TN 38118
CLIENT: ENSAFE

N

Historical Topo Map

1982, 1983



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

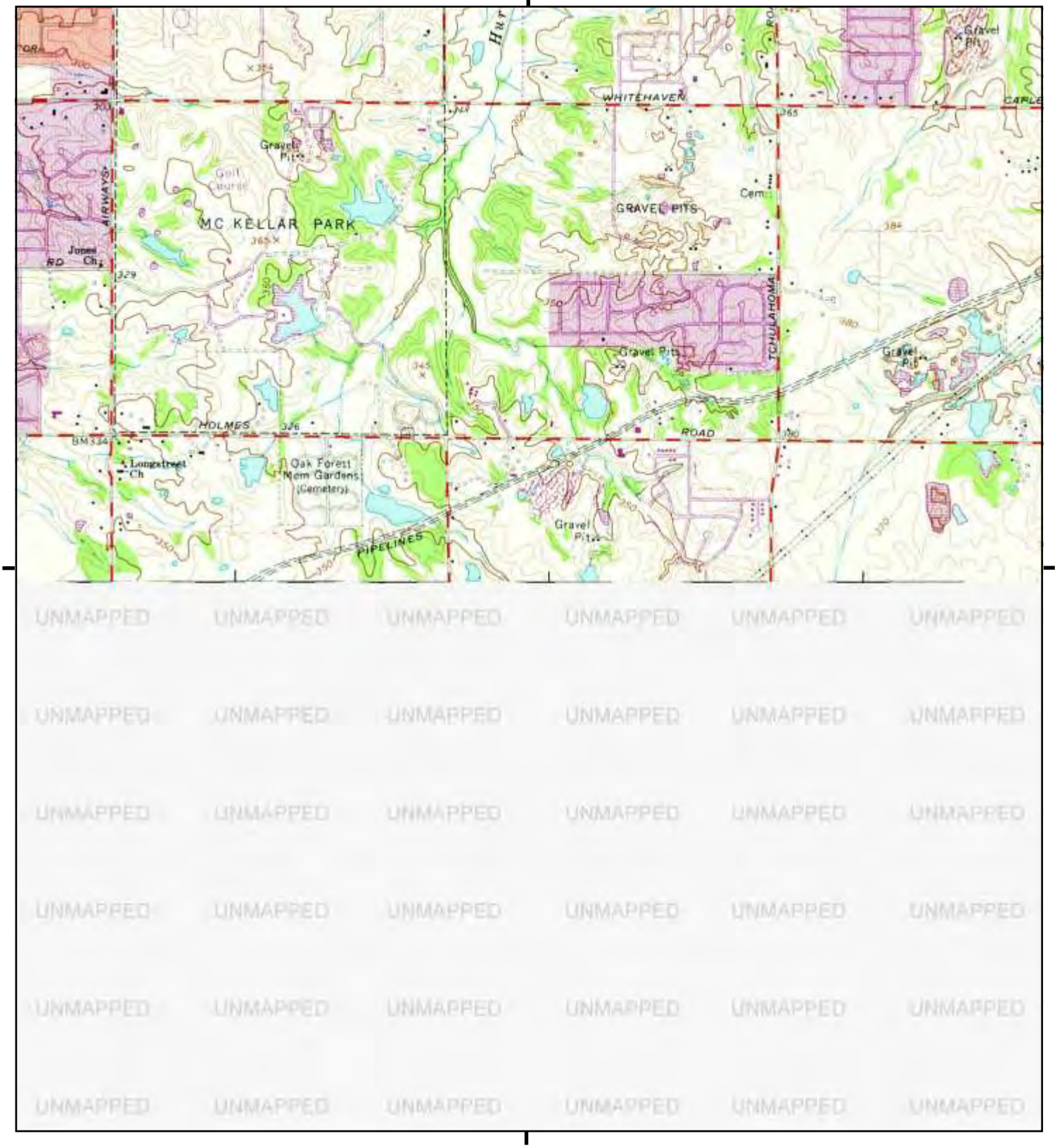
TP, Southeast Memphis, 1983, 7.5-minute
S, Pleasant Hill, 1982, 7.5-minute

SITE NAME: MSCAA - Holmes Road EA
ADDRESS: E Holmes Road
Memphis, TN 38118
CLIENT: ENSAFE

N

Historical Topo Map

1973



This report includes information from the following map sheet(s).

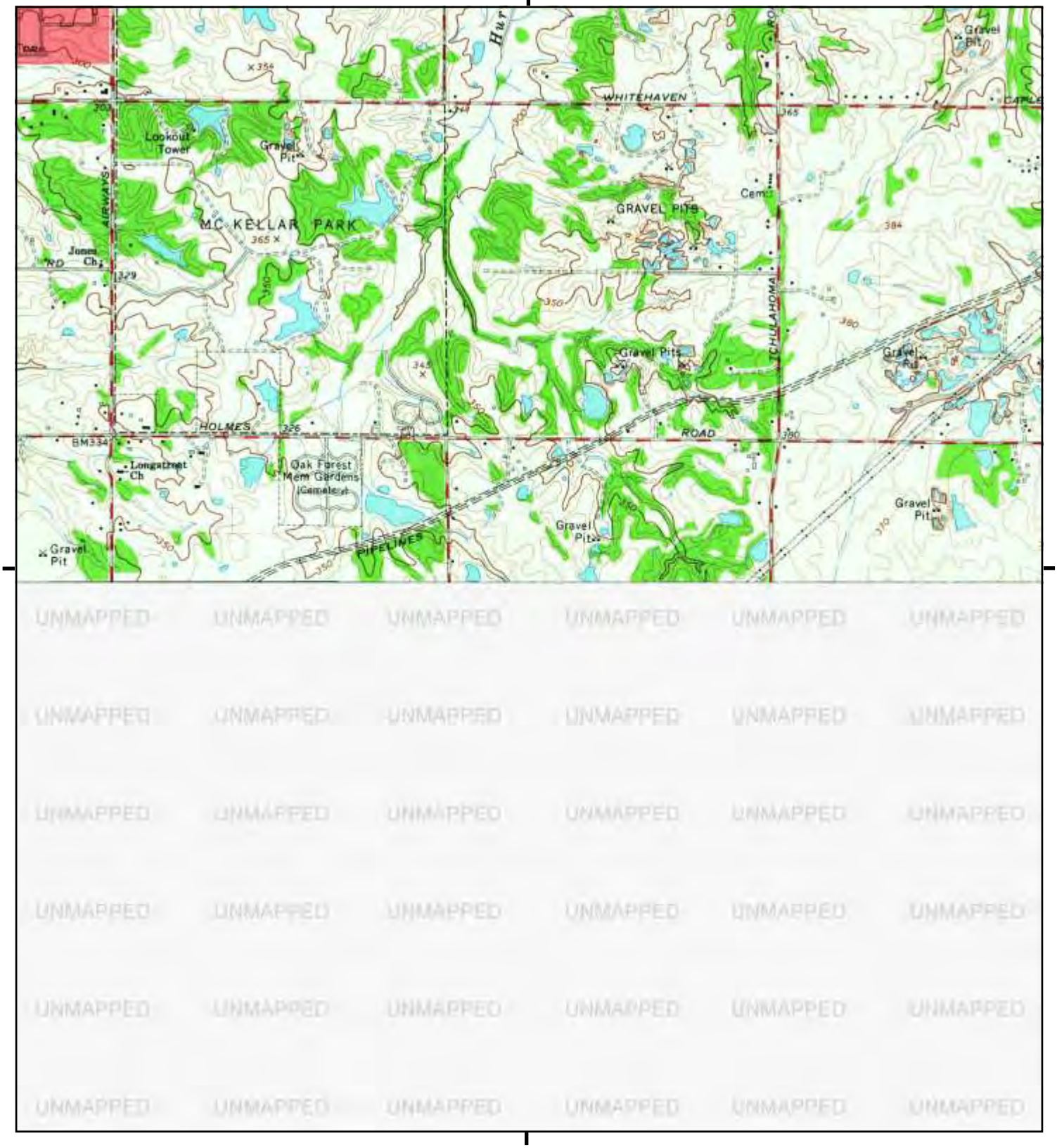
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Southeast Memphis, 1973, 7.5-minute

SITE NAME: MSCAA - Holmes Road EA
ADDRESS: E Holmes Road
Memphis, TN 38118
CLIENT: ENSAFE

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

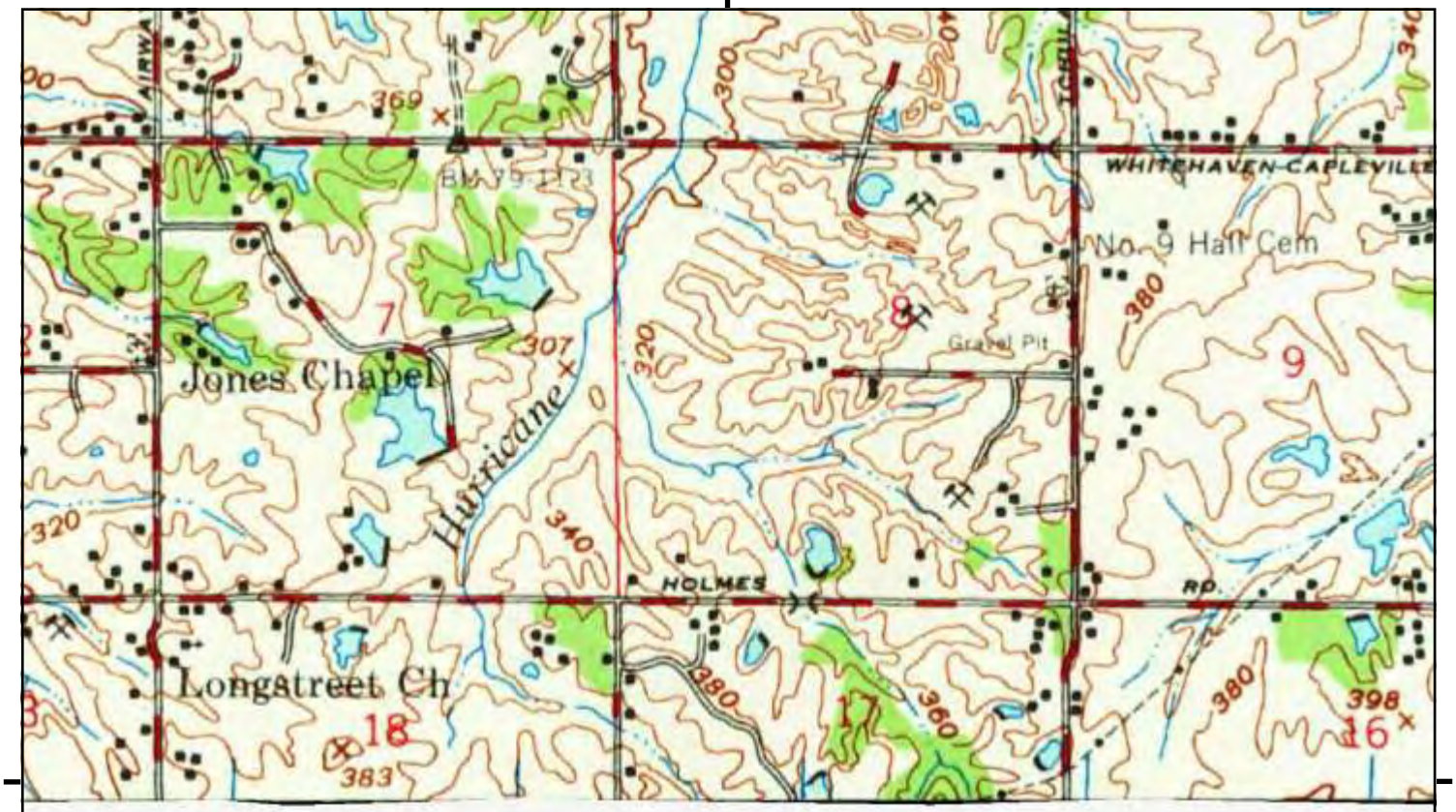
TP, Southeast Memphis, 1965, 7.5-minute

SITE NAME: MSCAA - Holmes Road EA
ADDRESS: E Holmes Road
Memphis, TN 38118
CLIENT: ENSAFE

N

Historical Topo Map

1961



This report includes information from the following map sheet(s).

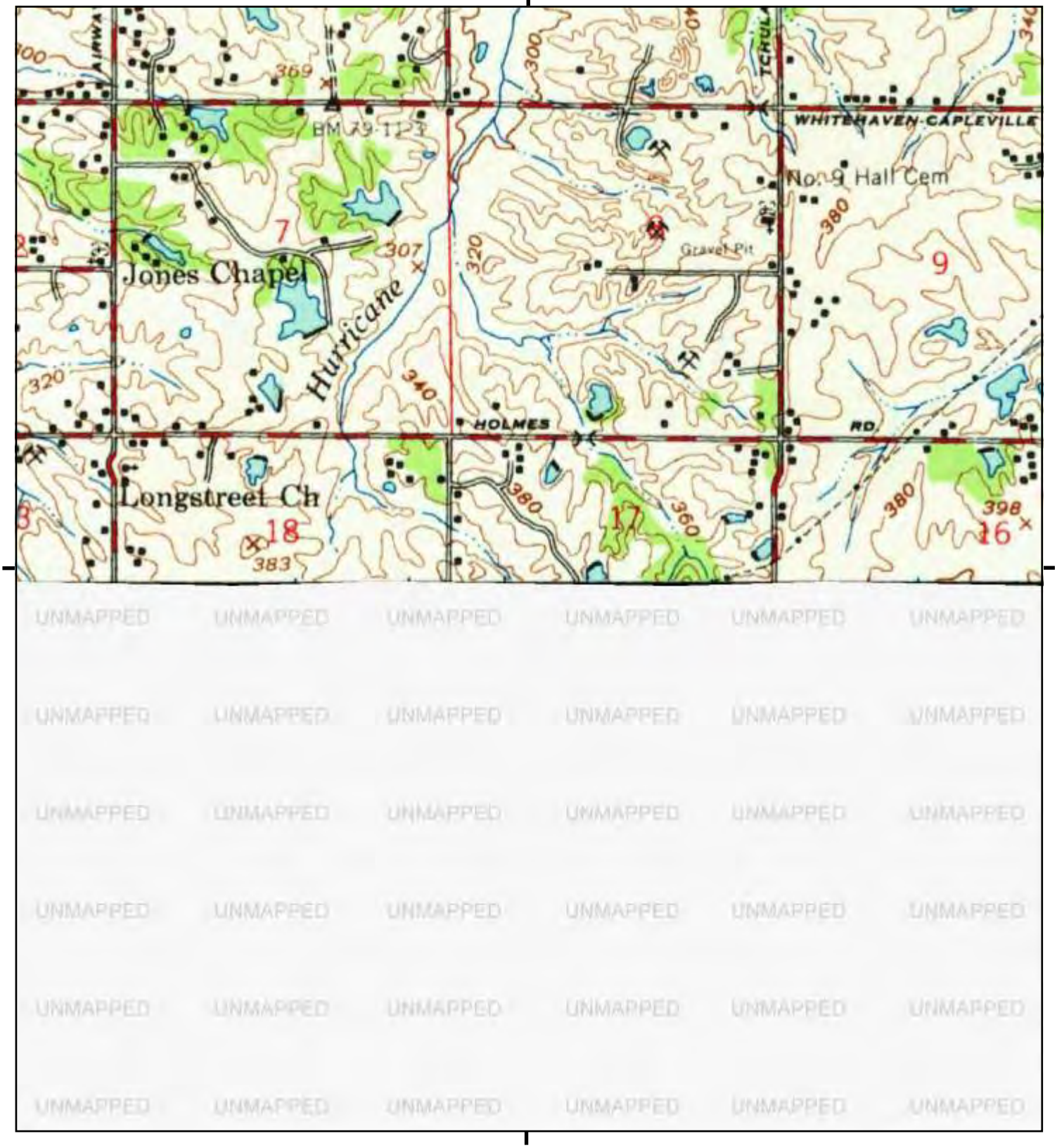
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Bartlett, 1961, 15-minute

SITE NAME: MSCAA - Holmes Road EA
ADDRESS: E Holmes Road
Memphis, TN 38118
CLIENT: ENSAFE

N



This report includes information from the following map sheet(s).

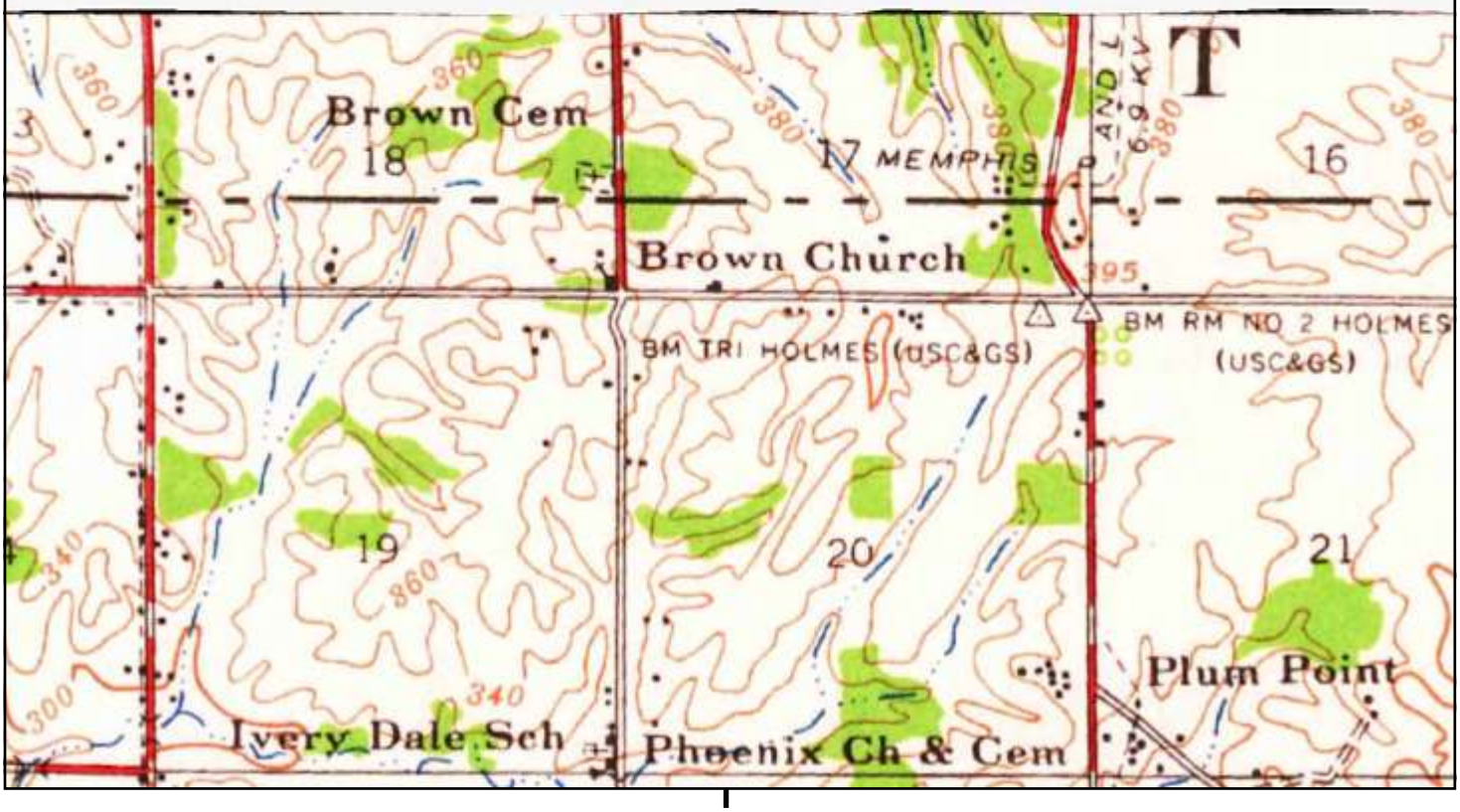
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Bartlett, 1960, 15-minute

SITE NAME: MSCAA - Holmes Road EA
ADDRESS: E Holmes Road
Memphis, TN 38118
CLIENT: ENSAFE

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

SE, Hernando, 1944, 15-minute

SITE NAME: MSCAA - Holmes Road EA
ADDRESS: E Holmes Road
Memphis, TN 38118
CLIENT: ENSAFE

N

MSCAA - Holmes Road EA

E Holmes Road

Memphis, TN 38118

Inquiry Number: 6034858.3

April 08, 2020

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

04/08/20

Site Name:

MSCAA - Holmes Road EA
E Holmes Road
Memphis, TN 38118
EDR Inquiry # 6034858.3

Client Name:

ENSAFE
5724 Summer Trees Drive
Memphis, TN 38134
Contact: Velita Thornton

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by ENSAFE were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # C70A-48DA-8363

PO # NA

Project MSCAA - E Holmes Road Phase I

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: C70A-48DA-8363

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✓ Library of Congress
- ✓ University Publications of America
- ✓ EDR Private Collection

The Sanborn Library LLC Since 1866™

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ENSAFE (the client) is permitted to make up to FIVE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

MSCAA - Holmes Road EA
E Holmes Road
Memphis, TN 38118

Inquiry Number: 6034858.5
April 08, 2020

The EDR-City Directory Abstract

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Abstract includes a search and abstract of available city directory data. For each address, the directory lists the name of the corresponding occupant at five year intervals.

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1921 through 2017. This report compiles information gathered in this review by geocoding the latitude and longitude of properties identified and gathering information about properties within 660 feet of the target property.

A summary of the information obtained is provided in the text of this report.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

EDR is licensed to reproduce certain City Directory works by the copyright holders of those works. The purchaser of this EDR City Directory Report may include it in report(s) delivered to a customer. Reproduction of City Directories without permission of the publisher or licensed vendor may be a violation of copyright.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

Year	Source	TP	Adjoining	Text Abstract	Source Image
2017	Cole Information Services	-	-	-	-
2014	Cole Information Services	-	-	-	-
2009	Cole Information Services	-	-	-	-
2006	Polk City Directory	-	-	-	-
2004	Cole Information Services	-	-	-	-
2003	Polk City Directory	-	-	-	-
1999	Cole Information Services	-	-	-	-
1997	R. L. Polk Co., Publishers	-	-	-	-
1994	Cole Information Services	-	-	-	-
1992	R. L. Polk Co.	-	-	-	-
1987	R.L. Polk Co., Publishers	-	-	-	-
1982	R.L. Polk Co., Publishers	-	-	-	-

EXECUTIVE SUMMARY

Year	Source	TP	Adjoining	Text Abstract	Source Image
1978	R.L. Polk Co., Publishers	-	-	-	-
1973	R.L. Polk Co., Publishers	-	-	-	-
1968	R.L. Polk Co., Publishers	-	-	-	-
1963	R.L. Polk Co., Publishers	-	-	-	-
1958	R.L. Polk Co., Publishers	-	-	-	-
1953	R.L. Polk Co., Publishers	-	-	-	-
1948	R.L. Polk Co., Publishers	-	-	-	-
1943	R.L. Polk Co., Publishers	-	-	-	-
1938	R.L. Polk Co., Publishers	-	-	-	-
1932	R.L. Polk Co., of Memphis, Publishers	-	-	-	-
1926	R.L. Polk Co., of Memphis	-	-	-	-
1921	R.L. Polk CO.	-	-	-	-

TARGET PROPERTY: ADDRESS NOT IDENTIFIED IN RESEARCH SOURCE

The following Target Property addresses were researched for this report, and the addresses were not identified in the research source.

Address Researched	Address Not Identified in Research Source
E Holmes Road	2017, 2014, 2009, 2006, 2004, 2003, 1999, 1997, 1994, 1992, 1987, 1982, 1978, 1973, 1968, 1963, 1958, 1953, 1948, 1943, 1938, 1932, 1926, 1921

Appendix E
Government Records

Dudley Anderson Pit

Past Producer in Shelby county in Tennessee, United States with commodity Sand and Gravel, Construction

Map (https://www.google.com/maps/place/35.(

XML (/mrds/xml/10076012) JSON (/mrds/js

D (/mrds/grade-summary.php?dep_id=100760

Geologic information

Identification information

Deposit ID	10076012 (/mrds/show-mrds.php?dep_id=10076012)
MRDS ID	W022891
Record type	Site
Current site name	Dudley Anderson Pit
Related records	10226902 (/mrds/show-mrds.php?dep_id=10226902)

Geographic coordinates

Geographic coordinates:	-89.9637, 35.00317 (WGS84)
Elevation	105

Political divisions (FIPS codes)

Shelby (county)
Tennessee (state)
United States (country)
North America (continent)
Land (continent)

USGS map quadrangles

Southeast Memphis (quadrangle 1:24,000 scale)
Memphis East (quadrangle 1:100,000 scale)
Blytheville (quadrangle 1:250,000 scale)

Hydrologic units (watersheds)

Horn Lake-Nonconnah (hydrologic unit)
Hatchie-Obion (hydrologic accounting unit)
Lower Mississippi-Hatchie (hydrologic subregion)
Lower Mississippi (hydrologic region)

Geographic areas

Country	State	County

Country	State	County
United States	Tennessee	Shelby

Commodities	
Commodity	**Importance**
Sand and Gravel, Construction	Primary

Materials information	
Materials	**Type of material**
Sand and Gravel	Ore

Nearby scientific data		
(1)	Loess (/geology/state/sgmc-unit.php?x=-89.9637&y=35.00317)	List (/general/near-point.php?x=-89.9637&y=35.00317) Map (/mrds/map-us.html?x=-89.9637&y=35.00317&z=14)

Economic information

Economic information about the deposit and operations	
Development status	Past Producer
Commodity type	Non-metallic
Significant	No

Land status	
Ownership category	Private

Reference information

Links to other databases				
Agency	**Database name**	**Acronym**	**Record ID**	**Notes**
USGS	Mineral Resources Data System	MRDS	W022891	

Bibliographic references

Deposit
CRIB MINERAL RESOURCES FILE, RECORD NUMBER K001575.

Deposit
MESA HEALTH AND SAFETY INSPECTION REPORT AUGUST 6, 1975.

Deposit

PROPERTY IS OWNED BY DUDLEY ANDERSON AND IS OPERATED BY AL COSBY

Deposit

CONSTRUCTION COMPANY.

Reporter information

Type	Date	Name	Affiliation	Comment
Reporter	01-JAN-1973	Unknown	U.S. Bureau of Mines	

Dudley Anderson Pit

Past Producer in Shelby county in Tennessee, United States with commodity Sand and Gravel, Construction

Map (https://www.google.com/maps/place/35.003

XML (/mrds/xml/10226902) JSON (/mrds/json/

D (/mrds/grade-summary.php?dep_id=10226902)

Geologic information

Identification information

Deposit ID	10226902 (/mrds/show-mrds.php?dep_id=10226902)
MRDS ID	W022891
MAS/MILS ID	0471570005
Record type	Site
Current site name	Dudley Anderson Pit
Alternate or previous names	Al Crosby Construction Company
Related records	10076012 (/mrds/show-mrds.php?dep_id=10076012)

Geographic coordinates

Point of reference	Ore Body
Geographic coordinates:	-89.96369, 35.00321 (WGS84)
Elevation	105

Political divisions (FIPS codes)

Shelby (county)
Tennessee (state)
United States (country)
North America (continent)
Land (continent)

USGS map quadrangles

Southeast Memphis (quadrangle 1:24,000 scale)
Memphis East (quadrangle 1:100,000 scale)
Blytheville (quadrangle 1:250,000 scale)

Hydrologic units (watersheds)

Horn Lake-Nonconnah (hydrologic unit)
Hatchie-Obion (hydrologic accounting unit)
Lower Mississippi-Hatchie (hydrologic subregion)
Lower Mississippi (hydrologic region)

Geographic areas

Country	State	County
United States	Tennessee	Shelby

Commodities

Commodity	Importance
Sand and Gravel, Construction	Primary

Nearby scientific data

Ore Body (1)	Loess (/geology/state/sgmc-unit.php?x=-89.96369&y=35.00321)	List (/general/near-point.php?x=-89.96369&y=35.00321&dist=14) Map (/general/near-point-map.php?x=-89.96369&y=35.00321&dist=14)

Economic information

Economic information about the deposit and operations

Operation type	Surface
Development status	Past Producer
Commodity type	Non-metallic
Significant	No

Land status

Ownership category	Private

Ownership information

Type	Unknown
Owner	Crosby Construction Co., Al
ID	4001451
Year	1981

Reference information

Links to other databases

Agency	Database name	Acronym	Record ID	Notes
U.S. Bureau of Mines	Minerals Availability System	MAS	0471570005	
USGS	Mineral Resources Data System	MRDS	W022891	MAS references MRDS

Agency	Database name	Acronym	Record ID	Notes
Mine Safety and Health Administration	MSHA	MSHA	4001451	

Bibliographic references

Deposit
CRIB MINERAL RESOURCES FILE, RECORD NUMBER K001575.

Deposit
MESA HEALTH AND SAFETY INSPECTION REPORT AUGUST 6, 1975.

Deposit
PROPERTY IS OWNED BY DUDLEY ANDERSON.

Deposit
RCF LIST 10/81

Deposit
NOT ON 1980 OR 1981 MSHA LIST; ASSUME PAST PRODUCER

Reporter information

Type	Date	Name	Affiliation	Comment
Reporter	15-NOV-1983	Eastern Field Operations Center (EFOC)	U.S. Bureau of Mines	

Anderson Pit

Producer in Shelby county in Tennessee, United States with commodity Sand and Gravel, Construction

Map (https://www.google.com/maps/place/35.0020

XML (/mrds/xml/10300075) JSON (/mrds/json/1

D (/mrds/grade-summary.php?dep_id=10300075)

Geologic information

Identification information

Deposit ID	10300075 (/mrds/show-mrds.php?dep_id=10300075)
MAS/MILS ID	0471570038
Record type	Site
Current site name	Anderson Pit

Geographic coordinates

Point of reference	Trench
Geographic coordinates:	-89.96399, 35.00201 (WGS84)
Elevation	110

Political divisions (FIPS codes)

Shelby (county)
Tennessee (state)
United States (country)
North America (continent)
Land (continent)

USGS map quadrangles

Southeast Memphis (quadrangle 1:24,000 scale)
Memphis East (quadrangle 1:100,000 scale)
Blytheville (quadrangle 1:250,000 scale)

Hydrologic units (watersheds)

Horn Lake-Nonconnah (hydrologic unit)
Hatchie-Obion (hydrologic accounting unit)
Lower Mississippi-Hatchie (hydrologic subregion)
Lower Mississippi (hydrologic region)

Geographic areas

Country	State	County
United States	Tennessee	Shelby

Commodities	
Commodity	**Importance**
Sand and Gravel, Construction	Primary

Nearby scientific data

Trench (1)	Loess (/geology/state/sgmc-unit.php?x=-89.96399&y=35.00201)	List (/general/near-point.php?x=-89.96399&y=35.00201&r=1) Map (/maps/map-us.html?x=-89.96399&y=35.00201&z=14)

Economic information

Economic information about the deposit and operations

Operation type	Surface
Development status	Producer
Commodity type	Non-metallic
Significant	No

Land status

Ownership category	Private

Ownership information

Type	Unknown
Owner	W. S. Johnson And Sons Sand And Gravel, Inc.
ID	4002425
Year	1980

Reference information

Links to other databases

Agency	**Database name**	**Acronym**	**Record ID**	**Notes**
U.S. Bureau of Mines	Minerals Availability System	MAS	0471570038	
Mine Safety and Health Administration	MSHA	MSHA	4002425	

Bibliographic references

Deposit

MSHA INSPECTION 5-20-80.

Deposit
PHONE CALL 2-11-81.

Deposit
1981 MSHA LIST

Deposit
RCF & CMS LISTS 10/81

Reporter information

Type	Date	Name	Affiliation	Comment
Reporter	15-NOV-1983	Eastern Field Operations Center (EFOC)	U.S. Bureau of Mines	

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION
01 STATE: TN | 02 SITE NUMBER: D 051386258.

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site): SES - 31

02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER: South of Holmes Road, East of Swinnea Road, West of Tchulahoma Road.

03 CITY: Memphis

04 STATE: TN | 05 ZIP CODE: 38129 | 06 COUNTY: Shelby | 07 COUNTY CODE: 157 | 08 CONG DIST: 08

09 COORDINATES LATITUDE: 350005. | LONGITUDE: 895744.

10 DIRECTIONS TO SITE (Starting from nearest public road): Immediately south of Jackson Pits Area

III. RESPONSIBLE PARTIES

01 OWNER (if known): W.S. Jordan

02 STREET (Business, mailing, residential):

03 CITY: Memphis | 04 STATE: TN | 05 ZIP CODE: | 06 TELEPHONE NUMBER: (901) 363-2345

07 OPERATOR (If known and different from owner):

08 STREET (Business, mailing, residential):

09 CITY: | 10 STATE: | 11 ZIP CODE: | 12 TELEPHONE NUMBER: ( )

13 TYPE OF OWNERSHIP (Check one)
☒ A. PRIVATE ☐ B. FEDERAL: ______ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER: ______ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
☐ A. RCRA 3001 DATE RECEIVED: __/__/__ (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: __/__/__ (MONTH DAY YEAR) ☒ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION
☒ YES ☐ NO DATE: 8/19/80 (MONTH DAY YEAR)

BY (Check all that apply)
☒ A. EPA ☐ B. EPA CONTRACTOR ☐ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: ______ (Specify)
CONTRACTOR NAME(S):

02 SITE STATUS (Check one)
☐ A. ACTIVE ☒ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION
______ BEGINNING YEAR ______ ENDING YEAR ☒ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
No indications of problems noted on 8/19/80 inspection

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
None known.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
☐ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☒ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT: W.S. Jordan | 02 OF (Agency/Organization): Owner | 03 TELEPHONE NUMBER: (901) 363-2345

04 PERSON RESPONSIBLE FOR ASSESSMENT: Michael d. Higgs | 05 AGENCY: TN. Dept. of Health & Env. | 06 ORGANIZATION: Division of Solid Waste Management | 07 TELEPHONE NUMBER: (615) 741-6287 | 08 DATE: 12.20.83 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

79-768

000001

SES-31

REGION 4 | **SITE NUMBER** (to be assigned by Hq) TN000001040

EPA — POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (Section II). File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335), 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: SES-31 (SIL)

B. STREET (or other identifier): South side of Holmes Rd ([redacted]); East of Riverview Rd.; West of Ichulahoma

C. CITY: Memphis

D. STATE: Tenn

E. ZIP CODE:

F. COUNTY NAME: Shelby

G. SITE OPERATOR INFORMATION
1. NAME:
2. TELEPHONE NUMBER:
3. STREET:
4. CITY:
5. STATE:
6. ZIP CODE:

H. REALTY OWNER INFORMATION (if different from operator of site)
1. NAME:
2. TELEPHONE NUMBER:
3. CITY:
4. STATE:
5. ZIP CODE:

I. SITE DESCRIPTION: Old gravel pit. Now overgrown. No sign of stain, leachate, or disturbance

J. TYPE OF OWNERSHIP
☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.):

B. APPARENT SERIOUSNESS OF PROBLEM
☐ 1. HIGH ☐ 2. MEDIUM ☐ 3. LOW ☒ 4. NONE

C. PREPARER INFORMATION
1. NAME: Tom Runyon
2. TELEPHONE NUMBER: 404/881-7428
3. DATE (mo., day, & yr.): 9/9/80

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION
1. NAME: Tom Runyon
2. TITLE: Environmental Engr.
3. ORGANIZATION: U.S. EPA, Region IV
4. TELEPHONE NO. (area code & no.): 404/881-7428

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
George Harvell	U.S. EPA, Region IV	404/881-4901
Tom Runyon	" "	404/881-7428

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, residents)

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
Mr. W. I. Jordan	Owner/supervisor of contractor reclaiming adjacent land 901/363-2345	

79-768

000002

Continued From Front

III. INSPECTION INFORMATION (continued)

D. GENERATOR INFORMATION (sources of waste)

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERATED

E. TRANSPORTER/HAULER INFORMATION

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORTED

F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.

1. NAME	2. TELEPHONE NO.	3. ADDRESS

G. DATE OF INSPECTION (mo., day, & yr.)	H. TIME OF INSPECTION	I. ACCESS GAINED BY: (credentials must be shown in all cases)
8/19/80	2:40 pm	☐ 1. PERMISSION ☐ 2. WARRANT

J. WEATHER (describe)

sunny & hot (dry)

IV. SAMPLING INFORMATION

A. Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

1. SAMPLE TYPE	2. SAMPLE TAKEN (mark 'X')	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
a. GROUNDWATER			
b. SURFACE WATER			
c. WASTE			
d. AIR			
e. RUNOFF			
f. SPILL			
g. SOIL			
h. VEGETATION			
i. OTHER (specify)			

B. FIELD MEASUREMENTS TAKEN (e.g., radioactivity, explosivity, PH, etc.)

1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS
79-768		000003

Continued From Page 2

IV. SAMPLING INFORMATION (continued)

C. PHOTOS

1. TYPE OF PHOTOS: ☒ a. GROUND ☐ b. AERIAL

2. PHOTOS IN CUSTODY OF: Tom Runyon

D. SITE MAPPED?

☒ YES. SPECIFY LOCATION OF MAPS: Southeast quad map of Memphis (Epic site # 31 red)

E. COORDINATES

1. LATITUDE (deg.-min.-sec.): 35° 06' 05" N

2. LONGITUDE (deg.-min.-sec.): -89° 57' 44" W

V. SITE INFORMATION

A. SITE STATUS

☐ 1. ACTIVE (Those inductrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if intrequently.)

☐ 2. INACTIVE (Those sites which no longer receive wastes.)

☐ 3. OTHER (specify): _____ (Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

☐ 1. NO ☐ 2. YES (specify generator's four-digit SIC Code): _____

C. AREA OF SITE (in acres)

D. ARE THERE BUILDINGS ON THE SITE?

☐ 1. NO ☐ 2. YES (specify):

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

X	A. TRANSPORTER	X	B. STORER	X	C. TREATER	X	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION		3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY		4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify)
					9. OTHER (specify):		

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this for..

☐ 1. STORAGE ☐ 2. INCINERATION ☐ 3. LANDFILL ☐ 4. SURFACE IMPOUNDMENT ☐ 5. DEEP WELL

☐ 6. CHEM/BIO/PHYS TREATMENT ☐ 7. LANDFARM ☐ 8. OPEN DUMP ☐ 9. TRANSPORTER ☐ 10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE

☐ 1. LIQUID ☐ 2. SOLID ☐ 3. SLUDGE ☐ 4. GAS

B. WASTE CHARACTERISTICS

☐ 1. CORROSIVE ☐ 2. IGNITABLE ☐ 3. RADIOACTIVE ☐ 4. HIGHLY VOLATILE

☐ 5. TOXIC ☐ 6. REACTIVE ☐ 7. INERT ☐ 8. FLAMMABLE

☐ 9. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

79-768

100004

B&V WASTE SCIENCE AND TECHNOLOGY CORP.
The Curtis Center, Suite 705, 601 Walnut Street, Philadelphia, Pennsylvania 19106-3307, (215) 928-0700, Fax (215) 928-1780

NET

79-768 41
See attached
water behind
this letter.
KG

US EPA - Region 4
ARCS - Site Assessment

B&V Project 52012.169
B&V File 52012.169
January 11, 1994

Refer to
Site 7967

NFRAP

U.S. Environmental Protection Agency
Site Assessment Section
345 Courtland Street, NE
Atlanta, Georgia 30365

Subject: Duplicate Site
SES-31
EPA ID# TND 051386258

Attention: Robert Morris, SAM

Dear Robert:

During the background investigation of the SES-31 site (TND 051386258), we found similarities with another site, Extraction Area (TND 980728182), that we prepared SIP report for in September 1993. The review of the background information leads us to believe that these two sites are the same site.

This is based on the following information:

- The locations provided in the Site Inspection reports (SI) performed by Tom Runyon and George Harvell on August 19, 1980, are identical. We have enclosed a copy of both of the SI reports for your use.
- The site descriptions in the SI reports are similar. The USGS Quad map for Southeast Memphis also indicates that the area has overgrown gravel pits.
- The inspectors were at both sites at the same time (2:40 pm) on the same date (8/19/80).
- The inspectors information regarding site mapping (section IV, part D), calls the SES-31 site "EPIC site #31 red", and the Extraction Area site "EPIC site

Site Assessment Section
Robert Morris, SAM

B&V Project 52012.169
January 11, 1994

#31 red - extraction".

- The SI reports list the identical latitude and longitude for the SES-31 and Extraction Area sites.

- The inspectors interviewed the same Site Representative for the SES-31 and Extraction Area sites.

Therefore, we recommend that the SES-31 site (TND 051386258) be deleted and all references and information concerning this file should be combined with the file for the Extraction Area site (TND 980728182).

79675

Very truly yours,

BLACK & VEATCH Waste Science, Inc.

Dane G. Pehrman
Project Manager

pd/DGP
Enclosures

cc: Hubert Wieland, BVWS-Atlanta
Tim Travers, BVWS-Philadelphia

79-768

000006

TNR 00 002 8761

MLGW-ASR WELL LOT

DATA (02)

MEMP
C.Dowlen
615-532-0316

SQG

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION **FORM HN - H**
DIVISION OF SOLID WASTE MANAGEMENT
INSTALLATION REGISTRATION AND NOTIFICATION

THIS FORM IS USED TO REGISTER NEW HAZARDOUS WASTE FACILITIES OR TO ALLOW ANY EXISTING BUSINESSES TO NOTIFY THE STATE OF ANY INFORMATIONAL UPDATE OF HAZARDOUS WASTE ACTIVITY THAT WE HAVE ON FILE. FOR ANNUAL REPORTS, PREVIOUSLY SUBMITTED DATA WILL BE PRE-PRINTED ON THIS FORM. VERIFY THE SUPPLIED DATA IS CORRECT, MAKE ANY NECESSARY CHANGES AND RETURN THIS FORM WITH YOUR ANNUAL REPORT PACKET. NOTE THIS IS A TWO SIDED FORM.

EPA ID NUMBER ▶ TNR000028761

GIA NUMBER 327453
MEMPHIS LIGHT, GAS AND WATER DIVISION

PREVIOUS EPA ID NUMBER (IF YOU MOVED)

BUSINESS NAME ▶ MLGW - ASR WELL LOT

PART 1 - PHYSICAL LOCATION (DO NOT USE PO BOX NUMBERS)

STREET, ROAD, OR DIRECTIONS TO YOUR SITE	CITY	STATE	ZIP
2686 E. HOLMES ROAD	MEMPHIS	TN	38118

PHONE	FAX	E-MAIL	COUNTY
(901) 528-4194			SHELBY

PART 2 - MAILING ADDRESS

SEND MAIL TO / ATTENTION OF:	MAIL ADDRESS
Kerry Roy BL-153	P.O. BOX 430

CITY	STATE	ZIP	FOREIGN PROVINCE	FOREIGN MAIL CODE	COUNTRY
MEMPHIS	TN	38118			

PART 3 - BUSINESS OWNER ADDRESS

OWNER NAME AND TITLE	ADDRESS
MLGW	PO BOX 430

CITY	STATE	ZIP	FOREIGN PROVINCE	FOREIGN MAIL CODE	COUNTRY
MEMPHIS	TN	38118			

PHONE	FAX	E-MAIL	DATE OWNERSHIP BEGAN	*OWNER CODE	*LAND CODE
901-528-4194	901-528-7764				M

* OWNER / LAND CODE CHOICES: Federal (F); State (S); Private (P); Indian (I); County (C); Municipal (M); District (D); Other (O)

PART 4 - BILLING ADDRESS

SEND INVOICE TO THE ATTENTION OF:	MAIL ADDRESS
Kerry Roy	Same as above

CITY	STATE	ZIP	FOREIGN PROVINCE	FOREIGN MAIL CODE	COUNTRY

PART 5 - BUSINESS OR SITE MANAGER

NAME AND TITLE	ADDRESS	CITY, STATE, ZIP
KERRY ROY BL153 Env Engineer	PO BOX 430	MEMPHIS TN 38118

PHONE	CELL PHONE	FAX	EMAIL
(901) 528-4194	901-491-0437	(901) 528-7764	KROY@MLGW.ORG

PART 6 - SITE TECHNICAL CONTACT

NAME AND TITLE	ADDRESS	CITY, STATE, ZIP
KERRY ROY BL153 Env Engineer	PO BOX 430	MEMPHIS TN 38118

PHONE	CELL PHONE	FAX	EMAIL
(901) 528-4194	901-491-0437	(901) 528-7764	KROY@MLGW.ORG

PART 7 - SITE EMERGENCY CONTACT

NAME AND TITLE	ADDRESS	CITY, STATE, ZIP
KERRY ROY BL153 Env Engineer	PO BOX 430	MEMPHIS TN 38118

PHONE	CELL PHONE	FAX	EMAIL
(901) 528-4194	901-491-0437	(901) 528-7764	KROY@MLGW.ORG

OTHER SITE INFORMATION ▶ | 2700+ | WATER SUPPLY (CHECK ALL THAT APPLY) ☐ WELL ☐ SPRING ☐ PUBLIC WATER SUPPLY ☐ OTHER | SEWER (CHECK ALL THAT APPLY) ☐ SEPTIC TANK ☐ POTW ☐ NPDES ☐ OTHER

OTHER PERMITS WITH TDEC ▶ (CHECK ALL THAT APPLY) ☐ SOLID WASTE ☐ AIR ☐ WATER ☐ GROUNDWATER ☐ HAZ WASTE TSDF ☐ HAZ WASTE TRANSPORTER ☐ HAZ WASTE TRANSFER FACILIT ☐ PERMIT BY RULE

INDUSTRIAL CLASSIFICATION NAICS CODE = NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM (REPLACES THE SIC CODE SYSTEM)

FOLLOWING IS A LIST OF COMMONLY FOUND NAICS CODES. CHECK ONE THAT BEST IDENTIFIES THE INDUSTRIAL CLASSIFICATION OF YOUR SITE. IF NOT ON THIS CHECKLIST, ENTER INFORMATION BELOW IN THE SPACE PROVIDED. ADDITIONAL INFORMATION ON NAICS CODES IS AVAILABLE AT THIS WEBSITE http://www.census.gov/epcd/www/naics.html

811121 ☐	AUTOMOTIVE BODY, PAINT, AND INTERIOR REPAIR AND MAINTENANCE	454312 ☐	LIQUEFIED PETROLEUM GAS (BOTTLED GAS) DEALERS
811198 ☐	ALL OTHER AUTOMOTIVE REPAIR AND MAINTENANCE	621511 ☐	MEDICAL LABORATORIES
811111 ☐	AUTOMOTIVE REPAIR (GENERAL)	335312 ☐	MOTOR AND GENERATOR MANUFACTURING
61131 ☐	COLLEGES, UNIVERSITIES, AND PROFESSIONAL SCHOOLS	336211 ☐	MOTOR VEHICLE BODY MANUFACTURING
323111 ☐	COMMERCIAL GRAVURE PRINTING	92811 ☐	NATIONAL SECURITY
339914 ☐	COSTUME JEWELRY AND NOVELTY MANUFACTURING	44111 ☐	NEW CAR DEALERS
49211 ☐	COURIERS	221113 ☐	NUCLEAR ELECTRIC POWER GENERATION
81232 ☐	DRYCLEANING AND LAUNDRY SERVICES (NOT COIN OPERATED)	32551 ☐	PAINT AND COATING MANUFACTURING
332813 ☐	ELECTROPLATING, PLATING, POLISHING, ANODIZING, AND COLORING	325412 ☐	PHARMACEUTICAL PREPARATION MANUFACTURING
221112 ☐	FOSSIL FUEL ELECTRIC POWER GENERATION	325992 ☐	PHOTOGRAPHIC FILM, PAPER, PLATE, AND CHEMICAL MANUFACTURING
62211 ☐	MEDICAL AND SURGICAL HOSPITALS (GENERAL)	486210 ☐	PIPELINE TRANSPORTATION OF NATURAL GAS
49311 ☐	WAREHOUSING AND STORAGE (GENERAL)	325211 ☐	PLASTICS MATERIAL AND RESIN MANUFACTURING
332212 ☐	HAND AND EDGE TOOL MANUFACTURING	323114 ☐	PRINTING (QUICK PRINTING)
562211 ☐	HAZARDOUS WASTE TREATMENT AND DISPOSAL	54171 ☐	RESEARCH AND DEVELOPMENT IN THE PHYSICAL, ENGINEERING, AND LIFE SCIENCES
333414 ☐	HEATING EQUIPMENT (EXCEPT WARM AIR FURNACES) MANUFACTURING	326192 ☐	RESILIENT FLOOR COVERING MANUFACTURING
221111 ☐	HYDROELECTRIC POWER GENERATION	337215 ☐	SHOWCASE, PARTITION, SHELVING AND LOCKER MANUFACTURING
32512 ☐	INDUSTRIAL GAS MANUFACTURING	311942 ☐	SPICE AND EXTRACT MANUFACTURING
337127 ☐	INSTITUTIONAL FURNITURE MANUFACTURING		

OTHER NAICS CODE (IF NOT LISTED ABOVE)(SEE WEBSITE)	DESCRIPTION OF INDUSTRIAL ACTIVITY (RELATED TO NAICS CODE YOU ENTERED AT LEFT)
221122	

OTHER WASTE ACTIVITY AT THIS INSTALLATION OR SITE (CHECK ANY AND ALL THAT MAY APPLY)

USED OIL

- ☐ USED OIL TRANSPORTER
- ☐ USED OIL TRANSFER FACILITY
- ☐ USED OIL PROCESSOR
- ☐ USED OIL RE-REFINER
- ☐ OFF SPECIFICATION USED OIL BURNER
- ☐ MARKETER WHO DIRECTS SHIPMENT OF OFF SPECIFICATION USED OIL TO OFF SPECIFICATION USED OIL BURNER

UNIVERSAL WASTE

GENERATE	MANAGE
☐ BATTERIES	☐ BATTERIES
☐ LAMPS	☐ LAMPS
☐ PESTICIDES	☐ PESTICIDES
☐ MERCURY CONTAINING EQUIPMENT	☐ MERCURY CONTAINING EQUIPMENT

☐ CHECK HERE IF THIS SITE IS A "UNIVERSAL WASTE DESTINATION FACILITY"

RECYCLING

- ☐ COMMERCIAL RECYCLER
- ☐ NON-COMMERCIAL RECYCLER

TO COMPLETE THIS FORM ▶ PROVIDE DATA OR MAKE CORRECTIONS TO PREPRINTED DATA AS NEEDED. NOTE: THIS IS A TWO SIDED FORM. FOR MORE INFORMATION CONTACT THE WASTE ACTIVITY AUDIT SECTION AT 1-800-237-7018 OR FAX TO: 615-532-0886. TO PAY ANNUAL FEES AND VIEW OTHER USEFUL INFORMATION, VIEW OUR WEBSITE AT: http://www.state.tn.us/environment/swm/

RETURN COMPLETED FORMS TO: ▶ TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION DIVISION OF SOLID WASTE MANAGEMENT
WASTE ACTIVITY AUDIT SECTION 401 CHURCH STREET, FIFTH FLOOR L & C TOWER NASHVILLE, TN 37243-1535

CERTIFICATION

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION ACCORDING TO A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THIS REPORTING SYSTEM OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THIS INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT OR BOTH FOR KNOWING VIOLATIONS.

Kerry R. Roy
SIGNATURE OF AUTHORIZED REPRESENTATIVE

Kerry R. Roy
PRINTED NAME

Environmental Engineer
TITLE

2.10.10
DATE

D Dowlen
615-532-0316
Page 1 of 1
12/21/2009 9:56:34 AM

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
SOLID WASTE MANAGEMENT

HAZARDOUS WASTE STREAM REPORT

FORM WSR

WASTE STREAM NUMBER: TNR000028761-1

1

REPORT YEAR: 2009 | [✓] ANNUAL REPORT [ ] INFORMATION UPDATE [ ] NEW WASTE STREAM

US EPA ID NUMBER: TNR000028761

BUSINESS NAME: MLGW - ASR WELL LOT

ITEM 1- HAZARDOUS WASTE STREAM DESCRIPTION AND PROCESS

1a- WASTE STREAM NAME: HYDROGEN PEROXIDE (40% - 60%)

1b- HOW IS THIS WASTE GENERATED? OFF-SPEC PRODUCT

1(b)1- SOURCE CODE: G11

1c- UNITS OF MEASURE
CHECK ONE: USE SAME UNIT OF MEASURE ON ALL ATTACHMENTS.
Kg [ ] I AM REPORTING IN KILOGRAMS
lbs [✓] I AM REPORTING IN POUNDS
10 lbs / gal

1d- GENERATION FREQUENCY
[✓] ONE TIME GENERATION
[ ] REGULARLY GENERATED
[ ] INTERMITTENTLY GENERATED

1e- WASTE STREAM STATUS
~~[✓] ACTIVE~~
[✓] CLOSED (SEE 1g)
KRR

1f- HAZARD CRITERIA
[ ] IGNITABLE
[ ] TCLP
[✓] CORROSIVE
[ ] REACTIVE
[ ] LISTED

1g- GENERATION DATES
DATE GENERATION BEGAN: 11/18/2009
DATE NO LONGER GENERATED: 11/18/2009

1h- EPA HAZARDOUS WASTE CODES (LIST CODES IN THIS ORDER: P, D, F, U, AND K)
D002
D002

1i- TN / RCRA RADIOACTIVE MIXED WASTE (YES OR NO): NO

1j- MONTHLY MAXIMUM GENERATED
499 KG
1100 LBS *

1k- pH	1l- FLASH POINT	1m- BTU PER POUND	1n- REACTIVE CODES	1o- WASTE FORM CODE	1p- NAICS CODE - up to 2
2	> 200			W110	221122

1q- U.S. DOT SHIPPING NAME	1r- U.S. DOT HAZARD CLASS	1s- U.S. DOT ID CODE
WASTE HYDROGEN PEROXIDE	5.1	2014

ITEM 2- WASTE STREAM CONSTITUENTS

	2a- HAZARDOUS WASTE CONSTITUENT	2b- LOWER VALUE	2c- UPPER VALUE	2d- CONCENTRATIONS PPM	%VOLUME	%WEIGHT
1	HYDROGEN PEROXIDE	0	60	%VOL		
2						
3						
4						
5						

ITEM 3- ANNUAL GENERATION AND HANDLING

NOTE: 3a + 3b - 3c = 3d 3d = 4a + 5a + 5b + 5c + 5d

3a- AMOUNT GENERATED	3b- AMOUNT ONSITE JAN 1st 2009	3c- AMOUNT ONSITE DEC 31st 2009	3d- AMOUNT HANDLED
1,010	0	0	1,010

ITEM 4- OFFSITE SHIPPING

4a- TOTAL AMOUNT SHIPPED OFFSITE	4b- STATE CODES: STORAGE AND FINAL DISPOSAL / TREATMENT	4c- EPA MANAGEMENT METHOD
1,010	SOI, TOT	H 040 H H

CN-0773

(CONTINUED ON REVERSE)

RDA 2203

HAZARDOUS WASTE STREAM REPORT - FORM WSR

HYDROGEN PEROXIDE (40% - 60%)

US EPA ID NUMBER	BUSINESS NAME	WASTE STREAM #
TNR000028761	MLGW - ASR WELL LOT	1

ITEM 5- TSD PERMITTED STORAGE ONLY - OR - FACILITY'S ONSITE HANDLING or TREATMENT

5a- AMOUNT OF 3d HANDLED ONSITE	STATE CODES: TREATMENT, STORAGE, DISPOSAL, HANDLING	EPA MANAGEMENT METHOD
0		H
5b- AMOUNT OF 3d HANDLED ONSITE	STATE CODES: TREATMENT, STORAGE, DISPOSAL, HANDLING	EPA MANAGEMENT METHOD
		H
5c- AMOUNT OF 3d HANDLED ONSITE	STATE CODES: TREATMENT, STORAGE, DISPOSAL, HANDLING	EPA MANAGEMENT METHOD
		H
5d- AMOUNT OF 3d HANDLED ONSITE	STATE CODES: TREATMENT, STORAGE, DISPOSAL, HANDLING	EPA MANAGEMENT METHOD
		H

ITEM 6- HAZARDOUS WASTE REDUCTION

6a- THIS YEAR RATIO	6b- GOAL YEAR RATIO	6c- GOAL YEAR	6d- WASTE / TOXICITY REDUCTION EFFORT CODES	6e- WASTE REDUCTION IMPEDIMENT CODES	6f- CHANGE IN TOXICITY
1	0	2010	g	e	☐ INCREASE ☐ DECREASE ☒ NO CHANGE

6g- NARRATIVE: EXPLAIN REPORTED DATA (IF APPLICABLE)

This material was a product stored at a well lot. The ASR program was discontinued, and the material was put on the TN Material Exchange list. No use could be found for this product, so it was disposed as a HW.

6h- NARRATIVE: IF NO NUMERIC GOAL EXPLAIN WHY

There will not be any future generation activities at this site.

ITEM 7- FACILITY COMMENTS

CERTIFICATION

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT OR BOTH FOR KNOWING VIOLATIONS.

Kerry R. Roy
SIGNATURE OF AUTHORIZED REPRESENTATIVE

Kerry R. Roy
PRINTED NAME

Environmental Engineer
TITLE

2. 10. 2010
DATE

TDEC USE ONLY

(NH) NOT HAZARDOUS
(PE) PARTIAL EXEMPTION
(V) VARIANCE GRANTED
(R) MIXED RAD WASTE
(TR) TREATMENT RESIDUE
(H) HAZARDOUS
(C) CORR ACTION
(W) WASTE WATER Rx
(RR) RES RECOVERY
(N) NO LONGER GEN
(CF) COMPARABLE FUELS
(U) UNIVERSAL WASTE

STATUS	FURTHER REPORTING	REVIEWER	REC'D DATE
	☐ YES ☐ NO		

NOTES

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

HAZARDOUS WASTE OFFSITE SHIPPING

PLEASE MAKE ENTRIES LEGIBLE

FORM OSR

PAGE 1 OF 1

YEAR 2009

US EPA ID NUMBER: TNR000028761

BUSINESS NAME: MLGW - ASR WELL LOT

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
WASTE STREAM NUMBER USE "FS" IF FROM PERMITTED STORAGE	WASTE STREAM NAME OR US DOT SHIPPING NAME	EPA WASTE CODES	AMOUNT SHIPPED UNITS YOU ARE USING (CHECK ONLY ONE) ( )KG (X)LBS INDICATE UNITS AND USE SAME UNITS THROUGHOUT	NUMBER OF SHIPMENTS	TRANSPORTER 1 US EPA ID NUMBER	DESIGNATED FACILITY US EPA ID NUMBER (PER UNIFORM HAZARDOUS WASTE MANIFEST)	TSDR HANDLING CODES	EPA MANAGEMENT METHOD CODE
a 1	Hydrogen Peroxide (40% - 60%)	D002	1,010	1	TNR000123497	TND000772186	S01, T07	H040
b								
c								
d								
e								
f								
g								
h								
i								

TOTAL AMOUNT SHIPPED (TOTAL OF COLUMN 4) ▶ 1,010 | 1 ◀ TOTAL SHIPMENTS

GRAND TOTAL OF ALL PAGES (IF THIS PAGE IS THE LAST PAGE) (TOTAL AMOUNT SHIPPED OFFSITE FOR ENTIRE REPORT YEAR) ▶ 1,010

CERTIFICATION I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT OR BOTH FOR KNOWING VIOLATIONS.

Kerry R. Roy — SIGNATURE OF AUTHORIZED REPRESENTATIVE — 2.11.10 DATE

Kerry R. Roy — PRINTED NAME

CN-0779

RDA 2203

Instructions for FORM OSR

For wastes shipped offsite only.

Summarize your offsite shipments of hazardous wastes for the reporting year. This information must be obtained from, and accountable to, your hazardous waste manifest copies returned by the TSDR. You and your TSDR must reconcile any manifest differences and report only the mutually corrected amounts or else file manifest discrepancy reports. Document the reasons for any corrections by using TSDR analyses, actual weights from scale receipts, manifest changes, etc.
Complete one line for each combination of initial transporter and TSDR who handled a waste. If the facility did not ship hazardous waste offsite for this report year, write "No Shipments" in the US DOT Shipping Name of "line a" and certify the report. If some wastes were shipped offsite, but others were not, omit those that were not shipped offsite.

COLUMN 1 WASTE STREAM NUMBER

Enter the source of the waste as the waste stream number from your Hazardous Waste Stream Report forms. For mixtures, enter as many numbers as appropriate. If you are a Treatment Storage and Disposal Recycling Facility and the waste is being shipped directly from your RCRA permitted storage, enter "FS" (From Permitted Storage) .

COLUMN 2 WASTE STREAM NAME or US DOT SHIPPING NAME

Enter only one of either a descriptive waste name or the DOT shipping name. Enter each different waste or waste combination on a separate line. Enter various mixtures of the same constituent wastes on the same line unless the hazard characteristics of the resultant mixtures are different.

COLUMN 3 EPA WASTE CODES

Enter the applicable hazardous waste code(s) which identifies the waste or combination of wastes. See Rules 1200-1-11-.02(3) and (4) for the EPA waste codes. (For example, F001, K001, D001.)

COLUMN 4 AMOUNT SHIPPED (in kilograms or pounds) YOU MUST DESIGNATE HOW YOU ARE REPORTING BY CHECKING KG OR LBS

Enter the amount of wastes in kilograms or pounds that you shipped during the reporting year to the specified TSDR facility by the specified transporter. Use the Total Quantity (Item 13) from the Manifest after converting it to kilograms or pounds. The weight reported should include the weight of the drum unless you know that the waste will be removed from the drum and the drum will not be handled as a hazardous waste. For generators, this amount should match the total of items 4a of the Waste Stream Reports that are included on this line. For TSDR's, it should match the lines on the Summary Report with the word "SHIPPED" in the handling column and the total of item 4a of the WS report.

COLUMN 5 NUMBER OF SHIPMENTS

Enter the number of separately manifested shipments during the reporting year for each line completed.

COLUMN 6 TRANSPORTER 1 US EPA ID NUMBER

Enter the US EPA ID NUMBER of the initial transporter (transporter 1 on the manifest) who picked up the waste. Enter only one number.

COLUMN 7 DESIGNATED FACILITY US EPA ID NUMBER

Enter the US EPA ID NUMBER of the designated facility to which the waste was shipped. Enter only one number.

COLUMN 8 TSDR HANDLING CODES

Enter the TSDR Handling Codes that most closely represent the techniques you contracted to be used at the facility that received this waste. Enter all codes that are applicable in the order of handling of the waste. Use only the TSDR Handling Codes and not the Waste Management Codes.

COLUMN 9 EPA MANAGEMENT METHOD CODE

Enter the System Code that best represents the techniques you used to handle the waste through final disposition. Refer to the System Type Code Form.

STATE OF TENNESSEE
DIVISION OF SOLID WASTE MANAGEMENT
WASTE ACTIVITY AUDIT SECTION

HAZARDOUS WASTE STREAM SUMMARY REPORT

TNR000028761 MLGW - ASR WELL LOT MEMPHIS DATE NOTIFIED 12/10/2009

WASTESTREAM NUMBER ACTUAL	WASTESTREAM NUMBER PRINTED	WASTESTREAM DESCRIPTION	WASTESTREAM PROCESS
CLOSED			
1	PRINT: 1	HYDROGEN PEROXIDE (40% - 60%)	OFF SPEC PRODUCT

1 CLOSED WASTE STREAMS

THIS FACILITY HAS 1 WASTE STREAM(s)

MEMPHIS LIGHT, GAS AND WATER DIVISION

February 26, 2010

Mr. Dave Dowlen
TDEC-DSWM-WAAS
5th Floor L&C Tower
401 Church Street
Nashville, TN 37243

RE: 2009 Annual Hazardous Waste Report
Memphis Light, Gas and Water Division
220 South Main Street
Memphis, TN 38103
#7005 0390 0006 1298 9414

Dear Mr. Dowlen,

Please find the enclosed 2009 Installation Registration and Notification Forms, the Waste Stream Reports and the Off-site Shipping Reports for the following Memphis Light, Gas and Water facilities:

1. Arlington LNG Plant – TNR000024794, GIA 311521;
2. ASR Well Lot – TNR000028761, GIA 327453;
3. Capleville LNG Plant – TNR000025007, GIA 311521;
4. Central Shops – TND980601835, GIA 13811;
5. Electric & System Operations – TNR000006122, GIA 311521;
6. Heavy Equipment Building – TNR000025999, GIA 324537;
7. Investment Recovery & Salvage – TNR000012179, GIA 311521;
8. North Service Center – TND987789062, GIA 15853;
9. Sheahan Pumping Station – TNR000025015, GIA 311521; and
10. South Service Center – TNR000006114, GIA 15856.

Please note that copies of the Generator Fee Determination Forms, along with MLGW Check 638809, has been sent via certified mail to the DSWM Fee Section. If you have any questions or require further information, please contact me at (901) 528-4194 or via email at kroy@mlgw.org.

Sincerely,

Kerry Roy

Kerry Roy, P.E.
Environmental Engineer
MLGW Environmental Affairs

Enclosure

GIA NUMBER 327453

State of Tennessee
Department of Environment and Conservation
Division of Solid Waste Management

ANNUAL HAZARDOUS WASTE GENERATION FEE DETERMINATION

FORM G-FDS
GENERATOR
REPORT YEAR 2009

US EPA ID NUMBER	SITE, BUSINESS, OR INSTALLATION NAME		
TNR000028761	MLGW ASR WELL LOT		
START HERE ▶▶	**Check (✓) the Unit of Measure:** (Pounds = Kilograms multiplied by 2.2046)	**POUNDS** ☑	**KILOGRAMS** ☐
Change of Ownership or Location?	YES ☐	NO ☑	

Part 1 Generation:

Lines 1 - 4 are designed to establish your appropriate hazardous waste generator base fee category according to Rule 1200-1-11-.08(5)(a). Refer to Rules 1200-1-11-.02(1)(d)3(II) and 1200-1-11-.02(1)(e)3 and 4 for more information on determining generator status as a Large Quantity Generator (LQG), Small Quantity Generator (SQG) or Conditionally Exempt Small Quantity Generator (CESQG). For a list of wastes that are excluded from generation fees, see the instruction handout for this form. (**NOTE**: Do not include wastes generated from the cleanup or containment of a Superfund site or a spill on public property.)

CHECK (✓) only one in each category for Lines 1 - 4 (for the report year):

Largest amount of hazardous waste generated in any calendar month in the report year.	☐	Zero amounts, none generated.	$0	LINE 1
	☐	Greater than zero but less than or equal to 100 kg (220 lbs).	$0	
	☑	Greater than 100 kg (220 lbs) but less than 1000 kg (2200 lbs).	$1000	
	☐	1000 kg (2200 lbs) or more.	$1600	
Largest amount of Hazardous Waste Accumulated at anytime in the report year (prior to being shipped offsite).	☐	Zero amounts, none accumulated.	$0	LINE 2
	☑	More than zero but less than or equal to 1000 kg (2200 lbs).	$0	
	☐	Greater than 1,000 kg (2200 lbs).	$1000	
Largest amount of acute Hazardous waste generated in any calendar month of the report year.	☑	Zero amounts, none generated.	$0	LINE 3
	☐	1 kilogram (2.2 lbs) or more.	$1600	
Largest amount of acute hazardous waste spill cleanup residue generated in any calendar month of the report year.	☑	Zero amounts, none generated.	$0	LINE 4
	☐	100 kg (220 lbs) or more.	$1600	

Hazardous Waste Generation Base Fee (From Lines 1 through 4) **ENTER on Line 5 the largest applicable fee amount not the sum of each line.**	$1,000.00	LINE 5

Part 2 Shipping: (IF LINE 5 IS $0, SKIP TO PART 3)

Enter the total amount of Hazardous Waste Shipped during the report year.	1,010.00	LINE 6
Amount of Line 6 resulting from a TDEC or EPA remediation or corrective action activity.	0.00	LINE 7
Amount of Line 6 that was recycle/recovered through Ion Exchange (T30), Distillation (T54), Solvent Recovery (T63), Lead smelting, Precious Metals Recovery, and/or High Temperature Metal Recovery.	0.00	LINE 8
Amount of Line 6 with a thermal heating value greater than 5000 BTU per pound that was legitimately recycle by burning it as a fuel in a boiler or industrial furnace (T50 and T80 through T93 or blending it into such fuel.	0.00	LINE 9
Amount of Line 6 that was wastewaters [< 1% total organic carbon (TOC) and < 1% total suspended solids (TSS)].	0.00	LINE 10
Multiply Line 10 by $0.004 (if in Pounds) or $0.0088184 (if in Kilograms).	0.00	LINE 11
Add Lines 7, 8, 9, and 10.	0.00	LINE 12
Subtract Line 12 from Line 6.	1,010.00	LINE 13
Multiply Line 13 by $0.0075 (if in Pounds) or $0.0165345 (if in Kilograms).	7.58	LINE 14
Multiply Line 9 by $0.001 (if in Pounds) or $0.0022046 (if in Kilograms).	0.00	LINE 15
Add Lines 11, 14, and 15.	7.58	LINE 16

ENTER on Line 17 the amount from Line 16 or $25,000 (whichever is	**$7.57**		**LINE 17**

CN-0906 Continued RDA 2203

Part 3 Summary of Generator Fees:

Hazardous Waste Generator Base Fee (From Line 5)	1,000.00	E18	LINE 18
Hazardous Waste Shipping Fee (From Line 17)	$7.57	E58	LINE 19
Total Hazardous Waste Generator Fees ▶ Pay This Amount (Add Lines 18 and 19.)	**$1,007.57**		LINE 20

NOTE:

(1) TREATMENT, STORAGE AND DISPOSAL FACILITIES ARE ALSO REQUIRED TO COMPLETE **Form TSD-FDS.**

(2) *** DO NOT SEND CASH *** MAKE CHECK PAYABLE TO ..... **TREASURER, STATE OF TENNESSEE"**

(3) INCLUDE THE FACILITY'S GIA NUMBER OR US EPA ID NUMBER ON THE CHECK and/or check stub.

(4) SEND TO:

STATE OFTENNESSEE
DEPARTMENT OF ENVIRONMENT and CONSERVATION
DIVISION OF SOLID WASTE MANAGEMENT - FEE SECTION (HWM)
14TH FLOOR, L & C TOWER ANNEX
401 CHURCH ST
NASHVILLE, TN 37243

Part 4 CERTIFICATION:

I CERTIFY UNDER PENALTY OF LAW THAT THESE DOCUMENTS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, ARE TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT OR BOTH FOR KNOWING VIOLATIONS.

	KERRY ROY
SIGNATURE OF AUTHORIZED REPRESENTATIVE	PRINTED NAME
ENV ENGINEER	02/10/2010
TITLE	DATE

FOR ASSISTANCE, CONTACT YOUR AREA DIVISION OF SOLID WASTE MANAGEMENT REPRESENTATIVE

MEMPHIS LIGHT, GAS AND WATER DIVISION
P.O. BOX 430 MEMPHIS, TENNESSEE 38101-0430
void if not presented within 90 days

ACCOUNT NUMBER

DATE MO 02 DA 25 YR 10

638809

PAY FIVE THOUSAND FORTY TWO AND 37/100

TO THE ORDER OF

CHECK AMOUNT
*****5,042.37

TREASURER, STATE OF TENNESSEE
ENVIRONMENT & CONSERVATION
SOLID WASTE/FEE SECTION-HWM
401 CHURCH-14 FLOOR-L&C TOWER
NASHVILLE TN 37243

COMMON ACCOUNT

BY Carol A. Shrein

BY
COUNTER SIGNATURE REQUIRED IF IN EXCESS OF FIFTEEN THOUSAND DOLLARS

⑈638809⑈ ⑆084000026⑆ 00⑈0090239⑈

MEMPHIS LIGHT, GAS AND WATER DIVISION
P.O. BOX 430 MEMPHIS, TENNESSEE 38101-0430

COMMON ACCOUNT

DATE MO 02 DA 25 YR 10

CHECK NUMBER 638809

DATE	INVOICE NUMBER	P.O. NUMBER	GROSS AMOUNT	DEDUCTIONS DISCOUNT	DEDUCTIONS FREIGHT	NET AMOUNT
2/15/10	987789062/2009 ANNUAL HAZARDOUS WASTE REPORT FOR MLGW - NORTH SERVICE CENTER GIA NUMBER 15853		1,007.53	0.00	0.00	1,007.53
2/15/10	980601835/2009 ANNUAL HAZARDOUS WASTE REPORT FOR MLGW - CENTRAL SHOPS GIA NUMBER 13811		1,009.69	0.00	0.00	1,009.69
2/15/10	000012179/2009 ANNUAL HAZARDOUS WASTE REPORT FOR MLGW - INVESTMENT RECOVERY & SALVAGE GIA NUMBER 311521		1,006.75	0.00	0.00	1,006.75
2/15/10	000024794/2009 ANNUAL HAZARDOUS WASTE REPORT FOR MLGW - ARLINGTON LNG PLANT GIA NUMBER 311521		1,010.82	0.00	0.00	1,010.82
2/15/10	000028761/2009 ANNUAL HAZARDOUS WASTE REPORT FOR MLGW - ASR WELL LOT GIA NUMBER 327453		1,007.58	0.00	0.00	1,007.58
TOTALS▶			5,042.37	0.00	0.00	5,042.37

RECEIVED
DIV SOLID WASTE MGT
MAR 0 2 2010

Group No
ID No

DEPARTMENT OF ENVIRONMENT & CONSERVATION

Customer Fee Report

Printed By : (BG35086) Dave Dowlen

Printed Date/Time: 7/10/2012 2:07:45PM

Customer Information

327453
MLGW - ASR WELL LOT
P.O. BOX 430
Memphis, TN 38118

Invoice Number	Batch Number	Invoice Date	Due Date	Invoice Amount
INV00000000153193	HWM_GEN-1268	03/30/2010	03/01/2010	$1,007.57

Item No.	Description	Date	Amount
Items Billed			
TNR000028761	E18 - HAZ WASTE GENERATOR FEE	03/30/2010	$1,000.00
TNR000028761	E58 - HAZ WASTE SHIPPING FEE	03/30/2010	$7.57
			$1,007.57
Payment			
RH012036639B	INV00000000153193 (CHK#: 638809)	02/26/2010	$-1,007.57
			$-1,007.57
		Balance :	**$0.00**

Invoice Number	Batch Number	Invoice Date	Due Date	Invoice Amount
INV00000000155160	HWM_GEN-1339	05/17/2010	06/16/2010	$201.32

Item No.	Description	Date	Amount
Items Billed			
TNR000028761	HWM-E18-HAZ WASTE GENERATOR FEE-INC PER REGS CHANGE	05/17/2010	$200.00
TNR000028761	HWM-E58-HAZ WASTE SHIPPING FEE-INC PER REGS CHANGE	05/17/2010	$1.32
			$201.32
Payment			
RH012045117D	INV00000000155160 (CHK#: 644629)	05/28/2010	$-201.32
			$-201.32
		Balance :	**$0.00**

Total Invoice Balance: $0.00

Criteria : Customer ID (starts with) : Customer Name (Like):

Permit Number/EPA ID (Like) : TNR000028761 Invoice Date Range : 01/01/2010 ~ 12/31/2010

Division: SWM Env. Interest (Fee) Type:

State of Tennessee
Department of Environment and Conservation
Division of Solid Waste Management
401 Church Street, L & C Tower 5th Floor
Nashville, TN 37243-1535

December 10, 2009
TNR000028761
MLGW - ASR WELL LOT
P.O. BOX 430
MEMPHIS TN 38118

ATTENTION: KERRY ROY BL153

RE: **NOTICE OF ISSUANCE OF NEW HAZARDOUS WASTE INSTALLATION IDENTIFICATION NUMBER**

Your request for a new Installation Identification Number and your $100.00 fee have been received and your application has been processed. Your new Installation Identification Number is:

TNR000028761

Reference Location: 2686 E. HOLMES ROAD MEMPHIS, TN 38118

For tracking purposes, please use this Installation Identification Number on all correspondence relating to hazardous waste management.

The following conditions apply:

1. **Changes in Data**
   Any changes in installation data such as ownership, contact persons, waste generation, mailing addresses, etc must be reported to the State of Tennessee within 30 days.
2. **Annual Reporting Requirements**
   Also by receipt of this number, you will be required to annually report your waste generation and shipping data and pay certain fees associated with the generation of hazardous wastes in Tennessee.
3. **Number is Site-Specific**
   This number is site specific, that is, if your business moves to another location, the Installation Identification Number remains at the physical location to which it was assigned. If you move, you are required to make notification to the Division of your new physical location and request a new Installation Identification Number and pay a $100.00 fee.

For further information about the Hazardous Waste Program in the State of Tennessee, please call D Dowlen at 615-532-0316

Sincerely,

12/10/2009

Director Date
Division of Solid Waste Management

NEW | SQG

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION **FORM HN - H**

DIVISION OF SOLID WASTE MANAGEMENT

INSTALLATION REGISTRATION AND NOTIFICATION

THIS FORM IS USED TO REGISTER NEW HAZARDOUS WASTE FACILITIES OR TO ALLOW ANY EXISTING BUSINESSES TO NOTIFY THE STATE OF ANY INFORMATIONAL UPDATE OF HAZARDOUS WASTE ACTIVITY THAT WE HAVE ON FILE. FOR ANNUAL REPORTS, PREVIOUSLY SUBMITTED DATA WILL BE PRE-PRINTED ON THIS FORM. VERIFY THE SUPPLIED DATA IS CORRECT. MAKE ANY NECESSARY CHANGES AND RETURN THIS FORM WITH YOUR ANNUAL REPORT PACKET. NOTE THIS IS A TWO SIDED FORM.

EPA ID NUMBER ▶ TNR000 002 876 | CA NUMBER 327453 | PREVIOUS EPA ID NUMBER (IF YOU MOVED)

BUSINESS NAME ▶ Memphis Light, Gas and Water Division

PART 1 - PHYSICAL LOCATION (DO NOT USE PO BOX NUMBERS)

STREET, ROAD, OR DIRECTIONS TO YOUR SITE: 2650 E. Holmes Rd. | CITY: Memphis | STATE: TN | ZIP: 38118

PHONE: None | FAX: None | E-MAIL: None | COUNTY: Shelby

PART 2 - MAILING ADDRESS

SEND MAIL TO THE ATTENTION OF: Kerry Roy BL153 | MAIL ADDRESS: P.O. Box 430

CITY: Memphis | STATE: TN | ZIP: 38101-0430 | FOREIGN PROVINCE | FOREIGN MAIL CODE | COUNTRY

PART 3 - BUSINESS OWNER ADDRESS

OWNER NAME AND TITLE: MLGW | ADDRESS: P.O. Box 430

CITY: Memphis | STATE: TN | ZIP: 38101-0430 | FOREIGN PROVINCE | FOREIGN MAIL CODE | COUNTRY

PHONE | FAX | E-MAIL | DATE OWNERSHIP BEGAN | *OWNER CODE | *LAND CODE

* OWNER / LAND CODE CHOICES: Federal (F); State (S); Private (P); Indian (I); County (C); Municipal (M); District (D); Other (O

PART 4 - BILLING ADDRESS

SEND INVOICE TO THE ATTENTION OF: Kerry Roy BL153 | MAIL ADDRESS: P.O. Box 430

CITY: Memphis | STATE: TN | ZIP: 38101-0430 | FOREIGN PROVINCE | FOREIGN MAIL CODE | COUNTRY

PART 5 - BUSINESS OR SITE MANAGER

NAME AND TITLE: Kerry Roy Environmental Engineer | ADDRESS: P.O. Box 430 | CITY, STATE, ZIP: Memphis TN 38101-0430

PHONE: (901)528-4194 | CELL PHONE: (901)491-0437 | FAX: (901)528-7764 | EMAIL: kroy@mlgw.org

PART 6 - SITE TECHNICAL CONTACT

NAME AND TITLE: SAME | ADDRESS | CITY, STATE, ZIP

PHONE | CELL PHONE | FAX | EMAIL

PART 7 - SITE EMERGENCY CONTACT

NAME AND TITLE: SAME | ADDRESS | CITY, STATE, ZIP

PHONE | CELL PHONE | FAX | EMAIL

CN-0909 - CONTINUED ON REVERSE - RDA 2203

OTHER SITE INFORMATION ▶

NUMBER OF EMPLOYEES	WATER SUPPLY (CHECK ALL THAT APPLY)				SEWER (CHECK ALL THAT APPLY)			
2700 +	[X] WELL	[ ] SPRING	[ ] PUBLIC WATER SUPPLY	[ ] OTHER	[ ] SEPTIC TANK	[ ] PCTW	[ ] NPDES	[ ] OTHER

OTHER PERMITS WITH TDEC ▶ (CHECK ALL THAT APPLY)

[ ] SOLID WASTE [ ] AIR [ ] WATER [ ] GROUNDWATER HAZ WASTE TSDF [ ] HAZ WASTE TRANSPORTER [ ] PERMIT BY RULE

INDUSTRIAL CLASSIFICATION (NAICS CODE = NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM (REPLACES THE SIC CODE SYSTEM)

FOLLOWING IS A LIST OF COMMONLY FOUND NAICS CODES. CHECK ONE THAT BEST IDENTIFIES THE INDUSTRIAL CLASSIFICATION OF YOUR SITE. IF NOT ON THIS CHECKLIST, ENTER INFORMATION BELOW IN THE SPACE PROVIDED. ADDITIONAL INFORMATION ON NAICS CODES IS AVAILABLE AT THIS WEBSITE http://www.census.gov/epcd/www/naics.html

811121	[ ] AUTOMOTIVE BODY, PAINT, AND INTERIOR REPAIR AND MAINTENANCE	454312	[ ] LIQUEFIED PETROLEUM GAS (BOTTLED GAS) DEALERS
811198	[ ] ALL OTHER AUTOMOTIVE REPAIR AND MAINTENANCE	621511	[ ] MEDICAL LABORATORIES
811111	[ ] AUTOMOTIVE REPAIR (GENERAL)	335312	[ ] MOTOR AND GENERATOR MANUFACTURING
61131	[ ] COLLEGES, UNIVERSITIES, AND PROFESSIONAL SCHOOLS	336211	[ ] MOTOR VEHICLE BODY MANUFACTURING
323111	[ ] COMMERCIAL GRAVURE PRINTING	92811	[ ] NATIONAL SECURITY
339914	[ ] COSTUME JEWELRY AND NOVELTY MANUFACTURING	44111	[ ] NEW CAR DEALERS
49211	[ ] COURIERS	221113	[ ] NUCLEAR ELECTRIC POWER GENERATION
81232	[ ] DRYCLEANING AND LAUNDRY SERVICES (NOT COIN OPERATED)	32551	[ ] PAINT AND COATING MANUFACTURING
332813	[ ] ELECTROPLATING, PLATING, POLISHING, ANODIZING, AND COLORING	325412	[ ] PHARMACEUTICAL PREPARATION MANUFACTURING
221112	[ ] FOSSIL FUEL ELECTRIC POWER GENERATION	325992	[ ] PHOTOGRAPHIC FILM, PAPER, PLATE, AND CHEMICAL MANUFACTURING
62211	[ ] MEDICAL AND SURGICAL HOSPITALS (GENERAL)	48621	[ ] PIPELINE TRANSPORTATION OF NATURAL GAS
49311	[ ] WAREHOUSING AND STORAGE (GENERAL)	325211	[ ] PLASTICS MATERIAL AND RESIN MANUFACTURING
332212	[ ] HAND AND EDGE TOOL MANUFACTURING	323114	[ ] PRINTING (QUICK PRINTING)
562211	[ ] HAZARDOUS WASTE TREATMENT AND DISPOSAL	54171	[ ] RESEARCH AND DEVELOPMENT IN THE PHYSICAL, ENGINEERING, AND LIFE SCIENCES
333414	[ ] HEATING EQUIPMENT (EXCEPT WARM AIR FURNACE) MANUFACTURING	326192	[ ] RESILIENT FLOOR COVERING MANUFACTURING
221111	[ ] HYDROELECTRIC POWER GENERATION	337215	[ ] SHOWCASE, PARTITION, SHELVING AND LOCKER MANUFACTURING
325120	[ ] INDUSTRIAL GAS MANUFACTURING	311942	[ ] SPICE AND EXTRACT MANUFACTURING
337127	[ ] INSTITUTIONAL FURNITURE MANUFACTURING		

OTHER NAICS CODE (IF NOT LISTED ABOVE)(SEE WEBSITE)	DESCRIPTION OF INDUSTRIAL ACTIVITY (RELATED TO NAICS CODE YOU ENTERED AT LEFT)
221122	Utility

OTHER WASTE ACTIVITY AT THIS INSTALLATION OR SITE (CHECK ANY AND ALL THAT MAY APPLY)

USED OIL	UNIVERSAL WASTE		RECYCLING
	GENERATE	MANAGE	
[ ] USED OIL TRANSPORTER	[ ] BATTERIES	[ ] BATTERIES	[ ] COMMERCIAL RECYCLER
[ ] USED OIL TRANSFER FACILITY	[ ] LAMPS	[ ] LAMPS	[ ] NON-COMMERCIAL RECYCLER
[ ] USED OIL PROCESSOR	[ ] PESTICIDES	[ ] PESTICIDES	
[ ] USED OIL RE-REFINER	[ ] MERCURY CONTAINING EQUIPMENT	[ ] MERCURY CONTAINING EQUIPMENT	
[ ] OFF SPECIFICATION USED OIL BURNER			
[ ] MARKETER WHO DIRECTS SHIPMENT OF OFF SPECIFICATION USED OIL TO OFF SPECIFICATION USED OIL BURNER	[ ] CHECK HERE IF THIS SITE IS A "UNIVERSAL WASTE DESTINATION FACILITY"		

TO COMPLETE THIS FORM ▶ PROVIDE DATA OR MAKE CORRECTIONS TO PREPRINTED DATA AS NEEDED. NOTE: THIS IS A TWO SIDED FORM. FOR MORE INFORMATION CONTACT THE WASTE ACTIVITY AUDIT SECTION AT 1-800-237-7018 OR FAX TO: 615-532-0886. TO PAY ANNUAL FEES AND VIEW OTHER USEFUL INFORMATION, VIEW OUR WEBSITE AT: http://www.state.tn.us/environment/swm/

RETURN COMPLETED FORMS TO: ▶ TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION, DIVISION OF SOLID WASTE MANAGEMENT
WASTE ACTIVITY AUDIT SECTION 401 CHURCH STREET, FIFTH FLOOR L & C TOWER NASHVILLE, TN 37243-1535

CERTIFICATION

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION ACCORDING TO A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THIS REPORTING SYSTEM OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THIS INFORMATION, THIS INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT OR BOTH FOR KNOWING VIOLATIONS.

Kerry Roy
SIGNATURE OF AUTHORIZED REPRESENTATIVE

Kerry Roy
PRINTED NAME

Environmental Engineer
TITLE

11.18.09
DATE

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
SOLID WASTE MANAGEMENT

10/23/2008 8:26:56 AM

HAZARDOUS WASTE STREAM REPORT

FORM WSR

WASTE STREAM NUMBER: 1

REPORT YEAR: 2009 | ☐ ANNUAL REPORT ☐ INFORMATION UPDATE ☒ NEW WASTE STREAM

US EPA ID NUMBER: TNR 00 002876 1 | BUSINESS NAME: Memphis Light, Gas and Water Division - ASR Well Lot

ITEM 1- HAZARDOUS WASTE STREAM DESCRIPTION AND PROCESS

1a- WASTE STREAM NAME: Hydrogen Peroxide (40% - 60%)

1b- HOW IS THIS WASTE GENERATED? Off Spec product

1(b)1- SOURCE CODE: G 1 1

1n- UNITS OF MEASURE
CHECK ONE - USE SAME UNIT OF MEASURE ON ALL ATTACHMENTS.
Kg ☐ I AM REPORTING IN KILOGRAMS
lbs ☒ I AM REPORTING IN POUNDS
≈ 10 lbs / gal

1d- GENERATION FREQUENCY
☒ ONE TIME GENERATION
__ REGULARLY GENERATED
__ INTERMITTENTLY GENERATED

1e- WASTE STREAM STATUS
☒ ACTIVE
☐ CLOSED (SEE 1g)
☐ RE-ACTIVATED

1f- HAZARD CRITERIA
☐ IGNITABLE
☒ CORROSIVE
☐ REACTIVE
☐ TCLP
☐ LISTED

1g- GENERATION DATES
DATE GENERATION BEGAN: 11.18.09
DATE NO LONGER GENERATED: 11.18.09

1h- EPA HAZARDOUS WASTE CODES (LIST CODES IN THIS ORDER: P, D, F, U, AND K): D002

1i- TN / RCRA RADIOACTIVE MIXED WASTE (YES OR NO): NO

1j- MONTHLY MAXIMUM GENERATED: 1,100 ( ) Kg (X) lbs

1k- pH	1l- FLASH POINT	1m- BTU PER POUND	1n- REACTIVE CODES	1o- WASTE FORM CODE			1p- NAICS CODE - up to 2
≈ 2	>200	NA	None	W 1 1 a	W ___	W ___	221122

1q- U.S. DOT SHIPPING NAME: Waste Hydrogen Peroxide

1r- U.S. DOT HAZARD CLASS: 5.1

1s- U.S. DOT ID CODE: 2014

ITEM 2- WASTE STREAM CONSTITUENTS

	2a- HAZARDOUS WASTE CONSTITUENT	2b- LOWER VALUE	2c- UPPER VALUE	2d- CONCENTRATIONS PPM	%VOLUME	%WEIGHT
1	Hydrogen Peroxide	0	60		X	
2						
3						
4						
5						

ITEM 3- ANNUAL GENERATION AND HANDLING NOTE: 3a + 3b - 3c = 3d | 3d = 4a + 5a + 5b + 5c + 5d

3a- AMOUNT GENERATED	3b- AMOUNT ONSITE JAN 1st	3c- AMOUNT ONSITE DEC 31st	3d- AMOUNT HANDLED

ITEM 4- OFFSITE SHIPPING

4a- TOTAL AMOUNT SHIPPED OFFSITE	4b- STATE CODES: STORAGE AND FINAL DISPOSAL / TREATMENT	4c- EPA MANAGEMENT METHOD
		H ___
		H
		H ___

HAZARDOUS WASTE STREAM REPORT - FORM WSR

US EPA ID NUMBER	BUSINESS NAME	WASTE STREAM #
TNR000028761	Memphis Light, Gas and Water Division — ASR Well Lot	1

ITEM 5- TSD PERMITTED STORAGE ONLY - OR - FACILITY'S ONSITE HANDLING or TREATMENT

	STATE CODES: TREATMENT, STORAGE, DISPOSAL, HANDLING	EPA MANAGEMENT METHOD
5a- AMOUNT OF 3d HANDLED ONSITE		H ___ ___ ___
5b- AMOUNT OF 3d HANDLED ONSITE		H ___ ___ ___
5c- AMOUNT OF 3d HANDLED ONSITE		H
5d- AMOUNT OF 3d HANDLED ONSITE		H

ITEM 6- HAZARDOUS WASTE REDUCTION

6a- THIS YEAR RATIO	6b- GOAL YEAR RATIO	6c- GOAL YEAR	6d- WASTE / TOXICITY REDUCTION EFFORT CODES	6e- WASTE REDUCTION IMPEDIMENT CODES	6f- CHANGE IN TOXICITY
					___ INCREASE ___ DECREASE ☐ NO CHANGE

6g- NARRATIVE: EXPLAIN REPORTED DATA (IF APPLICABLE)

6h- NARRATIVE: IF NO NUMERIC GOAL EXPLAIN WHY

ITEM 7- FACILITY COMMENTS

CERTIFICATION

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT OR BOTH FOR KNOWING VIOLATIONS

Kerry R. Roy
SIGNATURE OF AUTHORIZED REPRESENTATIVE

Kerry R. Roy
PRINTED NAME

Environmental Engineer
TITLE

11.18.09
DATE

TDEC USE ONLY

		STATUS	FURTHER REPORTING	REVIEWER	RECD DATE
(NH) NOT HAZARDOUS	(C) CORR ACTION		☐ YES ___ NO		
(PE) PARTIAL EXEMPTION	(W) WASTE WATER Rx				
(V) VARIANCE GRANTED	(RR) RES RECOVERY				
(R) MIXED RAD WASTE	(N) NO LONGER GEN	NOTES			
(TR) TREATMENT RESIDUE	(CF) COMPARABLE FUELS				
(H) HAZARDOUS	(U) UNIVERSAL WASTE				

FOR INFORMATION CONTACT:
WASTE ACTIVITY AUDIT
Phone: 1-800-237-7018
FAX: 615-532-0886

WASTE AUDIT USE ONLY

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF SOLID WASTE MANAGEMENT
401 Church Street, L & C Tower 5th Floor
Nashville, TN 37243-1535

FORM - NF
OFFICE USE ONLY
CHECK #
AMOUNT
DATE

HAZARDOUS WASTE GENERATOR NOTIFICATION FEE

REASON FOR FILING ▶
- [X] 1. TO APPLY FOR AN EPA ID NUMBER
  - [X] 1a. NEW GENERATOR
  - [ ] 1b. EMERGENCY REQUEST FOR AN ID NUMBER
  - [ ] 1c. CHANGE IN LOCATION (PROVIDE INFORMATION ON PREVIOUS SITE BELOW)
- [ ] 1d. NEW USED OIL GENERATOR
- [ ] 2. TO NOTIFY OF CHANGE IN OWNERSHIP

(IF YOU CHECKED 1c) ▶

PREVIOUS EPA ID NUMBER	PREVIOUS LOCATION OF YOUR BUSINESS	DATE YOU MOVED TO THIS LOCATION

CURRENT BUSINESS ▶

NAME: Memphis Light, Gas and Water Division – ASR Well Lot
DOING BUSINESS AS (CURRENTLY):

WHERE ARE YOU? ▶

PHYSICAL LOCATION - STREET ADDRESS OR DIRECTIONS TO YOUR SITE	CITY	STATE	ZIP
2686 E. Holmes Road	Memphis	TN	38118

WHAT DO YOU DO? ▶
BRIEFLY DESCRIBE THE TYPE OF BUSINESS AT THIS LOCATION AND IDENTIFY THE REASON FOR THE HAZARDOUS WASTE ACTIVITY
Utility Company – Offspec product generated at a well lot

OWNER ▶

OWNER NAME	ADDRESS	CITY	STATE	ZIP
Memphis Light, Gas and Water	P.O. Box 430	Memphis	TN	38101-0430

SITE MAILING ADDRESS ▶

STREET OR ADDRESS	CITY	STATE	ZIP
P.O. Box 430	Memphis	TN	38101-0430

BILLING ADDRESS ▶

BILLING CONTACT PERSON / TITLE / DEPT	ADDRESS	CITY	STATE	ZIP
P.O. Box 430	Memphis		TN	38101-0430

CONTACT PERSON ▶

NAME	PHONE(S)	CITY	STATE	ZIP
Kerry Roy	(901) 528-4194	Memphis	TN	38103

PAY YOUR FEE ▶

[X] FOR NEW EPA ID NUMBER	$ 100.00	E38
[ ] FOR OWNER CHANGE	$ 100.00	E38
AMOUNT YOU ARE PAYING ▶	$ 100.00	

RETURN YOUR REMITTANCE TO:
Division of Fiscal Services - Fee Section - (HWM)
Tennessee Department of Environment and Conservation
401 Church Street, 14th Floor L&C Tower
Nashville, TN 37243-0438
Make check or money order payable to "Treasurer, State of Tennessee".
Do Not Send Cash

OFFICE USE ONLY ▶

LOG ID CODE	STAFF INITIAL	DATE	NEWLY ASSIGNED EPA ID NUMBER
524 C	DW	11/23/09	TNR00 002 8761

NOTE ▶
THE TERMS, "EPA ID NUMBER" and "INSTALLATION ID NUMBER" ARE USED INTERCHANGEABLY. THE NUMBER IS ASSIGNED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA) AND IS UTILIZED AS THE MAIN TRACKING NUMBER FOR ALL HAZARDOUS WASTE ACTIVITIES. IT IS FREQUENTLY REFERRED TO AS THE INSTALLATION IDENTIFICATION NUMBER OR INSTALLATION ID NUMBER OR ID NUMBER BY THE STATE OF TENNESSEE. THE ID NUMBER IS REQUIRED FOR ALL WASTE RELATED DOCUMENTS, INCLUDING MANIFESTS FOR SHIPMENT. YOU ARE REQUIRED TO APPLY FOR AN ID NUMBER IF YOU ARE NEW OR HAVE MOVED YOUR OPERATION TO A DIFFERENT LOCATION. THE INSTALLATION ID NUMBER IS SITE SPECIFIC AND CANNOT BE USED IF YOU MOVE. ONCE ASSIGNED, THE NUMBER WILL REMAIN SPECIFIC TO THE PHYSICAL LOCATION OF YOUR HAZARDOUS WASTE OPERATION. FAILURE TO OBTAIN A NEW EPA ID NUMBER OR FILE UPON RELOCATION CAN RESULT IN ENFORCEMENT ACTION BY THE DEPARTMENT.

CERTIFICATION ▶
I CERTIFY UNDER PENALTY OF LAW THAT THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT OR BOTH FOR KNOWING VIOLATIONS.

Kerry R. Roy
SIGNATURE OF AUTHORIZED REPRESENTATIVE

Kerry R. Roy
PRINTED NAME

Environmental Engineer
TITLE

11.18.09
DATE

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF FISCAL SERVICES - FEE SECTION

CHECKS RECEIVED WITHOUT DOCUMENTATION

DIRECTIONS: Divisions must complete this form and attach it to checks received without documentation before transferring checks to the Division of Fiscal Services - Consolidated Fee Section for deposit.

Date/Time Check Received 12-7-09 Division HWM

Company Name Memphis Light, Gas, + Water Div

Company ID Number

Check Number 633317 Check Amount $100

Type of Fee EPA ID #

Received by: J Bellamy Transferred To D Roddy 12-8-09

Signature of Division Employee — Fee Coordinator — Date/Time

RDA 8730

Postmark D 11/30/09

Number 633317

Amount 100.00

ID TN-133698

From: Dave Dowlen
To: int:kroy@mlgw.org
Date: 12/10/2009 12:41 PM
Subject: Fwd: MLGW - ASR WELL LOT
Attachments: MLGW - ASR WELL LOT

Kerry,

Payment was not received. Since the Fee Office will be sending an invoice for the $100.00, the ID Number is **TNR000028761.**

Bill this company for $100 for Id number application.

Memphis Light, Gas And Water Division -ASR Well Lot
P.O. Box 430
Memphis, Tn 38101
Kerry Roy

GIA #327453

FACILITY

791182

RDA # 2298

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
Bureau of Environment
Room 1101, State Office Building
170 North Mid America Mall
Memphis, Tennessee 38103

November 5, 1990

Mr. George Dudley
City of Memphis
General Services, Room 568
125 N. Mid-America Mall
Memphis, Tennessee 38103

Re: Closure of Underground Storage Tank system at
McKellar Nursery, 2684 Holmes, Memphis, TN
UST Facility I.D. # 9-791182

Dear Mr. Dudley:

The Division of Underground Storage Tanks has received the results of the chemical analyses of the soil samples taken during the closure of your underground storage tank system located at the above referenced site. Upon review, it appears that all appropriate measures have been taken to remediate the release and to prevent future releases. At this time, the Division does not see the necessity for further investigation or enforcement but will reserve the right to require additional effort if evidence of contamination arises in the future.

In order to record the system as closed, an amended Notification Form must be completed, signed, and submitted to the Division's Central Office. Please number each tank the same as it was originally registered, making sure to note the date the site assessment was completed.

Please feel free to contact me at (901) 543-6695 with any questions or comments regarding this correspondence.

Sincerely,

James D. Minchey, R.P.E.
Environmental Specialist
Division of Underground Storage Tanks

cc: UST Nashville

enclosure

90-15

U. S. I. FILES INDEX 9-791182

INDEX NO.	DATE	TYPE DOCUMENT	SUBJECT MATTER	COPY TO CENTRAL OFFICE
90-1	5-10-90	Closure app	app and site sketch	
90-2	6-22-90	Analytical LAB Report	Analytical LAB Report	
90-3	6-22-90	Soil sampling analysis		
90-4	8-10-90	Chain of Custody		
90-5	8-2-90	Sample Results		
90-6	8-2-90	Sample Results		
90-7	8-10-90	Analytical LAB Report		
90-8	8-15-90	Letter to George Dudley from C&T	Refexencing Aug. 2, 1991 site visit to resample TANK pit	
90-9	10-24-90	Env. Testing and Consulting, Inc.	Sample Results	
90-10	10-26-90	Letter from ETC to George Dudley City of Memphis		
90-11	10-29-90	ETC organic analyses Report	Sample Results	
90-12	10-24-90	ETC organic analysis Report	sample Results	
90-13	10-29-90	ETC organic analysis Report	Sample Results	
90-14	10-31-90	Letter from ETC to george Dudley		
90-15	11-5-90	Letter from James Lincney to City of Memphis	Clean	

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

FILE REQUEST

DEPARTMENT USE ONLY

DIVISION(S): UST / SF

DATE: 6/4/99 APPOINTMENT TIME: 1130 (A.M. / P.M.)

COMPLETE THE FOLLOWING (OR ATTACH YOUR BUSINESS CARD):

Gary Sickenschick
NAME/COMPANY

4180 Pilot Drive
ADDRESS

Memphis TN 38118 (901) 3630600
CITY STATE ZIP TELEPHONE

File Review Procedures

1. Public records are available for review during the normal business hours from 8:00 a.m. until 4:30 p.m., Monday through Friday, except holidays. For your convenience and to assure prompt service and adequate time for file review, it is recommended appointments be made during the hours of 8:30 a.m. and 3:00 p.m.
2. The number of files reviewed at one time may be limited without authorization from the Division Manager or Field Office Administrative Manager.
3. Briefcases and other accessories (with the exception of writing materials – notepads, pencils, etc.) are not allowed in the file area.
4. Do not mark on the file(s) or change the order of documents within the file(s).
5. Unless otherwise informed, all copies are charged at the rate of 50 cents per page, payable in advance by exact cash or check only.
6. Tags will be provided to mark any pages for staff to copy.
7. Staff will make copies as their work schedule permits. It may be necessary to return for the copies, or they may be mailed upon request.

I have read and understand the above file review procedures.

Gary Sickenschick
Signature

6/4/99
Date

FACILITY NAME	FACILITY I.D. #	COUNTY	# OF PAGES COPIED
OMS #15	0790983	Shelby	
Park Comm McKellar Nurs	79-1182	Shelby	
Jackson Pits	V 79-604	Shelby	

TOTAL Pages Copied ____

69

CN-1077 (Rev. 8-95) RDA 5835-Z

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

FILE REQUEST

DEPARTMENT USE ONLY

DIVISION(S): UST SWM & SF

DATE: 6-3-96 APPOINTMENT TIME: 11:00 (A.M. / P.M.)

COMPLETE THE FOLLOWING (OR ATTACH YOUR BUSINESS CARD):

Kristi Toon / PSI
NAME/COMPANY

4145 Willow Lake Blvd.
ADDRESS

Memphis TN 38118 901 365-9255
CITY STATE ZIP TELEPHONE

1. Public records are available for review during the normal business hours from 8:00 a.m. until 4:30 p.m., Monday through Friday, except holidays. For your convenience and to assure prompt service and adequate time for file review, it is recommended appointments be made during the hours of 8:30 a.m. and 3:00 p.m.
2. The number of files reviewed at one time may be limited without authorization from the Division Manager or Field Office Administrative Manager.
3. Briefcases and other accessories (with the exception of writing materials -- notepads, pencils, etc.) are not allowed in the file area.
4. Do not mark on the file(s) or change the order of documents within the file(s).
5. Unless otherwise informed, all copies are charged at the rate of 50 cents per page, payable in advance by exact cash or check only.
6. Tags will be provided to mark any pages for staff to copy.
7. Staff will make copies as their work schedule permits. It may be necessary to return for the copies, or they may be mailed upon request.

FACILITY NAME	FACILITY I.D. #	COUNTY	# OF PAGES COPIED
64-40 inc.	9-79-0637	Shelby	
OMS #15	~~9-79-0983~~	Shelby	
Park Comm. Nursery	9-79-1102	Shelby	
Jackson Pits	79-604	Shelby	
Sycamore Cleaners	98-211-124	Shelby	

TOTAL Pages Copied _____

ENVIRONMENTAL TESTING & CONSULTING INC.
2924 WALNUT GROVE RD. · MEMPHIS, TN 38111 · PHONE (901) 327-2760 FAX (901) 327-6334

October 31, 1990

Mr. George Dudley
City of Memphis
General Service, Rm 568
125 N. Mid-America Mall
Memphis, TN 38103

REF: ANALYTICAL TESTING
SAMPLE DATE: 10/29/90
SAMPLE ID: 2684 HOLMES ROAD (SOIL)
CONTRACT #D6885

Dear Mr. Dudley:

The above referenced sample has been analyzed per your instructions. The tests were performed in our laboratory (#02027) in accordance with Standard Methods, 16th Edition and SW-846 (8020 & 5030) BTX; (503E & 3550) TPH. The results are shown on the attached Organic Analysis Data Sheet.

If you have any questions please contact our office.

Very truly yours,

Randall H. Kaiser

Michael J. Cimbalo
President

MJC/jsw

Attachment

10310003.doc

90-14

ENVIRONMENTAL TESTING AND CONSULTING, INC.

ORGANIC ANALYSIS DATA SHEET

CLIENT NAME : _CITY OF MEMPHIS
PROJECT # : _____
ANALYST : _LS/TW___

SITE ID : _2684 HOLMES RD.___
SAMPLE DATE : _10/29/90_
DATE ARRIVED : _10/29/90_
MATRIX : _SOIL_____
FILE NAME : _1029-002.DOC_
SAMPLE # : _1029-002_____

DATE ANALYZED : _10/29/90 10/29/90
METHOD (SW-846): _BTX TPH
(SM 16) 8020 503E
5030 3550

COMPOUND	SAMPLE RESULTS UNITS:(mg/kg)	METHOD DETECTION LIMIT:(mg/kg)
ETC #	#1 PILE COMP STOCKPILE	
Benzene	BDL	1.00
Toluene	BDL	1.00
Xylenes (Total)	BDL	1.00
Total BTX	BDL	1.00
Total Petroleum Hydrocarbons	23.9	10.0

BDL - BELOW DETECTION LIMIT

90-13

ENVIRONMENTAL TESTING AND CONSULTANTS, INC.

ORGANIC ANALYSIS DATA SHEET

CLIENT NAME : CITY OF MEMPHIS
PROJECT # : _____
ANALYST : LS/TW

SITE ID : 2684 HOLMES
MCKELLAR NURSERY

SAMPLE DATE : 10/24/90
DATE ARRIVED : 10/24/90
MATRIX : SOIL

FILE NAME : 1024-003.DOC
SAMPLE # : 1024-003

DATE ANALYZED : 10/25/90 10/24/90
METHOD (SW-846): BTX TPH
(SM 16) 8020 503E
5030 3550

COMPOUND	SAMPLE RESULTS UNITS:(mg/kg)	METHOD DETECTION LIMIT:(mg/kg)
ETC #	#3 EAST SIDE OF HOLE	
Benzene	BDL	0.02
Toluene	BDL	0.02
Xylenes (Total)	BDL	0.03
Total BTX	BDL	0.02
Total Petroleum Hydrocarbons	BDL	10.0

BDL - BELOW DETECTION LIMIT

Randle Rowe

90-12

ENVIRONMENTAL TESTING AND CONSULTING, INC.

ORGANIC ANALYSIS DATA SHEET

CLIENT NAME : CITY OF MEMPHIS
PROJECT # :
ANALYST : LS/TW

SITE ID : 2684 HOLMES RD.
SAMPLE DATE : 10/29/90
DATE ARRIVED : 10/29/90
MATRIX : SOIL

FILE NAME : 1029-002.DOC
SAMPLE # : 1029-002

DATE ANALYZED : 10/29/90 10/29/90
METHOD (SW-846): BTX TPH
(SM 16) 8020 503E
5030 3550

COMPOUND	SAMPLE RESULTS UNITS:(mg/kg)	METHOD DETECTION LIMIT:(mg/kg)
ETC #	#1 PILE COMP STOCKPILE	
Benzene	BDL	1.00
Toluene	BDL	1.00
Xylenes (Total)	BDL	1.00
Total BTX	BDL	1.00
Total Petroleum Hydrocarbons	23.9	10.0

BDL - BELOW DETECTION LIMIT

90-11

ENVIRONMENTAL TESTING & CONSULTING INC.
2924 WALNUT GROVE RD. · MEMPHIS, TN 38111 · PHONE (901) 327-2750 FAX (901) 327-6334

October 26, 1990

Mr. George Dudley
City of Memphis
General Services, Room 568
125 N. Mid-America Mall
Memphis, Tenn. 38103

REF: ANALYTICAL TESTING
SAMPLE DATE: 10/24/90
SAMPLE ID: McKELLAR NURSERY
2684 HOLMES (SOIL)

Dear Mr. Dudley:

The above referenced sample has been analyzed per your instructions. The tests were performed in our laboratory (#02027) in accordance with Standard Methods, 16th Edition, and SW-846, Method 503E & 3550 (TPH); 8020 & 5030 (BTX). The results are shown on the attached Organic Analysis Data Sheet.

If you have any questions please feel free to contact our office.

Very truly yours,

Michael J. Cimbalo
President

MJC/mg

Attachment

90-10

ENVIRONMENTAL TESTING AND CONSULTING, INC.

ORGANIC ANALYSIS DATA SHEET

CLIENT NAME : CITY OF MEMPHIS
PROJECT # : _____
ANALYST : LS/TW

SITE ID : 2684 HOLMES
McKELLAR NURSERY
SAMPLE DATE : 10/24/90
DATE ARRIVED : 10/24/90
MATRIX : SOIL

FILE NAME : 1024-003.DOC
SAMPLE # : 1024-003

DATE ANALYZED : 10/25/90 10/24/90
METHOD (SW-846): BTX TPH
(SM 16) 8020 503E
5030 3550

COMPOUND	SAMPLE RESULTS UNITS:(mg/kg)	METHOD DETECTION LIMIT:(mg/kg)
ETC #	#3 EAST SIDE OF HOLE	
Benzene	BDL	0.02
Toluene	BDL	0.02
Xylenes (Total)	BDL	0.03
Total BTX	BDL	0.02
Total Petroleum Hydrocarbons	BDL	10.0

BDL - BELOW DETECTION LIMIT

Randle Rose

90-9

Certified Engineering & Testing Company

Boston • Providence • New York • Memphis • Dallas • San Francisco • Los Angeles

August 15, 1990

Mr. George Dudley
City of Memphis/General Services Division
125 North Mid-America Mall
Memphis, Tennessee 38103

RE: CERTIFIED Project No. M00165
McKellar Nursery
2684 Holmes Road
Memphis, Tennessee

Dear Mr. Dudley:

In accordance with the recommendations of the Soil Sampling/Analysis reports issued for the above referenced site by CERTIFIED on June 22, 1990 and July 17, 1990, a representative of CERTIFIED revisited the site on August 2, 1990, in order to resample the tank pit after additional excavation was accomplished at its east end.

One (1) soil sample was collected from the east end of the UST pit. The sample was collected using a bucket auger which was manually advanced. No visual or olfactory evidence of contamination was observed. The sample was placed in a four (4) ounce glass jar with a heavy-duty aluminum foil seal and screw-on type lid. The sample was stored in a chain-of-custody cooler with bagged ice while in the field and was promptly returned to CERTIFIED's Memphis office and placed in a shipping cooler with an ice pack.

The soil sample was shipped overnight via Federal Express courier service on August 2, 1990, to CERTIFIED's corporate laboratory in Weymouth, Massachusetts. The cooler was secured with security seal 3844 which was not broken until the cooler arrived at the laboratory.

The enclosed Analytical Laboratory Report outlines analytical methods used and the results obtained. The results of all soil sample analyses performed to date at the site are summarized below (Table 1) for each of the current Tennessee regulated compounds.

90-8

TABLE 1

Sample	Location	Total BTX Result *	TPH Result
Date: June 13, 1990			
1	Gasoline UST Pit East End	8.1	355
2	Gasoline UST Pit West End	0.67	0
3	Gasoline UST Pit Aerating Excavated Soils	0.19	190
Date: July 09, 1990			
1	Gasoline UST Pit East End	10.4	500
2	Gasoline UST Pit Aerating Excavated Soils	5.3	575
Date: August 02, 1990			
1	Gasoline UST Pit East End	BMDL	250
	Cleanup Standard	10	100

* Total BTX = sum of the concentrations of benzene, toluene and total xylenes in parts per million (ppm)

** - excerpted from Tennessee Department of Health and Environment, Division of Groundwater Protection, Policy on Cleanup levels for Gasoline and other Petroleum Hydrocarbons, Groundwater, March 18, 1987.

BMDL = Below Minimum Detection Limit
NOTE - all results presented in ppm

Mr. George Dudley
August 15, 1990
Page Three

As can be seen in Table 1, Total Petroleum Hydrocarbon (TPH) concentrations at the east end of the tank pit on August 2, 1990, after the third excavation, were still found to be two and one-half (2.5) times the applicable standard. The Total BTX level in this sample was below the minimum detection limit of part per billion.

If you have any questions or comments regarding the results, please contact me or Tim McCaffery.

Sincerely,

John Sorrels

John Sorrels
Environmental Scientist

JS:cms

Enclosure

Certified Engineering & Testing Company®

Boston • Providence • New York • Chicago • Memphis • Dallas • San Francisco • Los Angeles

ANALYTICAL LABORATORY REPORT

August 10, 1990

Project No.: M00165
CERTIFIED Lab ID: 90-08-019

Attached are the results of analyses performed on the samples received by this laboratory on August 2, 1990.

REFERENCES

1 "Test Methods for Evaluating Solid Waste, SW846, Third Edition," USEPA, November 1986.

2 "Standard Methods for the Examination of Water and Wastewater, Sixteenth Edition," American Public Health Association, 1985.

3 40 CFR Part 136, July 1, 1987.

4 "Annual Book of ASTM Standards," Vol. 11.02, 1989.

5 "Method for Chemical Analysis of Water and Wastes EPA-600 4-79-020, Revised March, 1983.

If you have any questions concerning these results, please do not hesitate to contact me.

Very truly yours,

John J. Sulkowski
Laboratory Manager

JJS/smd

Enclosures

Certified Engineering & Testing Company, Inc.
25 Mathewson Drive, Weymouth, MA 02189 (617) 337-7887 - TeleFAX (617) 337-8237

90-7

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: CERTIFIED/Memphis
Matrix: Soil
Sample Location: Gasoline UST Pit

Sample Series: 90-08-019.1
Date Sampled: 08/02/90

Sample Description: One glass container of soil

Chemical Analysis	Result	Date Analyzed	Detection Limit	Method
Petroleum Hydrocarbon mg/Kg	250	08/09/90	1	418.1[5]

Analyst: Noel Reid
BMDL denotes Below Method Detection Limit.

90-6

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: CERTIFIED/Memphis
Matrix: Soil
Sample Location: Gasoline UST Pit

Sample Series: 90-08-019.1
Date Sampled: 08/02/90
Date Analyzed: 08/07/90

Sample Description: One 4 ounce glass container of soil

Purgeable Aromatics	Result ug/Kg	Detection Limit ug/Kg
Methyl-tert-Butylether	BMDL	5
Benzene	BMDL	1
Chlorobenzene	BMDL	1
1,3-Dichlorobenzene	BMDL	1
1,2-Dichlorobenzene	BMDL	1
1,4-Dichlorobenzene	BMDL	1
Ethylbenzene	BMDL	1
Toluene	BMDL	1
Xylenes, Total	BMDL	1

Surrogate Standard	Percent Recovery
a,a,a-Trifluorotoluene	100%

Method Referene: 8020[1]
BMDL denotes Below Method Detection Limit.

90-5

CERTIFIED ENGINEERING & TESTING COMPANY, INC.
25 MATHESON DRIVE
HEYWOOD, MASSACHUSETTS 02149

CHAIN OF CUSTODY RECORD

RUSH

SAMPLE SERIES #: 90-08-01

DUE DATE: 8-10-90

COMPANY: City of Memphis General Services Div.
125 N. Mid-America Mall Room 576
Memphis, TN 38103
PHONE#: (901) 576-6857 FAX#: ( )
P.O.#:
CLIENT CONTACT: George Dudley / John Sorrels
PROJECT #: M00165

SAMPLE TYPE: 1. WATER, 2. SOIL, 3. SLUDGE, 4. OIL, 5. TISSUE, OTHER
CONTAINER TYPE: P-PLASTIC, G-GLASS, V-VOA

SAMPLE #	SAMPLE IDENTIFICATION	SAMPLE TYPE	CONTAINER SIZE	CONTAINER TYPE	CONTAINER #	SAMPLING DATE	SAMPLING TIME	PRESERVATIVE	ANALYSES: EPA 8020 - BTX	ANALYSES: TPH by IR	
H-1	Gasoline UST Pit	2	4oz	G	1	8-2-90	11:05a		X	X	No Odor

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
John C. Sorrels	8-2-90	Jim McCoffey	8-2-90
	TIME: 4:45 pm		TIME: 4:45pm
RELINQUISHED BY: Jim McCoffey	DATE: 8-2-90	RECEIVED BY: Fed Ex	DATE: 8-2-90
	TIME: 5:25 pm		TIME: 5:25pm
RELINQUISHED BY:	DATE:	RECEIVED FOR LAB BY:	DATE:
	TIME:		TIME:

METHOD OF SHIPMENT: FED EXPRESS # 682562688 3

SPECIAL INSTRUCTIONS:

☑ RUSH 5 DAY TURN AROUND AS PER CONTRACT W/CITY

☐ REGULAR

RESULTS TO: John Sorrels
CERTIFIED - MEMPHIS

Certified Engineering & Testing Company®

Boston • Providence • New York • Memphis • Dallas • San Francisco • Los Angeles

SOIL SAMPLING/ANALYSIS
UNDERGROUND STORAGE TANK CLOSURE
CITY OF MEMPHIS/MCKELLAR NURSERY
2684 HOLMES ROAD
MEMPHIS, TENNESSEE 38118

CERTIFIED PROJECT NO: M00165
JUNE 22, 1990

PREPARED FOR:

MR. GEORGE DUDLEY
CITY OF MEMPHIS/GENERAL SERVICES DIVISION
125 N. MID-AMERICA MALL
MEMPHIS, TENNESSEE 38103

PREPARED BY:

MARK E. BOWERS
ENVIRONMENTAL SCIENTIST
ENVIRONMENTAL SERVICES DIVISION

REVIEWED BY:

AMY MCCAFFERY
OPERATIONS MANAGER
MID-SOUTH OPERATIONS

Certified Engineering & Testing Company of Tennessee, Inc.
5175 Elmore Road, Suite 1, Memphis, TN 38134 (901) 382-6282 TeleFAX (901) 372-5735

90-3

TABLE OF CONTENTS

1.0 INTRODUCTION

Certified Engineering and Testing Company, Inc. (CERTIFIED) was retained by the City of Memphis, General Services Division (the City) to obtain appropriate soil samples following the removal of an underground storage tank (UST) from the McKellar Nursery property (the Site). The physical removal of the UST was handled by the City prior to CERTIFIED's arrival at the Site. Soil sampling was performed in accordance with guidelines issued by the UST Program of the Tennessee Department of Health and Environment, Division of Superfund.

2.0 SITE DESCRIPTION

Soil sampling was performed at the City of Memphis McKellar Nursery property located at 2684 Holmes Road, Memphis, Tennessee. The UST pit is located in the central section of the Site just south of a vacant building. Appendix A, Figures 1 through 3 provide a Site Locus, Site Plan and Area Topographic Map, respectively.

3.0 FIELD ACTIVITIES

On June 13, 1990, CERTIFIED arrived at the Site to sample UST pit soils and soils removed during UST excavation.

The UST pit was formerly occupied by a gasoline UST with a capacity of approximately 1,000 gallons. Mr. George Dudley with the City of Memphis informed CERTIFIED that this UST had been out of service for some time prior to removal.

Two (2) soil samples were collected from the UST pit ends. A sample (composite) was also collected from the aerating gasoline UST pit soils (three (3) individual samples). Appendix A, Figure 2 shows sampling locations and general site layout.

All soil samples were collected using a bucket auger which was manually advanced. All soil samples were placed in four (4) ounce glass jars with heavy-duty aluminum foil seals and screw-on type lids. The soil samples were stored in a chain-of-custody cooler with bagged ice while in the field. The samples were promptly returned to CERTIFIED's Memphis office and placed in a shipping cooler with an ice pack. The soil samples were shipped overnight via Federal Express courier service on June 13, 1990 to CERTIFIED's corporate laboratory in Weymouth, Massachusetts. The cooler was secured with security seal #3813 which was not broken unit the cooler arrived at the laboratory.

The bucket auger used for sampling was cleaned, rinsed with methanol and rinsed with distilled water between samples to avoid cross contamination.

Soil samples collected in association with the former gasoline UST were analyzed for TPH and Gasoline Hydrocarbons (BTX).

4.0 OBSERVATIONS

A slight gasoline odor emanated from the UST pit during sampling procedures. There were, however, no signs of soil staining in the UST pit. There were areas of mottled soil along the pit walls at a depth of approximately four (4) feet. This would indicate that area soils had been subjected to a high water table. No free product was observed.

Aerating soils had a slight to moderate gasoline odor.

5.0 SOIL ANALYSIS RESULTS

The Analytical Laboratory Reports provided in Appendix B outline the analytical methods used and the results obtained for all soil sample analyses. The results are also summarized below (Table 1) for each of the current Tennessee regulated compounds.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the analytical results presented, CERTIFIED concludes that significant tank pit soil contamination (above cleanup standards) is confined to the east end of the pit. Total petroleum hydrocarbon (TPH) concentrations in this area were found to be greater than 3.5 times the applicable standard.

The TPH concentrations found in the aerating soil pile sample was also above the cleanup standard.

Gasoline hydrocarbon (BTX) concentrations were below the applicable cleanup standard in all soils sampled.

As a result of these findings, CERTIFIED recommends that additional soil excavation be performed in the east half of the tank pit to remove contaminated soils in this area. State regulations allow for overexcavation ten (10) feet in any direction (maximum). If soils from the overexcavated area are found to be in excess of cleanup standards, the Tennessee Department of Health and Environment, UST section should be contacted for further instructions. In addition, CERTIFIED recommends that the aerating soils be left in place. In doing so, volatilization of the lighter TPH fractions may be accomplished. This may serve to reduce TPH levels to below cleanup standards.

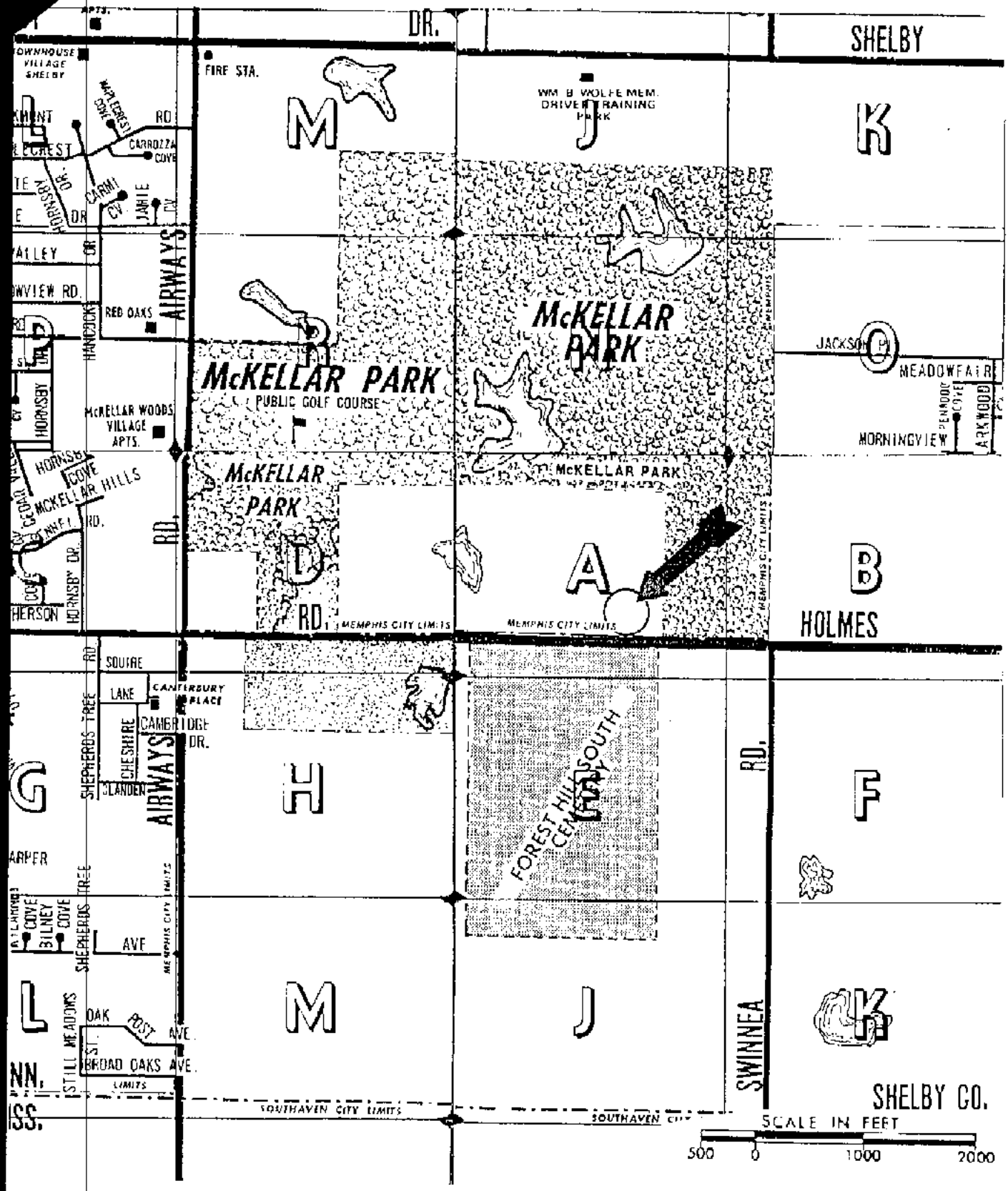
TABLE 1

Sample	Location	Total BTX Result *	TPH Result
1	Gasoline UST Pit East End	8.1	355
2	Gasoline UST Pit West End	0.67	0
3	Gasoline UST Pit Aerating Excavated Soils	0.19	190
	Cleanup Standard**	10	100

* Total BTX = sum of the concentrations of benzene, toluene and total xylenes in parts per million (ppm)

** - excerpted from Tennessee Department of Health and Environment, Division of Groundwater Protection, Policy on Cleanup Levels for Gasoline and Other Petroleum Hydrocarbons, Groundwater, March 18, 1987.

NOTE - all results presented in ppm.



SITE LOCUS

McKellar Nursery UST Closure
2684 Holmes Road
Memphis, Tennessee 38118

CERTIFIED

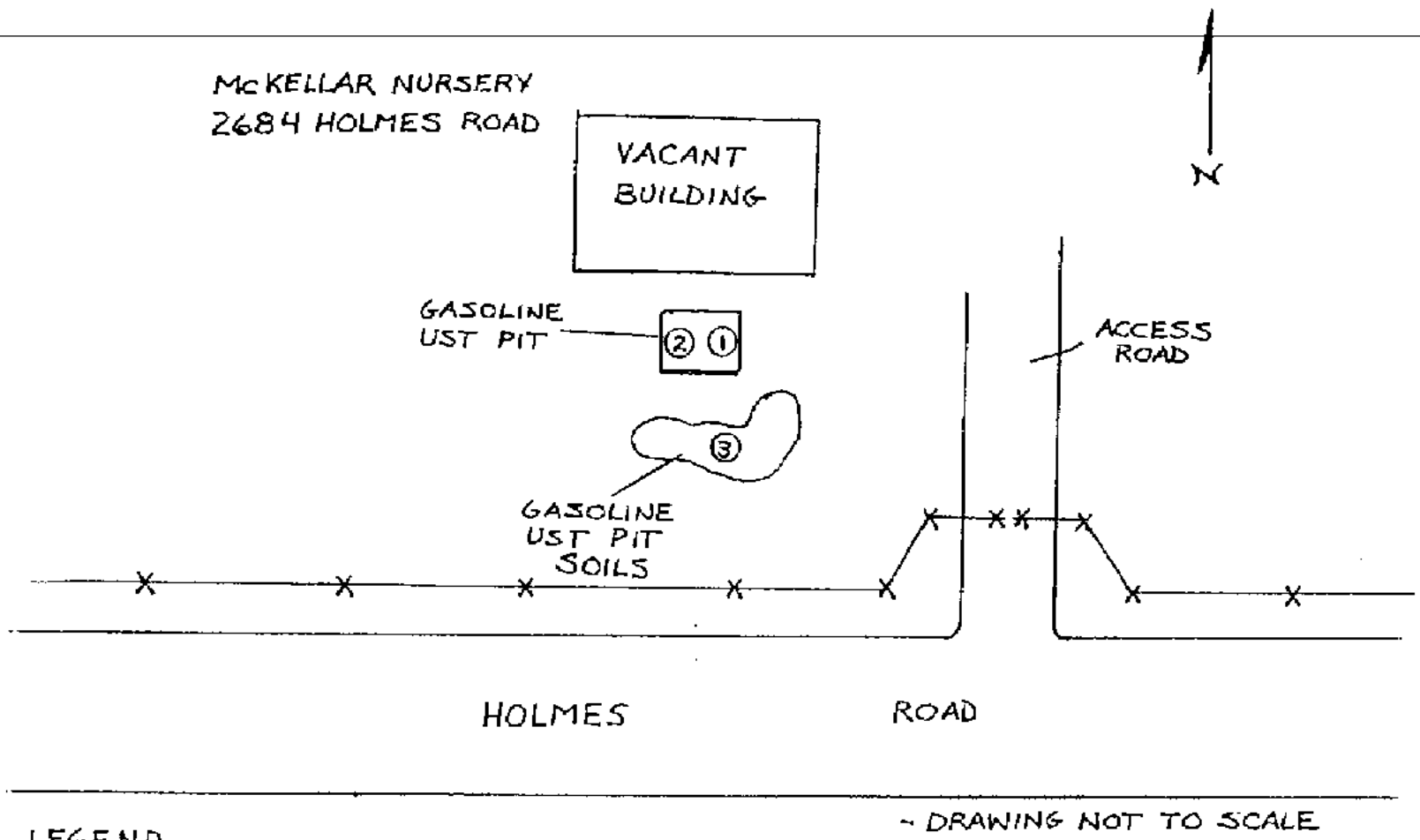
Figure: 1

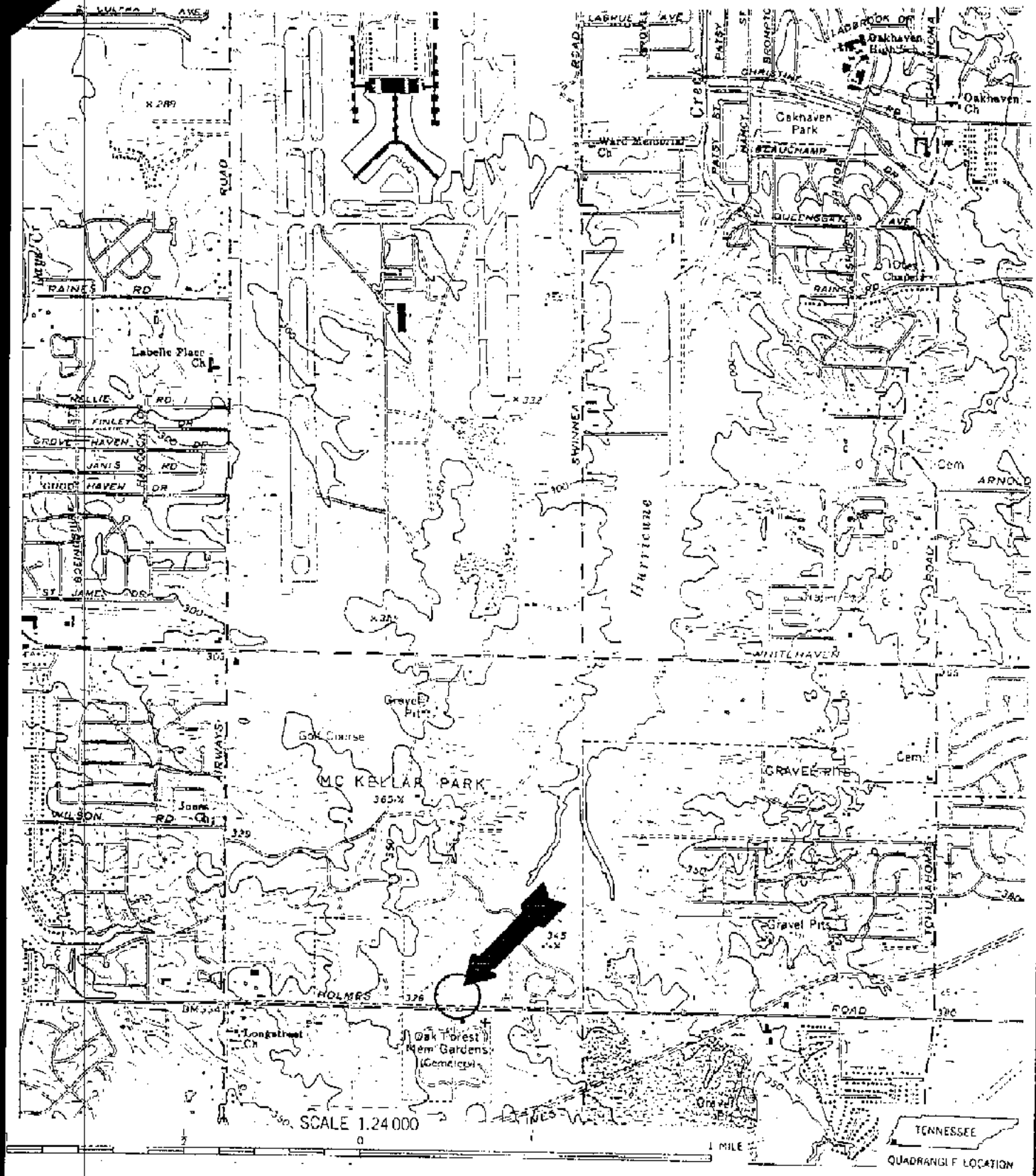
SITE PLAN

McKellar Nursery UST Closure
2684 Holmes Road
Memphis, Tennessee 38118

CERTIFIED

Figure: 2





N

TOPOGRAPHIC MAP

McKellar Nursery UST Closure
2684 Holmes Road
Memphis, Tennessee 38118

CERTIFIED

Figure: 3

ANALYTICAL LABORATORY REPORT

June 22, 1990

Project No.: M00165
CERTIFIED Lab ID: 90-06-068

Attached are the results of analyses performed on the samples received by this laboratory on June 14, 1990.

REFERENCES

[1] "Test Methods for Evaluating Solid Waste, SW846, Third Edition," USEPA, November 1986.

[2] "Standard Methods for the Examination of Water and Wastewater, Sixteenth Edition," American Public Health Association, 1985.

[3] 40 CFR Part 136, July 1, 1987.

[4] "Annual Book of ASTM Standards," Vol. 11.02, 1989.

If you have any questions concerning these results, please do not hesitate to contact me.

Very truly yours,

John J. Sulkowski
Laboratory Manager

JJS/smd

Enclosures

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: City of Memphis, Gen Ser Div
Matrix: Soil
Sample Location: Gasoline UST Pit

Samples Series: 9006068.1
Date Sampled: 06/13/90
Date Analyzed: 06/19/90

Sample Description: One 4 ounce glass container of soil

Purgeable Aromatics	Result ug/Kg	Detection Limit ug/Kg
Methyl-tert-Butylether	BMDL	2,500
Benzene	BMDL	500
Chlorobenzene	BMDL	500
1,3-Dichlorobenzene	BMDL	500
1,2-Dichlorobenzene	BMDL	500
1,4-Dichlorobenzene	BMDL	500
Ethylbenzene	820.0	500
Toluene	3,300.0	500
Xylenes, Total	4,800.0	500

Method Reference: 8020[1]
BMDL denotes Below Method Detection Limit

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: City of Memphis, Gen Ser Div
Matrix: Soil
Sample Location: Gasoline UST Pit

Samples Series: 90-06-068.2
Date Sampled: 06/13/90
Date Analyzed: 06/19/90

Sample Description: One 4 ounce glass container of soil

Purgeable Aromatics	Result ug/Kg	Detection Limit ug/Kg
Methyl-tert-Butylether	BMDL	25
Benzene	129.0	5
Chlorobenzene	BMDL	5
1,3-Dichlorobenzene	BMDL	5
1,2-Dichlorobenzene	BMDL	5
1,4-Dichlorobenzene	BMDL	5
Ethylbenzene	28.0	5
Toluene	370.0	5
Xylenes, Total	168.0	5

Method Reference: 8020[1]
BMDL denotes Below Method Detection Limit

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: City of Memphis, Gen Ser Div
Matrix: Soil
Sample Location: Gasoline Ust Pit
Aerating Soils

Sample Series: 90-06-068.3
Date Sampled: 06/13/90
Date Analyzed: 06/19/90

Sample Description: One 4 ounce glass container of soil

Purgeable Aromatics	Result ug/Kg	Detection Limit ug/Kg
Methyl-tert-Butylether	BMDL	5
Benzene	BMDL	1
Chlorobenzene	BMDL	1
1,3-Dichlorobenzene	BMDL	1
1,2-Dichlorobenzene	BMDL	1
1,4-Dichlorobenzene	BMDL	1
Ethylbenzene	115	1
Toluene	120	1
Xylenes, Total	70	1

Method Referene: 8020*
BMDL denotes Below Method Detection Limit.

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: City of Memphis, Gen Ser Div
Matrix: Water
Sample Location: Gasoline UST Pit

Sample Series: 90-06-068.1
Date Sampled: 06/13/90

Sample Description: One 4 ounce glass container of soil unpreserved

Chemical Analysis	Result	Date Analyzed	Detection Limit	Method
Petroleum Hydrocarbon	355	06/22/90	5	503D[a]

Client: City of Memphis, Gen Ser Div
Matrix: Water
Sample Location: Gasoline UST Pit

Sample Series: 90-06-068.2
Date Sampled: 06/13/90

Sample Description: One 4 ounce glass container of soil unpreserved

Chemical Analysis	Result	Date Analyzed	Detection Limit	Method
Petroleum Hydrocarbon	BMDL	06/22/90	5	503D[a]

Client: City of Memphis, Gen Ser Div
Matrix: Water
Sample Location: Gasoline UST Pit Aerating Soils

Sample Series: 90-06-068.3
Date Sampled: 06/13/90

Sample Description: One 4 ounce glass container of soil unpreserved

Chemical Analysis	Result	Date Analyzed	Detection Limit	Method
Petroleum Hydrocarbon	190	06/22/90	5	503D[a]

Analyst: John J. Sulkowski
BMDL denotes Below Method Detection Limit.

CERTIFIED ENGINEERING & TESTING COMPANY, INC.
25 MATHEWSON DRIVE
WEYMOUTH, MASSACHUSETTS 02189

SAMPLE SERIES #: 906-06-9

CHAIN OF CUSTODY RECORD

DUE DATE: 6-20-90

COMPANY: City of Memphis, General Services Div
: 125 N. Mid America Mall, Room 576
: Memphis, TN 38103
PHONE# : (___) 576-6857 FAX#(___)
P.O.# :
CLIENT CONTACT: George Dudley
PROJECT #: M00165

SAMPLE TYPE: 1. WATER 2. SOIL 3. SLUDGE 4. OIL 5. TISSUE OTHER

CONTAINER TYPE: P-PLASTIC G-GLASS V-VOA

ANALYSES: EPA 8020 - BTX; TPH

SAMPLE #	SAMPLE IDENTIFICATION	SAMPLE TYPE	CONTAINER SIZE	CONTAINER TYPE	CONTAINER #	SAMPLING DATE	SAMPLING TIME	PRESERVATIVE	EPA 8020 - BTX	TPH	
1	Gasoline UST Pit	2	4oz	G	1	6/13/90	11:30A		X	X	NO ODOR
2	Gasoline UST Pit	2	4oz	G	1	6/13/90	11:35A		X	X	NO ODOR
3	Gasoline UST Pit Aerating Soils	2	4oz	G	1	6/13/90	11:50A		X	X	SLIGHT ODOR COMPOSITE

RELINQUISHED BY:		RECEIVED BY:	
Mark F. Bowers	DATE: 6/13/90 TIME: 3:50 PM	[signature]	DATE: 6-14-90 TIME: 9:00am
RELINQUISHED BY:	DATE: TIME:	RECEIVED BY:	DATE: TIME:
RELINQUISHED BY:	DATE: TIME:	RECEIVED FOR LAB BY:	DATE: TIME:

METHOD OF SHIPMENT:

SEAL # 3813

SPECIAL INSTRUCTIONS:

☒ RUSH 5 DAY TURN AROUND

☐ REGULAR

RESULTS TO: TIM McCAFFERY / CERTIFIED - MEMPHIS

Certified Engineering & Testing Company®

Boston • Providence • New York • Memphis • Dallas • San Francisco • Los Angeles

July 17, 1990

Mr. George Dudley
City of Memphis/General Services Division
125 North Mid America Mall
Memphis, Tennessee 38103

RE: McKellar Nursery UST Closure Soil Sampling
CERTIFIED Project No: M00165

Dear Mr. Dudley:

Please find enclosed two (2) copies of the followup report outlining the findings of the above referenced project. Also find enclosed, an additional copy of the laboratory data sheets for the second sampling phase.

If you have any questions, please feel free to call me.

Sincerely,

Mark E. Bowers

Mark E. Bowers
Environmental Scientist

Enclosure

SOIL SAMPLING/ANALYSIS FOLLOWUP
UNDERGROUND STORAGE TANK CLOSURE
CITY OF MEMPHIS/MCKELLAR NURSERY
2684 HOLMES ROAD
MEMPHIS, TENNESSEE 38118

CERTIFIED PROJECT NO: M00165
JULY 17, 1990

PREPARED FOR:
MR. GEORGE DUDLEY
CITY OF MEMPHIS/GENERAL SERVICES DIVISION
125 N. MID-AMERICA MALL
MEMPHIS, TENNESSEE 38103

PREPARED BY:

Mark E. Bowers

MARK E. BOWERS
ENVIRONMENTAL SCIENTIST

REVIEWED BY:

Amy B. McCaffery

AMY B. McCAFFERY
OPERATIONS MANAGER

TABLE OF CONTENTS

1.0 INTRODUCTION

Certified Engineering and Testing Company, Inc. (CERTIFIED) collected and analyzed soil samples in conjunction with an underground storage tank (UST) closure at the City of Memphis/General Services Division (the City) McKellar Nursery site, 2684 Holmes Road, Memphis, Tennessee. Two (2) of the soils samples collected on June 13, 1990 were found to exceed the Tennessee Department of Health and Environment, Division of Ground Water Protection (the State) soil cleanup standards for total petroleum hydrocarbons (TPH). The TPH contaminated soils were found in the east end of the UST pit and the aerating soil pile.

As a result, the City overexcavated the UST pit. The east end of the pit was expanded by approximately 200 square feet (surface area). The depth of the pit (east half) was increased by approximately 4.5 feet.

The City contacted CERTIFIED on July 9, 1990 to request sample collection in the areas previously found to have soil contamination.

A site locus, site plan and area topographic map are provided as Appendix A, Figures 1, 2, and 3, respectively.

2.0 FIELD ACTIVITIES

On July 9, 1990, CERTIFIED arrived at the Site to sample UST pit soils (east end) and soils removed during UST excavation and overexcavation.

One (1) soil sample was collected from the east end of the UST pit. A sample (composite) was also collected from the aerating soil pile (four (4) individual samples). Appendix A, Figure 2 shows sampling locations and general site layout.

All soil samples were collected using a bucket auger which was manually advanced. All soil samples were placed in four (4) ounce glass jars with heavy-duty aluminum foil seals and screw-on type lids. The soil samples were stored in a chain-of-custody cooler with bagged ice while in the field. The samples

were promptly returned to CERTIFIED's Memphis office and placed in a shipping cooler with an ice pack. The soil samples were shipped overnight via Federal Express courier service on July 9, 1990 to CERTIFIED's corporate laboratory in Weymouth, Massachusetts. The cooler was secured with security seal 4249 which was not broken until the cooler arrived at the laboratory. The bucket auger used for sampling was cleaned, rinsed with methanol and rinsed with distilled water between samples to avoid cross contamination.

Soil samples collected in association with the former gasoline UST were analyzed for TPH and Gasoline Hydrocarbons (BTX).

3.0 OBSERVATIONS

The slight gasoline odor which was present in the UST pit vicinity (on June 13, 1990) had dissipated.

The soil sample collected from the UST pit east end was dry and had no noticeable odor. No stained soils were observed in the area.

The soil sample collected from the aerating soil pile had a slight gasoline odor.

4.0 SOIL ANALYSIS RESULTS

The Analytical Laboratory Report provided in Appendix B outlines the analytical methods used and the results obtained for all soil sample analyses. The results are also summarized below (Table 1) for each of the current Tennessee regulated compounds.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the analytical results presented, CERTIFIED concludes that significant tank pit soil contamination (above cleanup standards) still exists in the east end of the pit. Total petroleum hydrocarbon (TPH) concentrations in this area were found to be five (5) times the applicable standard. The Total BTX levels in this sample were also slightly above the corresponding cleanup standard.

The TPH concentrations found in the aerating soil pile sample were nearly six (6) times the cleanup standard. Total BTX concentrations in the aerating soils were below cleanup standards.

As a result of these findings, CERTIFIED recommends the following. It did not appear in CERTIFIED's opinion, that the area had been overexcavated to the fullest extent allowed (ten (10) feet in all directions). CERTIFIED would therefore recommend additional overexcavation in the east end of the tank pit (increase surface area). The depth of the pit (east end) should also be increased. This should remove the contaminated soils found during the second sampling phase. In addition, aerating soils should be left in place to allow for further votalilization of the lighter TPH fractions.

TABLE 1

Sample	Location	Total BTX Result *	TPH Result
1	Gasoline UST Pit East End	10.4	500
2	Gasoline UST Pit Aerating Excavated Soils	5.3	575
	Cleanup Standard **	10	100

* Total BTX = sum of the concentrations of benzene, toluene and total xylenes in parts per million (ppm)

** - excerpted from Tennessee Department of Health and Environment, Division of Groundwater Protection, Policy on Cleanup Levels for Gasoline and other Petroleum Hydrocarbons, Groundwater, March 18, 1987.

NOTE - all results presented in ppm.

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: City of Memphis
Matrix: Soil
Sample Location: East End of UST Pit

Samples Series: 90-07-029.1
Date Sampled: 07/09/90
Date Analyzed: 07/10/90

Sample Description: One 4 ounce glass container of soil

Purgeable Aromatics	Result ug/Kg	Detection Limit ug/Kg
Methyl-tert-Butylether	BMDL	5000
Benzene	6400	1000
Chlorobenzene	BMDL	1000
1,3-Dichlorobenzene	BMDL	1000
1,2-Dichlorobenzene	BMDL	1000
1,4-Dichlorobenzene	BMDL	1000
Ethylbenzene	2000	1000
Toluene	1000	1000
Xylenes, Total	3000	1000

Surrogate Standard	Percent Recovery
a,a,a-Trifluorotoluene	17.0

Method Reference: 8020[1]
BMDL denotes Below Method Detection Limit

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: City of Memphis
Matrix: Soil
Sample Location: Aerating Soil Piles

Samples Series: 90-07-029.2
Date Sampled: 07/09/90
Date Analyzed: 07/10/90

Sample Description: One 4 ounce glass container of soil

Purgeable Aromatics	Result ug/Kg	Detection Limit ug/Kg
Methyl-tert-Butylether	BMDL	5000
Benzene	5300	1000
Chlorobenzene	BMDL	1000
1,3-Dichlorobenzene	BMDL	1000
1,2-Dichlorobenzene	BMDL	1000
1,4-Dichlorobenzene	BMDL	1000
Ethylbenzene	BMDL	1000
Toluene	BMDL	1000
Xylenes, Total	BMDL	1000

Surrogate Standard	Percent Recovery
a,a,a-Trifluorotoluene	17.0

Method Reference: 8020[1]
BMDL denotes Below Method Detection Limit

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: City of Memphis
Matrix: Soil
Sample Location: East End of UST Pit

Sample Series: 90-07-029.1
Date Sampled: 07/09/90

Sample Description: One 4 ounce glass container of soil unpreserved

Chemical Analysis	Result	Date Analyzed	Detection Limit	Method
Petroleum Hydrocarbon mg/Kg	500	07/12/90	1	418.1[5]

Client: City of Memphis
Matrix: Soil
Sample Location: Aerating Soil Piles

Sample Series: 90-07-029.2
Date Sampled: 07/09/90

Sample Description: One 4 ounce glass container of soil unpreserved

Chemical Analysis	Result	Date Analyzed	Detection Limit	Method
Petroleum Hydrocarbon mg/Kg	575	07/12/90	5	418.1[5]

Analyst: Wayne Emanuello
BMDL denotes Below Method Detection Limit.

CERTIFIED ENGINEERING & TESTING COMPANY, INC.
25 NATHANSON DRIVE
WEYMOUTH, MASSACHUSETTS 02189

CHAIN OF CUSTODY RECORD

RUSH

SAMPLE SERIES #: 90 07 029

DUE DATE: 7-17-90

COMPANY: CITY OF MEMPHIS / GENERAL SERVICES DIVISION
125 N. Mid America Mall, Rm 576
MEMPHIS TN 38103

PHONE#: (901) 576-6857 FAX#:

P.O.#:

CLIENT CONTACT: GEORGE DUDLEY

PROJECT #: M00165

SAMPLE TYPE
1. WATER
2. SOIL
3. SLUDGE
4. OIL
5. TISSUE
OTHER

CONTAINER TYPE
P-PLASTIC
G-GLASS
V-VOA

ANALYSES: EPA 8020 - BTX, TPH

SAMPLE #	SAMPLE IDENTIFICATION	MATRIX TYPE	CONTAINER SIZE	CONTAINER TYPE	CONTAINER #	SAMPLING DATE	SAMPLING TIME	PRESERVATIVE	BTX	TPH	
1	EAST END OF UST PIT	2	4oz	G	1	7.9.90	2:00P	CHILL	X	X	NO ODOR
2	AERATING SOIL PILES	2	4oz	G	1	7.9.90	2:10P	CHILL	X	X	VERY SLIGHT ODOR

RELINQUISHED BY: MARK E. BOWERS	DATE: 7.9.90	RECEIVED BY:	DATE: 7-10-90
	TIME: 3:30 PM		TIME: 9:00
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
	TIME:		TIME:
RELINQUISHED BY:	DATE:	RECEIVED FOR LAB BY:	DATE:
	TIME:		TIME:

METHOD OF SHIPMENT: FED EX

SECURITY SEAL # 4249

SPECIAL INSTRUCTIONS:

☒ RUSH 5 DAY TURN AROUND (PAID)

☐ REGULAR FAX / SEND RESULTS TO:
MARK BOWERS CERTIFIED-MEMPHIS
901.382.6282 / FAX 901 372 5735

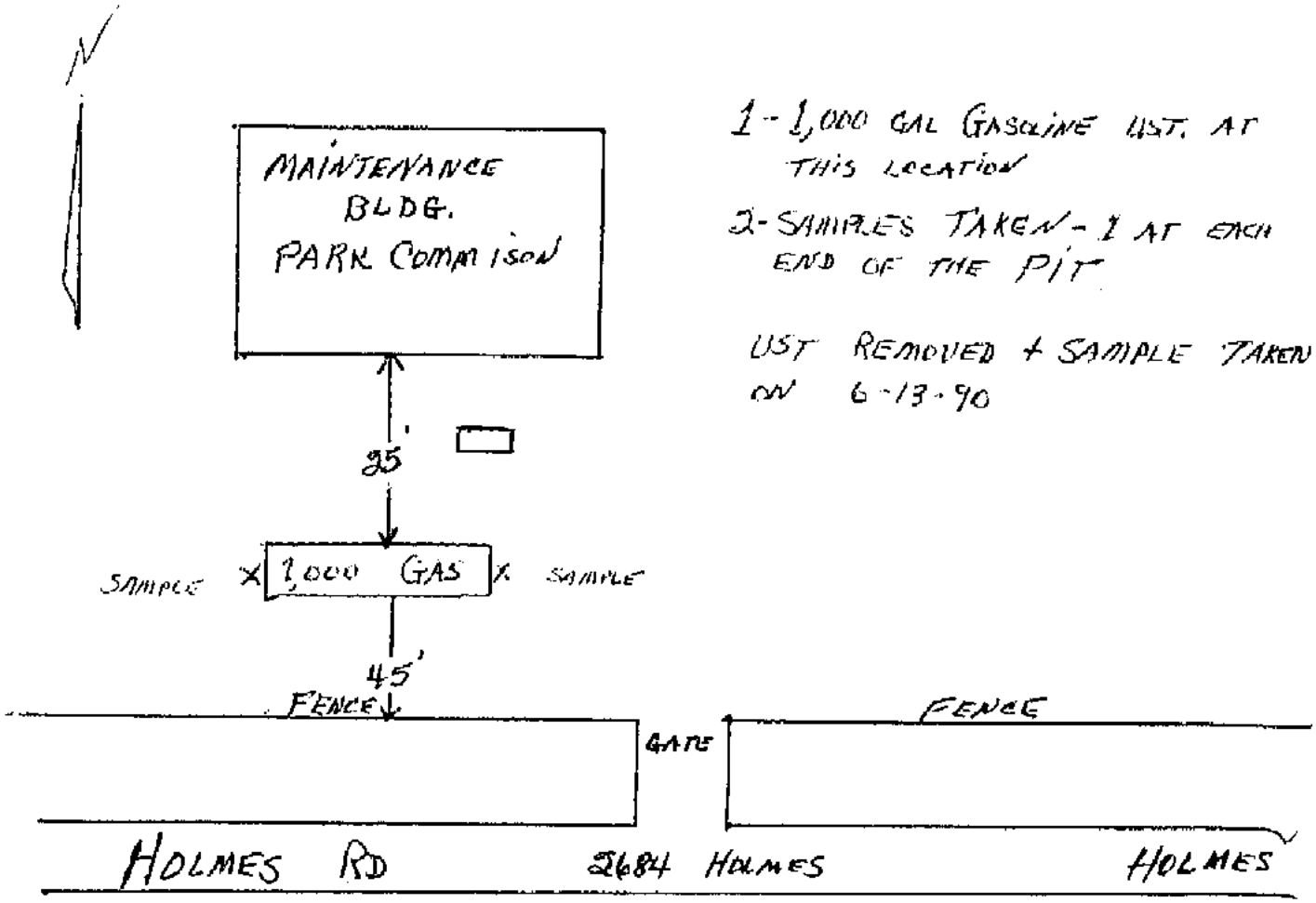
DRAWING REVISED
6-14-90

KELLER PARK NURSERY
2684 HOLMES RD.

UST ID 9-791182

THE ORIGINAL INFO INDICATED 2 USTs { 1-1,000 GAS
1-1,000 DIESEL

THERE WAS ONLY ONE UST AND IT WAS 1,000 GASOLINE AND EMPTY - NO SAND FILLING



1-1,000 GAL GASOLINE UST. AT THIS LOCATION

2-SAMPLES TAKEN - 1 AT EACH END OF THE PIT

UST REMOVED + SAMPLE TAKEN ON 6-13-90

ANALYTICAL LABORATORY REPORT

June 22, 1990

Project No.: M00165
CERTIFIED Lab ID: 90-06-068

Attached are the results of analyses performed on the samples received by this laboratory on June 14, 1990.

REFERENCES

[1] "Test Methods for Evaluating Solid Waste, SW846, Third Edition," USEPA, November 1986.

[2] "Standard Methods for the Examination of Water and Wastewater, Sixteenth Edition," American Public Health Association, 1985.

[3] 40 CFR Part 136, July 1, 1987.

[4] "Annual Book of ASTM Standards," Vol. 11.02, 1989.

If you have any questions concerning these results, please do not hesitate to contact me.

Very truly yours,

John J. Sulkowski
Laboratory Manager

JJS/smd

Enclosures

90-2

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: City of Memphis, Gen Ser Div
Matrix: Soil
Sample Location: Gasoline UST Pit

Samples Series: 9006068.1
Date Sampled: 06/13/90
Date Analyzed: 06/19/90

Sample Description: One 4 ounce glass container of soil

Purgeable Aromatics	Result ug/Kg	Detection Limit ug/Kg
Methyl-tert-Butylether	BMDL	2,500
Benzene	BMDL	500
Chlorobenzene	BMDL	500
1,3-Dichlorobenzene	BMDL	500
1,2-Dichlorobenzene	BMDL	500
1,4-Dichlorobenzene	BMDL	500
Ethylbenzene	820.0	500
Toluene	3,300.0	500
Xylenes, Total	4,600.0	500

Method Reference: 8020[1]
BMDL denotes Below Method Detection Limit

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: City of Memphis, Gen Ser Div
Matrix: Soil
Sample Location: Gasoline UST Pit

Samples Series: 90-06-068.2
Date Sampled: 06/13/90
Date Analyzed: 06/19/90

Sample Description: One 4 ounce glass container of soil

Purgeable Aromatics	Result ug/Kg	Detection Limit ug/Kg
Methyl-tert-Butylether	BMDL	25
Benzene	129.0	5
Chlorobenzene	BMDL	5
1,3-Dichlorobenzene	BMDL	5
1,2-Dichlorobenzene	BMDL	5
1,4-Dichlorobenzene	BMDL	5
Ethylbenzene	28.0	5
Toluene	370.0	5
Xylenes, Total	168.0	5

Method Reference: 8020[1]
BMDL denotes Below Method Detection Limit

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: City of Memphis, Gen Ser Div
Matrix: Soil
Sample Location: Gasoline Ust Pit
Aerating Soils

Sample Series: 90-06-068.3
Date Sampled: 06/13/90
Date Analyzed: 06/19/90

Sample Description: One 4 ounce glass container of soil

Purgeable Aromatics	Result ug/Kg	Detection Limit ug/Kg
Methyl-tert-Butylether	BMDL	5
Benzene	BMDL	1
Chlorobenzene	BMDL	1
1,3-Dichlorobenzene	BMDL	1
1,2-Dichlorobenzene	BMDL	1
1,4-Dichlorobenzene	BMDL	1
Ethylbenzene	115	1
Toluene	120	1
Xylenes, Total	70	1

Method Referene: 8020[1]
BMDL denotes Below Method Detection Limit.

CERTIFIED ENGINEERING AND TESTING COMPANY, INC.

Client: City of Memphis, Gen Ser Div
Matrix: Water
Sample Location: Gasoline UST Pit

Sample Series: 90-06-068.1
Date Sampled: 06/13/90

Sample Description: One 4 ounce glass container of soil unpreserved

Chemical Analysis	Result	Date Analyzed	Detection Limit	Method
Petroleum Hydrocarbon	355	06/22/90	5	503D[a]

Client: City of Memphis, Gen Ser Div
Matrix: Water
Sample Location: Gasoline UST Pit

Sample Series: 90-06-068.2
Date Sampled: 06/13/90

Sample Description: One 4 ounce glass container of soil unpreserved

Chemical Analysis	Result	Date Analyzed	Detection Limit	Method
Petroleum Hydrocarbon	BMDL	06/22/90	5	503D[a]

Client: City of Memphis, Gen Ser Div
Matrix: Water
Sample Location: Gasoline UST Pit Aerating Soils

Sample Series: 90-06-068.3
Date Sampled: 06/13/90

Sample Description: One 4 ounce glass container of soil unpreserved

Chemical Analysis	Result	Date Analyzed	Detection Limit	Method
Petroleum Hydrocarbon	190	06/22/90	5	503D[a]

Analyst: John J. Sulkowski
BMDL denotes Below Method Detection Limit.

CERTIFIED ENGINEERING & TESTING COMPANY, INC.
21 HAYWARD DRIVE
WEYMOUTH, MASSACHUSETTS 02189

SAMPLE SERIES #: 908-06-008

CHAIN OF CUSTODY RECORD

DUE DATE: 6-20-90

COMPANY: City of Memphis, General Services Div
: 125 N. Mid America Mall, Room 576
: Memphis, TN 38103
PHONE# : (___) 576-6857 FAX#: (___)
P.O.# :
CLIENT CONTACT: George Dudley
PROJECT #: M00165

SAMPLE TYPE
1. WATER
2. SOIL
3. SLUDGE
4. OIL
5. TISSUE
OTHER

CONTAINER TYPE
P-PLASTIC
G-GLASS
V-VOA

ANALYSES: EPA 8020 - BTX, TPH

PRESERVATIVE

SAMPLE #	SAMPLE IDENTIFICATION	SAMPLE TYPE	CONTAINER SIZE	CONTAINER TYPE	CONTAINER #	SAMPLING DATE	SAMPLING TIME	
1	Gasoline UST Pit	2	40z	G	1	6/13/90	11:30 AM	NO ODOR
2	Gasoline UST Pit	2	40z	G	1	6/13/90	11:35 AM	NO ODOR
3	Gasoline UST Pit Aerating Soils	2	40z	G	1	6/13/90	11:50 AM	SLIGHT ODOR COMPOSITE

RELINQUISHED BY: Mark E. Bowers	DATE: 6/13/90	RECEIVED BY:	DATE: 6-14-90	SEAL # 3813
	TIME: 3:50 PM		TIME: 9:00 AM	SPECIAL INSTRUCTIONS:
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:	☒ RUSH 5 DAY TURN AROUND
	TIME:		TIME:	☐ REGULAR
RELINQUISHED BY:	DATE:	RECEIVED FOR LAB BY:	DATE:	RESULTS TO: TIM McCAFFERY CERTIFIED - MEMPHIS
	TIME:		TIME:	

METHOD OF SHIPMENT:

M

STATE OF TENNESSEE
UNDERGROUND STORAGE TANK PROGRAM

APPLICATION FOR PERMANENT CLOSURE OF UNDERGROUND STORAGE TANK SYSTEMS

Submit the following application for approval to your local UST Field Office, 30 days in advance of closure of your UST system. Refer to the attached map for the address of the field office nearest your facility. In order to ensure prompt processing, ATTACH A SELF ADDRESSED, STAMPED ENVELOPE WITH THIS APPLICATION. An approved copy of this application must be kept on site during tank abandonment.

1. Facility I.D. Number: 9-791182

2. Name of Facility: McKellar Nursery
   Address: 2684 Holmes
   Memphis, TN
   Phone: (901) 528-2932 County: Shelby

3. Name of Tank Owner/Operator: City of Memphis
   Address: 125 N. Mid-America Mall
   Memphis, TN 38103
   Phone: (901) 528-2932

4. Number of tanks registered at this site: 2

5. Number of tanks to be closed: 2

6. Date the tanks were last used:

7. Tank #, size and substance(s) stored in each tank to be closed:

   Tank 1 Gasoline
   Tank 2 Diesel
   Tank 3
   Tank 4
   Tank 5
   Tank 6

Note: only one tank found

APPROVED
DIVISION OF UNDERGROUND STORAGE TANKS
DATE 5-10-90
BY

8. Will tanks be reinstalled at this location? Yes ____ NO X

9. Attach a site sketch showing the location of the tanks, associated lines, sampling points and any nearby underground utilities.

10. Closure Type: Removal X Closure in place ____ Change in service ____

    If tanks are closed in place, removed, modified, upgraded or a change in service occurs, an amended notification form must be submitted showing the current configuration and status of tanks at this facility.

11. If the tank(s) are to be closed in place, describe the method to be used to clean the tank(s) and the type of solid, inert fill material that will be used to fill the tank(s).

    NA

90-1

12. Soil and/or ground water samples must be collected to determine if leakage or spillage has occurred. Analytical analysis for the following parameters should be performed based on the type of product stored. Mark the type of analysis that will be performed.

FOR TANKS STORING GASOLINE:
Benzene, Toluene, Xylene (BTX) AND Total Petroleum Hydrocarbons (TPH) X

FOR TANKS THAT HAVE ONLY STORED OTHER HYDROCARBONS: (i.e. diesel, kerosene, waste oil) Total Petroleum Hydrocarbons(TPH): X

CHEMICALS TANKS: Contact the Environmental Protection Agency in Atlanta at (404) 347-3866, David Ariail.

13. The Federal UST Regulations require that samples be collected where contamination is most likely to occur. The Tennessee UST Program requires that at a minimum, sample collection should follow the protocol on the attached page. (There should be no deviation from this protocol unless a person with experience in environmental sampling prepares and submits a site specific sampling plan for approval.)

If you should decide to collect the samples yourself, the sampling protocol on the attached page shall be followed.

14. Describe how any contaminated soil that is encountered will be handled, stockpiled, and treated or disposed of based on site conditions.
If contaminated, it will be stockpiled.

15. List the name of the laboratory where samples will be sent. (This lab must be approved by the Tennessee Underground Storage Tank Program. See attached list.
Certified Engineering and Testing Co., Inc.
TN Approval #02901

16. Name of Company/Person performing the closure and date scheduled:
Cruzen Equipment Company - 6/18/90 (by contract for the City of Memphis)

(PLEASE SIGN)

The person signing this application should be the tank owner or his/her designated representative. Further, once this application has been approved, it or a copy must be kept at the tank closure site for review by the Division's inspectors.

I, (Print) _____, agree to report the results of the analytical samples collected in regard to this closure within 30 days of receipt from the laboratory and resolve any environmental contamination that exceeds UST policy.

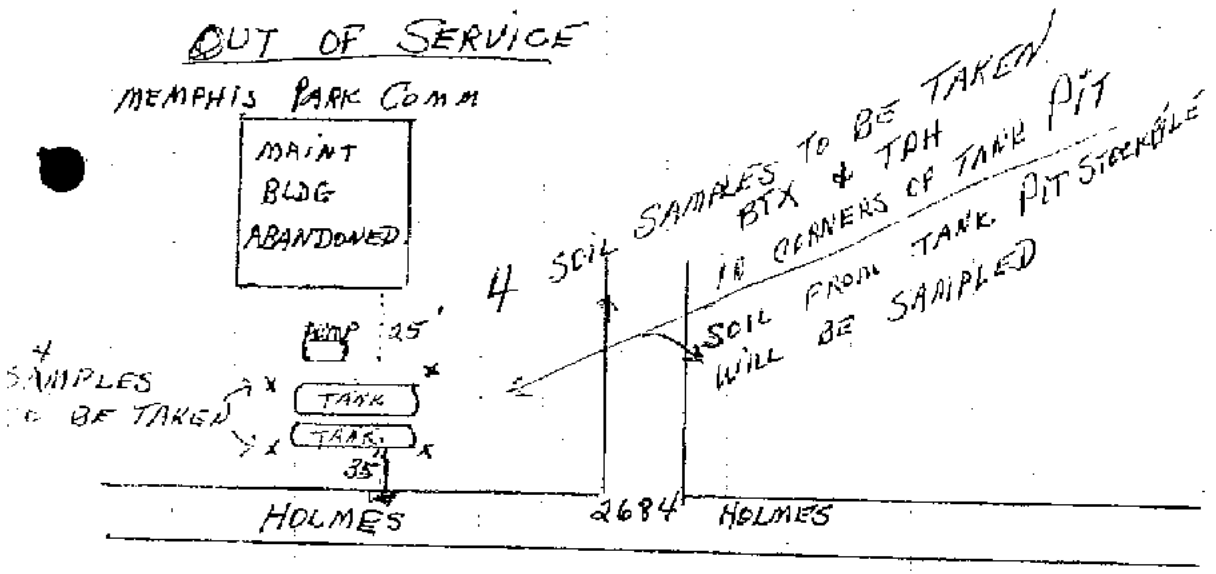
Signature George J. Dudley Date 5-10-90

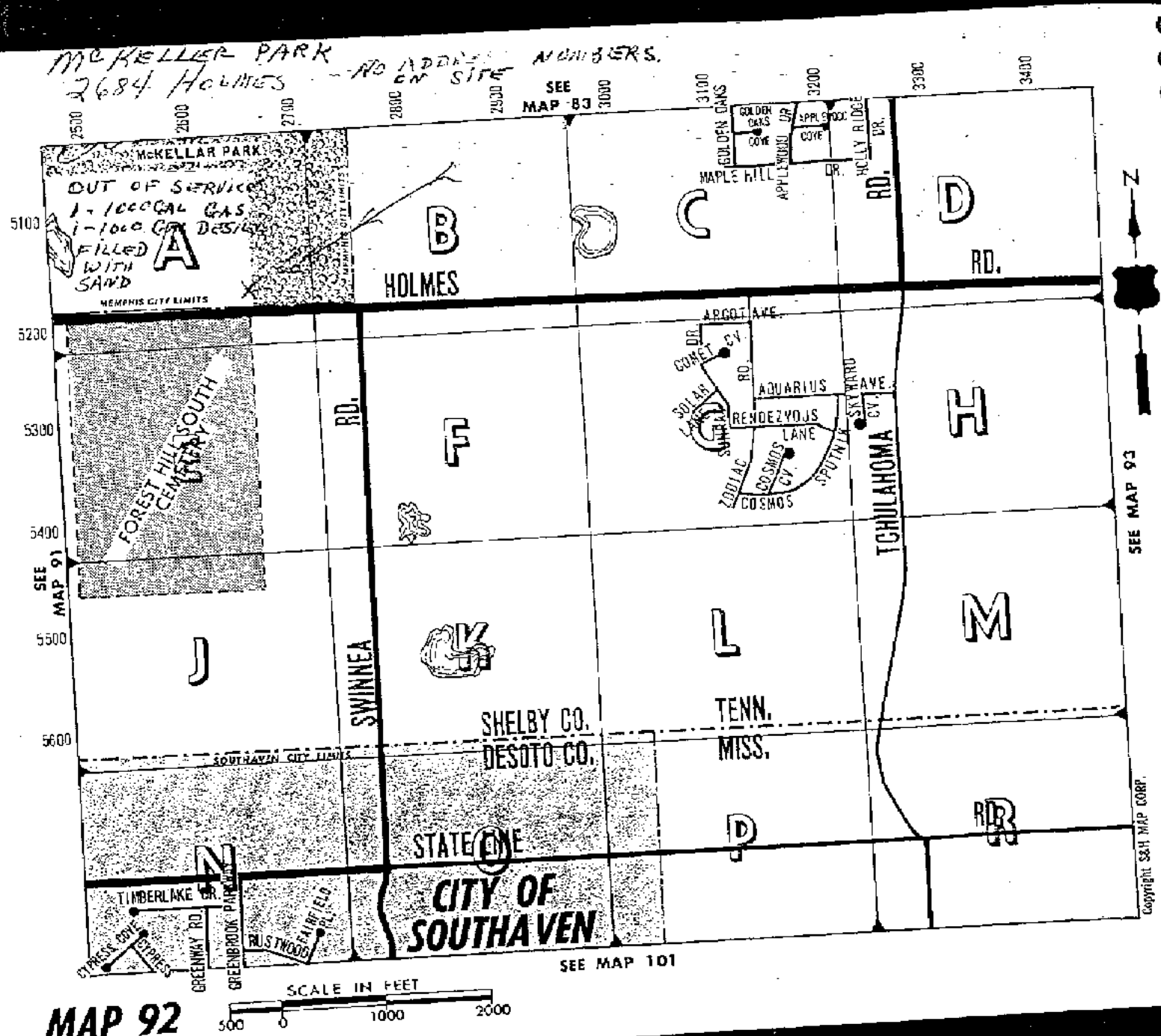
2684 HOLMES McKELLAR PARK

1-1,000 GAS TANK SAND FILLED
1-1,000 DIESEL TANK SAND FILLED

N

OUT OF SERVICE




McKELLAR PARK
2684 HOLMES
NO ADDRESS NUMBERS ON SITE
OUT OF SERVICE
1 - 1000 GAL GAS
1 - 1000 GAL DIESEL
FILLED WITH SAND
SEE MAP 83
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
5100
5230
5300
5400
5500
5600
A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
HOLMES RD.
ARGO AVE.
McKELLAR PARK
MEMPHIS CITY LIMITS
FOREST HILL SOUTH CEMETERY
SWINNEA RD.
TCHULAHOMA RD.
GOLDEN OAKS DR.
GOLDEN OAKS COVE
APPLEWOOD COVE
MAPLE HILL DR.
HOLLY RIDGE DR.
COMET CV.
COMET DR.
AQUARIUS RD.
SKYWORD AVE.
SKYWORD CV.
SOLAR CV.
RENDEZVOUS LANE
ZODIAC CV.
COSMOS CV.
SPUTNIK
COSMOS
SEE MAP 93
SEE MAP 91
SHELBY CO.
DESOTO CO.
TENN.
MISS.
SOUTHAVEN CITY LIMITS
STATE LINE
CITY OF SOUTHAVEN
TIMBERLAKE DR.
CYPRESS COVE
CYPRESS
GREENWAY RD.
GREENBROOK PARKWAY
RUSTWOOD
FAIRFIELD
SEE MAP 101
SCALE IN FEET
500
0
1000
2000
MAP 92
Copyright S&H MAP CORP.

FACILITY
790983

RDA # 2298

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

FILE REQUEST

DEPARTMENT USE ONLY

DIVISION(S): UST / SF

DATE: 6/4/99 APPOINTMENT TIME: 1400 (A.M./P.M.)

COMPLETE THE FOLLOWING (OR ATTACH YOUR BUSINESS CARD):

Gary Sickenschuh
NAME/COMPANY

4180 Poplar Pike
ADDRESS

Memphis TN 38118 (901) 3630600
CITY STATE ZIP TELEPHONE

File Review Procedures

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2. The number of files reviewed at one time may be limited without authorization from the Division Manager or Field Office Administrative Manager.
3. Briefcases and other accessories (with the exception of writing materials – notepads, pencils, etc.) are not allowed in the file area.
4. Do not mark on the file(s) or change the order of documents within the file(s).
5. Unless otherwise informed, all copies are charged at the rate of 50 cents per page, payable in advance by exact cash or check only.
6. Tags will be provided to mark any pages for staff to copy.
7. Staff will make copies as their work schedule permits. It may be necessary to return for the copies, or they may be mailed upon request.

I have read and understand the above file review procedures.

Gary Sickenschuh
Signature

6/4/99
Date

FACILITY NAME	FACILITY I.D. #	COUNTY	# OF PAGES COPIED
OMS #15	0790983	Shelby	
Park Care McKellar Nursing	791182	Shelby	
Jackson Gas	TF-604	Shelby	

TOTAL Pages Copied 69

CN-1077 (Rev. 8-96)

RDA 5836-2

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH ROAD
MEMPHIS, TENNESSEE 38115-1520
PHONE (901) 368-7939 STATEWIDE 1-888-891-8332 FAX (901) 368-7979

May 6, 1999

Mr. Steve Westerman
Tennessee Department of Finance and Administration
Capital Projects Management
312 Eighth Avenue, North Suite 2200
Nashville, Tennessee 37243-0300

RE: Case Closure
National Guard Armory OMS # 15
2610 E. Holmes Road, Memphis, Shelby County, TN
Facility ID # 0-790983

Dear Mr. Westerman:

The Division of Underground Storage Tanks has reviewed the Well Abandonment/Site Closure letter dated April 15, 1999 for the above referenced facility. Based on the information available, this case is considered closed. However, the Division reserves the right to require additional action if necessary.

If you have questions concerning this correspondence, call me at (901) 368-7971.

Sincerely,

Cynthia J. Patton

Cynthia J. Patton
Division of Underground Storage Tanks

c: John Hargraves – ATC Associates Inc. – Nashville
UST Memphis Environmental Assistance Center (a)
Debbie Mann - UST Nashville Central Office - Technical Review Section

ATC ASSOCIATES INC.

5217 Linbar Drive, Suite 306
Nashville, Tennessee 37211
615.331.5016
Fax 615.331.5032

APR 2 0 1999

April 15, 1999

Ms. Cindy Patton
TDEC Division of Underground Storage Tanks
Memphis Environmental Field Office
Suite E-645, Perimeter Park
2510 Mt. Moriah
Memphis, TN 38115-1520

RE: **Well Abandonment/Site Closure**
National Guard Armory OMS #15
Memphis, Shelby County, Tennessee
Facility ID No. 0-790983
ATC Project No. 01995.0043

Dear Ms. Patton:

On behalf of the Tennessee Department of Finance and Administration (F&A), ATC Associates Inc. (ATC) is pleased to submit this letter report summarizing the abandonment of the on-site wells at the above referenced facility.

On March 17, 1999, a driller and a geologist from ATC arrived at the site. The five monitoring wells were located and prepared for closure. The manhole covers were removed and the 2-inch PVC pipe was cut until it was below land surface.

A grout mixture consisting of Portland Cement and bentonite was pumped into the well casing with tremie pipe. The top of each well was capped with concrete. Approximately 5 to 6 gallons of cement were used in each well.

If you have any questions or comments, please contact us at your convenience.

Sincerely,

ATC ASSOCIATES INC.

Ken Johnson
Project Geologist

John W. Hargraves, P.G.
Project Manager

cc: Mr. Steven L. Westerman, TN Department of Finance and Administration

I:\SHARED\ENV\F&A\OMS#15\ABDNWELL.DOC

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH ROAD
MEMPHIS, TENNESSEE 38115-1520
PHONE (901) 368-7939 STATEWIDE 1-888-891-8332 FAX (901) 368-7979

January 26, 1999

Mr. Steve Westerman
Tennessee Department of Finance and Administration
Capital Projects Management
312 Eighth Avenue, North Suite 2200
Nashville, Tennessee 37243-0300

RE: Monitoring Well Abandonment
National Guard Armory OMS # 15
2610 E. Holmes Road, Memphis, Shelby County, TN
Facility ID # 0-790983

Dear Mr. Westerman:

The Division of Underground Storage Tanks has reviewed the file for the referenced facility. Based upon the submitted data, additional monitoring and corrective action are not required.

The Tennessee Department of Finance and Administration, Capital Projects Management is required to properly abandon all of the monitoring wells in accordance with Section II.N. of the Environmental Assessment Guidelines. Before this case can be considered closed, a report documenting the well abandonment procedures shall be submitted to this office by **March 26, 1999.**

If the wells have already been properly abandoned, a report documenting the procedure shall be submitted to the Division by **February 26, 1999.** A clean closure letter will then be issued to the Department of Finance and Administration.

If site conditions change and petroleum vapors, free product or other public health and/or environmental problems arise, then corrective action shall be immediately initiated and the Division notified within 72 hours. If you have questions concerning this correspondence, call me at (901) 368-7974.

Sincerely,

Cynthia Patton

Cynthia J. Patton
Division of Underground Storage Tanks

c: UST Memphis Environmental Assistance Center (a)
Debbie Mann - UST Nashville Central Office - Technical Review Section

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH ROAD
MEMPHIS, TENNESSEE 38115-1520
PHONE (901) 368-7939 STATEWIDE 1-888-891-8332 FAX (901) 368-7979

January 26, 1999

Mr. Steve Westerman
Tennessee Department of Finance and Administration
Capital Projects Management
312 Eighth Avenue, North Suite 2200
Nashville, Tennessee 37243-0300

RE: Monitoring Well Abandonment
National Guard Armory OMS # 15
2610 E. Holmes Road, Memphis, Shelby County, TN
Facility ID # 0-790983

Dear Mr. Westerman:

The Division of Underground Storage Tanks has reviewed the file for the referenced facility. Based upon the submitted data, additional monitoring and corrective action are not required.

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If site conditions change and petroleum vapors, free product or other public health and/or environmental problems arise, then corrective action shall be immediately initiated and the Division notified within 72 hours. If you have questions concerning this correspondence, call me at (901) 368-7974.

Sincerely,

Cynthia Patton

Cynthia J. Patton
Division of Underground Storage Tanks

c: UST Memphis Environmental Assistance Center (a)
Debbie Mann - UST Nashville Central Office - Technical Review Section

STATE OF TENNESSEE
Department of Finance and Administration
Division of Capital Projects Management / Real Property Management

Capital Projects Management
Tennessee Tower, Suite 1300
312 Eighth Avenue, North
Nashville, TN 37243-0300

Real Property Management
Tennessee Tower, Suite 1500
312 Eighth Avenue, North
Nashville, TN 37243-0299

Telephone
615-741-1563

Facsimile
615-741-2335

December 23, 1997

Mr. John Hargraves
ATC Associates, Inc.
5217 Linbar Drive, Suite 306
Nashville, TN 37211

RE: REQUEST FOR SERVICES
OMS #15 - Memphis
Fac. I.D. #0-790983

John:

As a result of the removal of the UST at the above facility, the analytical results provided readings which exceed the most stringent clean-up levels. Consequently, the DUST Memphis Field Office directs that an Initial Site Characterization Report (ISCR) be submitted per DUST guidelines. I request your firm proceed with this work as defined in your UST Regional Consultant Contract (including providing to me the customary task/budget letter.)

Please find enclosed a copy of the Permanent Closure Report filed for the site, which includes site maps and a summary report of analyses; and, a copy of the letter (N.O.V.) from Cynthia Patton with the Memphis Field Office, dated December 12, 1997; which states in part that the ISCR is due by February 27, 1998. If you require anything further, please do not hesitate to contact me.

Sincerely,

Steven L. Westerman
Environmental Program Administrator

pc: Ralph Harder, Tenn. Dept. of Military
Curtis Hopper, DUST Central Office, Nashville
Cynthia Patton, DUST, Memphis Field Office

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
MEMPHIS ENVIRONMENTAL FIELD OFFICE
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH
MEMPHIS, TENNESSEE 38115-1520

June 3, 1997

CERTIFIED MAIL P 182 143 780

Mr. Ralph S. Harder C.P.E.
Tennessee Army National Guard (STARC)
Houston Barracks, P.O. Box 41052
Nashville, Tennessee 37204-1502

RE: Release Response
OMS # 15 - Memphis
2610 East Holmes Road, Memphis, Shelby County, TN
Facility ID # 0-790983

Dear Mr. Harder:

The Division of Underground Storage Tanks (the Division) has reviewed the Permanent Closure Report dated May 15, 1997 for the referenced facility. According to the report water in the tank pit recharged within 24 hours. The water was sampled on February 12, 1997. The level of total petroleum hydrocarbons (TPH), diesel range organics (DRO) was 595 parts per million (ppm). This level is above the 1.0 ppm clean up level for non-drinking water.

Rule 1200-1-15-.06 of the Tennessee Petroleum Underground Storage Tank Regulations requires that Tennessee Army National Guard take immediate action to prevent any further release of petroleum into the environment and to identify and mitigate fire, explosion, and vapor hazards.

> Rule 1200-1-15-.06 requires that the Responsible Party, in response to a confirmed release from an underground storage tank system, perform initial abatement measures.

Since the underground storage tanks have been removed at this site, it will not be necessary to submit an **Initial Abatement Report (IAR)**.

The Tennessee Army National Guard shall submit an **Initial Site Characterization Report (ISCR)** to this office by **September 8, 1997** following the ISCR Guidelines. This report must contain all data gathered during the field activities and identify the applicable cleanup levels. <u>One well closest to the release shall be installed, instead of four wells as stated in the ISCR Guidelines.</u>

Environmental assessment activities and evaluation of the subsurface investigation shall be directed by a registered professional geologist under the Tennessee Geologist Act (T.C.A. 62-36-101 et seq.) or a registered professional engineer under the Tennessee Architects, Engineers, Landscape Architects, and Interior Designers Law and Rules (T.C.A. 62-2-101 et seq.). All assessment activities shall be conducted in accordance with the **1996 UST Reference Handbook**.

All fund eligible work must be conducted and/or overseen by an UST Approved Corrective Action Contractor to be eligible for reimbursement from the Tennessee Petroleum Underground Storage Tank Fund. The current list of approved contractors is enclosed. To determine if a site is Fund eligible, the enclosed Authorization for Fund Eligibility Form must be completed and submitted to the Nashville Central office.

T.C.A. 68-215-121(a)(1) states:

> Any person who violates or fails to comply with any provision of this chapter, any order of the commissioner or board, any rule, regulation, or standard pursuant to this chapter shall be subject to a civil penalty not to exceed ten thousand dollars ($10,000) per day for each day of violation. This civil penalty may be assessed by the commissioner, the board or the court. Each day such violation continues shall constitute a separate punishable offense, and such person shall also be liable for any damages to the state resulting therefrom.

Rule 1200-1-15-.09(11) states that a fund eligible owner or operator conducting UST corrective action is entitled to fund coverage for reasonable costs; subject to certain provisions. The owner or operator must comply with the requirements in rule 1200-1-15-.06 as outlined in this letter. If this facility is Fund eligible, failure to comply with these requirements may result in the loss of fund coverage of the release investigation and/or corrective action costs associated with this release.

This office must be notified at least one working day in advance of any major field activities.

Send one copy of all correspondence, including reports, to this office and one copy to:

Division of Underground Storage Tanks
4th Floor, L & C Tower
401 Church Street
Tennessee Department of Environment and Conservation
Nashville, Tennessee 37243-1541

If you have any questions concerning this correspondence, call me at (901)368-7974.

Sincerely,

Cynthia J. Patton

Cynthia J. Patton
Division of Underground Storage Tanks

Enclosures: UST Approved CAC List
Authorization For Fund Eligibility

c: Memphis UST Field Office (active file)
Curtis Hopper - Nashville UST Central Office - Technical Review Section

fo-004h

P 182 143 780

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

Sent to Ralph S. Harder	
Street & Number P.O. Box 41052	
Post Office, State, & ZIP Code Nashville TN 37204-1502	
Postage	$ .32
Certified Fee	1.10
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	1.10
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$ 2.52
Postmark or Date CP/UST 0-790983	

PS Form 3800, April 1995

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services. 0-790983 UST/CP
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Ralph S. Harder
TN Army National Guard
Houston Barracks
P.O. Box 41052
Nashville TN 37204-1502

4a. Article Number
P 182 143 780

4b. Service Type
☐ Registered ☑ Certified
☐ Express Mail ☐ Insured
☒ Return Receipt for Merchandise ☐ COD

7. Date of Delivery
JUN 11 1997

5. Received By: (Print Name)

6. Signature: (Addressee or Agent)
[signature]

8. Addressee's Address (Only if requested and fee is paid)

PS Form 3811, December 1994 102595-97-B-0179 Domestic Return Receipt

Thank you for using Return Receipt Service.

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

FILE REQUEST

DEPARTMENT USE ONLY

DIVISION(S): UST / SF

DATE: 6/4/99 APPOINTMENT TIME: 1:00 (A.M. / P.M.)

COMPLETE THE FOLLOWING (OR ATTACH YOUR BUSINESS CARD):

Gary Schoenschuh
NAME/COMPANY

4180 Pilot Drive
ADDRESS

Memphis | TN | 38118 | (901) 3630600
CITY | STATE | ZIP | TELEPHONE

File Review Procedures

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6. Tags will be provided to mark any pages for staff to copy.
7. Staff will make copies as their work schedule permits. It may be necessary to return for the copies, or they may be mailed upon request.

I have read and understand the above file review procedures.

[signature]
Signature

6/4/99
Date

FACILITY NAME	FACILITY I.D. #	COUNTY	# OF PAGES COPIED
OMS #15	0790983	Shelby	
Park Crm McKellar Nursery	9791182	Shelby	
Jackson Pits	79-604	Shelby	

TOTAL Pages Copied ______

CN-1077 (Rev. 6-96)

(69)

RDA S836-2

August 1996

STATE OF TENNESSEE
DIVISION OF UNDERGROUND STORAGE TANKS

PERMANENT CLOSURE REPORT

The Responsible Party (RP) of the underground storage tank (UST) system shall complete and submit the **original** of this report within 45 days of collecting samples during the UST system closure assessment. Tennessee Code Annotated (T.C.A.) §68-215-103(16) defines Responsible Party as the owner and/or operator of a petroleum site or any person who at the time of the release which caused the contamination was an owner and/or operator of a petroleum underground storage tank.

Include the following appendices in the report. Attach extra sheets if necessary.

Appendix A: A table containing the field screening and analytical results. All results shall be reported in parts per million (ppm). The results shall be properly identified and correlated with the sampling locations on the site map. If water was encountered during closure-in-place, include the monitoring well information required in the Environmental Assessment Guidelines.

Appendix B: The original or carbon copy of the laboratory analysis sheets. Photocopies are not acceptable. All laboratory analysis sheets shall include the information specified in the *UST System Closure Assessment Guidelines*.

Appendix C: Documentation for treatment and/or disposal of soil, sludge, liquid, tanks and piping (i.e. Application to Treat Petroleum Contaminated Soil, Solid Waste Permits, Landfill Disposal Manifests, etc.).

Appendix D: **A copy of the Amended Notification form shall be submitted with this report. Send the original Amended Notification form to the UST Nashville Central Office.**

1. UST Facility ID 0-790983

2. Facility Name OMS #15 Memphis

3. Division personnel with the appropriate field office were notified at least one working day before collecting soil samples for the UST system closure assessment. Yes ✓ No ___ If yes:
   Person contacted Cindy PATTON
   Field office MEMPHIS
   Date 2-12-97
   Reported by BILL HELTON

4. The tank atmosphere and work zone were regularly tested with a combustible gas indicator in accordance with UST regulations Appendix 6(2) and (3). Yes ✓ No ___

Facility ID Number 0-790983

5. Method of purging tank atmosphere:
Carbon dioxide gas___ Nitrogen___ Eductor-type air movers ✓
Diffused air blower___ Dry ice (1.5 lb/100 gal.) ___
Other_____

6. Product piping was drained into the tank. Yes ✓ No___

7. Product piping was: Capped ✓ Removed___

8. All liquid/sludge was removed from the UST system. Yes ✓ No___
Not encountered___

9. Method of liquid/sludge storage: 55 GAL DRUMS

10. Method of liquid/sludge disposal: RECYCLE

Manifests included in Appendix C. Yes ✓ No___
Not applicable___

11. Tank was labeled in accordance with the UST Regulations Appendix 6(4)(f).
Yes ✓ No___ Not applicable___

12. Method of UST system storage/disposal:
Cut up for disposal ✓ Stored on site___ Stored off site___
Other_____

UST systems stored on site or off site are subject to Rules 1200-1-15-.07(2)(e), (f) and (g) and Appendix 7.

13. Location of UST system storage/(disposal) KENWAY CONTRACTING

Certificate of disposal included in Appendix C. Yes ✓ No___
If no, explain_____

14. Amount of material excavated during UST system closure. 1385 cubic yards.

Facility ID Number 0-790983

15. Total amount of contaminated material overexcavated after removal of the UST system:
72 cubic yards.
If more than 100 cubic yards of material was overexcavated, Division personnel in the appropriate field office should have been contacted.
Division personnel in the appropriate field office were contacted. Yes___ No___
Not applicable ✓
If yes:
Person contacted_____
Field Office_____
Date_____
Reported by_____

All excavated material remaining on the site of generation or on a site owned by the responsible party or subsidiary of the responsible party shall be placed on and covered with plastic and bermed. Sampling the excavated material in accordance with Technical Guidance Document - 005, must be completed prior to proper disposal.

If petroleum contaminated material is managed in accordance with Technical Guidance Document-009, the appropriate *Application to Treat Petroleum Contaminated Soil* shall be completed and submitted to the local field office for approval. If the contaminated material is to be treated on a site owned by a Third Party, contact the Tennessee Division of Solid Waste Management.

All excavations shall be backfilled with material containing levels at or below 5 ppm benzene and/or 100 ppm TPH.

16. Mark all that apply regarding the management of the excavated material: N/A
Stockpiled on site___ Thermal treatment on site___ Thermal treatment off site___
Landfilled___ Other_____

Documentation is included in Appendix C. Yes___ No___ If no, explain why N/A
_____

17. Explain why the method in #16 was chosen for management of the excavated material___
N/A
_____

18. All samples were placed directly into the appropriate containers, immediately after collection. Yes ✓ No___

19. Immediately after collection all samples were placed on ice and maintained at 4°C until delivered to a Division approved laboratory. Yes ✓ No___

Facility ID Number 0-790983

20. Laboratory confirmation of petroleum contamination or discovery of free product was reported to the Division within 72 hours. Yes___ No___ Not applicable ✓
If yes:
Person contacted_____
Field office_____
Date_____
Reported by_____

21. Water was encountered in the soil borings during closure-in-place.
Yes___ No___ Not applicable ✓
If encountered, was water sampled. Yes___ No___
Monitoring well information is in Appendix A. Yes___ No___
Analytical results are in Appendix B. Yes___ No___

22. Water was encountered during excavation of the UST system. Yes ✓ No___
Amount of water removed: 6000 gals.
Water recharged within 24 hours. Yes ✓ No___
Recharge water was sampled. Yes ✓ No___
Analytical results are in Appendix B. Yes ✓ No___
Method of water disposal: RECYCLED
Manifests included in Appendix C. Yes ✓ No___

23. If more than 500 gallons of water were removed, Division personnel in the appropriate field office should have been contacted.
Division personnel in the appropriate field office were contacted. Yes ✓ No___
Not applicable___
If yes:
Person contacted Cindy Patton
Field Office Memphis
Date 2-12-97
Reported by_____

24. Bedrock was encountered during UST system removal/closure-in-place.
Yes___ No ✓
All contaminated material above the applicable cleanup level was excavated.
Yes___ No___ Not applicable ✓
Soil was sampled from floor of excavation. Yes ✓ No___
Analytical results are in Appendix B. Yes ✓ No___

25. The original Notification Form reporting the closure of the tank system was submitted to the Nashville Central Office. Yes ✓ No___

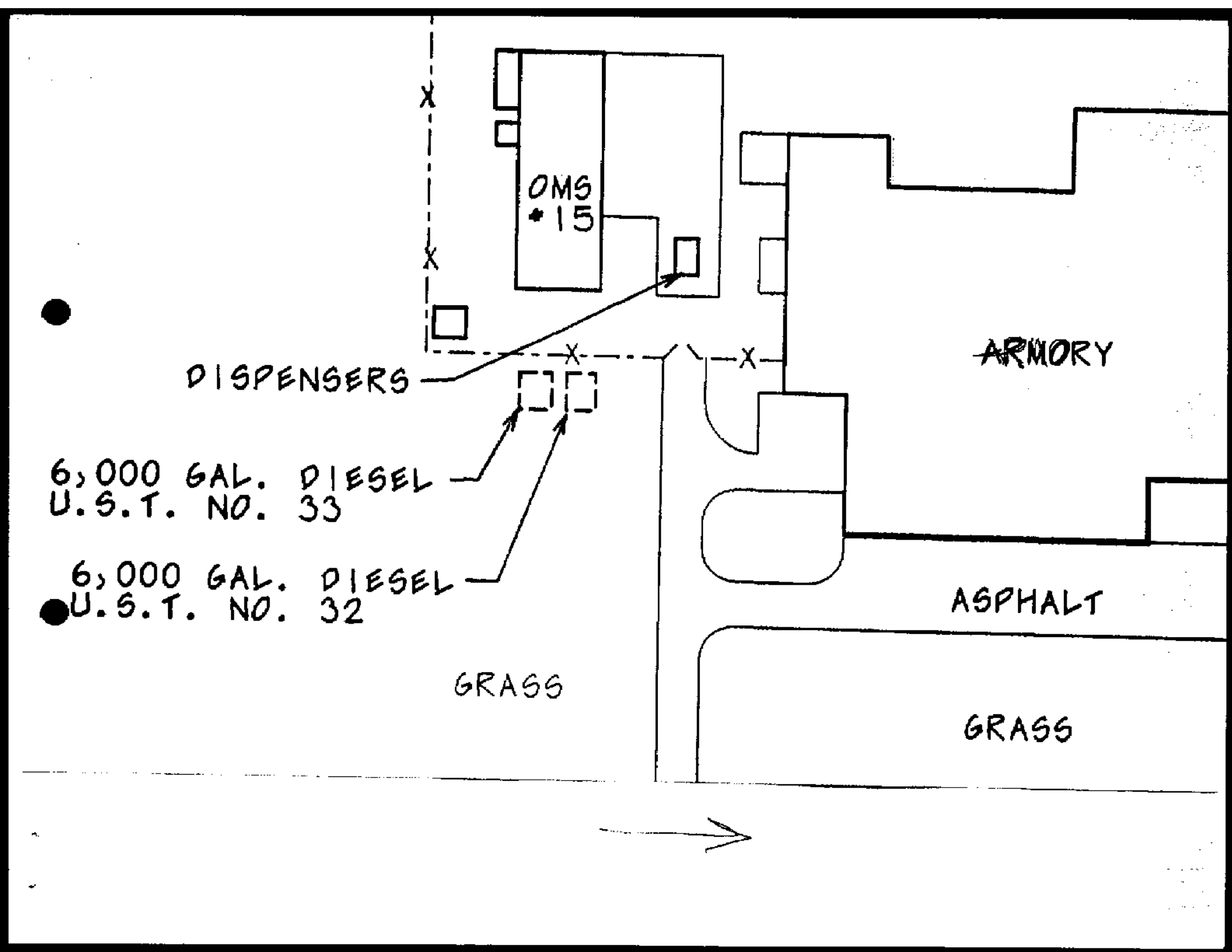
Facility ID Number 0-790983

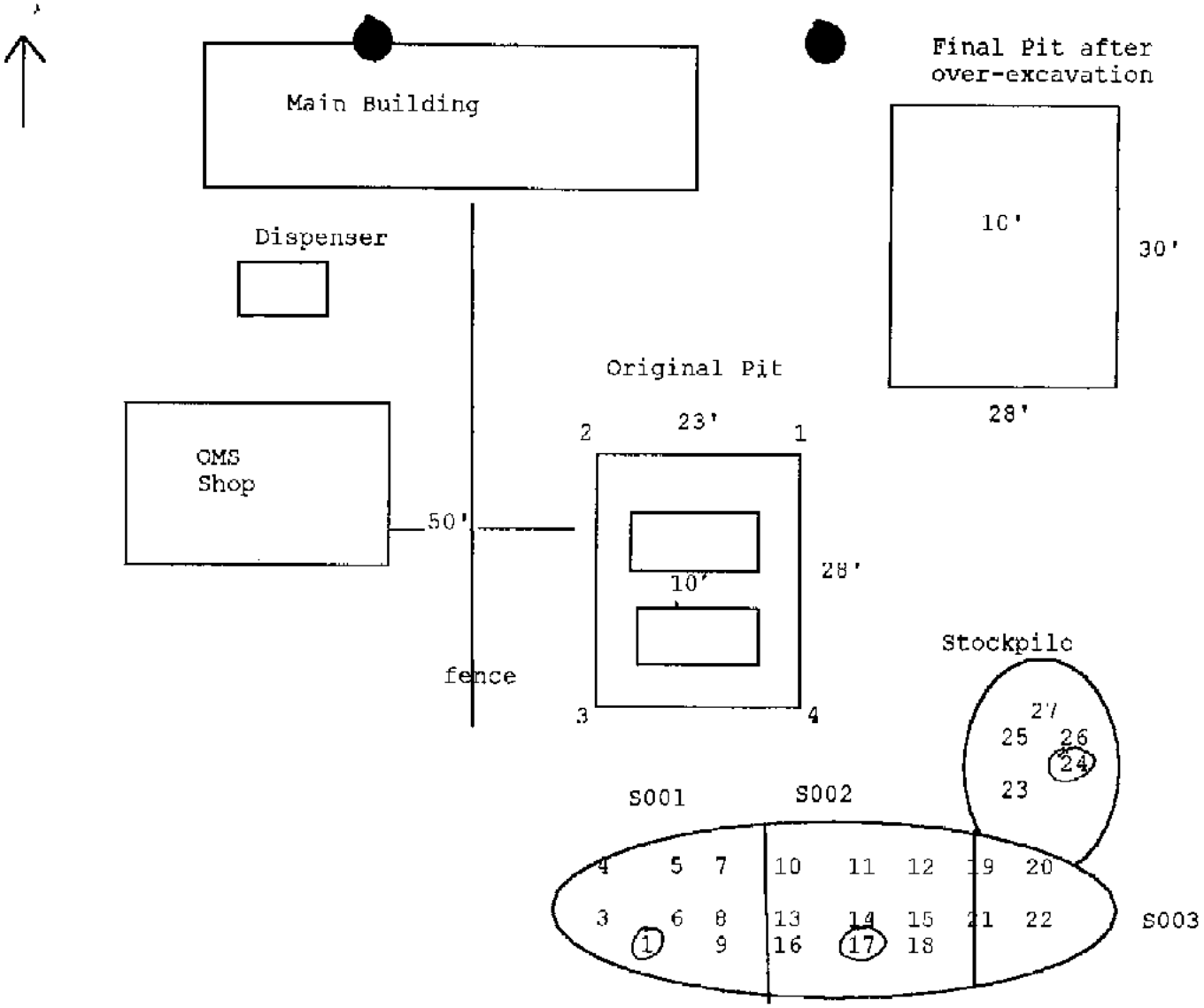
26. **Failure to submit a Notification Form may result in the assessment of additional tank fees.**

THIS PERMANENT CLOSURE REPORT WILL NOT BE PROCESSED WITHOUT THE COMPLETION AND SUBMITTAL OF THE APPROPRIATE APPENDICES IN THEIR ENTIRETY.

27. An updated site map shall be provided in this space showing buildings, utilities, areas of overexcavation, borings, and sample points. The map shall also include soil stockpiles, their dimensions in feet, and properly labeled screening and sampling points. A measurement shall be included from one corner of the tank excavation to a permanent structure (i.e. building, power pole, fire hydrant, etc.). The site map shall include a north arrow.

SEE ATTACHED


OMS
#15
ARMORY
DISPENSERS
6,000 GAL. DIESEL
U.S.T. NO. 33
6,000 GAL. DIESEL
U.S.T. NO. 32
ASPHALT
GRASS
GRASS


Main Building
Final Pit after over-excavation
10'
30'
28'
Dispenser
Original Pit
2
23'
1
OMS Shop
50'
28'
10'
fence
3
4
Stockpile
27
25
26
24
23
S001
S002
4
5
7
10
11
12
19
20
3
6
8
13
14
15
21
22
S003
1
9
16
17
18

Permanent Closure Report
Date 5-15-97
Page 6 of 6

Facility ID Number 0-790983

This signature page shall be signed by the RP (or authorized representative within the organization). If more than 100 cubic yards of material was overexcavated, the signature page shall also be signed by a registered professional geologist under the Tennessee Geologist Act (T.C.A. § 62-36-101 et seq.), a registered professional engineer under the Tennessee Architects, Engineers, and Landscape Architects, and Interior Designers Law and Rule (T.C.A. § 62-2-101 et seq.), or an Approved Corrective Action Contractor (Rule 1200-1-15-.09(15)).

I certify under penalty of law, including but not limited to penalties for perjury, that the information contained in this form and on any attachments is true, accurate and complete to the best of my knowledge, information and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional violations.

UST system RP or RP's authorized representative (Print name)	Signature	Date
Title (Print)		
WILLIAM O. HELTON	William O Helton	5-15-97
P.E., P.G., or CAC (Print name)	Signature	Date
TN Registration #	First Response Inc	
	CAC Company (Print)	

Note: Each of the above signatures shall be notarized separately with the following statement.

STATE OF Kentucky COUNTY OF At Large

Sworn to and subscribed before me by William O Helton on this date 5/16/97. My commission expires May 10, 2001

DEBBIE WATKINS	Debbie Watkins	5-16-97
Notary Public (Print name)	Signature	Date

Stamp/Seal

Facility ID Number _____

This signature page shall be signed by the RP (or authorized representative within the organization). If more than 100 cubic yards of material was overexcavated, the signature page shall also be signed by a registered professional geologist under the Tennessee Geologist Act (T.C.A. § 62-36-101 et seq.), a registered professional engineer under the Tennessee Architects, Engineers, and Landscape Architects, and Interior Designers Law and Rule (T.C.A. § 62-2-101 et seq.), or an Approved Corrective Action Contractor (Rule 1200-1-15-.09(15)).

I certify under penalty of law, including but not limited to penalties for perjury, that the information contained in this form and on any attachments is true, accurate and complete to the best of my knowledge, information and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional violations.

ROBERT D FULKERSON		19 May 97
UST system RP or RP's authorized representative (Print name)	Signature	Date

E.P.S.
Title (Print)

P.E., P.G., or CAC (Print name)	Signature	Date
TN Registration #	CAC Company (Print)	

Note: Each of the above signatures shall be notarized separately with the following statement.

STATE OF Tennessee COUNTY OF Davidson

Sworn to and subscribed before me by Robert D. Fulkerson on this date 5-27-97. My commission expires My Commission Expires NOV. 25, 2000

Harriet F. Hagar	Harriet F. Hagar	5/27/97
Notary Public (Print name)	Signature	Date

Stamp/Seal

APPENDIX A

Date: Feb 12 1997 Readings performed by: Bill Helton

Soil Stockpile Screening Results

* 1	75 ppm
2	36
3	30
4	22
5	6
6	12
7	10
8	25
9	70
10	40
11	23
12	19
13	44
14	70
15	27
16	36
*17	72
18	40
19	26
20	10
21	<10
22	<10
23	<10
*24	85
25	<10

*Sampled

Soil Sample Screening Results

1	TP01-S001- 29
2	TP01-S002- 16
3	TP01-S003- 28
4	TP01-S004- 19
5	SP01-S001- 75
6	SP01-S002- 72
7	SP01-S003- 85

Water Sample
3:00 2/12/97

APPENDIX B

SPECIALIZED ASSAYS
ENVIRONMENTAL

2960 Foster Creighton Drive
Nashville, TN 37204
615-726-0177
FAX 615/726-3404

Specialized Assays: (800) 765-0980

REFERRING CLIENT

Account: 6119
First Response, Inc.
Bill Helton
1052 Searcy Way
Bowling Green, KY 42103
Ph: 502-793-0906 Fax: 502-793-0908

NG CONTROL NUMBER (FOR LAB USE ONLY): Q2283

PROJECT #: 96137

P.O. #: 96137

LERS (Signature-Please Print): BILL HELTON

PROJECT NAME: MEMPHIS

OR LAB USE ONLY ACC#	SAMPLE DESCRIPTION	DATE	TIME	COMP	GRAB	# OF CONT	ANALYSIS REQUESTED
7-A011761	ME-TP01-S001	2/13/97	9:00		✓	1	BTEX TPH-DRO & GRO
7-A011762	ME-TP01-S002	2/13/97	9:10		✓	1	
7-A011763	ME-TP01-S003	2/13/97	9:20		✓	1	
7-A011764	ME-TP01-S004	2/13/97	9:30		✓	1	
7-A011765	ME-SP01-S001	2/13/97	9:45		✓	1	
7-A011766	ME-SP01-S002	2/13/97	10:00		✓	1	
7-A011767	ME-SP01-S003	2/13/97	10:15		✓	1	
7-A011768	ME-TP01-WS01	2/12/97	4:00		✓	3	

quished by: (Signature)	Date / Time	Received by: (Signature)	Received for Laboratory by:	Date / Time
Bill Helton	2/14/97 1330		CBB	2/14/97 1625
quished by: (Signature)	Date / Time	Received by: (Signature)	Remarks: O-790983	
quished by: (Signature)	Date / Time	Received by: (Signature)		
	2/14/97 1625			
quished by: (Signature)	Date / Time	Received by: (Signature)		

For further assistance in completing the chain of custody form please refer to the instructions found on the opposite side

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

FIRST RESPONSE, INC. 6119
ATTN BILL HELTON
1052 SEARCY WAY
BOWLING GREEN, KY 42103

Lab Number: 97-A011761

Sample ID: ME TP01 S001

Date Collected: 2/13/97

Project: 96137

Time Collected: 9:00

Project Name: MEMPHIS

Date Received: 2/14/97

Sampler: BILL HELTON

Time Received: 16:25

State Certification: 90038

Sample Type: Soil

Site I.D.:

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Benzene	ND	mg/kg	0.005	0.001	1	2/15/97	21:34	Holingwrth	8020	9070
Toluene	ND	mg/kg	0.005	0.001	1	2/15/97	21:34	Holingwrth	8020	9070
Ethylbenzene	ND	mg/kg	0.005	0.001	1	2/15/97	21:34	Holingwrth	8020	9070
Xylenes, total	ND	mg/kg	0.005	0.001	1	2/15/97	21:34	Holingwrth	8020	9070
TPH (Gasoline Range)	ND	mg/kg	5.00	4.00	1	2/17/97	21:20	Holingwrth	8015M/5030	9404
TPH (Diesel Range)	ND	mg/kg	10.0	4.00	1	2/18/97	2:59	K.Walkup	8015M/3550	9372

ND = Not detected at the report limit.

Sample Extraction Data

DRO Extracted 2/17/97 Wt extracted: 25.0 gm Extract Volume: 1.0 ml

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range
BTEX/GRO Surrogate	88.	50. - 150.
DRO Surrogate,s	77.0	50. - 150.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204 0566
Phone 1-615-726-0177

ANALYTICAL REPORT

Laboratory Number: 97-A011761
Sample ID: ME TP01 S001

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range

Report Approved By: Michael H. Dunn Report Date: 2/20/97

Theodore J. Duello, Ph.D.
Michael H. Dunn, M.S.
Danny B. Hale, M.S.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

FIRST RESPONSE, INC. 6119
ATTN BILL HELTON
1052 SEARCY WAY
BOWLING GREEN, KY 42103

Lab Number: 97-A011762

Sample ID: ME TP01 S002

Project: 96137

Project Name: MEMPHIS

Sampler: BILL HELTON

State Certification:

Site I.D.:

Date Collected: 2/13/97

Time Collected: 9:10

Date Received: 2/14/97

Time Received: 16:25

Sample Type: Soil

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Benzene	ND	mg/kg	0.10	0.100	1	2/17/97	21:56	Holingwrth	8020	9404
Toluene	ND	mg/kg	0.10	0.100	1	2/17/97	21:56	Holingwrth	8020	9404
Ethylbenzene	ND	mg/kg	0.10	0.100	1	2/17/97	21:56	Holingwrth	8020	9404
Xylenes, total	ND	mg/kg	0.10	0.100	1	2/17/97	21:56	Holingwrth	8020	9404
MTBE	ND	mg/kg	0.100	0.100	1	2/17/97	21:56	Holingwrth	8020	9404
Gasoline Range Organics	ND	mg/kg	5.00	5.00	1	2/17/97	21:56	Holingwrth	TDHE	9404
Diesel Range Organics	83.6	mg/kg	5.0	5.00	1	2/18/97	4:34	K.Walkup	TDHE	9372

ND = Not detected at the report limit.

Sample Extraction Data

DRO Extracted 2/17/97 Wt extracted: 25.0 gm Extract Volume: 1.0 ml

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range
BTEX/GRO Surrogate	117.	50. - 150.
DRO Surrogate,s	78.0	50. - 150.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

Laboratory Number: 97-A011769
Sample ID: ME TP01 WS01

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range

Report Approved By: Michael H. Dunn Report Date: 2/20/97

Theodore J. Duello, Ph.D.
Michael H. Dunn, M.S.
Danny B. Hale, M.S.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

FIRST RESPONSE, INC. 6119
ATTN BILL HELTON
1052 SEARCY WAY
BOWLING GREEN, KY 42103

Lab Number: 97-A011763

Sample ID: ME TP01 S003

Date Collected: 2/13/97

Project: 96137

Time Collected: 9:20

Project Name: MEMPHIS

Date Received: 2/14/97

Sampler: BILL HELTON

Time Received: 16:25

State Certification:

Sample Type: Soil

Site I.D.:

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Benzene	ND	mg/kg	0.10	0.100	1	2/17/97	22:32	Holingwrth	8020	9404
Toluene	ND	mg/kg	0.10	0.100	1	2/17/97	22:32	Holingwrth	8020	9404
Ethylbenzene	ND	mg/kg	0.10	0.100	1	2/17/97	22:32	Holingwrth	8020	9404
Xylenes, total	ND	mg/kg	0.10	0.100	1	2/17/97	22:32	Holingwrth	8020	9404
MTBE	ND	mg/kg	0.100	0.100	1	2/17/97	22:32	Holingwrth	8020	9404
Gasoline Range Organics	ND	mg/kg	5.00	5.00	1	2/17/97	22:32	Holingwrth	TDHE	9404
Diesel Range Organics	ND	mg/kg	5.0	5.00	1	2/18/97	5:21	K.Walkup	TDHE	9372

ND = Not detected at the report limit.

Sample Extraction Data

DRO Extracted 2/17/97 Wt extracted: 25.0 gm Extract Volume: 1.0 ml

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range
BTEX/GRO Surrogate	101.	50. - 150.
DRO Surrogate,s	81.0	50. - 150.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

Laboratory Number: 97-A011763
Sample ID: ME TP01 S003

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range

Report Approved By: Michael H. Dunn Report Date: 2/20/97

Theodore J. Duello, Ph.D.
Michael H. Dunn, M.S.
Danny B. Hale, M.S.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204 0566
Phone 1 615 726 0177

ANALYTICAL REPORT

FIRST RESPONSE, INC. 6119
ATTN BILL HELTON
1052 SEARCY WAY
BOWLING GREEN, KY 42103

Lab Number: 97-A011764

Sample ID: ME TP01 S004

Date Collected: 2/13/97

Project: 96137

Time Collected: 9:30

Project Name: MEMPHIS

Date Received: 2/14/97

Sampler: BILL HELTON

Time Received: 16:25

State Certification:

Sample Type: Soil

Site I.D.:

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Benzene	ND	mg/kg	0.10	0.100	1	2/17/97	23:07	Holingwrth	8020	9404
Toluene	ND	mg/kg	0.10	0.100	1	2/17/97	23:07	Holingwrth	8020	9404
Ethylbenzene	ND	mg/kg	0.10	0.100	1	2/17/97	23:07	Holingwrth	8020	9404
Xylenes, total	ND	mg/kg	0.10	0.100	1	2/17/97	23:07	Holingwrth	8020	9404
MTBE	ND	mg/kg	0.100	0.100	1	2/17/97	23:07	Holingwrth	8020	9404
Gasoline Range Organics	ND	mg/kg	5.00	5.00	1	2/17/97	23:07	Holingwrth	TDHE	9404
Diesel Range Organics	ND	mg/kg	5.0	5.00	1	2/18/97	6:09	K.Walkup	TDHE	9372

ND = Not detected at the report limit.

Sample Extraction Data

DRO Extracted 2/17/97 Wt extracted: 25.0 gm Extract Volume: 1.0 ml

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range
BTEX/GRO Surrogate	101.	50. - 150.
DRO Surrogate,s	78.0	50. - 150.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

Laboratory Number: 97-A011764
Sample ID: ME TP01 S004

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range

Report Approved By: Michael H. Dunn Report Date: 2/20/97

Theodore J. Duello, Ph.D.
Michael H. Dunn, M.S.
Danny B. Hale, M.S.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

FIRST RESPONSE, INC. 6119
ATTN BILL HELTON
1052 SEARCY WAY
BOWLING GREEN, KY 42103

Lab Number: 97-A011765

Sample ID: ME SP01 S001

Date Collected: 2/13/97

Project: 96137

Time Collected: 9:45

Project Name: MEMPHIS

Date Received: 2/14/97

Sampler: BILL HELTON

Time Received: 16:25

State Certification:

Sample Type: Soil

Site I.D.:

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Benzene	ND	mg/kg	0.10	0.100	1	2/17/97	23:43	Holingwrth	8020	9404
Toluene	ND	mg/kg	0.10	0.100	1	2/17/97	23:43	Holingwrth	8020	9404
Ethylbenzene	ND	mg/kg	0.10	0.100	1	2/17/97	23:43	Holingwrth	8020	9404
Xylenes, total	ND	mg/kg	0.10	0.100	1	2/17/97	23:43	Holingwrth	8020	9404
MTBE	ND	mg/kg	0.100	0.100	1	2/17/97	23:43	Holingwrth	8020	9404
Gasoline Range Organics	ND	mg/kg	5.00	5.00	1	2/17/97	23:43	Holingwrth	TDHE	9404
Diesel Range Organics	12.6	mg/kg	5.0	5.00	1	2/18/97	6:56	K.Walkup	TDHE	9372

ND = Not detected at the report limit.

Sample Extraction Data

DRO Extracted 2/17/97 Wt extracted: 25.0 gm Extract Volume: 1.0 ml

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range
BTEX/GRO Surrogate	117.	50. - 150.
DRO Surrogate,s	77.0	50. - 150.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

Laboratory Number: 97-A011765
Sample ID: ME SP01 S001

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range

Report Approved By: Michael H. Dunn Report Date: 2/20/97

Theodore J. Duello, Ph.D.
Michael H. Dunn, M.S.
Danny B. Hale, M.S.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

FIRST RESPONSE, INC. 6119
ATTN BILL HELTON
1052 SEARCY WAY
BOWLING GREEN, KY 42103

Lab Number: 97-A011766

Sample ID: ME SP01 S002

Date Collected: 2/13/97

Project: 96137

Time Collected: 10:00

Project Name: MEMPHIS

Date Received: 2/14/97

Sampler: BILL HELTON

Time Received: 16:25

State Certification:

Sample Type: Soil

Site I.D.:

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Benzene	ND	mg/kg	0.10	0.100	1	2/18/97	0:19	Holingwrth	8020	9404
Toluene	ND	mg/kg	0.10	0.100	1	2/18/97	0:19	Holingwrth	8020	9404
Ethylbenzene	ND	mg/kg	0.10	0.100	1	2/18/97	0:19	Holingwrth	8020	9404
Xylenes, total	ND	mg/kg	0.10	0.100	1	2/18/97	0:19	Holingwrth	8020	9404
MTBE	ND	mg/kg	0.100	0.100	1	2/18/97	0:19	Holingwrth	8020	9404
Gasoline Range Organics	ND	mg/kg	5.00	5.00	1	2/18/97	0:19	Holingwrth	TDHE	9404
Diesel Range Organics	41.6	mg/kg	5.0	5.00	1	2/18/97	7:44	K.Walkup	TDHE	9372

ND = Not detected at the report limit.

Sample Extraction Data

DRO Extracted 2/17/97 Wt extracted: 25.0 gm Extract Volume: 1.0 ml

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range
BTEX/GRO Surrogate	119.	50. - 150.
DRO Surrogate,s	79.0	50. - 150.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

Laboratory Number: 97-A011766
Sample ID: ME SP01 S002

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range

Report Approved By: Michael H. Dunn Report Date: 2/20/97

Theodore J. Duello, Ph.D.
Michael H. Dunn, M.S.
Danny B. Hale, M.S.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

FIRST RESPONSE, INC. 6119
ATTN BILL HELTON
1058 SEARCY WAY
BOWLING GREEN, KY 42103

Lab Number: 97-A011767

Sample ID: ME SP01 S003

Project: 96137

Project Name: MEMPHIS

Sampler: BILL HELTON

State Certification:

Site I.D.:

Date Collected: 2/13/97

Time Collected: 10:15

Date Received: 2/14/97

Time Received: 16:25

Sample Type: Soil

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Benzene	ND	mg/kg	0.10	0.100	1	2/18/97	0:54	Holingwrth	8020	9404
Toluene	ND	mg/kg	0.10	0.100	1	2/18/97	0:54	Holingwrth	8020	9404
Ethylbenzene	ND	mg/kg	0.10	0.100	1	2/18/97	0:54	Holingwrth	8020	9404
Xylenes, total	ND	mg/kg	0.10	0.100	1	2/18/97	0:54	Holingwrth	8020	9404
MTBE	ND	mg/kg	0.100	0.100	1	2/18/97	0:54	Holingwrth	8020	9404
Gasoline Range Organics	ND	mg/kg	5.00	5.00	1	2/18/97	0:54	Holingwrth	TDHE	9404
Diesel Range Organics	16.9	mg/kg	5.0	5.00	1	2/18/97	9:19	K.Malkup	TDHE	9372

ND = Not detected at the report limit.

Sample Extraction Data

DRO Extracted 2/17/97 Wt extracted: 25.0 gm Extract Volume: 1.0 ml

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range
BTEX/GRO Surrogate	106.	50. - 150.
DRO Surrogate,s	77.0	50. - 150.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

Laboratory Number: 97-A011767
Sample ID: ME SP01 S003

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range

Report Approved By: Michael H. Dunn Report Date: 2/20/97

Theodore J. Duello, Ph.D.
Michael H. Dunn, M.S.
Danny B. Hale, M.S.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

FIRST RESPONSE, INC. 6119
ATTN BILL HELTON
1052 SEARCY WAY
BOWLING GREEN, KY 42103

Lab Number: 97-A011768

Sample ID: ME TP01 WS01

Date Collected: 2/12/97

Project: 96137

Time Collected: 16:00

Project Name: MEMPHIS

Date Received: 2/14/97

Sampler: BILL HELTON

Time Received: 16:25

State Certification:

Sample Type: Water

Site I.D.:

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Benzene	0.040	mg/l	0.005	0.001	5	2/18/97	14:30	Duncan, J.	8020	9390
Toluene	0.020	mg/l	0.005	0.001	5	2/18/97	14:30	Duncan, J.	8020	9390
Ethylbenzene	0.010	mg/l	0.005	0.001	5	2/18/97	14:30	Duncan, J.	8020	9390
Xylenes, total	0.160	mg/l	0.005	0.001	5	2/18/97	14:30	Duncan, J.	8020	9390
Methyl-t-butylether	ND	mg/l	0.005	0.001	5	2/18/97	14:30	Duncan, J.	8020	9390
Gasoline Range Organics	3.10	mg/l	0.50	0.10	5	2/18/97	14:30	Duncan, J.	TDHE	9390
Diesel Range Organics	595.	mg/l	12.5	0.10	100	2/18/97	10:40	K.Walkup	TDHE	9369

ND = Not detected at the report limit.

Sample Extraction Data

DRO Extracted 2/17/97 Vol extracted: 800. ml Extract Volume: 1.00 ml

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range
DRO Surrogate,w	90.0	50. - 150.
BTEX/GRO Surrogate	98.	50. - 150.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204 0566
Phone 1-615-726-0177

ANALYTICAL REPORT

Laboratory Number: 97-A011762
Sample ID: ME TP01 S002

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range

Report Approved By: Michael H. Dunn Report Date: 2/20/97

Theodore J. Duello, Ph.D.
Michael H. Dunn, M.S.
Danny B. Hale, M.S.

SPECIALIZED ASSAY ENVIRONMENTAL

REFERRING CLIENT

2960 Foster Creighton Drive
Nashville, TN 37204
615-726-0177
FAX 615/726-3404

BILLING CONTROL NUMBER (FOR LAB USE ONLY)	PROJECT #	P.O. #
SAMPLERS (Signature-Please Print)	PROJECT NAME	

FOR LAB USE ONLY ACC#	SAMPLE DESCRIPTION	DATE	TIME	COMP	GRAB	# OF CONT	ANALYSIS REQUESTED
	ME-TP01-WS02	3/21/11				6	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Received for Laboratory by:	Date / Time
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Remarks	
Relinquished by: (Signature)	Date / Time	Received by: (Signature)		
Relinquished by: (Signature)	Date / Time	Received by: (Signature)		

For further assistance in completing the chain of custody form please refer to the instructions found on the opposite side

GENERAL INSTRUCTIONS FOR COMPLETING THE CHAIN OF CUSTODY FORM

SPECIALIZED ASSAYS
ENVIRONMENTAL

2960 Foster Creighton Drive
Nashville, TN 37204
615 726 0177
FAX 615/726-3404

REFERRING CLIENT
Doe & Doe, Inc.
1010 Maryland Way Suite 100
Nashville, TN 37012
Attn: Jay Doe 615-555-5555 Fax 615-555-0001

BILLING CONTROL NUMBER (FOR LAB USE ONLY) | PROJECT # A-3007 | P.O.# 1505

SAMPLERS (Signature-Please Print) | PROJECT NAME Mayfield Oil Refinery

FOR LAB USE ONLY ACC#	SAMPLE DESCRIPTION	DATE	TIME	COMP	GRAB	# OF CONT	ANALYSIS REQUESTED
	Oil Tank NE					1	TRPH
	Oil Tank SW					1	TRPH - BTEX
	Excavated Waste pile					1	TCLP: VOA Metals Extractables PCB Reactivity Flash point
	Oil Tank Contents					5	Total Violatiles Metals PCB Ignitability

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Received for Laboratory by:	Date / Time
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Remarks	
Relinquished by: (Signature)	Date / Time	Received by: (Signature)		

Complete mailing address as shown in the example form under **Referring Client.** Please be sure to include to who's attention laboratory correspondence should be directed as well as a phone and fax number.

Project # If applicable please include a project number. The Facility I.D. number for Underground Storage Tank analysis should also be placed here.

P.O.# If applicable please include a purchase order number.

Samplers (signature) Please direct all personnel taking samples to include their name on this line.

Project Name Identify the project name in this block whether it is descriptive of sample location or client project.

Sample Description is crucial in correctly filling out your chain of custody form. Sample Description alerts Accessioning personnel as to what you wish your sample to be referred to in future correspondence. Please be sure that all sample descriptions match what is written on sample containers. Each sample will require only one line regardless of how many tests are performed or the number of containers provided (please see example).

Date & Time are crucial information in monitoring holding time regulations for the analysis requested.

Comp Check if a composite sample (24 hr. flow composite or boring soil composite).

Grab Check if an instantaneous grab or exact soil depth is indicated.

# of Cont This block informs the Accessioning department exactly how many sample containers are being returned with the analysis requested.

Everyone coming in contact with your samples from the initial sampler to Accessioning personnel will need to sign the **relinquished by** and **received by** spaces as indicated on the form. Accessioning personnel will indicate that your samples have reached their destination by signing the **received for laboratory** space.

Remarks This block is for any additional information you wish to relay to Accessioning personnel. For example if the analysis you request needs to be placed on a RUSH priority, or if there are any types of hazardous associated with the sample, i.e. flammables.

Should you need any assistance in filling out your chain of custody form please feel free to contact our Client Services Department at 615-726-0177

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1 615 726 0177

ANALYTICAL REPORT

FIRST RESPONSE, INC. 6119
ATTN BILL HELTON
1052 SEARCY WAY
BOWLING GREEN, KY 42103

Lab Number: 97-A022235

Sample ID: ME-TP01-WS02

Date Collected: 3/21/97

Project:

Time Collected: 10:00

Project Name:

Date Received: 3/21/97

Sampler:

Time Received: 16:45

State Certification: 90038

Sample Type: Water

Site I.D.:

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Benzene	ND	mg/l	0.001	0.001	1	3/25/97	4:30	J. James	8020	7469
Toluene	ND	mg/l	0.001	0.001	1	3/25/97	4:30	J. James	8020	7469
Ethylbenzene	ND	mg/l	0.001	0.001	1	3/25/97	4:30	J. James	8020	7469
Xylenes, total	ND	mg/l	0.001	0.001	1	3/25/97	4:30	J. James	8020	7469
Oil and Grease	ND	mg/l	1.0	1.0	1	3/24/97	15:39	C.Gerenser	413.1	7164
TPH (Diesel Range)	0.31	mg/l	0.10	0.10	1	3/25/97	15:24	K.Walkup	8015M/3510	8039
Lead	ND	mg/l	0.0030	0.0030	1	3/25/97	7:28	R.Street	6010A	7304
pH	7.1	pH Units			1	3/22/97	14:30	J.Hale	9040/150.1	7105
Suspended Solids	18.4	mg/l	10.0	10	1	3/26/97	6:57	D. Hoover	160.2	7746

ND = Not detected at the report limit.

Sample Extraction Data

DRO Extracted 3/24/97 Vol extracted: 1000 ml Extract Volume: 1.00 ml

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range
DRO Surrogate,#	89.0	50. - 150.
BTEX/GRO Surrogate	85.	50. - 150.

SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

Laboratory Number: 97-A022235
Sample ID: ME-TP01-W802

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range

Report Approved By: _____ Report Date: 3/26/97

Theodore J. Duello, Ph.D.
Michael H. Dunn, M.S.
Danny B. Hale, M.S.

APPENDIX C

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

Manifest Document No.

2. Page 1 of 1

3. Generator's Name and Mailing Address

4. Generator's Phone ( ).

5. Transporter 1 Company Name		6. US EPA ID Number	
7. Transporter 2 Company Name		8. US EPA ID Number	
9. Designated Facility Name and Site Address		10. US EPA ID Number	

A. Transporter's Phone

B. Transporter's Phone

C. Facility's Phone

11. Waste Shipping Name and Description	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol
a. Non-Hazardous Oily water Non-Hazardous				
b.				
c.				
d.				

D. Additional Descriptions for Materials Listed Above

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name	Signature	Month	Day	Year
Dennis L Proctor WL-9		2	12	97

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Steve Ingle		2	12	97

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

GENERATOR / TRANSPORTER / FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year

COPY

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.	Manifest Document No.	2. Page 1 of	

3. Generator's Name and Mailing Address
TN NATIONAL GUARD
E HOLMES Rd
MEMPHIS TN

4. Generator's Phone ( )

5. Transporter 1 Company Name	6. US EPA ID Number
AM Pumping Ser.	TND000001540
7. Transporter 2 Company Name	8. US EPA ID Number

9. Designated Facility Name and Site Address	10. US EPA ID Number	
AM Pumping Ser. 3418 Fontaine Memphis TN	TND 000001540	A. Transporter's Phone B. Transporter's Phone C. Facility's Phone 901-398-5310

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. Oily WATER	VAC	TRK	2000	GAL
b.				
c.				
d.				

D. Additional Descriptions for Materials Listed Above

E. Handling Codes for Wastes Listed Above
HRS 6

15. Special Handling Instructions and Additional Information

16. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name	Signature	Month	Day	Year
X BILL HELTON FOR: DAN EUBANKS	X [signature]	07	12	97

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
STEVE Tyle	[signature]	7	11	97

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year

GENERATOR / TRANSPORTER / FACILITY

GENERATOR'S COPY

Memphis Tanks

KENWAY CONTRACTING, INC.
4520 Louisville Road
BOWLING GREEN, KY 42101
Phone 781-1932

CUSTOMER'S ORDER NO	PHONE	DATE 2-13 19[illegible]
NAME [illegible] Appliance		
ADDRESS		

CASH	PAID	CHARGE			
	31220				
	26580		50	00	
			TAX		
SOLD BY	RECEIVED BY		TOTAL		

All claims and returned goods MUST be accompanied by this bill.

32866

Thank You

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.:

Manifest Document No.:

2. Page 1 of

3. Generator's Name and Mailing Address: NATIONAL GUARD Holmes Rd MEMPHIS TN

4. Generator's Phone ( )

5. Transporter 1 Company Name: FFI

6. US EPA ID Number

7. Transporter 2 Company Name

8. US EPA ID Number

9. Designated Facility Name and Site Address: Consolidated Recycling Troy IN

10. US EPA ID Number

A. Transporter's Phone

B. Transporter's Phone

C. Facility's Phone

11. Waste Shipping Name and Description	12. Containers No	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol
a. OFF-SPEC DIESEL FUEL	004	DM	200	G
b. OFF-SPEC DIESEL FUEL SLUDGE & WATER	002	DM	100	G
c.				
d.				

D. Additional Descriptions for Materials Listed Above

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name: Bill Nelson For: Dan Fulkerson

Signature

Month: 05 Day: Year:

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in item 19

Printed/Typed Name

Signature

Month Day Year

GENERATOR

TRANSPORTER

FACILITY

ORIGINAL – RETURN TO GENERATOR

SPECIALIZED ASSAY ENVIRONMENTAL

2960 Foster Creighton Drive
Nashville, TN 37204
615-726-0177
FAX 615/726-3404

Specialized Assays: (800) 765-0980

REFERRING CLIENT

Account: 6119
Final Response, Inc.
Bill Helton
[illegible] Century Way
Bowling Green, KY 42103
Ph: 502-793-0906 Fax: 502-793-0908

BILLING CONTROL NUMBER (FOR LAB USE ONLY) 649769

PROJECT # | P.O. #

SAMPLERS (Signature-Please Print)

PROJECT NAME

FOR LAB USE ONLY ACC#	SAMPLE DESCRIPTION	DATE	TIME	COMP	GRAB	# OF CONT	ANALYSIS REQUESTED
97-A022235	ME-TP01-WS02	3/21/97	10:00		V	6	BTEX, TPH-DRO, TOTAL LEAD Total Suspended Solids, pH, OIL & GREASE

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Received for Laboratory by:	Date / Time
[signature]	3/21/97 12:30	[signature]	PJR Bjm	3/21/97 16:45
[signature]	3/21/97 1810	[signature]		
[signature]	3/21/97 1645			

Remarks

1 L OIL & GREASE - } NO PRESERV.
1 L TSS & pH -
1 L Total Lead -
1 L DRO — HCl
2 VOAs BTEX — HCl

For further assistance in completing the chain of custody form please refer to the instructions found on the opposite side

ECIALIZED ASSAYS ENVIRONMENTAL
60 Foster Creighton Drive
shville, Tennessee 37204

ANALYTICAL REPORT

Original report and a copy of the chain of custody will follow by mail.

FIRST RESPONSE, INC. 6119
ATTN BILL HELTON
1052 SEARCY WAY
BOWLING GREEN, KY 42103

Lab Number: 97-A022235

Sample ID: ME-TP01-W802

Date Collected: 3/21/97

Project:

Time Collected: 10:00

Project Name:

Date Received: 3/21/97

Sampler:

Time Received: 16:45

State Certification: 90038

Sample Type: Water

Site I.D.:

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Benzene	ND	mg/L	0.001	0.001	1	3/25/97	4:30	J. James	8020	7469
Toluene	ND	mg/L	0.001	0.001	1	3/25/97	4:30	J. James	8020	7469
Ethylbenzene	ND	mg/L	0.001	0.001	1	3/25/97	4:30	J. James	8020	7469
Xylenes, total	ND	mg/L	0.001	0.001	1	3/25/97	4:30	J. James	8020	7469
Oil and Grease	ND	mg/L	1.0	1.0	1	3/24/97	15:39	C.Gerenser	413.1	7164
TPH (Diesel Range)	0.31	mg/L	0.10	0.10	1	3/25/97	15:24	K.Wallup	8015M/3510	8039
Lead	ND	mg/L	0.0030	0.0030	1	3/25/97	7:28	R.Street	6010A	7304
pH	7.1	pH Units			1	3/22/97	14:30	J.Hale	9040/150.1	7105
Suspended Solids	18.4	mg/L	10.0	10	1	3/26/97	6:57	D. Hoover	160.2	7746

ND = Not detected at the report limit.

Sample Extraction Data

DRO Extracted 3/24/97 Vol extracted: 1000 ml Extract Volume: 1.00 ml

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range
DRO Surrogate,w	89.0	50. - 150.
BTEX/GRO Surrogate	85.	50. - 150.

APPENDIX D

Notification for Underground Storage Tanks

State Agency Name and Address
UST Division, 4th Floor, L&C Tower, 401 Church St., TN DEC, Nashville, TN

ID NUMBER 0-790983

DATE RECEIVED

A. Date Entered Into Computer
B. Data Entry Clerk Initials
C. Owner Was Contacted to Clarify Responses, Comments

TYPE OF NOTIFICATION

☐ A. NEW FACILITY ☒ B. AMENDED ☐ C. CLOSURE

____ No. of tanks at facility ____ No. of continuation sheets attached

INSTRUCTIONS

Please type or print in ink all items except "signature" in section VIII. This form must be completed for each location containing underground storage tanks. If more than five (5) tanks are owned at this location, photocopy the following sheets, and staple continuation sheets to the form.

GENERAL INFORMATION

Notification is required by Federal law for all underground tanks that have been used to store regulated substances since January 1, 1974, that are in the ground as of May 8, 1986, or that are brought into use after May 8, 1986. The information requested is required by Section 9002 of the Resource Conservation and Recovery Act, (RCRA), as amended.

The primary purpose of this notification program is to locate and evaluate underground tanks that store or have stored petroleum or hazardous substances. It is expected that the information you provide will be based on reasonably available records, or in the absence of such records, your knowledge, belief, or recollection.

Who Must Notify? Section 9002 of RCRA, as amended, requires that, unless exempted, owners of underground tanks that store regulated substances must notify designated State or local agencies of the existence of their tanks. Owner means—

(a) in the case of an underground storage tank in use on November 8, 1984, or brought into use after that date, any person who owns an underground storage tank used for the storage, use, or dispensing of regulated substances, and

(b) in the case of any underground storage tank in use before November 8, 1984, but no longer in use on that date, any person who owned such tank immediately before the discontinuation of its use.

(c) if the State agency so requires, any facility that has undergone any changes to facility information or tank system status (only amended tank information needs to be included).

What Tanks Are Included? Underground storage tank is defined as any one or combination of tanks that (1) is used to contain an accumulation of "regulated substances," and (2) whose volume (including connected underground piping) is 10% or more beneath the ground. Some examples are underground tanks storing: 1. Gasoline, used oil, or diesel fuel, and 2. industrial solvents, pesticides, herbicides or fumigants.

What Tanks Are Excluded? Tanks removed from the ground are not subject to notification. Other tanks excluded from notification are:

1. farm or residential tanks of 1,100 gallons or less capacity used for storing motor fuel for noncommercial purposes;
2. tanks used for storing heating oil for consumptive use on the premises where stored;
3. septic tanks;
4. pipeline facilities (including gathering lines) regulated under the Natural Gas Pipeline Safety Act of 1968, or the Hazardous Liquid Pipeline Safety Act of 1979, or which is an intrastate pipeline facility regulated under State laws;
5. surface impoundments, pits, ponds, or lagoons;
6. storm water or waste water collection systems;
7. flow-through process tanks;
8. liquid traps or associated gathering lines directly related to oil or gas production and gathering operations;
9. storage tanks situated in an underground area (such as a basement, cellar, mineworking, drift, shaft, or tunnel) if the storage tank is situated upon or above the surface of the floor.

What Substances Are Covered? The notification requirements apply to underground storage tanks that contain regulated substances. This includes any substance defined as hazardous in section 101 (14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), with the exception of those substances regulated as hazardous waste under Subtitle C of RCRA. It also includes petroleum, e.g., crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute).

Where To Notify? Send completed forms to:

Underground Storage Tank Division
4th Floor, L&C Tower
401 Church Street
Tennessee Department of Environment & Conservation
Nashville, TN 37243-1541

When To Notify? 1. Owners of underground storage tanks in use or that have been taken out of operation after January 1, 1974, but still in the ground, must notify by May 8, 1986. 2. Owners who bring underground storage tanks into use after May 8, 1986, must notify within 30 days of bringing the tanks into use. 3. If the State requires notification of any amendments to the facility, send information to State agency immediately.

Penalties: Any owner who knowingly fails to notify or submits false information shall be subject to a civil penalty not to exceed $10,000 for each tank for which notification is not given or for which false information is submitted.

I. OWNERSHIP OF TANK(S)

Owner Name (Corporation, Individual, Public Agency, or Other Entity)
Tennessee Army National Guard

Street Address
3041 Sidco Dr.

Nashville TN 37204-1502
City State ZIP Code

Davidson
County

901-661-6200
Phone Number (Include Area Code)

Type of Owner

II. LOCATION OF TANK(S)

If required by State, give the geographic location of tanks by degrees, minutes, and seconds. Example: Lat. 42, 36, 12 N Long. 85, 24, 17 W

Latitude ____ Longitude ____

State Tax Map No. ____ State Tax Parcel No. ____

Facility Name or Company Site Identifier, as applicable
OMS #15

Street Address (P.O. Box Not Acceptable)
2610 East Holmes Road

Memphis TN
City State Zip Code

Shelby
County Municipality

III. TYPE OF OWNER	IV. INDIAN LANDS	
☐ Federal Government ☐ Commercial ☐ State Government ☐ Private ☐ Local Government	Tanks are located on land within an Indian Reservation or on other trust lands. ☐ Tanks are owned by native American nation, tribe, or individual. ☐	Tribe or Nation:

V. TYPE OF FACILITY

Select the Appropriate Facility Description

____ Gas Station	____ Railroad	____ Trucking/Transport
____ Petroleum Distributor	____ Federal - Non-Military	____ Utilities
____ Air Taxi (Airline)	____ Federal - Military	____ Residential
____ Aircraft Owner	____ Industrial	____ Farm
____ Auto Dealership	____ Contractor	____ Other (Explain) _____

VI. CONTACT PERSON IN CHARGE OF TANKS

Name	Job Title	Address	Phone Number (Include Area Code)

VII. FINANCIAL RESPONSIBILITY

I have met the financial responsibility requirements in accordance with 40 CFR Subpart H ☐

Check All that Apply

☐ Self Insurance	☐ Guarantee	☐ State Funds
☐ Commercial Insurance	☐ Surety Bond	☐ Trust Fund
☐ Risk Retention Group	☐ Letter of Credit	☐ Other Method Allowed Specify

VIII. CERTIFICATION (Read and sign after completing all sections)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and official title of owner or owner's authorized representative (Print)	Signature	Date Signed
ROBERT D FULKERSON EPS		19 May 97

EPA estimates public reporting burden for this form to average 30 minutes per response including time for reviewing instructions, gathering and maintaining the data needed and completing and reviewing the form. Send comments regarding this burden estimate to Chief, Information Policy Branch PM-223, U.S. Environmental Protection Agency, 401 M Street, Washington D.C. 20460, marked "Attention Desk Officer for EPA." This form amends the previous notification form as printed in 40 CFR Part 280, Appendix I. Previous editions of this notification form may be used while supplies last.

Tank Identification Number	Tank No. 1	Tank No. 2	Tank No.	Tank No.	Tank No.
7. Substance Currently or Last Stored In Greatest Quantity by Volume					
Gasoline					
Diesel					
Gasohol					
Kerosene					
Heating Oil					
Used Oil					
Other, Please specify					
Hazardous Substance CERCLA name and/or, CAS number					
Mixture of Substances Please specify					

X. TANKS OUT OF USE, OR CHANGE IN SERVICE

1. Closing of Tank					
A. Estimated date last used (mo./day/year)	2-1-97	2-1-97			
B. Tank was removed from ground	✓	✓			
C. Estimated date tank was closed in ground or removed (mo./day/year)	2-12-97	2-12-97			
D. Tank filled with inert material					
F. Change in service					
2. Site Assessment Completed	N	N			
Evidence of a leak detected	Y	Y			

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
MEMPHIS ENVIRONMENTAL FIELD OFFICE
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH
MEMPHIS, TENNESSEE 38115-1520

April 22, 1997

CERTIFIED MAIL P 182 143 725
RETURN RECEIPT REQUIRED

Mr. Ralph S. Harder, C.P.E.
Tennessee Army National Guard (STARC)
Houston Barracks, P.O. Box 41502
Nashville, Tennessee 37204-1502

RE: Permanent Closure Report
OMS # 15 - Memphis
2610 East Holmes Road, Memphis, TN
Facility ID # 0-790983, Shelby County

Dear Mr. Harder:

On October 29, 1996, the Division of Underground Storage Tanks approved your Application for Permanent Closure of Underground Storage Tank Systems (APC) at the above referenced facility. On February 12, 1997, the underground storage tanks at the facility were removed. According to the APC, which was signed by Robert Fulkerson on October 14, 1996, the analytical results for the UST system closure were to be submitted within 45 days of collecting the samples. As of this date the Permanent Closure Report and analytical results have not been received by the Division.

Tennessee Army National Guard shall submit the Permanent Closure Report and analytical results by **May 22, 1997**.

If you have any questions concerning this correspondence, call me at (901) 368-7974.

Sincerely,

Cynthia J. Patton

Cynthia J. Patton
Division of Underground Storage Tanks

c: William Helton - First Response, Inc., P.O. Box 20310, Bowling Green, KY 42102-6310
Case File # 0-790983

SENDER: UST/OSP

- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "*Return Receipt Requested*" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to: 0-190983
Mr. Ralph S. Harder C.P.E.
TN Army National Guard (STM&C)
Houston Barracks, P.O. Box 41502
Nashville, TN 37204-1502

4a. Article Number P 182 143 725

4b. Service Type
☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery

5. Received By: (Print Name) Randy Hall

6. Signature

8. Addressee's Address (*Only if requested and fee is paid*)

ZIP + 4 37204-1502

PS Form 3

Thank you for using Return Receipt Service.

Is your RETURN ADDRESS completed on the reverse side?

UST P 182 143 725 OSP

U.S Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail (*See reverse*)

Sent to: MR. Ralph S. Harder CPE (STM&C)
Street & Number: TN Army National Guard
Post Office, State, & ZIP Code: Houston Barracks P.O. Box 41502, Nash. TN 37204

Postage	$ .32
Certified Fee	1.10
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	1.10
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$ 2.52
Postmark or Date	0-190983

PS Form **3800**, April 1995

First Response, Inc.
ENVIRONMENTAL & EMERGENCY SERVICES
BOWLING GREEN, KY • NASHVILLE, TN

0-790983

TO: Cindy Patton DATE 3-28-97

FROM: _____

NUMBER OF PAGES INCLUDING COVER PAGE 2

COMMENTS _____

PLEASE REVIEW & CALL ME TO DISCUSS.

Qty of water : Approx 50,000 gal.

Thanks

Bill

RETURN FAX NUMBER 1-502-793-0908
TELEPHONE NUMBER 1-502-793-0906

THIS FAX IS FROM:

BILL HELTON ✓
JERRY HARRISON
DEBBIE WATKINS

1052 Searcy Way • P.O. Box 20310 • Bowling Green, Kentucky 42102-6310
Telephone 502-793-0906 • Fax 502-793-0908 • 24 Hour Emergency Response 1-800-914-9111

:CIALIZED ASSAYS ENVIRONMENTAL
:0 Foster Creighton Drive
ihville, Tennessee 37204

ANALYTICAL REPORT

Original report and a copy of the chain of custody will follow by mail.

FIRST RESPONSE, INC. 6119
ATTN BILL HELTON
1052 SEARCY WAY
BOWLING GREEN, KY 42103

Lab Number: 97-A022235

Sample ID: ME-TP01-WS02

Date Collected: 3/21/97

Project:

Time Collected: 10:00

Project Name:

Date Received: 3/21/97

Sampler:

Time Received: 16:45

State Certification: 90038

Sample Type: Water

Site I.D.:

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Benzene	ND	mg/L	0.001	0.001	1	3/25/97	4:30	J. James	8020	7469
Toluene	ND	mg/L	0.001	0.001	1	3/25/97	4:30	J. James	8020	7469
Ethylbenzene	ND	mg/L	0.001	0.001	1	3/25/97	4:30	J. James	8020	7469
Xylenes, total	ND	mg/L	0.001	0.001	1	3/25/97	4:30	J. James	8020	7469
Oil and Grease	ND	mg/L	1.0	1.0	1	3/24/97	15:39	C.Ge[illegible]	413.1	7154
TPH (Diesel Range)	0.31	mg/L	0.10	0.10	1	3/25/97	15:24	K.Wallup	8015M/3510	8039
Lead	ND	mg/L	0.0030	0.0030	1	3/25/97	7:28	R.Street	6010A	7304
pH	7.1	pH Units			1	3/22/97	14:30	J.Hale	9040/150.1	7105
Suspended Solids	18.4	mg/L	10.0	10	1	3/26/97	6:57	D. Hoover	160.2	7746

ND = Not detected at the report limit.

Sample Extraction Data

DRO Extracted 3/24/97 Vol extracted: 1000 ml Extract Volume: 1.00 ml

** SURROGATE RECOVERIES **

Surrogate	% Recovery	Target Range
DRO Surrogate,w	89.0	50. - 150.
HEK/GRO Surrogate	85.	50. - 150.

PHONE CONVERSATION 2/12/97

FACILITY ID	Event	Received	Comment
0-790983 [redacted]	29 Trip Report	2/12/97	TRIP REPORT FEBRUARY 12, 1997: I ARRIVED ON SITE AT 11:30 AM. A&M CONTRACTING HAD REMOVED 2000 GALLONS OF WATER FROM TANK PIT. TANKS STILL IN GROUND. ODOR PRESENT. PEA GRAVEL IN TANK HOLD. WATER HAS BEEN KNOWN TO BE IN TANK HOLD IN THE PAST. NO CONCRETE OVER PIT. RAIN WATER RECHARGE TO PIT BECAUSE SOIL IS ONLY COVER. APPROXIMATELY 2 FEET OF SOIL OVER PIT FILL MATERIAL. FILL PORTS HAD BEEN RAISED TWO FEET DUE TO WATER IN TANKS IN PAST. WATER IN TANKS DUE TO RAIN WATER ENTERING TANKS THROUGH FILL PORT. A&M TO RETURN AFTER LUNCH TO REMOVE REST OF WATER. WATER HAS NOT BEEN SAMPLED. TIM WITH FIRST RESPONSE STATED THAT THERE WAS A SHEEN ON WATER AND ODOR. WEATHER : CLOUDY AND COLD SLEET IN FORECAST. LEFT SITE AT 12:10 C.J. PATTON

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
MEMPHIS ENVIRONMENTAL FIELD OFFICE
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH
MEMPHIS, TENNESSEE 38115-1520

March 14, 1997

Mr. Ralph Harder
c/o TNARNG
3041 Sidco Drive, Suite #1121
Nashville, TN 37204-1502

RE: Compliance Inspection File
OMS #15
2610 E. Holmes Road, Memphis, TN
Facility ID # 0-790983, Shelby County

Dear Mr. Harder:

The Division of Underground Storage Tanks has received the October 14, 1997, Application for Permanent Closure of the UST systems registered at the above referenced facility. Consequently, based on your decision to permanently close the UST systems, the Division is closing the inspection file on the facility, and notifying the Nashville Central Office of your decision to remove the tanks. However, TNARNG, OMS #15 will be required to continue with the closure process in accordance with UST regulations, and to submit a Permanent Closure Report within 45 days of the collection of samples.

If you have any questions regarding this correspondence, or if we can be of further assistance, please contact me at (901) 368-7991.

Sincerely yours,

Chuck Nance, Environmental Specialist
Division of Underground Storage Tanks

cc: MFO/UST Inspection File
CLOSURE FILE

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

OFFICE CORRESPONDENCE

FROM	TO	DATE

DATE: March 14, 1997

TO: Randy Mann - UST Enforcement

FROM: Chuck Nance

SUBJECT:

OMS #15
2610 E. Holmes Road, Memphis, TN
Facility ID # 0-790983, Shelby County

Mr. Ralph Harder, C. P. E. for the Tennessee Army National Guard (STARC), has submitted to the Memphis Field Office, an Application for Permanent Closure of the UST systems currently registered at the above referenced facility. The application was approved by Cynthia J. Patton on October 29, 1996, and the UST systems have since heen removed. The Permanent Closure Report is scheduled to be submitted to this office by March 18, 1997. Therefore, the UST violations discovered during the compliance inspection conducted on July 27, 1995, will not be corrected, and the compliance inspection file has been closed.

If you have any questions regarding this facility please give me a call at (901) 368-7991.

cc: UST Inspection File
UST Closure File

FROM	DATE

TO

CN-0920

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
MEMPHIS ENVIRONMENTAL FIELD OFFICE
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH
MEMPHIS, TENNESSEE 38115-1520

October 30, 1996

Mr. Ralph S. Harder, C.P.E.
Tennessee Army National Guard (STARC)
Houston Barracks, P.O. Box 41502
Nashville, TN 37204-1502

RE: Permanent Closure Application - Approved
OMS # 15 - Memphis
2610 East Holmes Road, Memphis, TN
Facility ID #0-790983, Shelby County

Dear Mr. Harder:

The Division of Underground Storage Tanks has approved your application for Permanent Closure of Underground Storage Tank Systems dated October 14, 1996 for the above referenced facility. Enclosed is a copy of the approved application. This copy must be kept at the site during all closure activities.

This office must be notified at least one working day in advance of any major field activities.

If a release is identified during closure procedures, then the following initial response actions must be performed by Tennessee Army National Guard as required by Rule 1200-1-15-.06(2):

(a) Report the release to the Division within 72 hours (e.g., by telephone or electronic mail);

(b) Take immediate action to prevent any further releases of the petroleum into the environment; and

(c) Take immediate action to identify and mitigate fire, explosion, and vapor hazards.

All Fund eligible work shall be conducted and/or overseen by an UST Approved Corrective Action Contractor. The current list of approved contractors is enclosed. Also refer to the Authorization for Fund Eligibility form.

Tennessee Army National Guard must comply with all applicable federal, state, and local requirements during tank closure activities, including treatment and disposal of contaminated soil and/or groundwater. For information regarding the treatment of petroleum contaminated soils, refer to the enclosed Technical Guidance Document 009.

Enclosed is a copy of the Permanent Closure Report Form, Technical Guidance Document 005 and Technical Guidance Document 009. The Permanent Closure Report Form must be completed and submitted with original or carbon copies of the analytical results. Photocopies will NOT be accepted.

Before the closure of your UST system can be considered complete, an amended UST Notification Form must be completed, signed, and submitted to the UST Central Office in Nashville. Failure to properly submit the form may result in the assessment of additional UST fees. To assist you in properly completing the Notification Form, the following instructions should be followed:

1. If tanks are being removed and no additional tanks are being installed, then complete only sections I, II, VIII, and X. The tank identification numbers should correspond with the numbers for these tanks on the previous Notification Form.

2. If additional tanks are to be installed at this facility, then sections IX and XI must also be completed. The identification numbers for the new tanks must be different from the numbers of the tanks which were removed (e.g., Tanks 1, 2, and 3 were removed, Tanks 4, 5, and 6 are to be installed).

If you have any questions concerning this correspondence, contact me at (901) 368-7974.

Sincerely,

Cynthia J. Patton

Cynthia J. Patton
Division of Underground Storage Tanks

CJP\79016304\ag

Enclosure: Approved Closure Application (copy)
Permanent Closure Report Form (1/94)
Technical Guidance Document 005 (1/94)
Technical Guidance Document 009 (1/94)
Authorization For Fund Eligibility

c: Nashville UST Central Office - Fee & Notification Section
Memphis UST Field Office

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
MEMPHIS ENVIRONMENTAL FIELD OFFICE
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH
MEMPHIS, TENNESSEE 38115-1520

October 30, 1996

Mr. Ralph S. Harder, C.P.E.
Tennessee Army National Guard (STARC)
Houston Barracks, P.O. Box 41502
Nashville, TN 37204-1502

RE: Permanent Closure Application - Approved
OMS # 15 - Memphis
2610 East Holmes Road, Memphis, TN
Facility ID #0-790983, Shelby County

Dear Mr. Harder:

The Division of Underground Storage Tanks has approved your application for Permanent Closure of Underground Storage Tank Systems dated October 14, 1996 for the above referenced facility. Enclosed is a copy of the approved application. This copy must be kept at the site during all closure activities.

This office must be notified at least one working day in advance of any major field activities.

If a release is identified during closure procedures, then the following initial response actions must be performed by Tennessee Army National Guard as required by Rule 1200-1-15-.06(2):

(a) Report the release to the Division within 72 hours (e.g., by telephone or electronic mail);

(b) Take immediate action to prevent any further releases of the petroleum into the environment; and

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All Fund eligible work shall be conducted and/or overseen by an UST Approved Corrective Action Contractor. The current list of approved contractors is enclosed. Also refer to the Authorization for Fund Eligibility form.

Tennessee Army National Guard must comply with all applicable federal, state, and local requirements during tank closure activities, including treatment and disposal of contaminated soil and/or groundwater. For information regarding the treatment of petroleum contaminated soils, refer to the enclosed Technical Guidance Document 009.

Enclosed is a copy of the Permanent Closure Report Form, Technical Guidance Document 005 and Technical Guidance Document 009. The Permanent Closure Report Form must be completed and submitted with original or carbon copies of the analytical results. Photocopies will NOT be accepted.

Before the closure of your UST system can be considered complete, an amended UST Notification Form must be completed, signed, and submitted to the UST Central Office in Nashville. Failure to properly submit the form may result in the assessment of additional UST fees. To assist you in properly completing the Notification Form, the following instructions should be followed:

1. If tanks are being removed and no additional tanks are being installed, then complete only sections I, II, VIII, and X. The tank identification numbers should correspond with the numbers for these tanks on the previous Notification Form.

2. If additional tanks are to be installed at this facility, then sections IX and XI must also be completed. The identification numbers for the new tanks must be different from the numbers of the tanks which were removed (e.g., Tanks 1, 2, and 3 were removed, Tanks 4, 5, and 6 are to be installed).

If you have any questions concerning this correspondence, contact me at (901) 368-7974.

Sincerely,

Cynthia J. Patton

Cynthia J. Patton
Division of Underground Storage Tanks

CJP\79016304\ag

Enclosure: Approved Closure Application (copy)
Permanent Closure Report Form (1/94)
Technical Guidance Document 005 (1/94)
Technical Guidance Document 009 (1/94)
Authorization For Fund Eligibility

c: Nashville UST Central Office - Fee & Notification Section
Memphis UST Field Office

August 1996

STATE OF TENNESSEE
DIVISION OF UNDERGROUND STORAGE TANKS

APPLICATION FOR PERMANENT CLOSURE OF UNDERGROUND STORAGE TANK SYSTEMS

APPROVED DIVISION OF UNDERGROUND STORAGE TANKS DATE 10/29/96 BY

The UST system Responsible Party shall complete and submit the **original** application to the appropriate Division of Underground Storage Tanks field office for approval 30 days prior to closing a UST system. Tennessee Code Annotated (T.C.A.) §68-215-103(16) defines Responsible Party (RP) as the owner and/or operator of a petroleum site or any person who at the time of the release which caused the contamination was an owner and/or operator of a petroleum underground storage tank. T.C.A. §68-215-114(b) states that the Responsible Party shall be liable to the state for costs of investigation, identification, containment and cleanup, including monitoring and maintenance.

Refer to the attached map for the address of the appropriate field office. A copy of the approved application shall be on the premises with the person in charge during closure of the UST system. All of the following items shall be addressed.

The application is valid for twelve months from the approval date. **The approved application is non-transferable**. If RP of the UST system changes, a new application shall be submitted for approval. Approval of this application is for closure activity only. **Fund coverage approval is a separate process.**

Date 14 Oct 96 Facility ID Number: 0-720883-1 0-720883-2

1. Name of Facility: QMS #15 - Memphis

   Address: 2610 E. Holmes Rd.

   Memphis, TN 38118

   Phone Number: 901 543-7500 County: SHELBY

   On-site Contact (Operator): Cust William R. Hopper

2. Name of Responsible Party: MAT Robert D. Fulkerson

   Address: Houston Barnes - 3041 Sidco Dr.

   NASHVILLE, TN. 37204-1502

   Phone Number (615) 313-0604 Contact person: Dan Fulkerson

3. Number of tanks registered at this facility: 2

4. Number of regulated tanks to be closed: 2

RECEIVED OCT 25 1996 MEMPHIS FIELD OFFICE

OID 12491

1

Application for Permanent Closure of UST Systems Facility ID# 0790983-1 0-790983-2
Date 14 Oct 96

5. List the tank number, size, contents, primary use and date last used for all tanks to be closed. Attach sheet for additional tanks to be closed.

Tank Number	Size	Contents (past and present)	Usage* (all that apply)	Last Used
0790983-1	6000 gal	Diesel #2	Military	Oct 96
0790983-2	6000 gal	Diesel Gas mix	Military	N/A

* Retail, Commercial, Heating oil, Emergency generator, Residential, Farm, Other

6. Type of closure: Removal ✓ ** Closure in place_____

** Inert material selected_____

** Attach a statement explaining the reason for closure in place.

7. Proposed date of UST system closure 1 Nov 96

8. Soil and/or ground water samples shall be collected. Laboratory analyses are based on the type of product stored. If the type of product stored is unknown, all samples shall be analyzed using benzene, TPH-GRO, TPH-DRO, and a waste oil method. Mark **all** the following that apply:

GASOLINE TANKS: (Boiling Point Range 70-180° F)

Benzene **AND**

Total Petroleum Hydrocarbons-Gasoline Range Organics (TPH-GRO) X

DIESEL OR KEROSENE TANKS: (Boiling Point Range 180-450° F)

Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO) X

WASTE OIL TANKS: (Boiling Point Range greater than 450° F)

418.1 OR 503E_____

If closing chemical tanks, contact the Environmental Protection Agency in Atlanta at (404) 347-3866.

Facility ID# 0-790983-1
F-2

9. Name of Division approved laboratory Technical Assays / ENV. Sci. Corp.

10. Name of Company/Person performing the UST system closure / SI Response Inc

11. Name of Company/Person obtaining soil/ground water samples / SI Response Inc.

12. All excavated material remaining on the site of generation or on a site owned by the RP or subsidiary of the RP shall be placed on and covered with plastic, and bermed. If practical, the material should be segregated pending soil conditions. Proper screening and sampling of the excavated material in accordance with Technical Guidance Document - 005 shall be completed prior to treatment. If treatment is required, the material shall be properly screened and sampled prior to disposal.

    If petroleum contaminated material is to be managed in accordance with Technical Guidance Document-009, the appropriate *Application to Treat Petroleum Contaminated Soil* shall be completed and submitted to the appropriate field office for approval. If the contaminated material is to be treated on a site owned by a Third Party, contact the Tennessee Division of Solid Waste Management.

    Give the location/address where contaminated soil will be stockpiled OMS #15 - Memphis

13. Describe how the contaminated soil will be treated On Site Treatment / Aeration

14. Give the location/address where the contaminated soil will be treated OMS #15

15. If water is encountered, a maximum of 500 gallons can be properly removed without notifying the Division. Pumped - Removed - Transport

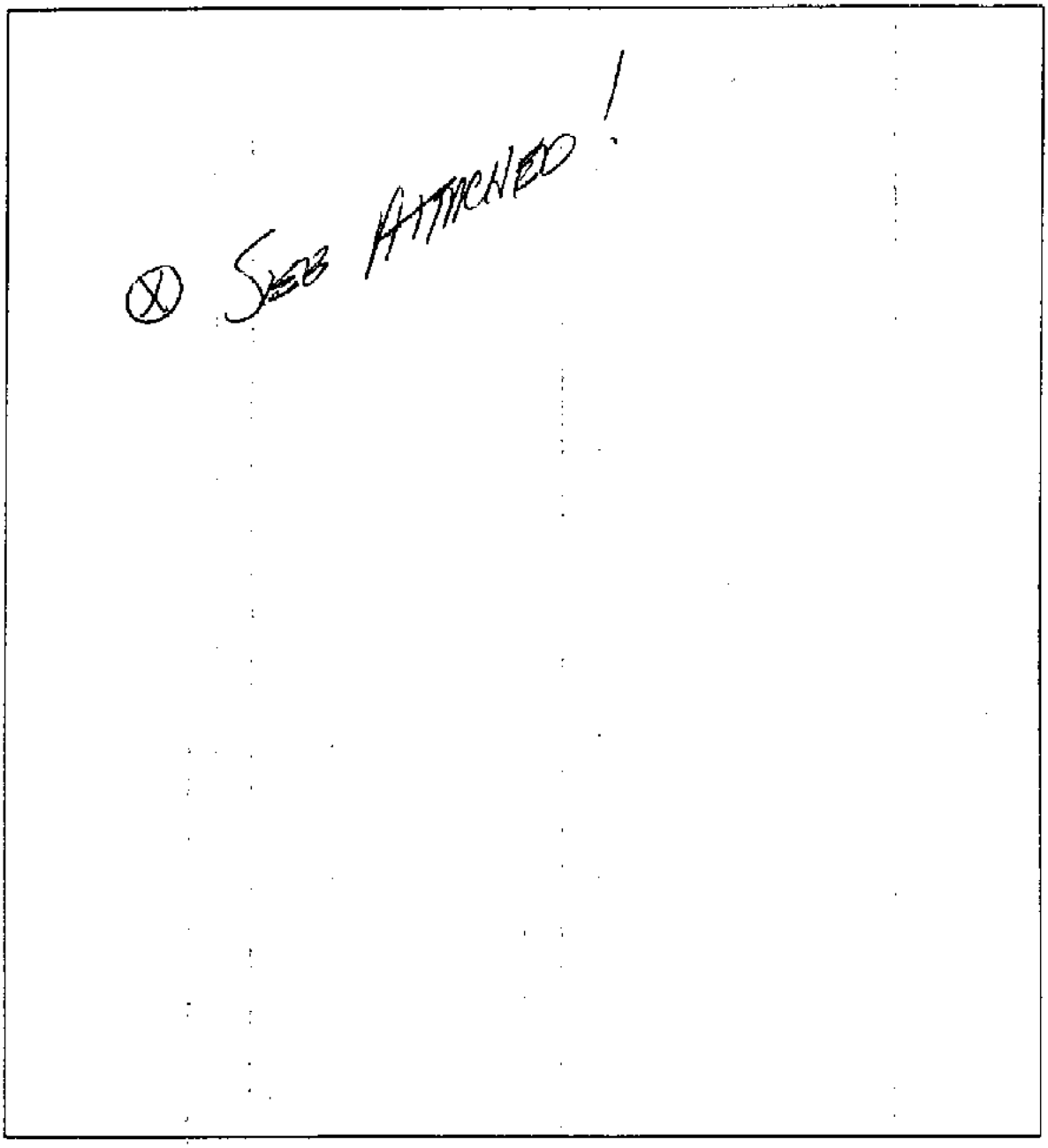
16. Describe where contaminated water will be treated To Reclamation Facility

17. Describe how treated water will be disposed Aeration / Recycling

Application for Permanent Closure of UST Systems
Date 14 Oct 96
Page 4 of 5

Facility ID# 0790983-1
E-2

18. A site map shall be provided in this space giving the location of the underground storage tanks, associated lines, sampling points and any nearby underground utilities. A permanent fixed point must be identified and a distance referenced to the UST system. **THE APPLICATION WILL NOT BE PROCESSED WITHOUT THE MAP.**



Application for Permanent Closure of UST Systems
Date 14 Oct 96
Page 5 of 5

Facility ID# 0-790983-1
E-2

I, (print) Robert D. Fulkerson, Responsible Party of the petroleum UST system(s) at this facility, agree to submit, within 45 days of collecting the samples, the analytical results for the UST system closure and will resolve all environmental problems resulting from a release from the UST system(s) at this site.

I certify under penalty of law, including but not limited to penalties for perjury, that the information contained in this form and on any attachments is true, accurate and complete to the best of my knowledge, information and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional violations.

Robert D. Fulkerson	X [signature]	14 Oct 96
UST system RP or RP authorized representative (Print name)	Signature	Date

X _____
Title (Print)

STATE OF _____ COUNTY OF _____

Sworn to and subscribed before me by _____ on this date

_____. My commission expires _____.

_____	_____	_____
Notary Public (Print name)	Signature	Date

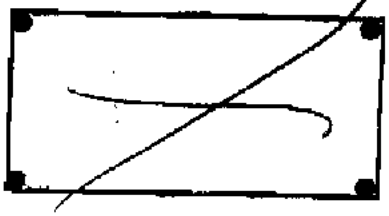
Stamp/Seal

FIGURE 1

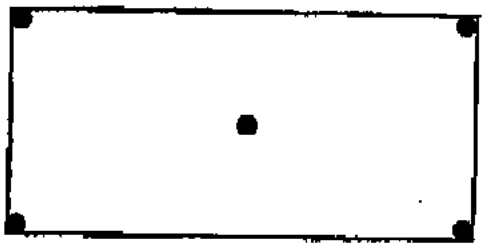
SAMPLE LOCATIONS FOR UST REMOVAL

1,120 gal. or LESS

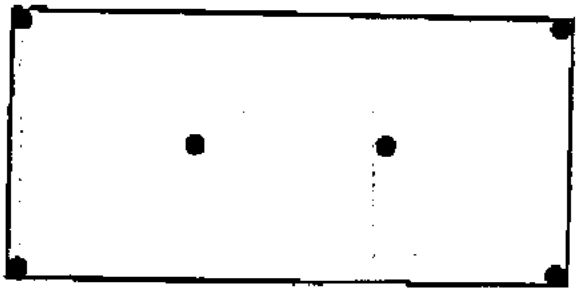
1,121 to 15,000 gal. x(2)



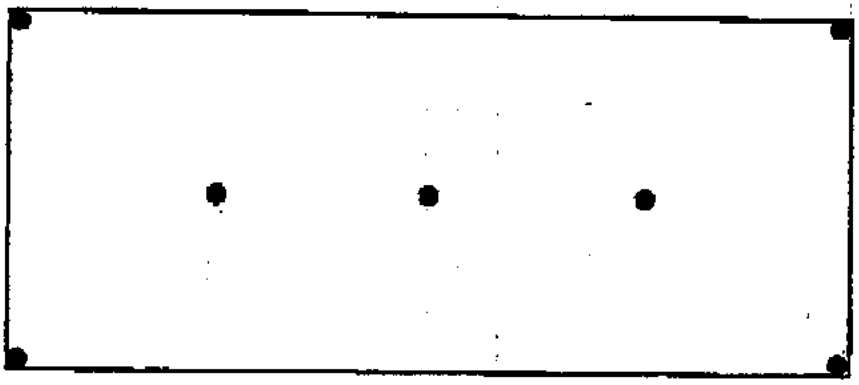
15,001 to 30,000 gal.



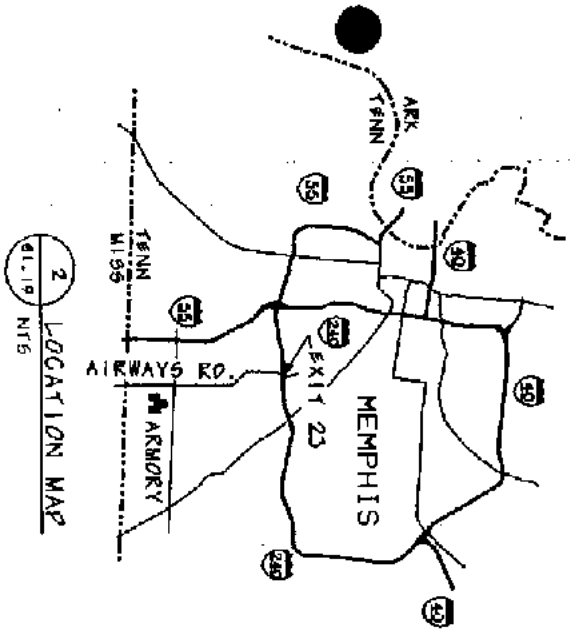
30,001 to 45,000 gal.



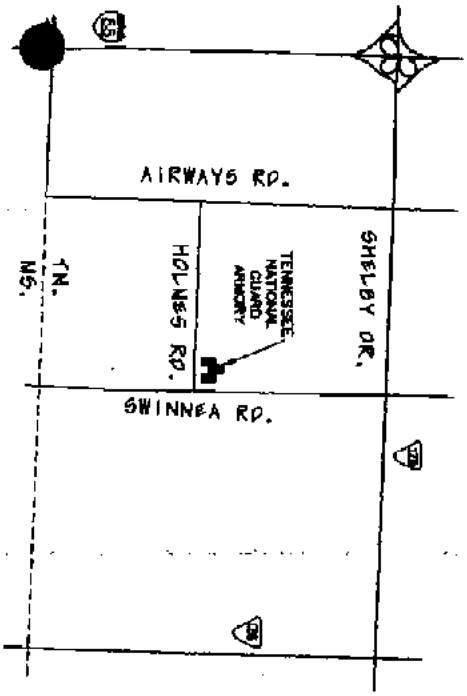
45,001 to 60,000 gal.



● - Sampling point

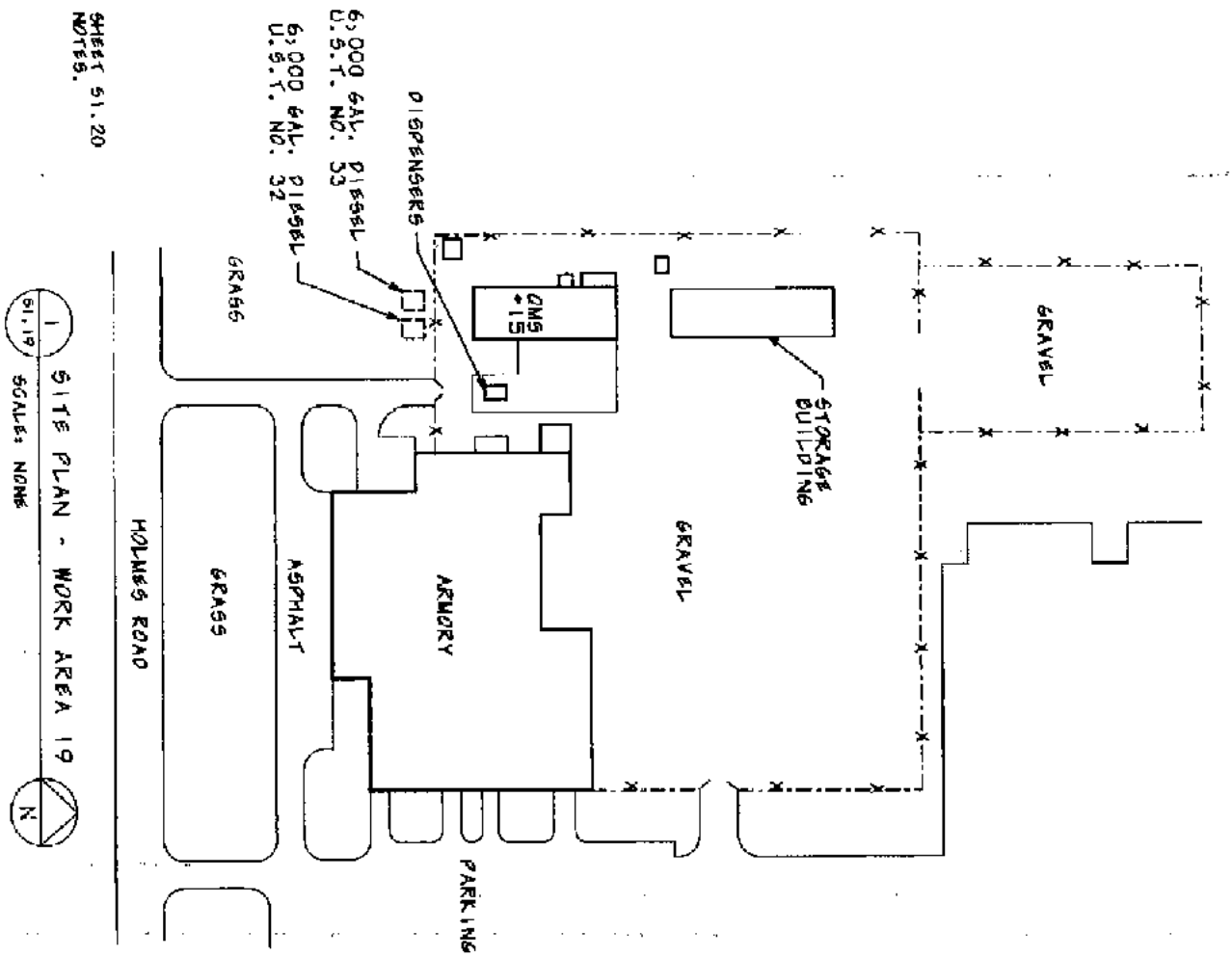


2 / 51.19 NTS LOCATION MAP



3 / 51.19 NTS VICINITY MAP

SEE SHEET 51.20 FOR NOTES.



1 / 51.19 SCALE: NONE SITE PLAN - WORK AREA 19

N

DATE JULY 29, 1996 SCALE AS NOTED SHEET NO. 51.19	SITE 19 LOCATION PLAN UNDERGROUND STORAGE TANKS REMOVAL MEMPHIS NATIONAL GUARD ARMORY MEMPHIS, TN. SDC PROJECT NO. 361/000-01-96	TENNESSEE ARCHITECTURAL SERVICES CAPITAL PROJECTS MANAGEMENT DEPT. OF FINANCE AND ADMINISTRATION STATE OF TENNESSEE SUITE 500 ~ 511 UNION STREET ~ NASHVILLE, TN (615) 741-4034 ~ FAX (615) 741-2336	STAMP

NOTIFICATION DATA FOR UNDERGROUND STORAGE TANKS

FACILITY DATA

FACILITY ID NUMBER: 0-790983

OWNER'S ID : 12491

DATE RECEIVED : 05-08-86

NOTIFICATION TYPE : Amended

NUMBER OF TANKS : 2

OWNERSHIP OF TANK(S):
Name : HEADQUARTERS TN ARMY/NAT GUARD
Mailing Address: ATT:AGTN-DFE CAPTAIN COUCH, HOUSTON BARRACKS P O BOX 41502
City : NASHVILLE State : TN Zip Code: 37204-1501
Phone: (615) 532-3376 County: DAVIDSON

LOCATION OF TANK(S):
Name : OMS #15
Street Address: 2610 E HOLMES RD
City : MEMPHIS State : TN Zip Code : 38118
County: SHELBY Latitude: NOT MARKED Longitude: NOT MARKED

OWNER TYPE : Federal

INDIAN LANDS :
Reservation/Trust Lands: NOT MARKED
Owned by Tribe : NOT MARKED
Name of Tribe/Nation : NOT MARKED

FACILITY TYPE(S):
Fed. Military JV

CONTACT PERSON IN CHARGE OF TANKS:
Name : ALBERT FORREST Title: FOREMAN
Address: NOT MARKED
City : NOT MARKED State: NOT MARKED Zip Code: NOT MARKED
Phone : (901) 346-1528

CERTIFICATION:
Name : ROBERT FULKERSON
Title: CAPTAIN
Date : 07-19-90

FINANCIAL RESPONSIBILITY:
I have met the financial requirements: NOT MARKED
Method(s):
NOT MARKED

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Signature: Date:

NOTIFICATION DATA FOR UNDERGROUND STORAGE TANKS

Tank Data

FACILITY ID	0 790983	0-790983
TANK ID	1	2
Status of Tank		
Currently In Use	X	X
Temp. Out of Use		
Perm. Out of Use		
Amendment		
Date of Installation	04-30-82	04-30-82
Age	14	14
Est. Total Capacity (Gals)	6,000	6,000
Material of Construction		
Asphalt or Bare Steel		
Cath. Protected Steel		
Epoxy Coated Steel		
Composite		
Fiberglass Reinf. Plas.	X	X
Lined Interior		X
Double Walled		
Poly. Tank Jacket		
Concrete		
Excavation Liner		
Unknown		
Other, explanation		
Tank been repaired?		
Piping Material		
Bare Steel		
Galvanized Steel	X	X
Fiberglass		
Copper		
Cathodically Protected		
Double Walled		
Secondary Containment		
Unknown		
Other, explanation		
Piping Type		
Suction: No Valve		
Suction: Valve		
Pressure		
Gravity Fed		
Piping been repaired?		
Substance Stored in Tank		
Gasoline		X
Diesel	X	
Gasohol		
Kerosene		
Heating Oil		
Used Oil		
Other, explanation		

Tank Data

FACILITY ID	0-790983	0-790983
TANK ID	1	2
Substance Stored in Tank		
Hazardous Substance		
CERCLA Name		
CAS Number		
Mixture		
Mixture, Specification		
Tanks Out of Use/Chg. Ser.		
Est. Date Last Used		
Est. Date Tank Closed		
Removed from Ground		
Closed in Ground		
Filled with Inert Mat.		
Inert Mat. Description		
Change in Service		
Site Assessment Compl.		
Leak Detected		
Installation		
Certified by Manufac.		
Certified by Imple. Agn		
Inspected by Engineer		
Inspected by Imple. Agn		
Checklists Completed		
Another Allowed Method		
Method Description		
Release Detection	Tank / Piping	Tank / Piping
Manual Tank Gauging	X /	X /
Tank Tightness Testing	X /	X /
Inventory Controls	/	/
Automatic Tank Gauging	/	/
Vapor Monitoring	/	/
Groundwater Monitoring	/	/
Inter. Mon./Double Wall	/	/
Inter. Mon./Sec. Cont.	/	/
Auto. Line Leak Detect.	/	/
Line Tightness Testing	/	/
Other Method	/	/
Other Description		
Spill and Overfill		
Overfill Device Inst.		
Spill Device Installed		
Installation		
Name		
Position		
Company		
Date		

RALPH S. HARDER C.P.E.
ENVIRONMENTAL ENGINEERING SPECIALIST 5

OFFICE 615-313-0607
FAX 615-313-0769

HEADQUARTERS (AGTN-CFMO)
TENNESSEE ARMY NATIONAL GUARD (STARC)
HOUSTON BARRACKS, P.O. BOX 41502
NASHVILLE, TN 37204-1502

ATC ASSOCIATES INC.

INITIAL SITE CHARACTERIZATION REPORT
NATIONAL GUARD ARMORY OMS#15
2610 E. Holmes Road
Memphis, Tennessee
TDUST Facility #0-790983
ATC Project No. 1995.0043

Prepared For:

Mr. Steven L. Westerman
Environmental Programs Coordinator
Tennessee Department of Finance and Administration
Tennessee Tower, Suite 1500
312 N. 8th Street
Nashville, Tennessee 37243-0300

Date: July 28, 1998

ATC ASSOCIATES INC.

6217 Linbar Drive
Suite 306
Nashville, Tennessee
37211
615.331.5010
Fax 615.331.5032

July 28, 1998

Mr. Steven L. Westerman
Environmental Programs Coordinator
Tennessee Department of Finance and Administration
Tennessee Tower, Suite 1500
312 N. 8th Street
Nashville, Tennessee 37243-0300

RE: Army National Guard OMS #15
Holmes Road
Memphis, Tennessee
TDUST Facility I.D. #0-790983
ATC Project No. 1995-0043

Dear Mr. Westerman:

On behalf of the Tennessee Department of Finance and Administration (F&A), ATC Associates Inc. (ATC) is hereby submitting the enclosed Initial Site Characterization Report (ISCR) for the above referenced project. It is our understanding that you will forward copies to the Tennessee Division of Underground Storage Tanks (TDUST) central office and Memphis field office.

ATC has completed the primary phase of assessment to characterize the site, and determined the extent of hydrocarbon impact in both soil and groundwater. The results and findings are summarized in this report.

Should you have any questions or comments regarding this project, please call at your convenience.

Respectfully Submitted,

ATC ASSOCIATES INC.

Ken Johnson
Ken Johnson
Staff Geologist

John W. Hargraves
John W. Hargraves
Program Manager

cc: Mr. Jim Ozment - TDEC Central Office
Mr. Rudy Collins - TDEC Jackson Office

L:\SHARED\NVF&A\OMS#15\ISCR.DOC

EXECUTIVE SUMMARY

ATC Associates Inc. (ATC) was retained by the Tennessee Department of Finance and Administration (F&A) to complete an Initial Site Characterization Report (ISCR) at the Memphis Army National Guard OMS # 15 located at 2610 Holmes Road, Memphis, Shelby County, Tennessee. The methodologies used for the investigation were in accordance with the Tennessee Division of Underground Storage Tanks (TDUST) "Environmental Assessment Guidelines" (1996). The results and findings of the investigation are summarized in this ISCR.

A total of five monitoring wells were installed by ATC during one phase of drilling. All five wells were installed at on-site locations. Based on the lack of drinking water wells located within 0.25 miles of the site, ATC recommends that groundwater cleanup levels of 0.07 parts-per-million (ppm) benzene and 1.0 ppm Total Petroleum Hydrocarbons (TPH) be applied to this site. Based on soil permeabilities of 10^{-6} to 10^{-7} cm/sec and a non-drinking water classification for groundwater, ATC recommends that soil cleanup levels of 50 ppm Benzene and 500 ppm TPH be applied to this site.

Laboratory analysis of samples collected during the investigation indicate the soil and groundwater beneath the site has not been impacted by hydrocarbons in concentrations above the applicable cleanup levels. Based on this and a site ranking score of 138, ATC recommends no further action and site closure.

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FIGURES:

INITIAL SITE CHARACTERIZATION REPORT
NATIONAL GUARD ARMORY OMS #15
2610 E. Holmes Road
Memphis, Tennessee
TDUST Facility I.D. #9-790983
ATC Project No. 1995.0043

A. INTRODUCTION

1. On May 15, 1997, First Response Inc. submitted a Permanent Closure Report to the Tennessee Department of Environment and Conservation (TDEC) Division of Underground Storage Tanks (DUST) Memphis field office detailing UST removal activities at the National Guard Armory OMS #15 located in Memphis, Tennessee. Analytical results from soil sampling during the removal provided readings which exceed the most stringent clean-up levels

   On December 23, 1997, ATC Associates Inc. (ATC) was retained by the Tennessee Department of Finance and Administration to complete subsurface investigation activities and maintain regulatory compliance.

2. Five groundwater monitoring wells were installed on-site in April 1998, to define the extent of hydrocarbons in soil and groundwater beneath the site.

   A water use survey consisting of a computer search, field interviews, and field surveys, was completed as the initial steps in the groundwater classification procedure. The results of this survey, which are discussed in Section D.6 of this report, indicate that this site is a "non-drinking water" site.

   Technical Guidance Document - 014 "UST Site Ranking System" was completed and a score of 138 was derived. The completed site ranking form is included as Appendix G.

B. SITE LOCATION

1. The Site Vicinity Map is illustrated in Figure 1.

2. The Scaled Site Map is illustrated in Figure 2.

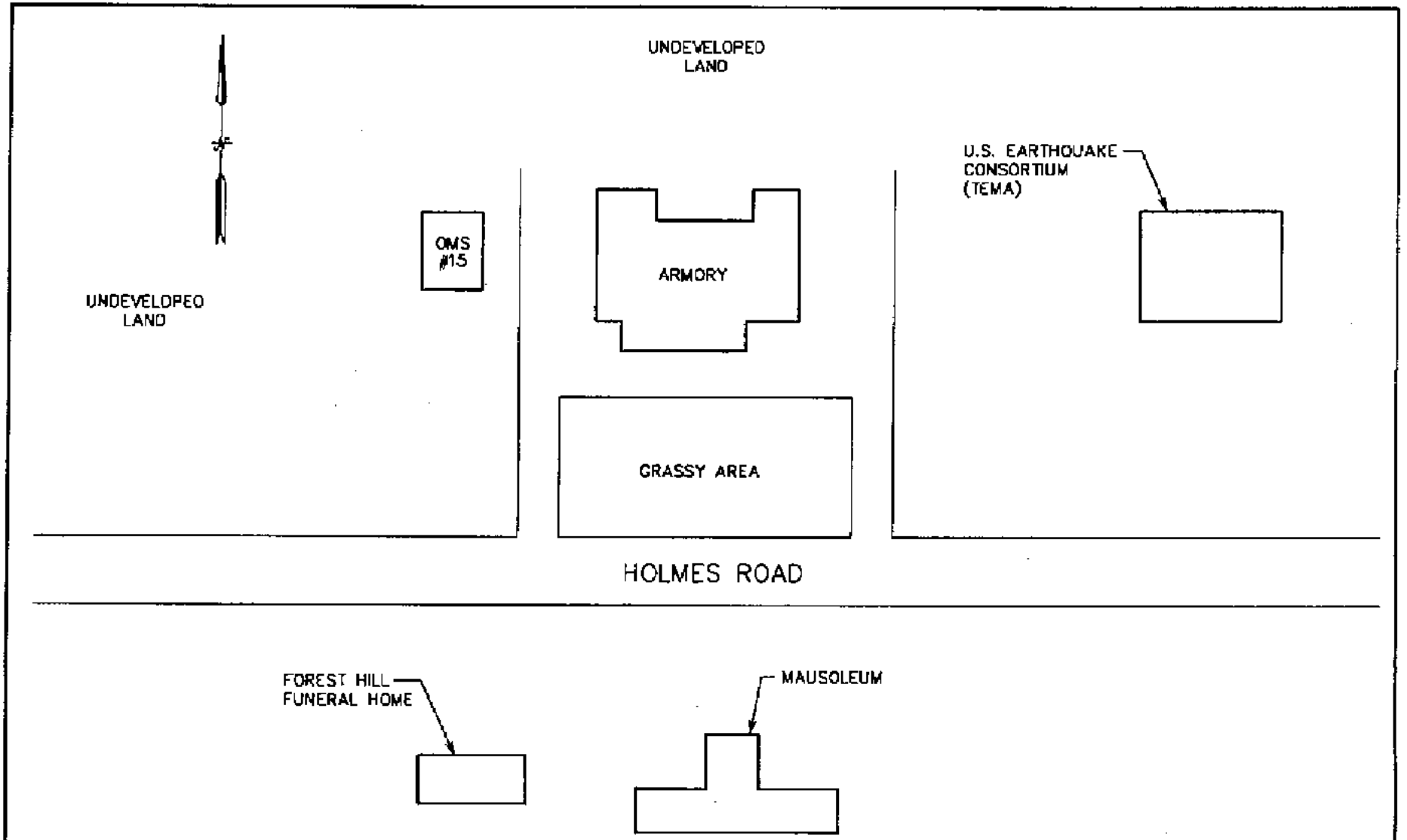
3. The Monitoring Well Location Map is illustrated in Figure 3.

4. The Site Location Topographic Map is illustrated in Figure 4.

5. The site is located at 2610E Holmes Road, Memphis, Shelby County, Tennessee. Its location as well as surrounding topographic and cultural features are illustrated on Figure 4. Topography in the site vicinity is slight relief to gently rolling. Intermittent surface flow is toward the north and west and surface flow drains indirectly into undeveloped land adjacent to the north and west property boundary.

   Land use in the site vicinity is mixed commercial and residential. The site is bound to the north by undeveloped land, to the east by the United States Earthquake Consortium with undeveloped land beyond, to the south by Holmes Road with Forest Hill Funeral Home and Cemetery beyond, and to the west by undeveloped property.

   The site property is rectangular in shape with north/south and east/west dimensions of approximately 600 feet and 500 feet, respectively (see Figure 3). Approximately half of the property consists of a grassy area located on the southern portion of the site. The western and northern property boundary are enclosed by a chain link fence. The Administration building occupies the central and eastern portion of the property. The OMS building is located near the western property boundary, and the former tankhold is located directly south of the OMS.



SITE VICINITY MAP
ARMY NATIONAL GUARD – OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: NOT TO SCALE
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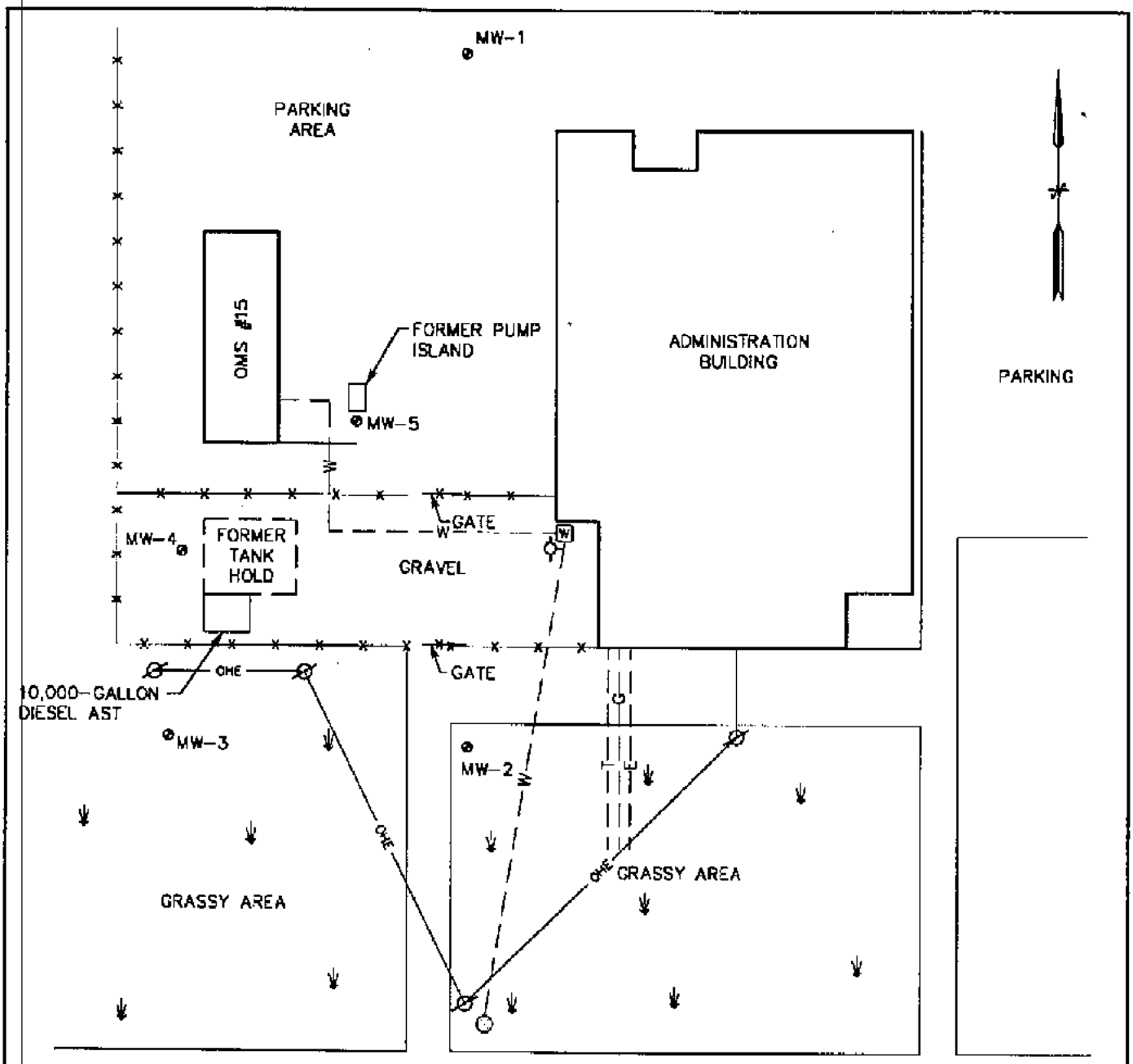
DRAWING FILE: 19950043\0043-1.DWG			REVISED BY:

ATC



LEGEND

- MONITORING WELL LOCATION
- WATER METER
- FIRE HYDRANT
- POWER POLE
- OHE — OVERHEAD ELECTRIC LINE
- T — UNDERGROUND TELEPHONE LINE
- OHE — UNDERGROUND GAS LINE
- W — WATER LINE

0 40 80
SCALE IN FEET

SCALED SITE MAP

ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
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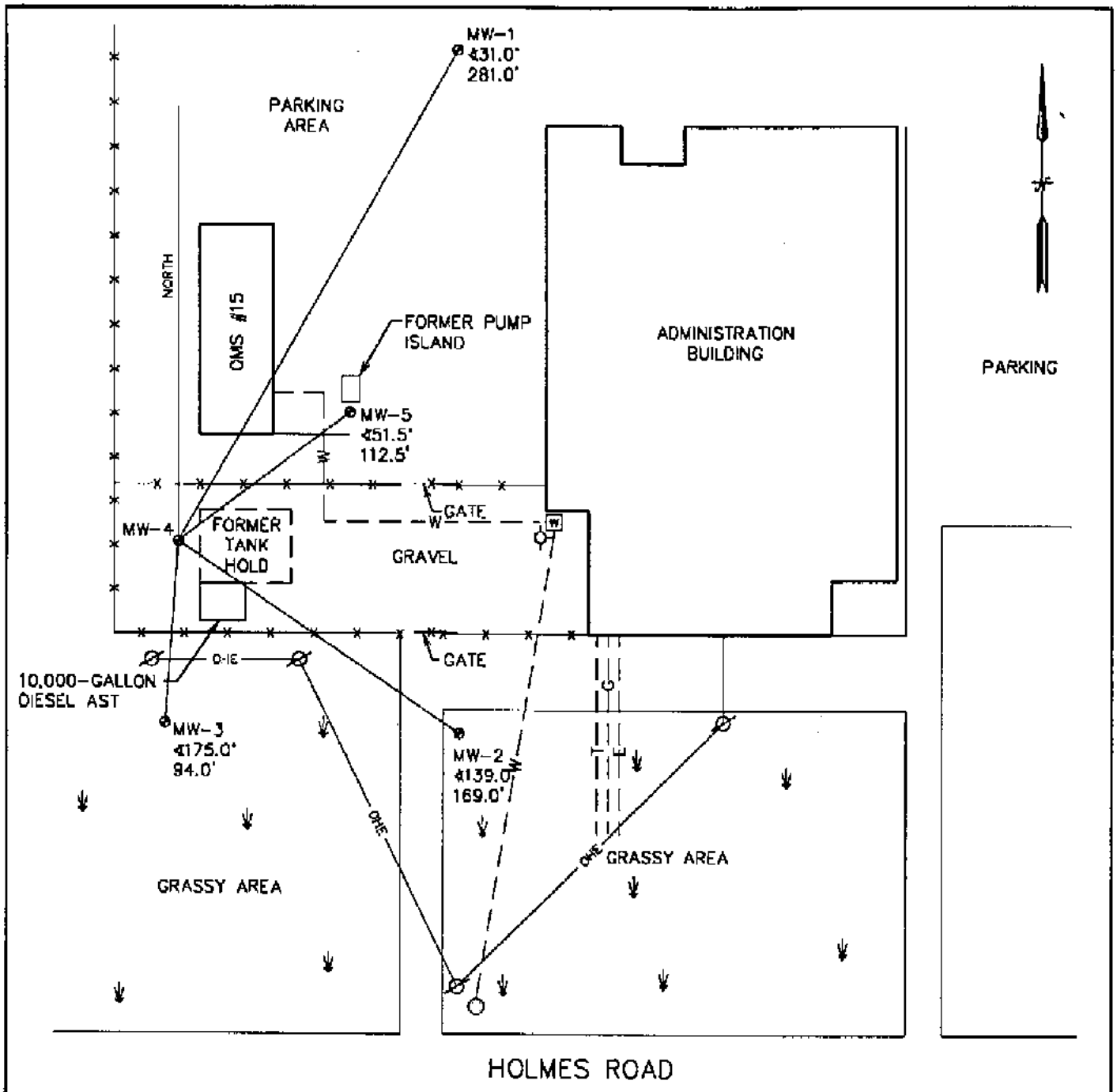
ATC



LEGEND

- MONITORING WELL LOCATION
- WATER METER
- FIRE HYDRANT
- POWER POLE
- OHE — OVERHEAD ELECTRIC LINE
- T — UNDERGROUND TELEPHONE LINE
- G — UNDERGROUND GAS LINE
- W — WATER LINE

0 40 80
SCALE IN FEET

MONITORING WELL LOCATION MAP

ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
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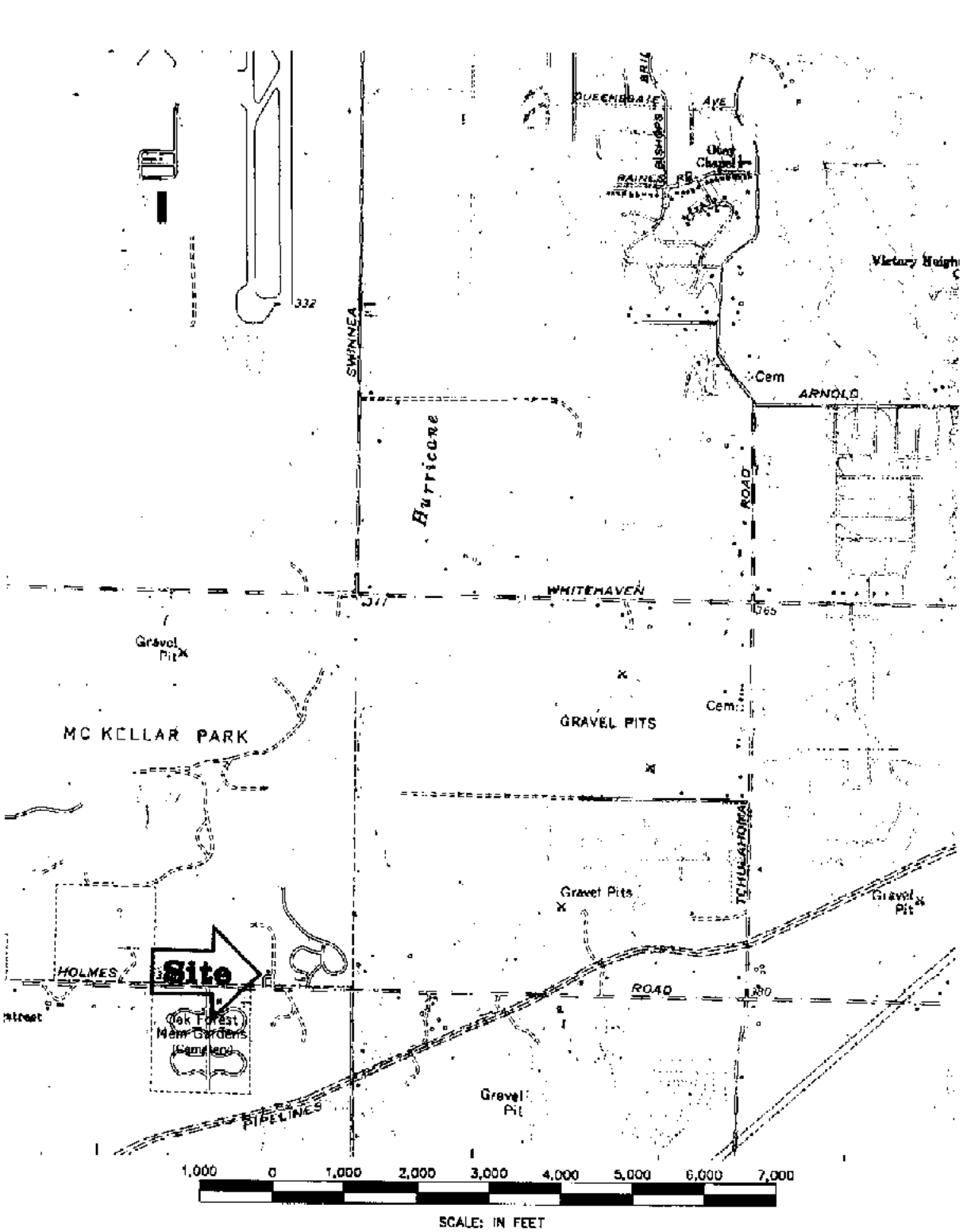
DRAWING FILE: 19950043\T-2\0043-3.DWG			REVISED BY:

ATC



SOURCE: SOUTHEAST MEMPHIS, TENNESSEE U.S.G.S. 7.5 MINUTE SERIES TOPOGRAPHIC QUADRANGLE DATED: 1965; PHOTOREVISED: 1983.

SITE LOCATION TOPOGRAPHIC MAP

NATIONAL GUARD ARMORY OMS #015
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
1995.0043	4		DRAWN BY: ALW 07-27-98
DRAWING FILE: 19950043\T-2\0043-4.DWG			REVISED BY:

ATC

building. A 10,000-gallon above ground storage tank (AST) which stores diesel fuel is located adjacent to the former tankhold. The remaining central and northern portion of the property serves as a parking area for various military vehicles. This parking area consists of a mixture of asphalt and gravel

An underground water line, telephone line, and electric line intersect the southwest corner of the Administration building and terminate at Holmes Road. An underground water line intersects the west central portion of the Administration building and terminates at the southeast corner of the OMS building. Overhead electric lines intersect the southwest and southeast portion of the site and terminate near the entrance to the site near Holmes Road. The location of the subsurface utilities are illustrated in Figure 2.

C. SOIL INVESTIGATION

ATC completed a subsurface investigation during the assessment of this site. The subsurface investigation was required to define the extent of hydrocarbon impact in soil and groundwater. During April 1998, monitoring wells MW-1 through MW-5 were installed onsite.

C.1 Geology

a) The National Guard Armory OMS #15 is located in the Gulf Coastal Plain Physiographic Province. This area is characterized by gently rolling topography formed by erosion, and includes alluvial, fluvial, and sedimentary units from the Tertiary and Quaternary age geologic formations. The area is covered by a blanket of loess sediments (clayey and sandy silt) which make up the present land surface in most areas of the Mississippi River flood plain. Underlying the loess blanket is a sequence of clastic sedimentary units that range from low energy environmental sand and gravels.

b) Published Geologic maps of the southeast Memphis Quadrangle, Tennessee, currently are not available. According to the Soil Conservation District Map for Shelby County, the site is located within the Memphis-Grenada-Loring Association.

This association is common throughout the Shelby County. It is characterized by nearly level to sloping, well drained and moderately well drained, silty soils on broad uplands. The soils in this association formed in silt deposits 5 to 30 feet deep.

Memphis soils are on the narrower ridge tops and steeper hillsides and are well drained. Memphis soils have a surface layer of brown silt loam and a subsoil of brown to reddish-brown silty clay loam or silt loam.

Grenada soils are commonly on nearly level ridgetops and sloping hillsides. They have a surface layer of brown silt loam, a subsoil of yellowish-brown silt loam, and a fragipan at a depth of 15 to 30 inches.

Loring soils are on ridgetops and hillsides and are moderately well drained. They have a surface layer of brown silt loam, a subsoil of brown to dark-brown silt loam or heavy silt loam, and a weak fragipan at a depth of 12 to 30 inches.

c) The soils penetrated during drilling at this site consisted of three recognizable sections which are in descending order: 1) silty clay, 2) gravel, and 3) poorly sorted sands.

The uppermost section consists of light brown to reddish brown silty clay to an average depth of 15.34 feet below land surface (bls). This uppermost unit ranges from soft to stiff and slightly moist. Groundwater saturation is present in this section at an average depth of 12.5 feet bls.

The second section consist of a poorly sorted gravel layer ranging from an average depth of 15.34 feet bls to 15.88 feet bls. This unit sometimes contains coarse sand.

The underlying section penetrated consists of a poorly sorted sand ranging from an average depth of 15.88 feet to the terminal depths of the borings. This section is brown to reddish-brown.

d) A bedrock contour map was not provided due to the absence of bedrock.

e) No dip and strike measurements were made due to the absence of bedrock.

C.2 Soil Boring Results

On site wells MW-1 through MW-5 were drilled by Tri-State Drilling Services using a truck mounted drill rig equipped with 8.25 inch outside diameter (O.D.) hollow stem augers. A 5.0 foot length split spoon sampler was used to collect soil samples from ground surface to the approximate total depth of each boring.

All soil samples retrieved during each phase of the investigation were logged by the onsite geologist. Standard boring logs for each boring are included as Appendix A.

The drilling rig, sampling tools, and all downhole equipment were decontaminated prior to each use with a high pressure steam cleaner. All drilling

and sampling activities were completed in accordance with TDUST Environmental Assessment Guidelines (EAG, 1996).

The EAG protocols for selecting soil samples for laboratory analysis were followed during all sampling activities. Upon opening the soil sampler, the sample was split and one portion was placed in a laboratory container and immediately stored on ice for possible analysis. The remaining portion of the sample was placed in a sealable plastic bag, for headspace screening, and allowed to volatilize for a minimum of fifteen minutes. The onsite geologist then used a Foxboro Organic Vapor Analyzer (OVA) Flame Ionization Detector (FID) to measure and record relative levels of volatile organics which were present in the headspace portion. A minimum of two samples were selected from most of the borings for laboratory analysis; the sample with the highest OVA-FID reading, and the sample collected at the point of initial contact with groundwater. Proper chain-of-custody procedures were followed during sample collection and handling activities.

C.3 Analytical Results

a) Soil samples collected during this investigation were submitted for analysis of benzene, toluene, ethyl-benzene, and xylenes (BTEX) with Methyl-tert-butyl ether (MTBE) by EPA method 5030/8020, and Total Petroleum Hydrocarbons - Gasoline Range Organics (TPH-GRO) and total Petroleum Hydrocarbons - Diesel Range Organics (TPH-DRO) by Tennessee standard method. Laboratory services were provided by Hygeia Laboratories, a subsidiary of ATC, located in Marietta, Georgia.

b) The soil sample analytical results are summarized in Table 1. The laboratory reports and corresponding chain-of-custody forms are included as Appendix B.

TABLE 1
Soil Analytical Summary
ARMY NATIONAL GUARD OMS # 15
TDUST Facility I.D. #0-790983

Boring Well	Interval Sampled (feet bls)	Date Sampled	Analytical Parameters							
			Benzene	Toluene	Xylenes	MTBE	Total BTX	TPH-GRO	TPH-DRO	Total TPH
Method Detection Limits			0.002	0.002	0.002	0.025	---	0.5	4.0	---
MW-1	8-10	4-7-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	6-8	4-7-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	6-8	4-7-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	8-10	4-7-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-3	5-7	4-6-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-3	10-12	4-6-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	3-5	4-6-98	ND	ND	ND	ND	ND	ND	5.0	5.0
MW-4	10-12	4-6-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-5	5-7	4-6-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-5	10-12	4-6-98	ND	ND	ND	ND	ND	ND	ND	ND

NOTES:
Results listed in parts-per-million (ppm)
Benzene clean-up level = 50 ppm
TPH clean-up level = 500 ppm
ND - None Detected
MW - Monitoring Well
Shaded areas exceed applicable clean-up levels

C.4 Soil Properties

a) Two shelby tubes were collected from boring SB-5 at intervals of 9-11 feet bls to 11-13 feet bls. The 11 to 13 foot bls sample was collected as the most permeable zone and the zone just above the water table. The 9 to 11 foot bls sample was collected as the second most permeable zone.

b) The samples were collected by direct-push shelby tube techniques. The soil boring was advanced to the top of a desired sample interval. A shelby

tube was then lowered into the boring, and an undisturbed soil sample was collected by pushing the shelby tube through the desired interval.

c) The shelby tube samples were tested in accordance with method 9100 of test methods for evaluating solid waste, Third Edition (SW-486) and in general accordance with ASTM D-5084. Fractional Organic Carbon was tested in accordance with ASTM D-2974-90 (Method C).

d) Tri-State Testing Services, Inc. In Memphis, Tennessee, performed the analysis.

e) Soil permeability data is summarized in Table 2.

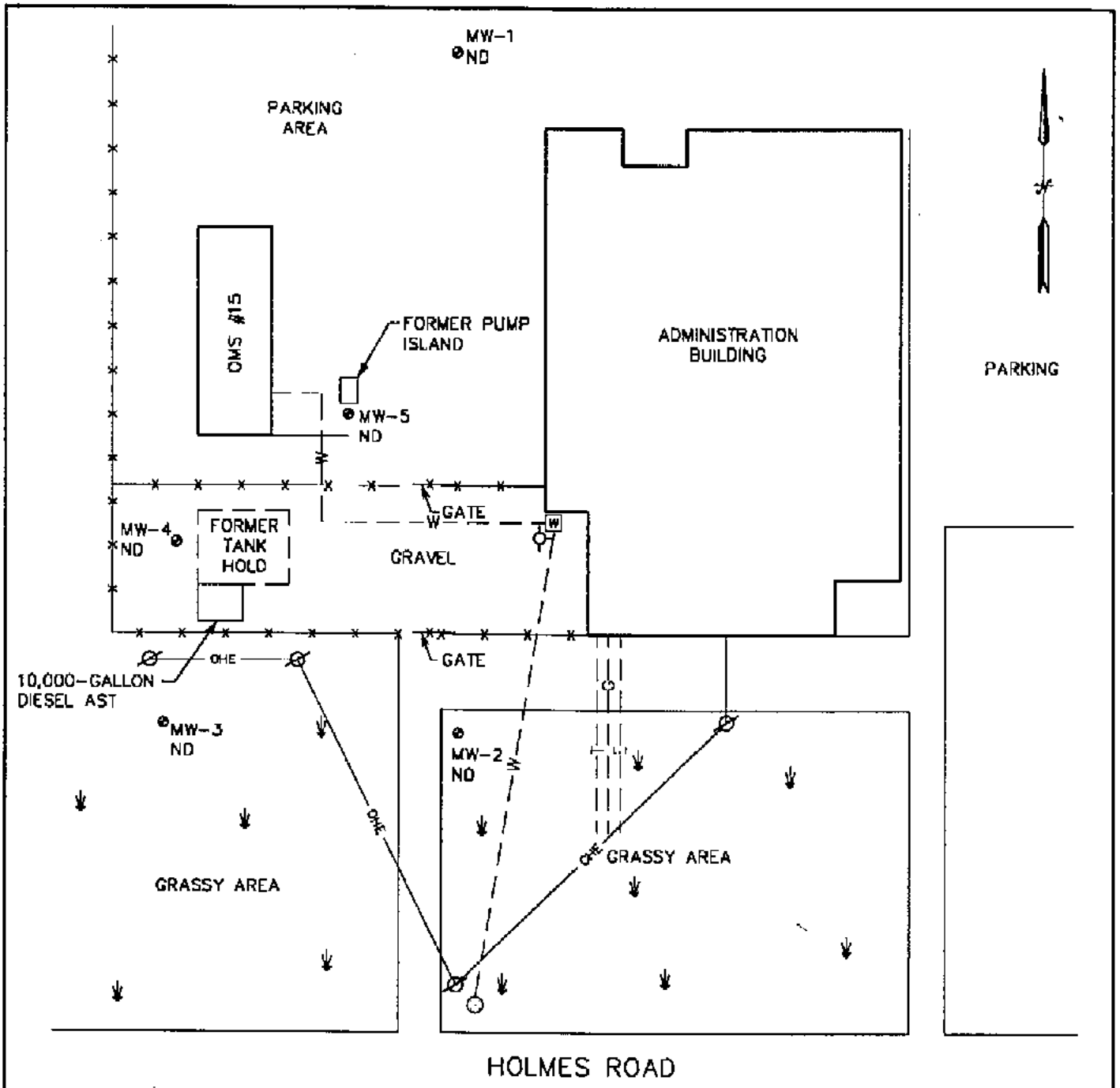
C.5 Soil Containment Plume Maps

Plume maps depicting the estimated lateral extent and concentrations of BTEX and TPH in soil beneath the site are included as Figures 5 and 6, respectively. BTEX and TPH-GRO concentrations were not detected in the immediate vicinity of monitoring wells MW-1 through MW-5. The highest concentrations of TPH-DRO are present within the immediate vicinity of monitoring well MW-5 adjacent to the former dispenser island. TPH-DRO concentrations were not detected in the vicinity of monitoring wells MW-1 through MW-4. The containment area of the plume and general plume morphology, indicate that plume migration is minimal. Soil analytical results indicate TPH levels below site action limits.

TABLE 2
Soil Properties Summary
NATIONAL GUARD ARMORY 0MS #15
TDUST Facility I.D. #0-790983

Boring Depth (bls) Zone		SB5A-1 9-11 Vadose Zone	SB5A-2 11-13 Capillary Fringe
Parameters	units		
Permeability	cm/sec	2.3 X 10^{-7}	4.1 X 10^{-6}
Volumetric Air Content	cm^3-air/cm^3-soil	0.017	0.012
Volumetric Water Content	cm^3-air/cm^3-soil	0.334	0.316
Total Soil Porosity	cm^3/cm^3-soil	0.351	0.328
Soil Bulk Density (wet)	g-soil/cm^3-soil	2.04	2.06
Fractional Organic Carbon	g-carbon/g-soil	0.009	0.009

f) Based on the most permeability sample of 4.1 X 10^{-6} and the groundwater classification of non-drinking water, the applicable clean-up levels were determined. The levels are 50 parts-per-million (ppm) benzene and 500 ppm TPH. Appendix C contains the soil properties report from Tri-State Testing Services, Inc.



LEGEND

- MONITORING WELL LOCATION
- WATER METER
- FIRE HYDRANT
- POWER POLE
- OHE — OVERHEAD ELECTRIC LINE
- T — UNDERGROUND TELEPHONE LINE
- OHE — UNDERGROUND GAS LINE
- W — WATER LINE

0 40 80
SCALE IN FEET

SOIL BTX PLUME MAP (04-06-98)

ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
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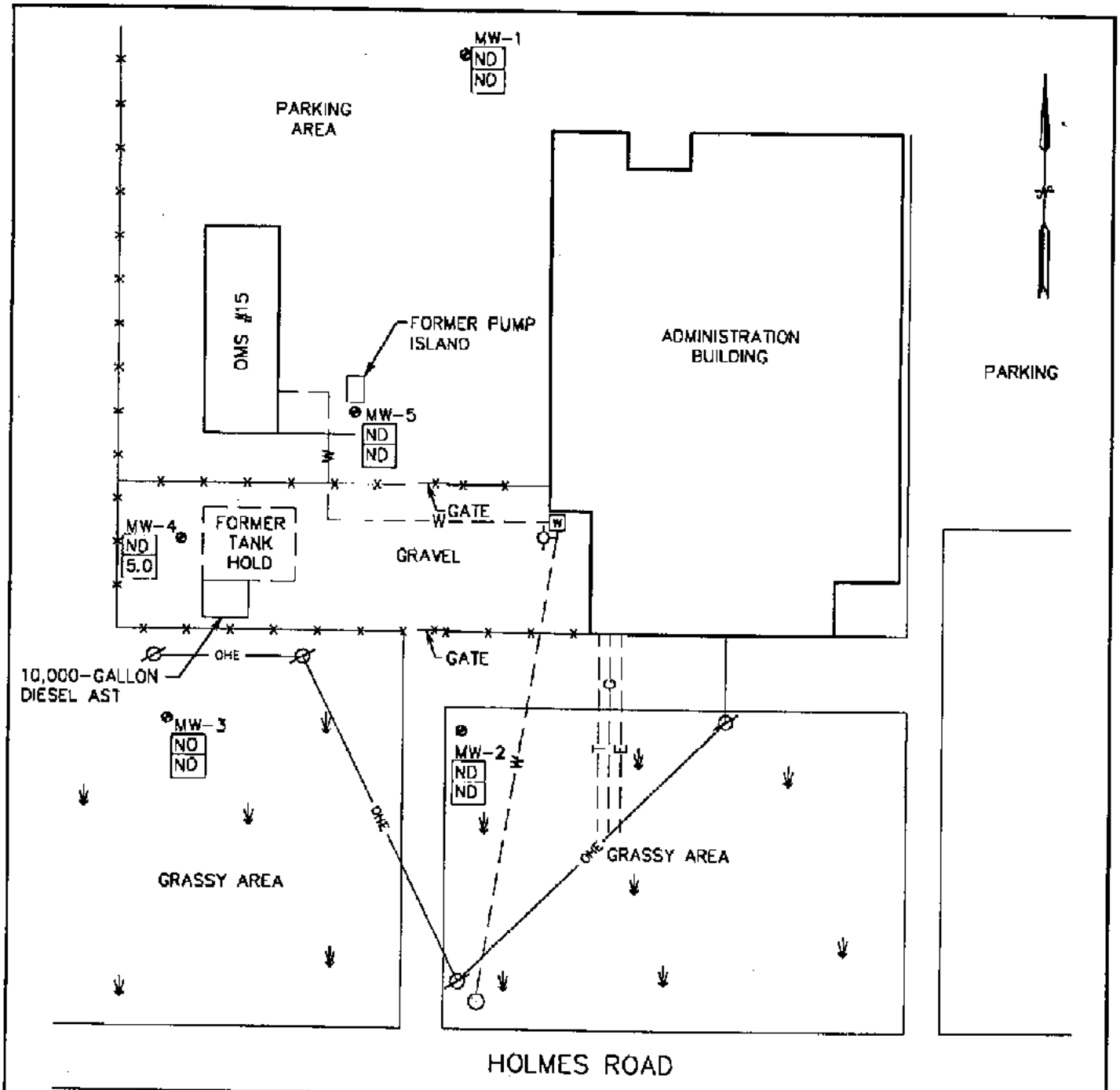
DRAWING FILE: 19950043\T-2\0043-5.DWG			REVISED BY:

ATC



LEGEND

- MONITORING WELL LOCATION
- WATER METER
- FIRE HYDRANT
- POWER POLE
- OHE — OVERHEAD ELECTRIC LINE
- T — UNDERGROUND TELEPHONE LINE
- OHE — UNDERGROUND GAS LINE
- W — WATER LINE
- GRO / DRO — TPH
- 0 40 80 — SCALE IN FEET

SOIL TPH PLUME MAP (04-06-98)

ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
1995.0043	6		DRAWN BY: ALW 07-27-98
DRAWING FILE: 19950043\T-2\0043-6.DWG			REVISED BY:

ATC

D. GROUNDWATER INVESTIGATION

Five groundwater monitoring wells, MW-1 through MW-5, were installed during the investigation phase during April 1998, to assess conditions in the vicinity of and laterally from the suspected point of hydrocarbons release. Monitoring well MW-1 was located in an inferred upgradient position. Wells MW-2 and MW-3 were located in inferred downgradient and lateral directions. MW-4 was installed adjacent to the suspected point of release. MW-5 was installed adjacent to the former pump island.

Laboratory analysis of groundwater samples collected from groundwater monitoring wells MW-1 through MW-5 indicated that the groundwater contaminate plume had been adequately defined and that groundwater beneath the site had not been impacted. Analytical results indicated that BTEX, TPH-GRO, and TPH-DRO parameters were not detected in monitoring wells MW-1 through MW-5.

D.1 Hydrogeology

a) Saturated conditions occur at an average depth of approximately 12.5 feet bls within the underlying silty clays. The inferred direction of groundwater flow is westerly. Primary aquifer recharge is believed to be from associated tributaries of Hurricane Creek, McKellar Lake, and from infiltrating meteoric water. Preferential pathways for infiltrating water were not identified.

b) Free product was not observed during the site investigation.

c) Historic water levels measured at the site area summarized in Table 3.

d) Potentiometric maps for water levels measured in April 24, 1998, and June 11, 1998, are illustrated in Figures 7 and 8 respectively. The inferred direction of groundwater flow April 24 and June 11, 1998, was westerly.

e) The hydraulic gradient (i) is defined as the loss of head (dh) over the linear distance (dl) dh/dl = di. The hydraulic gradient (i) was an average determined between wells MW-2 and MW-3 from the potentiometric data collected from April 24, 1998, and between wells MW-2 and MW-4 from the Potentiometric data collected from June 11, 1998.

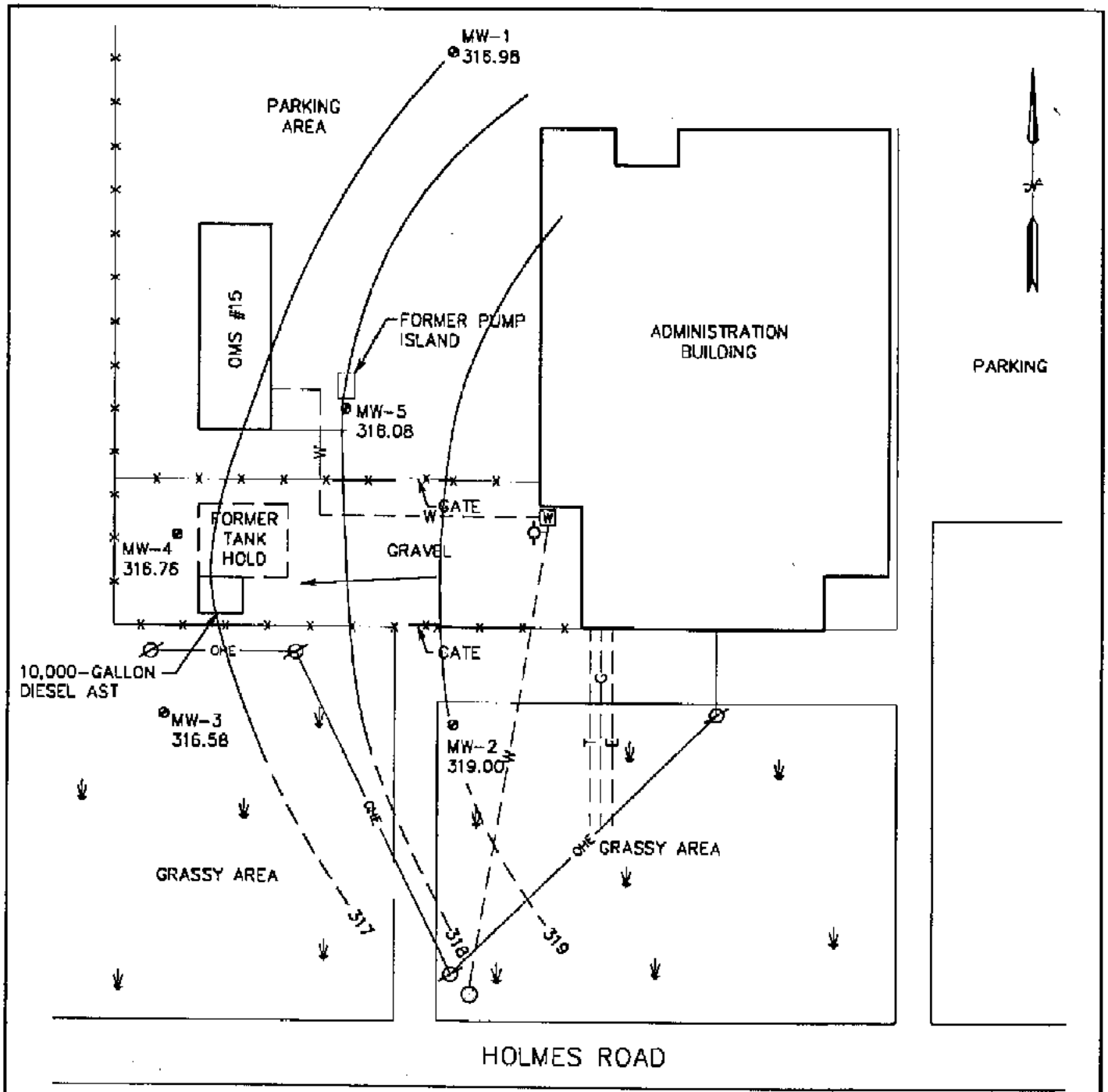
4/24/98	6/11/98
319.998 (MW-2 static elevation)	319.00 (MW-2 static elevation)
-318.60 (MW-3 static elevation)	-316.76 (MW-4 static elevation)
1.39 (dh)	2.24(dh)
dh = 1.39 ft	dh = 2.24 ft
dl = 150 ft	dl = 172.5 ft
$i = 9.26 \times 10^{-3}$	$i = 1.29 \times 10^{-2}$

Average hydraulic gradient, (i_{avg}) $= (9.26 \times 10^{-3} + 1.29 \times 10^{-2}) / 2$
$= 1.11 \times 10^{-2}$

TABLE 3
Water Level Data Summary
NATIONAL GUARD ARMORY OMS #15
TDUST Facility I.D. #0-790983

Well	Well Depth	TOC Elevation	Date Measured	Depth from TOC to Free Product	Depth from TOC to Water	Thickness of Free Product	Potentiometric Surface Elevation	Adjusted Potentiometric Surface Elevation
MW-1	17.68	324.07	4-23-98	NP	6.04	NP	318.03	318.03
MW-1	17.68	324.07	6-11-98	NP	7.09	NP	316.98	316.98
MW-2	17.77	323.40	4-23-98	NP	3.41	NP	319.99	319.99
MW-2	17.77	323.40	6-11-98	NP	4.40	NP	319.00	319.00
MW-3	17.45	321.18	4-23-98	NP	2.58	NP	318.60	318.60
MW-3	17.45	321.18	6-11-98	NP	4.60	NP	316.58	316.58
MW-4	17.09	321.82	4-23-98	NP	3.98	NP	317.84	317.84
MW-4	17.09	321.82	6-11-98	NP	5.06	NP	316.76	316.76
MW-5	17.52	322.77	4-23-98	NP	3.29	NP	319.48	319.48
MW-5	17.52	322.77	6-11-98	NP	4.69	NP	318.08	318.08

NOTES:
All measurements in feet
NP= No product encountered



LEGEND

- MONITORING WELL LOCATION
- WATER METER
- FIRE HYDRANT
- POWER POLE
- OHE — OVERHEAD ELECTRIC LINE
- T — UNDERGROUND TELEPHONE LINE
- OHE — UNDERGROUND GAS LINE
- W — WATER LINE
- GROUNDWATER FLOW DIRECTION

0 40 80
SCALE IN FEET

POTENTIOMETRIC SURFACE MAP (06-11-98)
ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
1995.0043	8		DRAWN BY: ALW 07-27-98
DRAWING FILE: 19950043\T-2\0043-8.DWG			REVISED BY:

ATC

f) Using Darcy's Law, the apparent groundwater velocity (v) in centimeters per second (cm/sec) is the hydraulic conductivity (K) times the hydraulic gradient (I) divided by the efficient porosity (Ne).

$$V = \frac{K(i)}{Ne}$$

A 20 percent porosity was used in the equation. Using a published hydraulic conductivity for clayey sands of 1.0×10^{-3} cm/sec, and the hydraulic gradient of 1.11×10^{-2}, the groundwater velocity is calculated as:

$$\frac{.001 \text{ cm/sec } (.011) \text{ ft/ft}}{0.20}$$

$\approx 5.5 \times 10^{-5}$ cm/sec

Converted to a yearly rate, the anticipated groundwater flow based on the above calculation is approximately 1,734.48 cm/yr.

D.2 Monitor Well Construction

a) Drilling activities for groundwater monitoring wells MW-1 through MW-5 were completed by Tri-State Testing Services using a mobile rig equipped with 8.25 inch outside diameter (O.D.) hollow-stem auger. Soil samples were collected during drilling operations with a 5.0 foot length split spoon sampler.

Monitor wells MW-1 through MW-5 were constructed of 2-inch diameter schedule 40 flush threaded PVC riser and 0.010 inch slot well screen. The screen section of the well was positioned to extend approximately 5 feet below the saturation zone and approximately 5 feet above.

A filter pack of 10-20 silica sand was then tremied into the well annulus to a point approximately two feet above the top of the well screen. A bentonite pellet seal approximately two feet thick as then positioned above the filter pack and hydrated with clean water. Cement/bentonite grout was then placed in the well annulus above the bentonite seal to within approximately one-half foot of the ground surface. Each well was completed at the surface with locking water-tight expansion caps and a load bearing manhole set flush in a concrete pad.

b) Standard Drilling Logs are located in Appendix A.

c) Well Construction Material usage is summarized in Table 4.

TABLE 4
Well Construction Usage Summary
NATIONAL GUARD ARMORY OMS #15
DUST Facility I.D. #0-790983

Well	Fill Sand (lbs)		Bentonite (lbs)		Grout (gal)		Concrete
	Estimate	Used	Estimate	Used	Estimate	Used	Used (lbs)
MW-1	312.5	300	46	50	6.4	7.0	160
MW-2	312.5	300	46	50	6.4	7.0	160
MW-3	312.5	287.5	46	50	8.4	9.0	160
MW-4	312.5	300	46	50	8.2	8.0	160
MW-5	312.5	287.5	46	50	7.9	8.0	160

NOTES:
* More grout required due to uneven annulus.

D.3 Well Development

Upon Completion of well installation activities, the wells were developed by removing water with a disposable bailer. Each well was bailed until relatively clear of sediment. Although relatively clear of visible sediment, the development water retained a reddish-brown color that is believed to be due to the high iron content of the host sediments. No odors were detected from wells MW-1 through MW-5.

D.4 Monitoring Well Sampling

Prior to sample collection, each monitoring well was opened, water was allowed to reach static levels, and the resulting depth to water was measured and recorded.

This information was then used to calculate the standing well volume, and a minimum of three well volumes were purged from the well prior to sampling.

Groundwater samples were collected with single-use disposable bailers and new nylon string. Upon retrieval, the samples were placed in the appropriate laboratory sample containers, labeled, and placed on ice until delivery to the laboratory. Proper chain-of-custody procedures were followed during all sample collection and handling activities. Laboratory services were provided by Hygeia Laboratory of Marietta, Georgia. The groundwater samples were analyzed for BTEX, MTBE, TPH-GRO, and TPH-DRO.

D.5 Analytical Results

a) Historical analytical results for groundwater samples collected at this site are summarized in Table 5. Benzene, TPH-GRO, and TPH-DRO were not detected for MW-1 through MW-5.

b) Groundwater Analytical Reports are located in Appendix D.

TABLE 5
Groundwater Analytical Summary
NATIONAL GUARD ARMORY OMS #15
DUST Facility I.D. #0-790983

Well Boring	Date Sampled	Analytical Parameters						
		Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE	TPH-GRO	TPH-DRO
Method Detection Limit		0.0004	0.0004	0.0004	0.0004	0.005	0.1	0.1
MW-1	4-24-98	ND	ND	ND	ND	ND	ND	ND
MW-2	4-24-98	ND	0.0045	ND	0.0006	ND	ND	ND
MW-3	4-24-98	ND	ND	ND	ND	ND	ND	ND
MW-4	4-24-98	ND	ND	ND	ND	ND	ND	ND
MW-5	4-24-98	ND	ND	ND	ND	ND	ND	ND

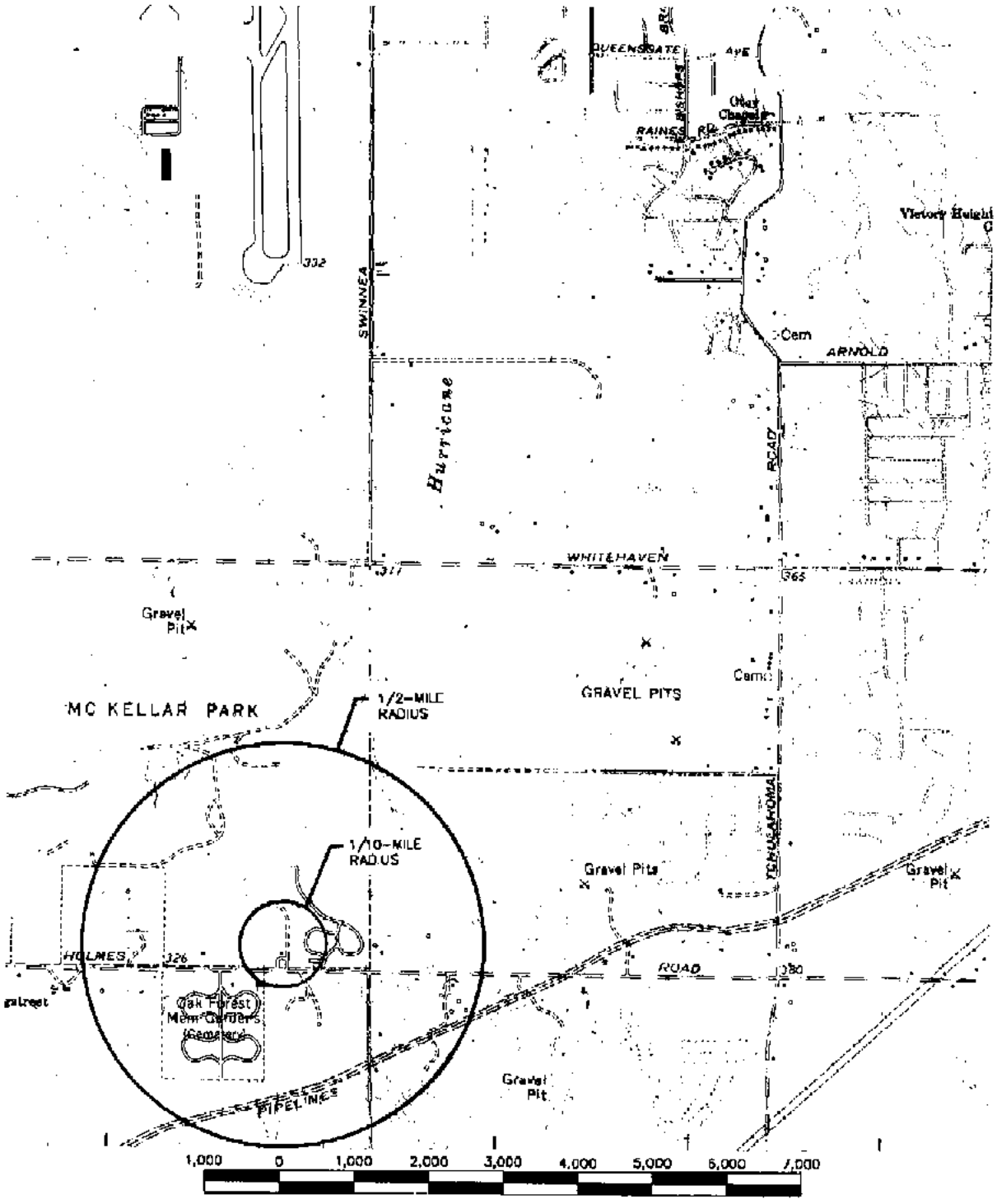
NOTES:
All results listed in parts-per-million (ppm)
Applicable benzene clean-up level = 0.07
Applicable TPH clean-up level = 1.0 ppm
Shaded areas exceed applicable clean-up levels

D.6 Groundwater Classification Procedure

a) Data from the water use survey.

i. The location of wells and springs is illustrated in Figure 9.

ii. No drinking water supplies were identified within a one-half mile radius of the site.



SOURCE: SOUTHEAST MEMPHIS, TENNESSEE U.S.G.S. 7.5 MINUTE SERIES TOPOGRAPHIC QUADRANGLE DATED: 1965; PHOTOREVISED: 1983.

DRINKING WATER WELL LOCATION MAP

ARMY NATIONAL GUARD – OMS #015
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
1995.0043	9		DRAWN BY: ALW 07 27 98
DRAWING FILE: 19950043\T-2\0043-9.DWG			REVISED BY:

VATC

iii - iv. Completed water use survey forms for all water supplies (wells and springs) identified within a one-half mile radius of the tank hold are located in Appendix E.

v. ATC personnel conducted a reconnaissance of the vicinity and located no private, domestic, or commercial drinking water wells. Drinking water supplies for the site and vicinity are publicly provided by the Memphis Light, Gas, and Water Utility Department.

A water well database printout was obtained from the Tennessee Division of Water Supply. Based on recorded latitudes and longitudes, there are two drinking water production wells within an approximate one-half mile radius of the site. These drinking water wells include the Haisch residence located approximately three-tenths of a mile west of the site and the Anderson residence located approximately four-tenths of a mile east of the site. However, these residences have been abandoned due to the southward expansion of the Memphis International Airport. Therefore, a "non-drinking water" classification is applicable.

vi. No alternative water supplies or systems are required.

b) Data from Analytical Sampling

Since a drinking water supply was not located within a one-half mile of the site, no analytical sampling was performed.

c) Data from the Pump Test

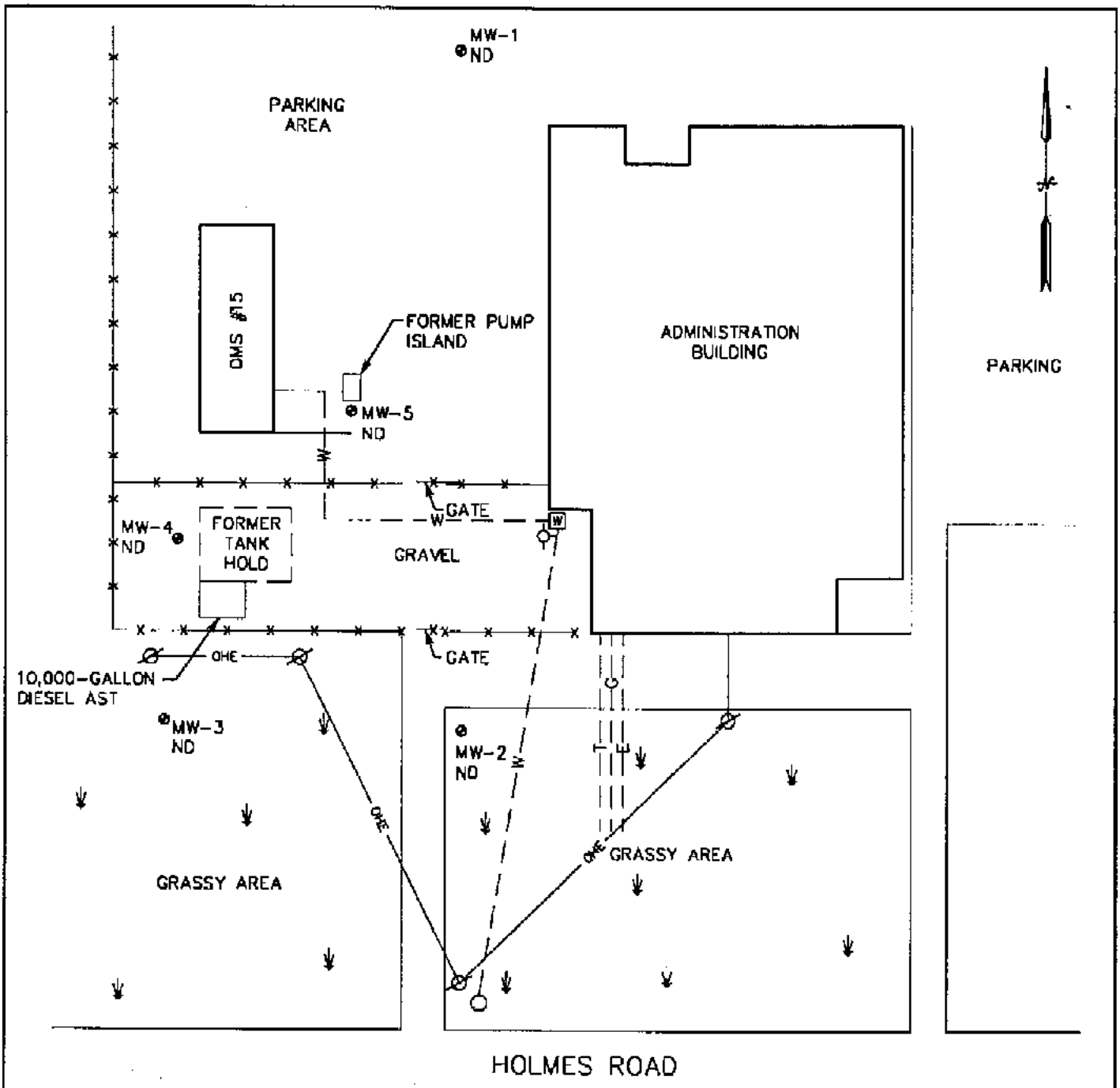
Pump tests were not conducted during the investigation of this site.

d) Applicable Clean-up Levels

The data collected during the investigation indicates that a "non-drinking water" status is appropriate for the study aquifer. ATC recommends that groundwater clean-up levels of 0.07 ppm benzene and 1.0 TPH be applied for interpretation of the site data.

D.7 Groundwater Containment Plume Maps

Benzene, TPH-GRO, and TPH-DRO groundwater plume maps are depicted in Figures 10 and 11, respectively. Analytical results for all parameters indicate no detectable levels of hydrocarbons in the groundwater. Topography for the site slopes toward the west and north.



LEGEND

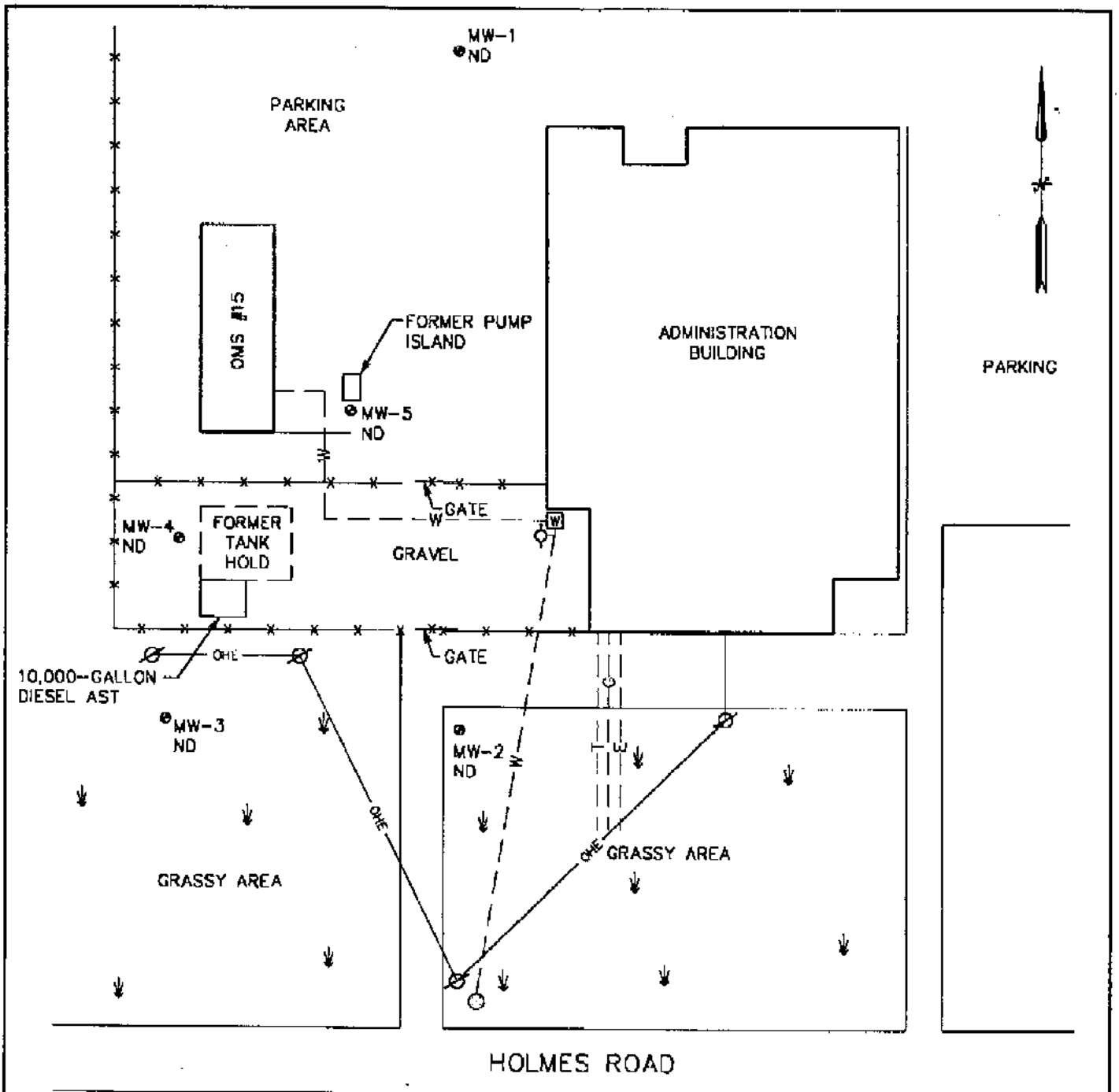
- MONITORING WELL LOCATION
- WATER METER
- FIRE HYDRANT
- POWER POLE
- OHE — OVERHEAD ELECTRIC LINE
- T — UNDERGROUND TELEPHONE LINE
- OHE — UNDERGROUND GAS LINE
- W — WATER LINE

0 40 80
SCALE IN FEET

BENZENE CONTAMINATION PLUME MAP (04-24-98)
ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #D-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
1995.0043	10		DRAWN BY: ALW 07-27-98
DRAWING FILE: 19950043\T-2\0043-10.DWG			REVISED BY:

ATC



LEGEND

- MONITORING WELL LOCATION
- WATER METER
- FIRE HYDRANT
- POWER POLE
- OHE — OVERHEAD ELECTRIC LINE
- T — UNDERGROUND TELEPHONE LINE
- GAS — UNDERGROUND GAS LINE
- W — WATER LINE

0 40 80
SCALE IN FEET

TPH CONTAMINATION PLUME MAP (04-24-98)
ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
1995.0043	11		DRAWN BY: ALW 07-27-98
DRAWING FILE: 19950043\T-2\0043-11.DWG			REVISED BY:

ATC

E. SITE RANKING

Appendix G contains the completed Site Ranking Form. The score for the site was 138.

F. PROPOSED ADDITIONAL MONITORING WELLS

No additional monitoring wells are warranted.

G. ASSESSMENT ACTIVITIES COST

Appendix H contains the completed cost forms for this investigation.

H. SIGNATURE PAGE

I certify under penalty of law, including but not limited to penalties for perjury, that the information contained in this report and on any attachments, is true, accurate and complete to the best of my knowledge, in formation, and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional violations.

STATE OF TENNESSEE

Steven L. Westerman — Signature: [signature] — Date: 8/5/98

Owner/Operator (Print)

STATE OF TENNESSEE

Sworn to and subscribed before me by Steven L. Westerman on this date

________________,

My commission expires __________

____

Notary Public - Print Name

____

Signature

John W. Hargraves — Signature: [signature] — Date: 07-30-98

P.E. or P.G. (Print)

4116

TN Lic./Reg. #

STATE OF TENNESSEE

Sworn to and subscribed before me by John W. Hargraves on this date

7/30/98,

My commission expires My Commission Expires MAY 28, 2000

Marcie A. Allen

Notary Public - Print Name

[signature]

Signature

----- ‡ -----

APPENDIX A

STANDARD BORING LOGS

------- ‡ -------

FACILITY NAME: Army National Guard OMS #15

TN FAC. ID#: 0-790983

WELL# B/or BORING: MW1 — # 1

PROJECT #: 495.0043

LOCATION MAP: OMS #15 ⊕ MW 1 — N — Building — Holmes Rd

START DATE & TIME: 4-7-98 1003

COMP. DATE & TIME: 4-7-98 1047

LOGGED BY: James McCabe — TN LIC#: 0534

DRILLER: Joe TRI-STATE

DRILLING METHOD: 4¼" ID HSA

ELEV (MSL): — T.D. (BGL):

COMMENTS:

Standard Boring Log

State of Tennessee
Underground Storage Tank Division
Department of Environment and Conservation

BOREHOLE DIAMETER: 8"

Completion diagram notes: grout; 2" PVC riser; bentonite; coarse sd; 2" PVC screen 0.01; 17.9

DEPTH	OVD	TYPE	DESCRIPTION (Color, Texture, Structure, etc.)
0	42	CS	CS gravels
			Slty Cl, Lt. Brn, Soft to Med Stiff, saturated, organics
2.9	2.9	CS	Slty Cl, Lt Brn, med stiff to stiff, saturated, Sd, v. fine grained, Fe staining, root holes
7.9	1.9	CS	Slty Cl, Sdy, Rdsh Brn, Stiff, saturated, poorly sorted Sds, rounded to sub-rounded
12.9	3.6	CS	Slty sdy Cl, Rdsh Brn, stiff, water, poorly sorted Sds, sub-rounded
16.9			~~Pebbles and Sd (coarse)~~ Sd, Rdsh Brn, poorly sorted
17.9			BOH 17.9

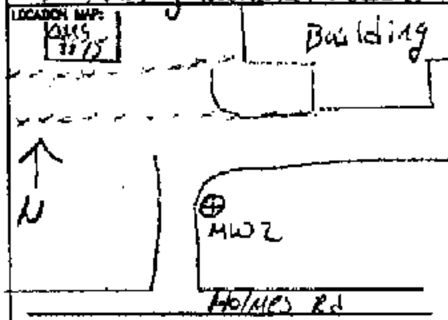
Depth scale: 0, 5, 10, 15, 20, 25, 30

FACILITY NAME: Army National Guard OMS # 15	TN FAC. ID#: 0-790983 — WELL/BORING: MW2
START DATE & TIME: 4-7-98 0842	PROJECT #: 1995.0045
COMP. DATE & TIME: 4-7-98 0940	
LOGGED BY: James McCabe — TN LIC#: 0034	
DRILLER: Joe TRI-STATE	
DRILLING METHOD: 4¼" ID HSA	
ELEV (MSL): — T.D. (MSL):	
COMMENTS:	

Standard Boring Log

State of Tennessee
Underground Storage Tank Division
Department of Environment and Conservation

LOCATION MAP:

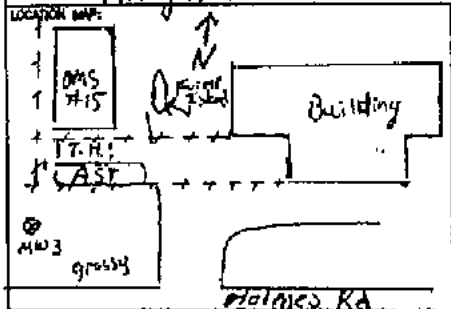


MSL	COMPLETION DIAGRAM (BOREHOLE DIAMETER: 8")	WATER LEVEL	PENETRATION RATE	DEPTH	GRAPHIC LITHOLOGY	REC	SAMPLES & CORES: TYPE	ANAL	DESCRIPTION (Color, Texture, Structure, etc.)
	grout; 2" PVC Riser			0–2.9		1.3	CS	PID	Slty Clay, Lt Rdsh Brn, some greyish mix, v. moist, stiff, organics (roots), blocky
	Bentonite			2.9		1.2		PID	Slty Cl, Rdsh Brn, v. moist, organics, blocky, stiff
				5		1.3	CS	BTX GRO DRO	Slty Clay, greyish, v. moist, stiff, Fe staining, root holes
	coarse sd	▽		7.9–10		2.2	CS	PID BTX GRO DRO	Slty Cl, greyish, stiff, v. moist to saturated, Sd, fine grained, Fe staining. water
	2" PVC Screen 0.01	▽		12.9–15		2.0	CS	PID	Slty Clay, greyish, Sdy, poorly sorted
				16.3					Pebbles & Sd
				16.6					Sd, Rdsh Brn, poorly sorted
17.9				17.9					BOH 17.9
				20					
				25					
				30					

FACILITY NAME: Army National Guard OMS #15

TN FAC. ID#: 0-790983 | WELL #/ REFERENCE: MW3 | PAGE 1

LOCATION MAP:



START DATE & TIME: 4-6-98 1245

COMP. DATE & TIME: 4-6-98 1341

LOGGED BY: James McGee TN LIC#: 0534

DRILLER: Joe TRI-STATE

DRILLING METHOD: 4¼" I.D. HSA

ELEV (MSL): T.D. (MSL):

COMMENTS:

PROJECT #: 1995.0043

Standard Boring Log

State of Tennessee
Underground Storage Tank Division
Department of Environment and Conservation

MSL	COMPLETION DIAGRAM (BOREHOLE DIAMETER: 8")	WATER LEVELS	PENETRATION RATE	DEPTH	GRAPHIC LITHOLOGY	SOIL CLASS	SAMPLES & CORES: TYPE	SAMPLES & CORES: NO./REC.	SAMPLES & CORES: ANAL.	DESCRIPTION (Color, Texture, Structure, etc.)
				0						
				2						
				2.8						
				3		3.4	CS			Fill Clay Brn/RdshBrn Silty clay, d Brn, stiff, moist, very organic (roots)
				4.0						
5.8				4.5		5.4	CS			Silty Cl, Brn, organics (roots) stiff to med stiff, d moist
5.8				6						
				7		8.4	CS			Silty Clay, greyish, med stiff, d moist, Sd, Fine grained, Fe staining
7.8				7.8						
				10		5.2	CS			Silty Clay, Sdy, Brn/ greysh mix, Fine to med. grain sd, san pebbles, Fe staining
				12		3.2				Silty Clay, greysh, stiff so. pebbles, rounded, Sd, poorly sorted
				12.8						
				13		3.8				Pebbles
				13.8						
				15			CS			Sand, poorly sorted Rdsh, rounded to sub-Rounded, coarse
				17		7.0				
17.8				17.8						
				18						
				20						

BOH 17.8'

FACILITY NAME: Army National Guard OMS #15

TN FAC. ID#: 0-790983

WELL# b/o BORING: MW04 #1

PROJECT #: 1995.0043

Standard Boring Log

State of Tennessee
Underground Storage Tank Division
Department of Environment and Conservation

START DATE & TIME: 4-6-98 1007

COMP. DATE & TIME: 4-6-98 1145

LOGGED BY: James McCabe TN LIC#: 0534

DRILLER: Joe TRI-STATE

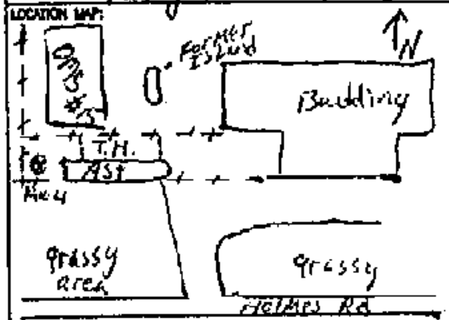
DRILLING METHOD: 4¼" ID HSA

ELEV (MSL):

T.D. (MSL):

COMMENTS:

LOCATION MAP:



COMPLETION DIAGRAM — BOREHOLE DIAMETER: 8"

Completion diagram notes: grout; bentonite; 2" PVC Riser; coarse Sd; 2" PVC Screen 0.01

MSL: 17.1

DEPTH	OVD	TYPE	DESCRIPTION (Color, Texture, Structure, etc.)
0–2	120	CS	Fill, Brn Cl
2–2.7	118	CS	Silty Cl, grsh, stiff, organic, Fine Sd
2.7–7.7	112		Silty Clay, greyish, organics (roots), Fine Sd saturated to wet
7.7–12.7	3.8		greyish silty Clay to Sd (10') very coarse, wet, staining esp in the sands, water
12.7–14	5.8		dark greyish silty Cl, Sd and pebbles, rounded, poorly sorted
14			Large Pebbles
14–17.7	10.4		Sd, Coarse grained, rounded to sub-rounded, water
17.7			BOH 17.7

FACILITY NAME: Army National Guard OMS #15

TN FAC. ID#: 0-790483 WELL #/BORING #: MW5 2 of 2

PROJECT #: 1995.0043

START DATE & TIME: 4-6-98 0900

COMP. DATE & TIME: 4-6-98 1008

LOGGED BY: James McCabe TN LIC#: 0534

DRILLER: Joe TRI-STATE

DRILLING METHOD: 4¼" ID HSA

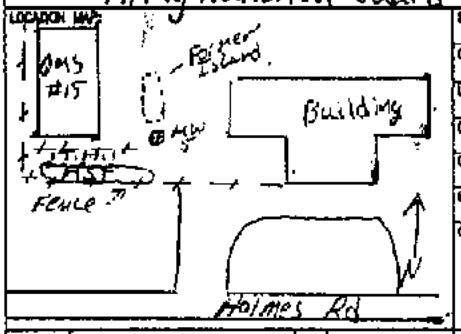
ELEV (MSL): T.D. (MSL):

COMMENTS:

Standard Boring Log

State of Tennessee
Underground Storage Tank Division
Department of Environment and Conservation

LOCATION MAP:



WELL	COMPLETION DIAGRAM (BOREHOLE DIAMETER: 8")	WATER LEVEL	PENETRATION RATE	DEPTH	GRAPHIC LITHOLOGY	PID	SAMPLES & CORES: TYPE	SAMPLES & CORES: NO./REC.	SAMPLES & CORES: ANAL.	DESCRIPTION (Color, Texture, Structure, etc.)
				0						asphalt
										G.S. gravels
	grout					2.0	CS		GVA	Silty Clay, Lt Rdsh Brn/Brn Mix, Saturated, blk nodules, Fe staining, organics, blocky
	bentonite			2.8		2.0			GVA	Silty Clay, Lt Rdsh Brn, Saturated, Sd, Fine grained, Fe staining and concretions (upper 2'), blocky
				5			CS			
						4.2			GVA BTK GRY ORG	
				7.8						Slty Sdy Cl, Lt Rdsh Brn, soft, Fine grained Sd, Sl Staining, wtr
	coarse Sd			10		4.6	CS		BTK GRY ORG	
										Sdy Cl w/ Sd, greyish, fine grained
	2" PVC Screen 0.01			12.8		2.8			GVA	Sandy Clay, Rdsh Brn, Med stiff, wet, Pebbles
				15			CS			
				17		4.0				Large Pebbles w/ Sd
17.8				17.8						Sd, med to coarse grained, rounded to sub-rounded, wtr
				20						BOH 17.8'
				25						
				30						

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APPENDIX B

SOIL ANALYTICAL REPORT

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HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

CLIENT: ATC Associates Inc. - Nashville, TN

ATTENTION: James McCabe

CLIENT PROJECT #: 1995.0043 - OMS # 15; Fac. I.D. # 0-790983

CLIENT I.D. #: 10-67-11887

LAB PROJECT #: 23317 DATE SAMPLED: 04/06/98

MATRIX: Soil DATE SAMPLE RECEIVED: 04/08/98

METHOD: SW-846 8020 (BTEX) DATE SAMPLE ANALYZED: 04/10/98

UNITS: mg/kg (ppm) DATE REPORT: 04/17/98

PARAMETER	EQL	SAMPLE I.D. LAB:	182525	182526	182527
		STATION:	MW 5 09:24	MW 5 09:32	MW 4 10:17
Benzene	0.002		ND	ND	ND
Toluene	0.002		ND	ND	ND
Ethylbenzene	0.002		ND	ND	ND
Total Xylenes	0.002		ND	ND	ND
MTBE	0.024		ND	ND	ND
Surrogate Recoveries %					
Fluorobenzene			100	104	102

ND-None Detected

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

Reviewed by: JW

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

CLIENT: ATC Associates Inc. - Nashville, TN

ATTENTION: James McCabe

CLIENT PROJECT #: 1995.0043 - OMS # 15; Fac. I.D. # 0-790983

CLIENT I.D. #: 10-67-11887

LAB PROJECT #: 23317 DATE SAMPLED: 04/06/98

MATRIX: Soil DATE SAMPLE RECEIVED: 04/08/98

METHOD: SW-846 8020 (BTEX) DATE SAMPLE ANALYZED: 04/10/98

UNITS: mg/kg (ppm) DATE REPORT: 04/17/98

PARAMETER	EQL	SAMPLE I.D. LAB:	182528	182529	182530
		STATION:	MW 4 10:24	MW 3 13:01	MW 3 13:10
Benzene	0.002		ND	ND	ND
Toluene	0.002		ND	ND	ND
Ethylbenzene	0.002		ND	ND	ND
Total Xylenes	0.002		ND	ND	ND
MTBE	0.024		ND	ND	ND
Surrogate Recoveries %					
Fluorobenzene			103	101	101

ND-None Detected

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

Reviewed by: gvb

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

CLIENT: ATC Associates Inc. - Nashville, TN

ATTENTION: James McCabe

CLIENT PROJECT #: 1995.0043 - OMS # 15; Fac. I.D. # 0-790983

CLIENT I.D. #: 10-67-11887

LAB PROJECT #: 23317 DATE SAMPLED: 04/06-07/98

MATRIX: Soil DATE SAMPLE RECEIVED: 04/08/98

METHOD: SW-846 8020 (BTEX) DATE SAMPLE ANALYZED: 04/10-13/98

UNITS: mg/kg (ppm) DATE REPORT: 04/17/98

PARAMETER	EQL	SAMPLE I.D. LAB:	182531	182532	182533
		STATION:	MW 2 09:00	MW 2 09:07	MW 1 10:15
Benzene	0.002		ND	ND	ND
Toluene	0.002		ND	ND	ND
Ethylbenzene	0.002		ND	ND	ND
Total Xylenes	0.002		ND	ND	ND
MTBE	0.024		ND	ND	ND
Surrogate Recoveries %					
Fluorobenzene			103	97	98

ND-None Detected

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

Reviewed by: gpd.

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

CLIENT: ATC Associates Inc. - Nashville, TN

ATTENTION: James McCabe

CLIENT PROJECT #: 1995.0043 - OMS # 15; Fac. I.D. # 0-790983

CLIENT I.D. #: 10-67-11887

LAB PROJECT #: 23317 DATE SAMPLED: 04/07/98

MATRIX: Soil DATE SAMPLE RECEIVED: 04/08/98

METHOD: SW-846 8020 (BTEX) DATE SAMPLE ANALYZED: 04/13/98

UNITS: mg/kg (ppm) DATE REPORT: 04/17/98

PARAMETER	EQL	SAMPLE I.D. LAB: 182534 STATION: MW 1 10:20
Benzene	0.002	ND
Toluene	0.002	ND
Ethylbenzene	0.002	ND
Total Xylenes	0.002	ND
MTBE	0.024	ND
Surrogate Recoveries %		
Fluorobenzene		98

ND-None Detected

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

Reviewed by: JH

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

CLIENT: ATC Associates Inc. - Nashville, TN

ATTENTION: James McCabe

CLIENT PROJECT #: 1995.0043 - OMS # 15; Fac. I.D. # 0-790983

CLIENT I.D. #: 10-67-11887

LAB PROJECT #: 23317 DATE SAMPLED: 04/06-07/98

MATRIX: Soil DATE SAMPLE RECEIVED: 04/08/98

METHOD: TPH-8015B (GRO) DATE SAMPLE ANALYZED: 04/10-13/98

UNITS: mg/kg (ppm) DATE REPORT: 04/17/98

SAMPLE I.D.	STATION	EQL	PARAMETER TOTAL PETROLEUM HYDROCARBONS CONC. RANGE
182525	MW 5 (09:24)	0.5	ND
182526	MW 5 (09:32)	0.5	ND
182527	MW 4 (10:17)	0.5	ND
182528	MW 4 (10:24)	0.5	ND
182529	MW 3 (13:01)	0.5	ND
182530	MW 3 (13:10)	0.5	ND
182531	MW 2 (09:00)	0.5	ND
182532	MW 2 (09:07)	0.5	ND
182533	MW 1 (10:15)	0.5	ND
182534	MW 1 (10:20)	0.5	ND

ND-None Detected

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

Reviewed by:

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

CLIENT: ATC Associates Inc. - Nashville, TN

ATTENTION: James McCabe

CLIENT PROJECT #: 1995.0043 - OMS # 15; Fac. I.D. # 0-790983

CLIENT I.D. #: 10-67-11887

LAB PROJECT #: 23317 DATE SAMPLED: 04/06-07/98

MATRIX: Soil DATE SAMPLE RECEIVED: 04/08/98

METHOD: TPH-8015B (DRO) DATE SAMPLE ANALYZED: 04/10/98

UNITS: mg/kg (ppm) DATE REPORT: 04/17/98

SAMPLE I.D.	STATION	EQL	PARAMETER TOTAL PETROLEUM HYDROCARBONS CONC.	RANGE
182525	MW 5 (09:24)	4	ND	
182526	MW 5 (09:32)	4	ND	
182527	MW 4 (10:17)	4	5	Diesel
182528	MW 4 (10:24)	4	ND	
182529	MW 3 (13:01)	4	ND	
182530	MW 3 (13:10)	4	ND	
182531	MW 2 (09:00)	4	ND	
182532	MW 2 (09:07)	4	ND	
182533	MW 1 (10:15)	4	ND	
182534	MW 1 (10:20)	4	ND	

ND-None Detected

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

Reviewed by: JH

HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

CLIENT: ATC Associates Inc. - Nashville, TN **LAB PROJECT #:** 23317

CLIENT I.D. #: 10-67-11887

ANALYTICAL REPORT
CASE NARRATIVE

1. All holding times were met and no QA problems were encountered.

2. The analytical results and EQL's for soil samples are based on wet weight. Dry weight calculations are available upon request.

NOTES:
- This "Analytical Report" may not be reproduced, except in full, without the written approval of the laboratory.
- Results relate only to the items tested as received (see chain-of-custody).
- EQL = Estimated Quantitation Limit
- ND = Not Detected within the calibration range of the test method down to the EQL

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

CERTIFICATIONS

A2LA - No. 0330-01; AIHA - Lab ID 09072; Alabama - Lab ID 40970; Arkansas; Connecticut - Lab ID PH-0208; Delaware; Florida - No. 97056 (EW), No. 97258 (DW); Georgia - No. 804; Indiana - Lab ID C-GA-01; Kansas - E-10212 (SW); Kentucky - Lab ID 90053; Maryland - No. 251; Massachusetts - Lab ID M-GA040; North Carolina - No. 409; South Carolina - No. 98012; Tennessee - Lab ID 02827 (DW), UST Program; Virginia - Lab ID 0024

CHAIN OF CUSTODY RECORD

PROJ. NO. 1995.0043 | PROJECT NAME OMS #15 | CLIENT TN EPA/AIC Facility ID# 0-790963 | LAB PROJ. NO. 2380

SAMPLERS: (Signature) James A. McCabe

SAMPLING METHOD: Continuous Sampling

SAMPLE I.D. NO.	DATE	TIME	COMPOSITE	GRAB	WATER	SOIL		FILTERED	ACIDIFIED	ICED		NUMBER OF CONTAINERS	LAB I.D. NUMBER	BTEX (602,8020) w/MTBE	TPH 418.1	TPH-GRO (5030) TN Method	TPH-DRO (3550) TN Method	LEAD	PAHS				SAMPLE LOCATION / REMARKS
MW5	4-6-98	0924		X		X				X		2		X		X	X						5'-7'
MW5	4-6-98	0932		X		X				X		2		X		X	X						10'-12'
MW4	4-6-98	1017		X		X				X		2		X		X	X						3'-5'
MW4	4-6-98	1024		X		X				X		2		X		X	X						10'-12'
MW3	4-6-98	1301		X		X				X		2		X		X	X						5'-7'
MW3	4-6-98	1310		X		X				X		2		X		X	X						10'-12'
MW2	4-7-98	0900		X		X				X		2		X		X	X						3'-5'
MW2	4-7-98	0907		X		X				X		2		X		X	X						8'-10'
MW1	4-7-98	1015		X		X				X		2		X		X	X						3'-5'
MW1	4-7-98	1020		X		X				X		2		X		X	X						8'-10'

REMARKS: Normal Turnaround

HYGEIA LABORATORIES, INC.
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FAX (770) 514-6966

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
James A. McCabe	4/7/98 1045				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Project Manager / Phone #:
			4/8/98	

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APPENDIX C

SOIL PERMEABILITY REPORT

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TRI STATE
TESTING SERVICES, INC.

Measurement of Hydraulic Conductivity

Client: ATC Associates Project No.: E-4-090

Date of Report: 04/30/98

Project Name: Army National Guard, 2610 East Holmes Road, Memphis, Tennessee

Sample I.D.: Boring No.: SB5A1, Shelby tube, Depth: 9' - 11'

Soil Description: Brown Silty Clay

Test Media: City of Memphis Water

TN Facility I.D. No.: 0-790983

Volumetric Air Content	.017 cm^3-air/cm^3-soil
Volumetric Water Content	.334 cm^3-H_2O/cm^3-soil
Total Soil Porosity	.351 cm^3/cm^3-soil
Soil Bulk Density (wet)	2.04 g-soil/cm^3-soil
Moisture Content	21.4 Percent

PERMEABILITY

Temperature Correction, R_t = .925

$K_1 = 2.7 \times 10^{-7}$ cm/sec
$K_2 = 2.0 \times 10^{-7}$ cm/sec
$K_3 = 2.1 \times 10^{-7}$ cm/sec
$K_4 = 2.2 \times 10^{-7}$ cm/sec

Coefficient of Permeability, $K_{20} = 2.3 \times 10^{-7}$ cm/sec

Test in accordance with Method 9100 of Test Methods for evaluating Solid Waste, Third Edition, (SW-846) and in general accordance with ASTM D-5084-90. Fractional Organic Carbon tested in accordance with ASTM D-2974-87 (Method C).

Lab No.: P-98-025 Reviewed By: David D. McCray

6756 Buckles Cove Memphis, TN 38133 901-385-1199 FAX 901-386-6614

TRI STATE
TESTING SERVICES, INC.

Measurement of Hydraulic Conductivity

Client: ATC Associates Project No.: E-4-090

Date of Report: 04/30/98

Project Name: Army National Guard, 2610 East Holmes Road, Memphis, Tennessee

Sample I.D.: Boring No.: SB5A2, Shelby tube, Depth: 11' - 13'

Soil Description: Brown Silty Clay with trace of Fine Sand

Test Media: City of Memphis Water

TN Facility I.D. No.: 0-790983

Volumetric Air Content	.012 cm^3-air/cm^3-soil
Volumetric Water Content	.316 cm^3-H_2O/cm^3-soil
Total Soil Porosity	.328 cm^3/cm^3-soil
Soil Bulk Density (wet)	2.06 g-soil/cm^3-soil
Moisture Content	18.1 Percent

PERMEABILITY

Temperature Correction, R_t = .979

$K_1 = 4.0 \times 10^{-6}$ cm/sec
$K_2 = 3.9 \times 10^{-6}$ cm/sec
$K_3 = 4.4 \times 10^{-6}$ cm/sec
$K_4 = 4.0 \times 10^{-6}$ cm/sec

Coefficient of Permeability, $K_{20} = 4.1 \times 10^{-6}$ cm/sec

Test in accordance with Method 9100 of Test Methods for evaluating Solid Waste, Third Edition, (SW-846) and in general acoordance with ASTM D-5084-90. Fractional Organic Carbon tested in accordance with ASTM D-2974-87 (Method C).

Lab No.: P-98-026 Reviewed By: David D. McCray

6756 Buckles Cove Memphis, TN 38133 901-385-1199 Fax 901-386-6614

TESTING SERVICES, INC.

Report of Fractional Organic Carbon

Client: ATC

Project No.: E-4-090

Project: Army National Guard
2610 East Holmes Road
Memphis, Tennessee

Date of Report: 28 April '98

Sample I.D.: Jar sample, Boring No.: 1, Sample No.: 1

Fractional Organic Carbon .009 g-carbon/g-soil

Tested in accordance with ASTM D-2974-87 (Method C).

Lab No.: FOC-E4090

Reviewed By: David D. McCray

6756 Buckles Cove Memphis, TN 38133 901 385-1199 FAX 901-386 6614

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APPENDIX D

GROUNDWATER ANALYTICAL REPORT

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HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

Client: **ATC Associates - NASHVILLE, TN**
5217 Linbar Drive
#306
Nashville, TN 37211-3662
Attention: **James McCabe**

Project Name: **OMS #15 Facility ID # 0-790983**
Project ID: 1995.0043
Received: 6/12/98
Lab Project No. 24061

Report Date: 7/1/98

CASE NARRATIVE

1 The holding times for each sample were met.
2 Where applicable, results & reporting limits are based on wet weight; dry weight calculations available.

Reviewed by: DW

Respectfully Submitted,

Randy Brown
Hygeia Laboratories, Inc.

LAB ID	CLIENT ID	MATRIX	COLLECTED
188213	MW-1	WATER	6/11/98
188214	MW-4	WATER	6/11/98

HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 24061 Report Date: 7/1/98

Total Petroleum Hydrocarbons-Diesel Units: **mg/L (ppm)** Method: **EPA 8015 B**

Matrix: Water Analysis Date: 6/23/98 Prep. Date: 6/19/98 Analyst: DBT

Lab ID:	188213		188214	
Client ID:	MW-1		MW-4	
Analyte	**Result**	**RL**	**Result**	**RL**
TPH-Diesel	ND	0.1	ND	0.1
Surrogate Recovery (%)				
PZ-49	41 %		64 %	

NOTES:

- Results relate only to the samples tested as received (see chain-of-custody).
- ND = "Not Detected" within the calibration range of the test method down to the reporting limit
- RL = "Reporting Limit"
- Dates are presented in the format "month/day/year"

Certifications

American Association for Laboratory Accreditation (A2LA) - No. 0330-01; American Industrial Hygiene Association (AIHA) - Lab ID 09072 Alabama - Lab ID 40970; Arkansas; Connecticut - Lab ID PH-0206; Delaware; Florida - No. 97056 (EW), No. 97268 (DW); Georgia - No. 804; Indiana - Lab ID C-GA-01; Kansas - E-10212 (SW); Kentucky - Lab ID 90053; Maryland - No. 251; Massachusetts - Lab ID M-GA040; North Carolina - No. 409; South Carolina - No. 96012; Tennessee - Lab ID 02827 (DW), UST Program; Virginia - Lab ID 0024

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME	LAB PROJ. NO.
19451004.3	CLIENT ATC Nashville	24021

SAMPLERS: (Signature)

SAMPLING METHOD: Bailer

SAMPLE I.D NO	DATE	TIME	COMPOSITE	GRAB	WATER	SOIL		FILTERED	ACIDIFIED	ICED		NUMBER OF CONTAINERS	LAB I.D. NUMBER	BTEX (602.8020)	TPH 418.1	TPH-GRO (5030)	TPH-DRO (3550)	LEAD	PAH'S			SAMPLE LOCATION / REMARKS
MW-1	6-11-98	1355		X	X				X	X		1					X					
MW-4	6/11/98	1340		X	X				X	X		1					X					

REMARKS:

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	6/11/98 1405				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Project Manager / Phone #:
			6/12/98 10:40	

HYGEIA LABORATORIES, INC.
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(770) 514-6933
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HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

Client: **ATC Associates - NASHVILLE, TN**
5217 Linbar Drive
#306
Nashville, TN 37211-3662
Attention: **Ken Johnson**

Project Name: **Memphis OMS #15/ Fac ID# 0-790983**
Project ID: 1995.0043
Received: 4/27/98
Lab Project No. 23512

Report Date (m/d/y): 5/22/98

LAB ID	CLIENT ID	COLLECTED
183802	MW-1	4/24/98
183803	MW-2	4/24/98
183804	MW-3	4/24/98
183805	MW-4	4/24/98
183806	MW-5	4/24/98

CASE NARRATIVE

1. The holding times for each sample were met.
2. Where applicable, results & reporting limits are based on wet weight; dry weight calculations available.
3. Samples MW-1 (183802) and MW-4 (183805) 1 Liter Amber bottles for Diesel Range Organics were broken in transit. Ken Johnson was notified 4/27/98.

Reviewed by: PW

Respectfully Submitted,

Hygeia Laboratories, Inc.

HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 23512

Report Date (m/d/y): 5/22/98

Volatile Organics (BTEX)

Units: ug/L (ppb) Method: EPA 602

Matrix: Water Analysis Date: 5/5/98 Prep. Date: 5/5/98 Analyst: MZ

Lab ID:	183802		183803		183804		183805	
Client ID:	MW-1		MW-2		MW-3		MW-4	
Analyte	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
Benzene	ND	0.4	ND	0.4	ND	0.4	ND	0.4
Ethylbenzene	ND	0.4	ND	0.4	ND	0.4	ND	0.4
Toluene	ND	0.4	4.5	0.4	ND	0.4	ND	0.4
Total Xylenes	ND	0.4	0.6	0.4	ND	0.4	ND	0.4
MTBE	ND	5	ND	5	ND	5	ND	5
Surrogate Recoveries (%)								
Fluorobenzene	101 %		102%		104 %		101 %	

Volatile Organics (BTEX)

Units: ug/L (ppb) Method: EPA 602

Matrix: Water Analysis Date: 5/5/98 Prep. Date: 5/5/98 Analyst: MZ

Lab ID:	183806	
Client ID:	MW-5	
Analyte	**Result**	**RL**
Benzene	ND	0.4
Ethylbenzene	ND	0.4
Toluene	ND	0.4
Total Xylenes	ND	0.4
MTBE	ND	5
Surrogate Recoveries (%)		
Fluorobenzene	101 %	

Total Petroleum Hydrocarbons-Gasoline

Units: mg/L (ppm) Method: EPA 8015B

Matrix: Water Analysis Date: 5/5/98 Prep. Date: 5/5/98 Analyst: MZ

Lab ID:	183802		183803		183804		183805	
Client ID:	MW-1		MW-2		MW-3		MW-4	
Analyte	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
TPH-Gasoline	ND	0.1	ND	0.1	ND	0.1	ND	0.1
Surrogate Recovery (%)								
Isopropyltoluene	116 %		110 %		118 %		108 %	

HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 23512 Report Date (m/d/y): 5/22/98

Total Petroleum Hydrocarbons-Gasoline

Units: mg/L (ppm) Method: EPA 8015B

Matrix: Water Analysis Date: 5/5/98 Prep. Date: 5/5/98 Analyst: MZ

Lab ID:	183806
Client ID:	MW-5
Analyte	**Result**
TPH-Gasoline	ND
Surrogate Recovery (%)	
Isopropyltoluene	110 %

Total Petroleum Hydrocarbons-Diesel

Units: mg/L (ppm) Method: EPA 8015B

Matrix: Water Analysis Date: 5/6/98 Prep. Date: 4/28/98 Analyst: DBT

Lab ID:	183803		183804		183806	
Client ID:	MW-2		MW-3		MW-5	
Analyte	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
TPH-Diesel	ND	0.1	ND	0.1	ND	0.1
Surrogate Recovery (%)						
PZ-49	36 %		47 %		65 %	

NOTES:

- Results relate only to the samples tested as received (see chain-of-custody).
- ND = "Not Detected" within the calibration range of the test method down to the reporting limit
- RL = "Reporting Limit"

Certifications

American Association for Laboratory Accreditation (A2LA) - No. 0330-01; American Industrial Hygiene Association (AIHA) - Lab ID 09072
Alabama - Lab ID 40970; Arkansas; Connecticut - Lab ID PH-0206; Delaware; Florida - No. 97056 (EW), No. 97268 (DW); Georgia - No. 804;
Indiana - Lab ID C-GA-01; Kansas - E-10212 (SW); Kentucky - Lab ID 90053; Maryland - No. 251; Massachusetts - Lab ID M-GA040;
North Carolina - No. 409; South Carolina - No. 98012; Tennessee - Lab ID 02827 (DW), UST Program; Virginia - Lab ID 0024

Page 1 of 1

CHAIN OF CUSTODY RECORD

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A
Marietta, Georgia 30066-6299
(770) 514-6933 FAX (770) 514-6966

PROJ. NO. 1993-0093

PROJECT NAME memphis OMS # 15 / Fac ID # 0-790983

CLIENT TN Dept. [illegible]

LAB PROJ. NO. 93513

SAMPLERS: (Signature) [illegible]

SAMPLING METHOD Grab

LABORATORY ANALYSIS

SAMPLE I.D. NO.	DATE	TIME	COMPOSITE	GRAB	WATER	SOIL		FILTERED	ACIDIFIED	ICED		NUMBER OF CONTAINERS	LAB I.D. NUMBER	BTEX MTBE	TPH GRO	TPH DRO	SAMPLE LOCATION / REMARKS
MW-1	4-23-98	0830		X	X				X	X		3		X	X	X	1L Amber bottle [illegible]
MW-2	〃	0900		〃	〃				〃	〃		〃		〃	〃	〃	
MW-3	〃	0930		〃	〃				〃	〃		〃		〃	〃	〃	
MW-4	〃	1000		〃	〃				〃	〃		〃		〃	〃	〃	1L amber bottle [illegible]
MW-5	〃	1030		〃	〃				〃	〃		〃		〃	〃	〃	

Informed Ken [illegible] 4/27/98 [illegible] 4/27/98

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[illegible]	[illegible]				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Project Manager / Phone #:
		[illegible]	4-27-98	

------- ‡ -------

APPENDIX E

GROUNDWATER CLASSIFICATION PROCEDURES

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TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS IN SELECTED AREAS OF TENNESSEE

EXPLANATION OF COLUMN HEADINGS

QUAD/NTH = Designation by number, Quadrant and ninth of the 2.5 - minute quadrangle area in which the well is located. The leading numbers identify the 15-minute quadrangle, the next two letters identify the 7.5-minute quadrant and the last digit identifies the one-ninth subdivision of the latter.

COUNTY = County in which the well is located.

WELL NUM = Identification number assigned to the well by the State.

TAG NUM = An inspection number assigned to the well at the time of inspection by the State.

OWNER'S NAME = Name of person or organization for whom the well was drilled.

LOCATION ROAD = Name of street or road from which to access the well. Blank if unknown.

COMP DATE = Month, day and year the well was completed.

INSPT DATE = Month, day and year the well was inspected by TDHE. Blank if well has not been inspected.

TOT DEPTH = Total depth of the well in feet.

AQ DEPTH = Depth, in feet, below land surface to the top of the shallowest aquifer or water-bearing zone tapped by the well.

TOT YIELD = Total yield of the well in gallons per minute (gpm). Yields less than one-half gpm reported as zero.

STAT LEVEL = Static water-level: depth, in feet, from the land surface to the surface of the water standing in an idle well.

CSE DEPTH = Casing depth: depth, in feet, to the bottom of the water tight casing installed in the well.

CSE TYPE = Casing type: PLAST = Plastic; STEEL = Steel; OTHER = any other material such as concrete, fiberglass or tile.

WELL FINISH = Construction of the well in the interval supplying water to the well: OPEN = Uncased or open hole; SLOT = Hand perforated or slotted pipe; SCREEN = Manufactured device designed to maintain the wall of the borehole and allow ground water to enter the well.

INTERVAL = The depth, in feet, from the top to the bottom of the interval that is open to the well.

WAT QUAL = Water Quality: a word to describe the relative quality of the well water such as GOOD, FAIR, BAD, LIME, IRON, SULFUR, SALT, OIL, GAS, OTHER.

GEO FORM = Name of the geologic formation tapped by the well (not generally reported).

LATITUDE = Latitude of well site in degrees, minutes, and seconds.

LONGITUDE = Longitude of well site in degrees, minutes, and seconds.

A/C = Accuracy Code for latitude and longitude: S = Nearest second; F = nearest 15 seconds; T = nearest 30 seconds; M = nearest minute; Blank = nearest 2.5 minutes.

LOG = Refers to availability of drillers log: Y = yes; N = no.

DRILLER = License number of driller who supervised construction of the well. Names provided upon request.

USE = Purpose for which the well was constructed: HOME = residential; COMM = commercial; etc.

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / MTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 1 SHELBY	15700218	LEHMA-ROBERTS CO EXPRESSWAY LAMAR	06/29/1964 / /	233 --	-- 66	-- 	 200 - 233		35-05-30 89-58-00	T	C0108 IND
0409SW 1 SHELBY	15700514	MID-SWREFIGERATED	02/21/1967 / /	499 --	-- 154	459 STEEL	 459 - 499		35-06-54 89-58-56	S	00108 IND
0409SW 1 SHELBY	15700953	MID SOUTH REFR WHS	10/29/1971 / /	496 460	23 165	460 STEEL	 460 - 496	UNK	35-06-52 89-58-57	S	C0108 COMM
0409SW 1 SHELBY	15709010	FRISCO RRR SH K-9K-	06/00/1927 / /	371 311	500 65	-- 	 311 - 371		35-05-39 89-59-10	S	 IND
0409SW 1 SHELBY	15709011	FRISCO RR SH K-10-1	06/00/1927 / /	386 --	-- 76	-- 	 336 - 386	GOOD	35-05-38 89-59-14	S	 IND
0409SW 1 SHELBY	15709012	MEMPHIS CC SHSK-111	00/00/1920 / /	392 --	-- --	-- 	 -- - --	UNK	35-06-57 89-57-44	S	 MUN
0409SW 1 SHELBY	15709013	MEMPHIS C C SHEK-12	00/00/1941 / /	376 --	290 119	-- 	 330 - 376	GOOD	35-06-57 89-57-36	S	 MUN
0409SW 1 SHELBY	15709014	RAILWAYS ICE SH:K-1	00/00/1928 / /	380 355	-- 118	330 STEEL	 330 - 380		35-05-41 89-58-58	S	 OTER
0409SW 1 SHELBY	15709015	RAILWAYS ICE SH:K-1	03/06/1947 / /	390 --	-- 107	-- 	 -- - --	GOOD	35-05-40 89-58-58	S	 IND
0409SW 1 SHELBY	15709016	RAINBOW LAKE SH:K-1	06/00/1936 / /	464 434	750 --	403 STEEL	 403 - 464		35-05-23 89-57-59	S	 MUN
0409SW 1 SHELBY	15709017	RAINBOW LAKE SH:K-1	05/30/1937 / /	458 408	-- --	407 STEEL	 407 - 458		35-05-24 89-57-59	S	 MUN
0409SW 1 SHELBY	15709018	MID.S.REFRIG SH:K-1	00/00/1921 / /	554 --	500 --	-- 	 -- - --	GOOD	35-06-54 89-58-57	S	 OTHR
0409SW 1 SHELBY	15709019	MID S REFRIG SH:K-1	/ /19 / /	500 --	-- --	-- STEEL	 -- - --	GOOD	35-06-55 89-58-56	S	 OTHR
0409SW 1 SHELBY	15709020	SWIFT & CO SHSK-191	/ /19 / /	443 391	-- 73	391 STEEL	 -- - --	GOOD	35-06-17 89-59-23	S	 OTHR
0409SW 1 SHELBY	15709021	SWIFT & CO SHSK-202	/ /19 / /	220 --	-- 121	-- 	 -- - --	GOOD	35-06-16 89-59-23	S	 IND
0409SW 1 SHELBY	15709022	SWIFT & CO SHSK-212	03/00/1951 / /	459 --	1720 115	-- 	 -- - --	GOOD	35-06-16 89-59-24	S	00029 IND

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 1 SHELBY	15709033	KELLOGG CO SHSK-333	/ /19 / /	389 --	-- 100	-- 	 -- - --	GOOD	35-05-45 89-59-24	S	 END
0409SW 1 SHELBY	92002802	WASSUM_____CHAR WARD RD	08/31/1990 / /	125 --	20 2	60 PLAST	SLOT 50 - 116	GOOD	- - - -	 Y	00036 HOME
0409SW 1 SHELBY	92002187	LOTT_____DAVI TALL FOREST LN	01/30/1992 / /	150 100	30 90	140 PLAST	SCREEN 140 - 150	GOOD	- - - -	 Y	00396 HOME
0409SW 2 SHELBY	15700119	MEMPHIS COUNTRY CLU 	03/03/1964 / /	356 295	600 100	295 STEEL	 300 - 350	 	35-07-16 89-57-25	S 	00029 MUN
0409SW 2 SHELBY	15700857	MEMPHIS LG & W normanl	05/15/1970 / /	456 --	1000 124	365 STEEL	 350 - 450	GOOD	- - - -	 	00029 MUN
0409SW 2 SHELBY	15701081	MEMPHIS LG & W GETWELL/RHODES	10/23/1974 / /	796 --	-- --	686 STEEL	SCREEN 692 - 792	GOOD	35-05-45 89-55-45	T Y	00029
0409SW 2 SHELBY	15701084	MEMPHIS LG & W ZH CURLIN ST	11/15/1974 / /	706 --	-- --	539 STEEL	SCREEN 600 - 700	OTHR	35-07-00 89-56-00	T Y	00029 MUN
0409SW 2 SHELBY	15701085	MEMPHIS LG & W RHODES/GETWELL	12/20/1974 / /	796 --	-- --	634 STEEL	SCREEN 690 - 790	GOOD	35-05-45 89-55-45	T Y	00029 MUN
0409SW 2 SHELBY	15701086	MEMPHIS LG & W POPLAR AVE	11/27/1974 / /	757 	-- --	745 STEEL	SCREEN 651 - 751	OTHR	35-07-30 89-56-15	T Y	00029 MUN
0409SW 2 SHELBY	15701102	MEMPHIS LG & W GETWELL & PARK	01/23/1975 / /	883 777	-- 101	774 STEEL	 777 - 877	GOOD	- - - -	 	00029 MUN
0409SW 2 SHELBY	15701445	MEMPHIS LG & W PARK & GETWELL	06/01/1987 / /	594 --	1200 117	485 STEEL	SCREEN 491 - 591	GOOD	35-10-00 89-50-00	S Y	00632 MUN
0409SW 2 SHELBY	15701473	MEMPHIS LG & W GOODLETT IN AUD	09/25/1987 / /	574 470	1400 130	464 STEEL	SCREEN 470 - 570	GOOD	35-05-00 89-55-00	S Y	00632 MUN
0409SW 2 SHELBY	15701485	MEMPHIS LG & W SOUTHERN IN AUD	11/09/1987 / /	623 0	1400 130	515 STEEL	SCREEN 520 - 620	GOOD	35-05-00 89-55-00	S Y	00632 MUN
0409SW 2 SHELBY	15701510	MEMPHIS LG & W LOEB ST	12/14/1987 / /	-- --	1400 --	350 STEEL	SCREEN 355 - 455	GOOD	35-05-00 89-55-00	S Y	00168 MUN
0409SW 2 SHELBY	15709002	MCALEXANDER JIMH:K- 	03/11/1982 / /	100 --	15 60	92 PLAST	 -- - --	 	35-07-11 89-56-19	S 	00005 HOME
0409SW 2 SHELBY	15709004	MSU SH K-3 SH:K- 	/ /19 / /	461 --	-- --	-- 	 -- - --	GOOD	35-07-12 89-56-19	S 	

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (04C9SW) IN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
04C9SW 2 SHELBY	15709023	WALLS ESSOSH K-22-2	/ /19 / /	-- --	237 --	-- STEEL	-- -- ---		35-06-57 89-56-44	S	CTHR
04C9SW 2 SHELBY	15709037	MEMPHIS LG & W SH:K	03/10/1932 / /	1310 1288	-- --	-- STEEL	-- - --	UNK	35-07-21 89-56-00	S	MUN
0409SW 2 SHELBY	15709038	MEMPHIS LG & W SH:K	02/11/1932 / /	547 471	-- --	471 STEEL	466 - 547		35-07-21 89-56-00	S	MUN
0409SW 2 SHELBY	15709039	MEMPHIS LG & W SH:K	/ /19 / /	540 --	-- --	-- 	-- - --		35-07-13 89-56-01	S	MUN
0409SW 2 SHELBY	15709040	MEMPHIS LG & W SH:K	01/03/1932 / /	1313 1231	500 --	-- STEEL	-- - --		35-07-12 89-56-01	S	MUN
0409SW 2 SHELBY	15709041	MEMPHIS LG & W SH:K	01/28/1932 / /	442 --	450 67	-- 	-- - --	GOOD	35-07-07 89-56-01	S	MUN
0409SW 2 SHELBY	15709042	MEMPHIS LG & W SH:K	05/31/1940 / /	409 382	450 81	382 STEEL	378 - 439	GOOD	35-07-05 89-56-01	S	MUN
0409SW 2 SHELBY	15709043	MEMPHIS LG & W SH:K	00/00/1938 / /	485 407	450 48	407 STEEL	407 - 485	GOOD	35-06-59 89-56-01	S	MUN
0409SW 2 SHELBY	15709044	MEMPHIS LG & W SH:K	04/12/1943 / /	485 415	450 100	415 STEEL	415 - 485	GOOD	35-06-58 89-56-01	S	MUN
0409SW 2 SHELBY	15709045	MEMPHIS LG & W SH:K	/ /19 / /	1370 --	-- --	-- 	-- - --	GOOD	35-06-58 89-56-00	S	00029 MUN
0409SW 2 SHELBY	15709046	MEMPHIS LG & W SH:K	/ /19 / /	442 --	-- --	-- 	-- - --		35-06-58 89-55-53	S	MUN
0409SW 2 SHELBY	15709047	MEMPHIS LG & W SH:K	/ /19 / /	420 359	-- --	-- 	-- - --		35-06-58 89-55-54	S	00029 MUN
0409SW 2 SHELBY	15709048	MEMPHIS LG & W SH:K	09/00/1950 / /	420 359	-- --	-- 	-- - --		35-06-59 89-55-54	S	00029 MUN
0409SW 2 SHELBY	15709049	MEMPHIS LG & W SH:K	11/00/1961 / /	449 369	-- 125	-- STEEL	369 - 449	GOOD	35-06-58 89-55-54	S	MUN
0409SW 2 SHELBY	15709050	MEMPHIS LG & W SH:K	00/00/1933 / /	489 --	450 83	-- 	386 - 489	GOOD	35-06-58 89-55-51	S	MUN
0409SW 2 SHELBY	15709051	MEMPHIS LG & W SH:K	03/21/1935 / /	366 305	--- 136	--- STEEL	-- - --		35-06-58 89-55-40	S	MUN

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION -- DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (C409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 2	15709052	MEMPHIS LG & W SE:K	/ /19	1303	--	--		GOOD	35-06-58	S	
SHELBY			/ /	1225	--	STEEL	224 - 1303		89-55-41		MUN
0409SW 2	15709053	MEMPHIS LG & W SE:K	/ /19	593	--	--			35-06-58	S	
SHELBY			/ /	--	--		-- - --		89-55-34		MUN
0409SW 2	15709054	MEMPHIS LG & W SE:K	06/00/1944	375	450	--		GOOD	35-06-59	S	
SHELBY			/ /	--	117		314 - 375		89-55-33		MUN
0409SW 2	15709055	MEMPHIS LG & W SH:K	04/08/1932	1301	450	--			35-07-02	S	DC029
SHELBY			/ /	1223	84	STEEL	-- - --		89-55-36		MUN
0409SW 2	15709056	MEMPHIS LG & W	/ /19	428	1925	--			35-07-02	S	DC029
SHELBY			/ /	308	--	STEEL	-- - --		89-55-40		MUN
0409SW 2	15709057	MEMPHIS LG & W SH:K	06/30/1941	1307	500	--			35-07-06	S	DC029
SHELBY			/ /	1235	98		-- - --		89-56-00		MUN
0409SW 2	15709058	MEMPHIS LG & W SH:K	12/00/1941	1305	450	--		UNK	35-07-02	S	
SHELBY			/ /	1243	112	STEEL	250 - 1305		89-55-41		MUN
0409SW 2	15709059	MEMPHIS LG & W SH:K	08/13/1943	508	--	--		GOOD	35-07-16	S	
SHELBY			/ /	447	92	STEEL	447 - 508		89-56-09		MUN
0409SW 2	15709060	MEMPHIS LG & W SH:K	08/03/1943	362	--	319		GOOD	35-07-16	S	
SHELBY			/ /	319	104	STEEL	219 - 362		89-56-04		MUN
0409SW 2	15709061	MEMPHIS LG & W SH:K	11/00/1943	472	--	425		GOOD	35-07-17	S	
SHELBY			/ /	425	98	STEEL	429 - 472		89-55-47		MUN
0409SW 2	15709062	MEMPHIS LG & W SH:K	/ /19	580	--	--			35-07-17	S	
SHELBY			/ /	--	--		-- - --		89-55-58		MUN
0409SW 2	15709063	MEMPHIS LG & W SH:K	07/01/1944	514	--	451		GOOD	35-07-26	S	
SHELBY			/ /	451	125	STEEL	465 - 514		89-56-06		MUN
0409SW 2	15709064	MEMPHIS LG & W SH:K	07/15/1944	470	--	--		GOOD	35-07-25	S	
SHELBY			/ /	416	99	STEEL	421 - 470		89-55-48		MUN
0409SW 2	15709065	MEMPHIS LG & W SH:K	10/00/1943	474	--	--			35-07-19	S	
SHELBY			/ /	413	87	STEEL	-- - --		89-55-38		MUN
0409SW 2	15709066	MEMPHIS LG & W SH:K	/ /19	499	--	--			35-07-23	S	
SHELBY			/ /	438	--		-- - --		89-55-52		MUN
0409SW 2	15709067	MEMPHIS LG & W SH:K	/ /19	525	--	--			- -		
SHELBY			/ /	--	--		-- - --		- -		MUN

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 2 SHELBY	15709068	MEMPHIS LG & W SH:K	/ /19 / /	596 --	-- --	-- 	-- - --		- - - -		TEST
0409SW 2 SHELBY	15709069	MEMPHIS LG & W SH:K	07/21/1947 / /	388 328	1425 --	-- STEEL	328 - 388	GOOD	35-05-42 89-55-41	S	MUN
0409SW 2 SHELBY	15709070	MEMPHIS LG & W SH:K	05/00/1947 / /	301 235	580 71	-- STEEL	235 - 301		35-05-33 89-55-52	S	MUN
0409SW 2 SHELBY	15709071	MEMPHIS LG & W SH:K	09/12/1946 / /	360 260	1500 --	-- 	260 - 360	GOOD	35-05-23 89-55-53	S	MUN
0409SW 2 SHELBY	15709072	MEMPHIS LG & W SH:K	/ /19 / /	293 --	1450 --	-- 	212 - 293	GOOD	35-05-14 89-55-53	S	MUN
0409SW 2 SHELBY	15709073	MEMPHIS LG & W SH:K	11/13/1946 / /	915 273	1550 --	-- 	-- - --		35-05-18 89-55-44	S	MUN
0409SW 2 SHELBY	15709074	MEMPHIS LG & W SH:K	11/04/1946 / /	273 213	1600 --	-- STEEL	213 - 273	GOOD	35-05-14 89-55-36	S	MUN
0409SW 2 SHELBY	15709075	MEMPHIS LG & W SH:K	00/00/1958 / /	91 --	-- 45	-- STEEL	-- - --	GOOD	35-05-13 89-55-36	S	TEST
0409SW 2 SHELBY	15709076	MEMPHIS LG & W SH:K	12/19/1950 / /	374 --	-- 101	-- 	-- - --		35-07-12 89-55-47	S	MUN
0409SW 2 SHELBY	15709077	MEMPHIS LG & W SH:K	11/02/1950 / /	479 419	450 124	-- STEEL	419 - 479		35-07-12 89-55-43	S	MUN
0409SW 2 SHELBY	15709082	MEMPHIS LG & W SH:K	06/00/1961 / /	480 420	-- 122	-- 	420 - 480	GOOD	35-07-24 89-55-47	S	MUN
0409SW 2 SHELBY	15709088	MEMPHIS LG & W SH:K	06/25/1963 / /	538 --	-- --	-- 	-- - --	GOOD	35-07-25 89-56-06	S	MUN
0409SW 2 SHELBY	15709089	MEMPHIS LG & W SH:R	08/02/1963 / /	540 --	-- --	-- 	-- - --	GOOD	35-07-19 89-55-39	S	MUN
0409SW 2 SHELBY	15709090	MEMPHIS LG & W SH:R	09/26/1963 / /	312 --	-- --	-- 	-- - --	GOOD	35-07-05 89-55-56	S	MUN
0409SW 2 SHELBY	15709703	MEMPHIS LG & W SH:R	00/00/1965 / /	550 --	-- --	-- 	-- - --		35-07-12 89-56-00	S	MUN
0409SW 2 SHELBY	15709704	MEMPHIS LG & W SH:K	10/18/1966 / /	372 306	1166 129	306 STEEL	306 - 365		35-07-12 89-55-47	S	MUN

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / MCH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL CAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 2	15709705	V A HOSP SH:K-9	/ /19	94	0	--			35-05-17	S	
SHELBY			/ /	--	--		-- - --		89-55-26		OTHR
0409SW 2	15709706	MEMPHIS LG & W SH:K	05/24/1969	617	--	--			35-06-53	S	
SHELBY			/ /	--	--		-- - --		89-55-30		TEST
0409SW 2	15709708	MEMPHIS LG & W SH:K	00/00/1969	618	--	--			35-05-27	S	
SHELBY			/ /	--	--		-- - --		89-55-33		TEST
0409SW 2	15709709	MEMPHIS LG & W SH:K	09/18/1965	620	--	--			35-07-02	S	
SHELBY			/ /	--	--		-- - --		89-55-35		TEST
0409SW 2	15709710	MEMPHIS LG & W SH:K	07/21/1972	428	--	--			35-05-33	S	
SHELBY			/ /	380	--		-- - --		89-55-54		MUN
0409SW 2	15709750	MEMPHIS LG & W SH:K	00/00/1970	500	--	--			35-07-07	S	00029
SHELBY			/ /	--	--		-- - --		89-55-00		TEST
0409SW 2	94001160	MLGW	03/11/1994	530	1400	406	SCREEN	GOOD	- -		00674
SHELBY	D0006276	3824 POPLAR AVE	/ /	526	147	PLAST	411 - 526		- -	Y	MUN
0409SW 2	95002033	PACTON & TAYLOR	05/03/1995	210	40	190	SLOT	GOOD	- -		00565
SHELBY	D0004036	GERMANTOWN	/ /	--	60	PLAST	190 - 210		- -	Y	IRR
0409SW 2	95002034	PACTON & TAYLOR	05/04/1995	210	40	190	SLOT	GOOD	- -		00565
SHELBY	D0004037	GERMANTOWN	/ /	--	30	PLAST	190 - 210		- -	Y	IRR
0409SW 3	15709024	COLONIAL CC SHHK-23	/ /19	385	--	--		GOOD	35-06-47	S	00030
SHELBY			/ /	--	115	STEEL	-- - --		89-54-19		OTHR
0409SW 3	15709025	COLONIAL CC SHHK-24	03/00/1962	410	300	387			35-06-45	S	
SHELBY			/ /	--	--	STEEL	349 - 410		89-54-19		MUN
0409SW 3	15709030	MEMP PARK C.SHHK 30	00/00/1959	308		--		GOOD	35-06-37	S	00029
SHELBY			/ /	--	112		-- - --		89-54-47		
0409SW 3	15709086	SOUTHERN BTT SH:K-8	/ /19	270	--	--		GOOD	35-06-52	S	
SHELBY			/ /	--	--		-- - --		89-53-44		IND
0409SW 3	15709707	MEMPHIS LG & W SH:K	10/08/1959	619	--	--			35-06-35	S	
SHELBY			/ /	--	--		-- - --		89-54-39		TEST
0409SW 3	91000953	MEMPHIS LG & W	10/17/1990	454	2000	335	SCREEN	GOOD	- -		00674
SHELBY		PARK	/ /	445	141	STEEL	339 - 445		- -	Y	MUN
0409SW 3	97002136	DIXON GALLERY	05/26/1997	283	--	253	SLOT	GOOD	- -		00565
SHELBY	D0023073	PARK AVE 4339	/ /	--	120	OTHER	253 - 283		- -	Y	IRR

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 4 SHELBY	15700217	METAL BLDGS CO	07/08/1964 / /	53 --	-- --	-- 	 40 - 52		35-03-37 89-59-57	S	00108 OTHR
0409SW 4 SHELBY	15700871	CATFISH MOTEL	02/20/1969 / /	210 165	295 42	180 STEEL	 -- - --	GOOD	35-04-34 89-57-40	S	00036 MUN
0409SW 4 SHELBY	15709029	W NORRIS SH K-29K-2	/ /19 / /	406 --	-- --	-- 	 -- - --	GOOD	35-02-58 89-59-30	S	00108
0409SW 4 SHELBY	15709036	MEMP MUN AIR SH:K-3	01/14/1959 / /	70 --	-- --	9 	 -- - --		35-03-08 89-58-36	S	 TEST
0409SW 5 SHELBY	15700308	CONNELLY B	/ /19 / /	109 --	-- 93	105 SCREEN	 105 - 109		35-02-47 89-56-16	S	 HOME
0409SW 5 SHELBY	15700318	MCCALL E	05/11/1965 / /	108 --	-- 92	104 STEEL	 104 - 108		35-02-50 89-56-16	S	00108 HOME
0409SW 5 SHELBY	15700648	BOISE J	06/21/1968 / /	101 --	-- 86	93 STEEL	 93 - 101		35-03-12 89-55-13	S	00108 HOME
0409SW 5 SHELBY	15701378	MCCLAY_____NILE FOREST HILL RD	11/14/1985 / /	178 --	16 80	158 PLAST	SCREEN 158 - 178	GOOD	- - - -	 Y	00052 FARM
0409SW 5 SHELBY	15709005	OAKVILLE HOSP SH:K-	06/19/1920 / /	502 --	-- 60	-- 	 -- - --	GOOD	35-03-25 89-56-15	S	 MUN
0409SW 5 SHELBY	15709006	OAKVILLE HOSP SH:K-	00/00/1929 / /	413 --	-- 53	-- 	 -- - --	GOOD	35-03-25 89-56-14	S	 FARM
0409SW 5 SHELBY	15709007	J GARAVELLI SHSK-6-	00/00/1934 / /	101 --	275 265	-- 	 -- - --	GOOD	35-03-07 89-55-42	S	00029 COMM
0409SW 5 SHELBY	15709008	J GARAVELLI SHSK-7-	00/00/1935 / /	109 --	325 --	-- 	 -- - --	GOOD	35-03-05 89-55-41	S	00029 COMM
0409SW 5 SHELBY	15709026	L VACCARIO SHSK-25Z	10/01/1953 / /	229 --	-- 41	200 	 200 - 229	GOOD	35-04-39 89-55-42	S	00108 FARM
0409SW 5 SHELBY	15709035	S D ODELL SH K-35-3	/ /19 / /	279 --	50 --	-- SCREEN	 247 - 279		35-04-26 89-56-52	S	 HOME
0409SW 5 SHELBY	90000222	MEMPHIS LG & W 3890 HICKORY HI	11/30/1989 / /	1340 1257	133 13	1255 STEEL	SCREEN -- - 1340	GOOD	- - - -	 Y	00614 OTHR
0409SW 6 SHELBY	15700043	S BELL TELEPHONE CO	11/04/1963 / /	140 108	20 92	83 	 129 - 139		35-02-52 89-54-10	S	00029 IND

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 6 SHELBY	15700417	TEXACO OIL COMPANY	03/11/1965 / /	92 --	-- --	92 PLAST	74 - 92	UNK	35-04-52 89-53-26	S	00047 OTHR
0409SW 6 SHELBY	90000659	PROTEIN_TECHNOL MENDENHALL RD	04/20/1989 / /	479 415	750 11	410 STEEL	SCREEN 415 - 475	GOOD	- - - -	Y	00574 COMM
0409SW 6 SHELBY	90001550	PROPERTIE_____ TREZ 2166 S PERKINS	05/21/1990 / /	140 --	0 9	140 PLAST	-- - --	OTHR	- - - -	N	00686 OTHR
0409SW 6 SHELBY	91001002	TREVANT DELTA IRRI AMERICAN WAY	02/04/1990 / /	240 240	250 50	200 PLAST	OPEN 200 - 240	GOOD	- - - -	Y	00441 IRR
0409SW 7 SHELBY	15700069	MEMPHIS LG & W / /	10/28/1963 --	51 --	-- 33	-- 	 45 - 51		35-02-30 89-59-22	S	00108 OTHR
0409SW 7 SHELBY	15700210	ANDERSON D / /	09/01/1964 --	338 --	-- 145	-- 	 329 - 338		35-00-21 89-58-07	S	00108 HOME
0409SW 7 SHELBY	15700213	MEMPHIS PARK COMM / /	07/21/1964 --	347 --	... 145	... 	 339 - 347		35-00-24 89-58-27	S	00108 MUN
0409SW 7 SHELBY	15700249	VISCOVI V / /	10/07/1964 --	255 --	-- 76	-- 	 246 - 255		35-02-14 89-58-18	S	00108 OTHR
0409SW 7 SHELBY	15700262	BROWN T / /	11/02/1964 --	66 45	3 45	60 STEEL	60 - 66	GOOD	35-00-24 89-57-26	S	00286 HOME
0409SW 7 SHELBY	15700367	BAPTIST HOSPITAL / /	08/31/1965 --	285 --	-- 157	-- 	 264 - 286		35-00-19 89-59-08	S	00108 MUN
0409SW 7 SHELBY	15700433	ALLENBERG OIL CO / /	04/29/1966 --	310 --	-- 98	-- 	 263 - 310		35-01-17 89-59-25	S	00108 IND
0409SW 7 SHELBY	15700464	AIRWAYS EQUIPMENT C / /	10/03/1966 --	302 276	200 85	270 STEEL	 276 - 296	GOOD	35-00-41 35-00-41	S	00029 IND
0409SW 7 SHELBY	15700577	OAK FORES C SH:K-10 / /	07/25/1967 --	43 10	10 10	43 PLAST	 33 - 43	GOOD	35-00-22 89-58-40	S	00198 COMM
0409SW 7 SHELBY	15700581	MOUSBY C / /	07/31/1967 --	44 33	2 33	40 PLAST	 40 - 44	GOOD	35-00-00 89-59-24	S	00286 HOME
0409SW 7 SHELBY	15700703	HAISCH L / /	10/18/1968 --	82 61	5 61	72 PLAST	 72 - 82	GOOD	35-00-28 89-58-56	S	00286 HOME
0409SW 7 SHELBY	15700751	RASP W / /	02/26/1969 --	313 --	-- 148	305 	 305 - 313		35-00-08 89-59-21	S	00108 HOME

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 7 SHELBY	15700872	RIDGECREST B CHURCH	05/25/1970 / /	338 302	15 151	318 PLAST	318 - 338	GOOD	35-00-25 89-57-39	S	00108 MDOM
0409SW 7 SHELBY	15700963	CHURCH OF GOD	09/24/1971 / /	80 27	-- 27	80 PLAST	60 - 80	GOOD	35-00-28 89-57-44	S	00198 MDOM
0409SW 7 SHELBY	15709028	HARRISON D SH:K-2	/ /19 / /	318 --	-- 116	--	-- - --		- - - -		
0409SW 7 SHELBY	15709079	MEM PARK COM SH:K-7	12/00/1961 / /	370 360	-- 92	-- STEEL	360 - 370		35-00-23 89-58-28	S	00030 MUN
0409SW 7 SHELBY	15709080	SMITH DAIRY SH:K-80	/ /19 / /	360 --	-- 70	-- STEEL	-- - --		35-02-09 89-59-25	S	FARM
0409SW 7 SHELBY	15709087	MEM PARK COM SH:K-8	/ /19 / /	-- --	400 134	-- STEEL	-- - --		35-00-24 89-58-26	S	00030 FARM
0409SW 7 SHELBY	91003851	MEMPHIS LG & W 4869 AIRWAYS BL	11/14/1991 / /	570 530	125 130	525 STEEL	SCREEN 530 - 540	GOOD	- - - -	 Y	00674 MON
0409SW 8 SHELBY	15700039	WHITAKER E	11/12/1963 / /	180 --	-- 85	172 STEEL	173 - 180		35-02-11 89-56-17	S	00193 HOME
0409SW 8 SHELBY	15700182	BELLA COUNTRY CLUB	06/10/1964 / /	296 --	-- 136	-- 	259 - 296		35-00-17 89-55-32	S	00108 MUN
0409SW 8 SHELBY	15700211	JOE ENNIS	/ /19 / /	-- --	-- --	-- 	-- - --		35-00-19 89-57-19	S	
0409SW 8 SHELBY	15700252	CLIFFORD RUSH AIRWAYS	09/29/1964 / /	52 --	-- 43	-- 	47 - 52		35-02-00 89-56-00	T	00108 HOME
0409SW 8 SHELBY	15700573	DAVENPORT	07/14/1967 / /	94 80	10 80	94 PLAST	84 - 94	GOOD	35-00-25 89-57-16	S	00198 HOME
0409SW 8 SHELBY	15700612	HOLMES A	02/15/1968 / /	268 --	-- 155	251 STEEL	261 - 268		35-00-25 89-55-31	S	00108 HOME
0409SW 8 SHELBY	15701367	BROWNING_FERRIS HOLMES RD	06/03/1985 / /	140 --	-- --	130 PLAST	SCREEN 130 - 140	OTHR	- - - - -	 Y	00029 MON
0409SW 8 SHELBY	15701368	BROWNING_FERRIS HOLMES RD	06/05/1985 / /	135 --	-- --	125 PLAST	SCREEN 125 - 135	OTHR	- - - -	 Y	00029 MON
0409SW 8 SHELBY	15701369	BROWNING_FERRIS HOLMES RD	06/12/1985 / /	28 --	-- --	18 PLAST	SCREEN 18 - 28	OTHR	- - - - -	 Y	00029 MON

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) ON.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 8 SHELBY	15701370	BROWNING_FERRIS HOLMES RD	06/10/1985 / /	36 --	-- --	26 PLAST	SCREEN 26 - 36	OTHR	- - - -	Y	00029 MON
0409SW 8 SHELBY	15701371	BROWNING_FERRIS HOLMES RD	06/12/1985 / /	28 --	-- --	18 PLAST	SCREEN 18 - 28	OTHR	- - - -	Y	00029 MON
0409SW 8 SHELBY	15701372	BROWNING_FERRIS HOLMES RD	06/13/1985 / /	22 --	-- --	12 PLAST	SCREEN 12 - 22	OTHR	- - - -	Y	00029 MON
0409SW 8 SHELBY	15701373	BROWNING_FERRIS HOLMES RD	06/14/1985 / /	25 --	-- --	15 PLAST	SCREEN 15 - 25	OTHR	- - - -	Y	00029 MON
0409SW 8 SHELBY	15701374	BROWNING_FERRIS HOLMES RD	06/14/1985 / /	22 --	-- --	12 PLAST	SCREEN 12 - 22	OTHR	- - - -	Y	00029 MON
0409SW 8 SHELBY	15701523	ZELLARS_____MARK HOLMES OAK DR	06/22/1988 / /	190 190	25 85	150 PLAST	SCREEN 150 - 190	GOOD	35-00-00 89-50-00	- Y	00198 HOME
0409SW 8 SHELBY	15709081	W PARRISH SH:K-81-8	02/20/1962 / /	315 306	-- --	-- STEEL	 306 - 315		35-01-02 89-57-18	S	 HOME
0409SW 8 SHELBY	15709091	BURDETTE GH SH:K-91	00/00/1963 / /	155 --	-- --	-- 	 -- - --	GOOD	35-00-48 89-55-10	S	00212 MEM
0409SW 8 SHELBY	15709092	MEMPHIS LG & W SH:K	05/08/1964 / /	551 --	-- --	-- 	 -- - --		35-07-34 89-56-04	S	 TEST
0409SW 8 SHELBY	15709093	MEMPHIS LG & W SH:K	09/30/1964 / /	528 --	-- --	-- 	 -- - --		35-07-31 89-55-51	S	 MUN
0409SW 8 SHELBY	92000495	JACKSON_____LARR TCHULAHOMA RD	10/15/1951 / /	72 25	15 57	62 PLAST	SCREEN 62 - 72	GOOD	- - - -	Y	00007 HOME
0409SW 9 SHELBY	15700452	DELTA IRRIGATION CO	06/29/1966 / /	251 --	-- 98	-- 	 230 - 251		35-02-09 89-54-02	S	00108 IND
0409SW 9 SHELBY	15700715	FISHER CONCRETE CO	11/29/1968 / /	273 --	-- 132	229 STEEL	 229 - 273		35-00-12 89-54-51	S	00106 IND
0409SW 9 SHELBY	15700716	FISCHERCONCRETE CO	11/29/1968 / /	264 --	-- 130	222 STEEL	 222 - 264		35-00-11 89-54-51	S	00106 IND
0409SW 9 SHELBY	15700846	PULLIAM NURSERY	02/23/1970 / /	227 200	-- 120	207 PLAST	 207 - 227	GOOD	35-00-31 89-54-05	S	00052 COMM
0409SW 9 SHELBY	15700945	MAYLE.D. SH:K-10	06/13/1974 / /	168 100	10 50	168 PLAST	 156 - 168	GOOD	35-02-03 89-53-22	S	00400 HOME

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) IN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 9 SHELBY	15700946	J SCHL BR SH:K-10	07/21/1971 / /	489 500	1001 93	390 STEEL	403 - 483	GOOD	35-01-56 89-53-21	S	00030 IND
0409SW 9 SHELBY	15700947	SCHLITZ SH:K-10	07/21/1971 / /	485 500	1001 84	390 STEEL	399 - 479	GOOD	35-01-50 89-53-27	S	00030 IND
0409SW 9 SHELBY	15700948	J SCHL BREW SH:K-10	07/21/1971 / /	495 500	1001 91	404 STEEL	412 - 492	GOOD	35-01-50 89-53-38	S	00030 IND
0409SW 9 SHELBY	15700949	SCHLITZ SH:K-10	07/21/1971 / /	473 500	1001 93	381 STEEL	387 - 467	GOOD	35-01-58 89-53-37	S	00030 IND
0409SW 9 SHELBY	15700985	RALSTON PURINA K-10	06/02/1972 / /	477 419	-- --	410 STEEL	419 - 469	GOOD	35-01-55 89-53-00	S	00029
0409SW 9 SHELBY	15700990	RALSTON PURINA K-10	07/19/1972 / /	473 417	600 82	410 STEEL	417 - 467		35-01-53 89-53-00	S	00029 MUN
0409SW 9 SHELBY	15700996	RALSTIN PURINA TEST	/ /19 / /	192 --	-- --	--	-- - --	GOOD	- - - -		00029 IND
0409SW 9 SHELBY	15701070	ALLEN MATERIALS HUNGERFORD	6/ 7/1974 / /	180 156	10 87	156 STEEL	SCREEN 156 - 180	IRON	35-01-00 89-53-00	T Y	00108 IND
0409SW 9 SHELBY	15701071	JAS.SCHLITZ BREJOSE RAINES ROAD	08/23/1974 / /	467 --	-- --	375 STEEL	SCREEN 244 - 324	GOOD	35-02-00 89-58-30	T Y	00029 IND
0409SW 9 SHELBY	15701082	RALSTON PURINA MENDENHALL	11/06/1974 / /	462 --	-- --	400 STEEL	SCREEN 405 - 456	GOOD	35-02-00 89-58-00	T Y	00029
0409SW 9 SHELBY	15701268	WHITEHEAD PROPERTIE / /	11/24/1981 / /	260 200	-- 143	210 PLAST	210 - 260	GOOD	35-00-09 89-53-55	S	00570 HOME
0409SW 9 SHELBY	15701568	MEMPHIS LG & W 3899 HICKORY HI	04/03/1989 / /	787 680	1400 118	678 STEEL	SCREEN 680 - 783	GOOD	35-00-00 89-52-30	S Y	00029 MUN
0409SW 9 SHELBY	15701569	MEMPHIS LG & W 3911 HICKORY HI	02/09/1989 / /	475 471	1400 116	366 STEEL	SCREEN 369 - 471	GOOD	35-00-00 89-52-30	S Y	00029 MUN
0409SW 9 SHELBY	15701570	MEMPHIS LG & W 3901 HICKORY HI	03/06/1989 / /	-- --	-- --	-- OTHER	-- - --		35-00-00 89-52-30	S N	00029 OTHER
0409SW 9 SHELBY	15701584	MEMPHIS LG & W 4269 CRUMP	06/12/1989 / /	575 568	-- 148	463 STEEL	SCREEN 468 - 568	GOOD	35-00-00 89-52-30	S Y	00029 MUN
0409SW 9 SHELBY	15705031	FRISCO RR SH X-31-3	/ /19 / /	176 --	-- 76	-- STEEL	-- - --	GOOD	35-01-42 89-53-52	S	

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (C409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOC	DRILLER USE
C409SW 9 SHELBY	15709078	R C CAN CO SH:K-787	00/00/1958 / /	-- --	-- --	-- 	 -- - --	UNK	35-01-06 89-53-13	S	00108 IND
C409SW 9 SHELBY	15709083	WHITE STONE SH:K-8	04/23/1962 / /	169 --	-- 58	-- STEEL	 -- - --		35-01-26 89-53-05	S	00108 IND
0409SW 9 SHELBY	15709084	R H WOOD SH:K-84K-8	08/00/1961 / /	214 --	-- 80	-- PLAST	 200 - 214	GOOD	35-01-26 89-53-05	S	 HOME
0409SW 9 SHELBY	15709085	C E BOWE	/ /19 / /	24 --	-- 15	-- 	 -- - --	GOOD	35-01-15 89-54-36	S	 HOME
0409SW 9 SHELBY	97002872 D0025144	APAC TN INC TUTTLES	06/27/1997 / /	180 90	250 90	140 PLAST	SCREEN 140 - 180	GOOD	- - - -	 Y	00570 COMM

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APPENDIX F

WATER QUALITY LABORATORY REPORTS

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NO DRINKING WATER ANALYTICAL WAS PERFORMED

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APPENDIX G

UST SITE RANKING FORM

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UST SITE RANKING FORM

Facility ID Number: 0-790983

Facility Name: Army National Guard OMS #015

Facility Address: Memphis, TN

Date Ranking Form Completed: 7/16/98

Geologic and Hydrogeologic Factors

1	Minimum depth to the water table		
	<5.0 Feet	X	50
	5.1 to 10.0 Feet		45
	10.1 to 15.0 Feet		40
	15.1 to 30.0 Feet		35
	30.1 to 50.0 Feet		25
	50.1 to 75.0 Feet		15
	75.1 to 100.0 Feet		10
	> 100.0 Feet		5
ISCR, 07/29/98, p. 16, Table 3		Score	50

2	Minimum distance between water table & contaminated soil		
	<5.0 Feet		50
	5.1 to 10.0 Feet		45
	10.1 to 15.0 Feet		40
	15.1 to 30.0 Feet		35
	30.1 to 50.0 Feet		25
	50.1 to 75.0 Feet		15
	75.1 to 100.0 Feet		10
	> 100.0 Feet		5
	No soil contamination	X	0
ISCR, 07/29/98, p. 12, Table 1		Score	0

3	Soil Permeability		
	Undetermined		30
	> 10^-4 cm/sec		30
	10^2-4 to 10^-6 cm/sec	X	20
	<10^-6 cm/sec		10
ISCR, 07/29/98, p. 14, Table 2		Score	20

4	Calculated Groundwater Flow Rate		
	<10 Feet/day	X	3
	10 to 40 feet/day		6
	40 to 90 Feet /day		12
	90 to 130 Feet /day		18
	130 to 260 Feet/day		24
	> 260 Feet/day		30
	KARST		30
ISCR, 07/29/98, p. 18		Score	3

Receptor Factors

5	Basements/Crawl Spaces/Utility Vaults		
	<50.0 Feet from known contamination		150
	50.1 to 100.0 Feet from known contamination		75
	100.1 to 200.0 Feet from known contamination		50
	200.1 to 300.0 Feet from known contamination		25
	> 300.1 Feet	X	0
	ISCR, 07/29/98, p. 8	Score	0

6	Sanitary sewer mains and service lines		
	<50.0 Feet from known contamination		75
	50.1 to 100.0 Feet from known contamination		40
	100.1 to 200.0 Feet from known contamination		20
	200.1 to 300.0 Feet from known contamination	X	10
	> 300.1 Feet from known contamination		0
	ISCR, 07/29/98, p. 8 and Figure 2 on p. 5	Score	10

7	Storm Water Sewers		
	<50.0 Feet from known contamination		50
	50.1 to 100.0 Feet from known contamination		30
	100.1 to 200.0 Feet from known contamination		10
	200.1 to 300.0 Feet from known contamination		5
	> 300.1 Feet	X	0
	ISCR, 07/29/98, p. 8 and Figure 2 on p. 5	Score	0

8	Other Subsurface Utilities (i.e. natural gas, water, electric, telephone, etc.)		
	<50.0 Feet from known contamination		75
	50.1 to 100.0 Feet from known contamination	X	40
	100.1 to 200.0 Feet from known contamination		20
	200.1 to 300.0 Feet from known contamination		10
	> 300.1 Feet from known contamination		0
	ISCR, 07/29/98, p. 8 and Figure 2 on p. 5	Score	40

9	Public Water Supply Source		
	<0.1 miles		300
	0.1 to 0.25 miles		200
	0.25 to 0.5 miles		100
	>0.51 miles	X	0
	ISCR, 07/28/98, p. 26-28	Score	0

10	Private Water Supply Source		
	<0.1 miles		200
	0.1 to 0.25 miles		150
	0.25 to 0.5 miles		100
	>0.51 miles	X	0
	ISCR, 07/28/98, p. 26-28	Score	0

11	Distance to Surface Water		
	<.1 miles		25
	0.1 to 0.25 miles	X	15
	0.25 to 0.5 miles		5
	>0.51 miles		0
	ISCR, 07/28/98, p. 27, Figure 9	Score	15

Contaminant Factors

	Contaminant Concentration	A. Max. Contam. Levels	B. App. Cleanup Levels		C. Cont. Conc. Ratio A/B
	Benzene in ground water	0.00	0.07		0.0
	TPH in ground water at clause 995 ppm	0.0	1.00		0.0
	BTX in Soil	0.000	50.00		0.0
	TPH in Soil	5.0	500.00		0.0

ISCR, 07/28/98, Table 1, p. 12 (SOIL)

ISCR, 07/28/98, Table 5, p. 28 (GW)

12	Benzene in ground water		
	<1.0	X 0	
	1.1 to 10.0	25	
	10.1 to 50.0	50	
	50.1 to 100.0	100	
	100.1 to 500.0	200	
	> 500.1	300	
		Score	0

13	TPH on groundwater		
	<1.0	X 0	
	1.1 to 10.0	20	
	10.1 to 50.0	40	
	50.1 to 100.0	80	
	100.1 to 500.0	120	
	> 500.1	200	
		Score	0

14	Benzene in soil		
	<1.0	X 0	
	1.1 to 5.0	25	
	5.1 to 10.0	50	
	10.1 to 50.0	100	
	>50.1	200	
		Score	0

15	TPH in soil		
	<1.0	X 0	
	1.1 to 5.0	20	
	5.1 to 10.0	40	
	10.1 to 50.0	80	
	>50.1	100	
		Score	0

17	Total site score	138

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APPENDIX H

TN UST COST ESTIMATE COVER SHEET

AND

REPORT PREPARATION COST ESTIMATE FORM

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INITIAL SITE CHARACTERIZATION REPORT COST FORM

Submit with ISCR	Estimated Costs	Actual Costs
Site Check		N/A
Initial Abatement/Emergency Response		N/A
Free Product Recovery		N/A
Initial Site Characterization	$26,001.00	$17,389.00
Monitoring (per event)	N/A	
Additional Assessment Activities	N/A	
Environmental Assessment	N/A	

ASSESSMENT ACTIVITIES COST ESTIMATE FORM

Provide a brief description of the tasks included in this estimate. (Expand this form as necessary)

1. No new work is planned, except for well abandonment
2.
3.
4.
5.

Professional Services			
Personnel (List Below)	Hours	Cost Per Hour	TOTAL
		GRAND TOTAL	

ASSOCIATED CHARGES	
Drilling	
Excavation	
Trucking	
Surveying	
Analytical Samples $/Sample	
Rentals (List Below)	
Disposal - Free Product	
Water	
Soil	
Capital Expenditures (List Below)	

Permitting	
Lodging and Per Diem Days x $	
Mileage Miles $ /mile	
Miscellaneous (List Below)	
GRAND TOTAL	

ATC ASSOCIATES INC.

INITIAL SITE CHARACTERIZATION REPORT
NATIONAL GUARD ARMORY OMS#15

2610 E. Holmes Road
Memphis, Tennessee
TDUST Facility #0-790983
ATC Project No. 1995.0043

Prepared For:

Mr. Steven L. Westerman
Environmental Programs Coordinator
Tennessee Department of Finance and Administration
Tennessee Tower, Suite 1500
312 N. 8th Street
Nashville, Tennessee 37243-0300

Date: July 28, 1998

ATC ASSOCIATES INC.

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July 28, 1998

Mr. Steven L. Westerman
Environmental Programs Coordinator
Tennessee Department of Finance and Administration
Tennessee Tower, Suite 1500
312 N. 8th Street
Nashville, Tennessee 37243-0300

RE: Army National Guard OMS #15
Holmes Road
Memphis, Tennessee
TDUST Facility I.D. #0-790983
ATC Project No. 1995-0043

Dear Mr. Westerman:

On behalf of the Tennessee Department of Finance and Administration (F&A), ATC Associates Inc. (ATC) is hereby submitting the enclosed Initial Site Characterization Report (ISCR) for the above referenced project. It is our understanding that you will forward copies to the Tennessee Division of Underground Storage Tanks (TDUST) central office and Memphis field office.

ATC has completed the primary phase of assessment to characterize the site, and determined the extent of hydrocarbon impact in both soil and groundwater. The results and findings are summarized in this report.

Should you have any questions or comments regarding this project, please call at your convenience.

Respectfully Submitted,

ATC ASSOCIATES INC.

Ken Johnson

Ken Johnson/ng
Staff Geologist

John W. Hargraves
Program Manager

cc: Mr. Jim Ozment - TDEC Central Office
Mr. Rudy Collins - TDEC Jackson Office

I:\SHARED\ENVIR\F&A\OMS#15\ISCR.DOC

EXECUTIVE SUMMARY

ATC Associates Inc. (ATC) was retained by the Tennessee Department of Finance and Administration (F&A) to complete an Initial Site Characterization Report (ISCR) at the Memphis Army National Guard OMS # 15 located at 2610 Holmes Road, Memphis, Shelby County, Tennessee. The methodologies used for the investigation were in accordance with the Tennessee Division of Underground Storage Tanks (TDUST) "Environmental Assessment Guidelines" (1996). The results and findings of the investigation are summarized in this ISCR.

A total of five monitoring wells were installed by ATC during one phase of drilling. All five wells were installed at on-site locations. Based on the lack of drinking water wells located within 0.25 miles of the site, ATC recommends that groundwater cleanup levels of 0.07 parts-per-million (ppm) benzene and 1.0 ppm Total Petroleum Hydrocarbons (TPH) be applied to this site. Based on soil permeabilities of 10^{-6} to 10^{-7} cm/sec and a non-drinking water classification for groundwater, ATC recommends that soil cleanup levels of 50 ppm Benzene and 500 ppm TPH be applied to this site.

Laboratory analysis of samples collected during the investigation indicate the soil and groundwater beneath the site has not been impacted by hydrocarbons in concentrations above the applicable cleanup levels. Based on this and a site ranking score of 138, ATC recommends no further action and site closure.

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INITIAL SITE CHARACTERIZATION REPORT
NATIONAL GUARD ARMORY OMS #15
2610 E. Holmes Road
Memphis, Tennessee
TDUST Facility I.D. #9-790983
ATC Project No. 1995.0043

A. INTRODUCTION

1. On May 15, 1997, First Response Inc. submitted a Permanent Closure Report to the Tennessee Department of Environment and Conservation (TDEC) Division of Underground Storage Tanks (DUST) Memphis field office detailing UST removal activities at the National Guard Armory OMS #15 located in Memphis, Tennessee. Analytical results from soil sampling during the removal provided readings which exceed the most stringent clean-up levels

   On December 23, 1997, ATC Associates Inc. (ATC) was retained by the Tennessee Department of Finance and Administration to complete subsurface investigation activities and maintain regulatory compliance.

2. Five groundwater monitoring wells were installed on-site in April 1998, to define the extent of hydrocarbons in soil and groundwater beneath the site.

   A water use survey consisting of a computer search, field interviews, and field surveys, was completed as the initial steps in the groundwater classification procedure. The results of this survey, which are discussed in Section D.6 of this report, indicate that this site is a "non-drinking water" site.

   Technical Guidance Document - 014 "UST Site Ranking System" was completed and a score of 138 was derived. The completed site ranking form is included as Appendix G.

B. SITE LOCATION

1. The Site Vicinity Map is illustrated in Figure 1.

2. The Scaled Site Map is illustrated in Figure 2.

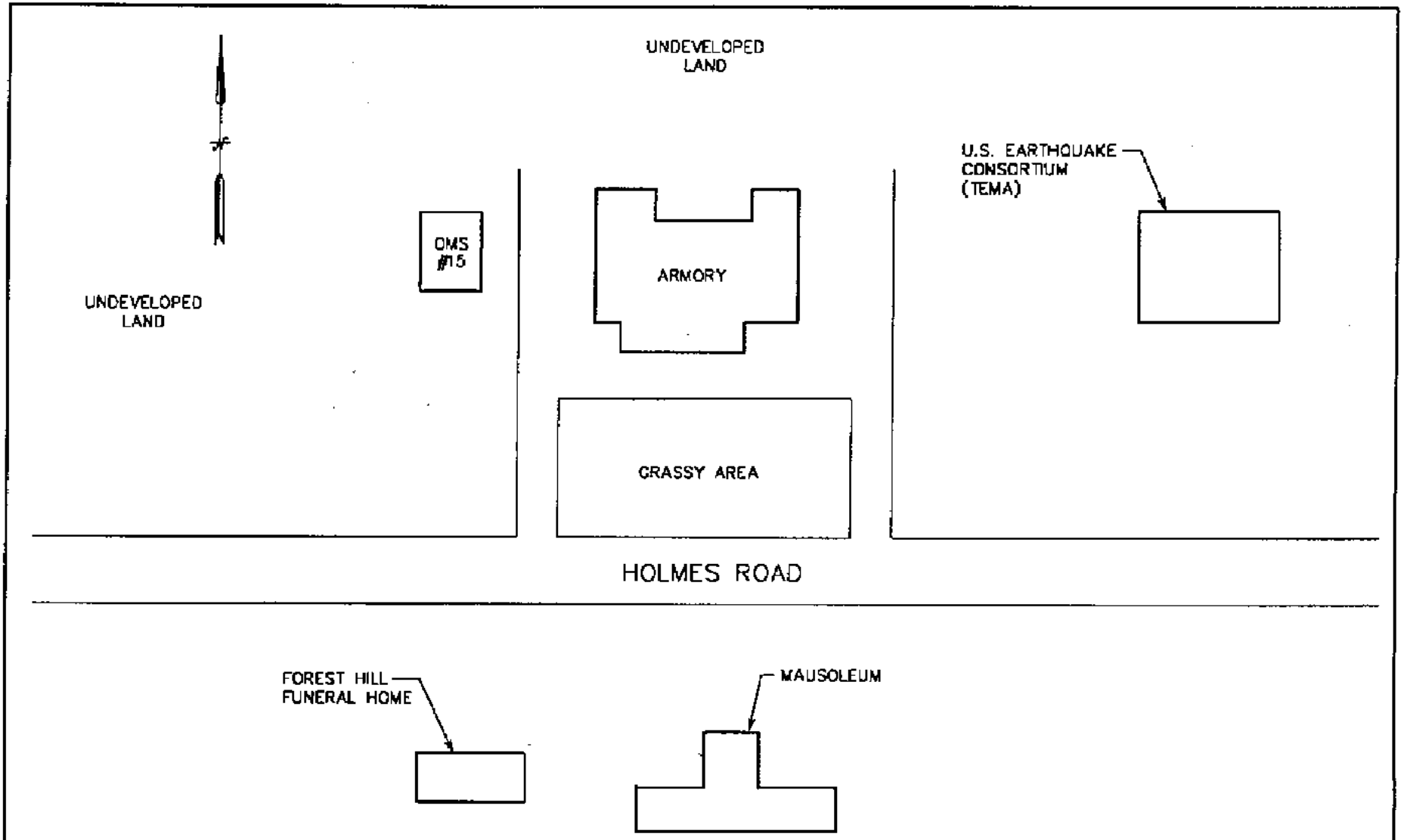
3. The Monitoring Well Location Map is illustrated in Figure 3.

4. The Site Location Topographic Map is illustrated in Figure 4.

5. The site is located at 2610E Holmes Road, Memphis, Shelby County, Tennessee. Its location as well as surrounding topographic and cultural features are illustrated on Figure 4. Topography in the site vicinity is slight relief to gently rolling. Intermittent surface flow is toward the north and west and surface flow drains indirectly into undeveloped land adjacent to the north and west property boundary.

   Land use in the site vicinity is mixed commercial and residential. The site is bound to the north by undeveloped land, to the east by the United States Earthquake Consortium with undeveloped land beyond, to the south by Holmes Road with Forest Hill Funeral Home and Cemetery beyond, and to the west by undeveloped property.

   The site property is rectangular in shape with north/south and east/west dimensions of approximately 600 feet and 500 feet, respectively (see Figure 3). Approximately half of the property consists of a grassy area located on the southern portion of the site. The western and northern property boundary are enclosed by a chain link fence. The Administration building occupies the central and eastern portion of the property. The OMS building is located near the western property boundary, and the former tankhold is located directly south of the OMS.



SITE VICINITY MAP
ARMY NATIONAL GUARD – OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: NOT TO SCALE
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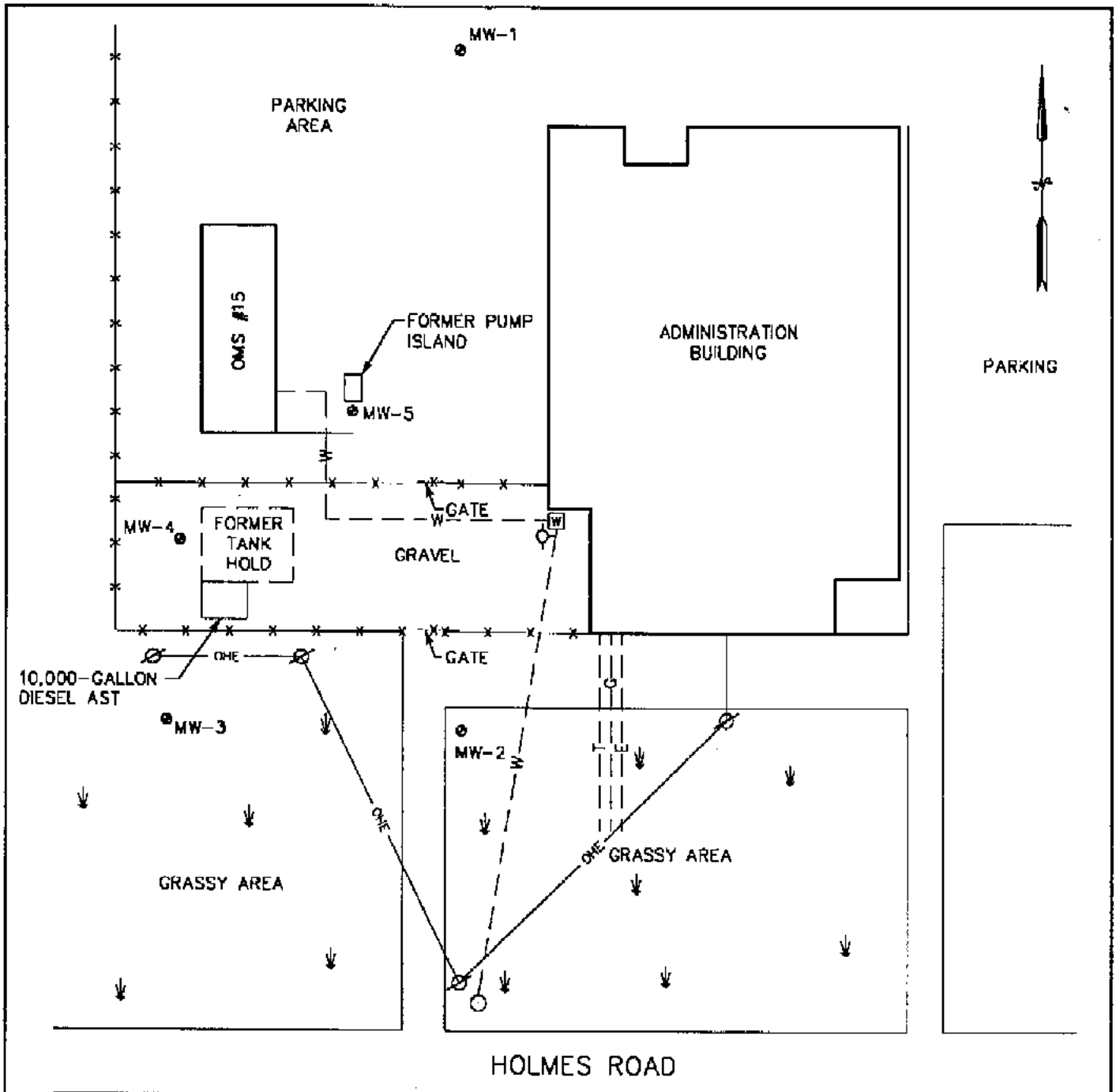

LEGEND

- MONITORING WELL LOCATION
- WATER METER
- FIRE HYDRANT
- POWER POLE
- OHE — OVERHEAD ELECTRIC LINE
- T — UNDERGROUND TELEPHONE LINE
- G — UNDERGROUND GAS LINE
- W — WATER LINE

0 40 80
SCALE IN FEET

SCALED SITE MAP
ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
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DRAWING FILE: 19950043\0043-2.DWG			REVISED BY:

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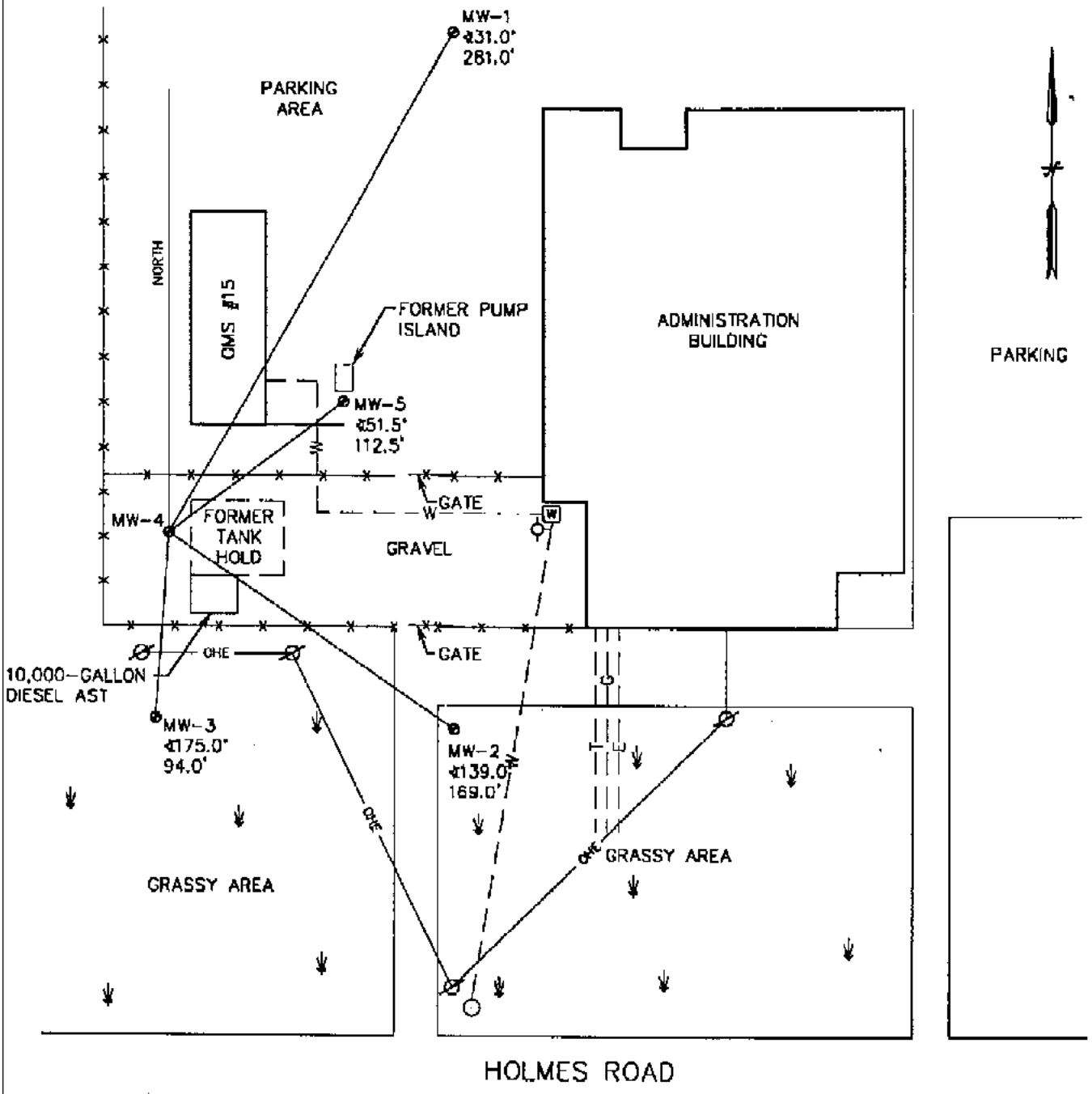

LEGEND

⊙	MONITORING WELL LOCATION	—OHE—	OVERHEAD ELECTRIC LINE
W	WATER METER	— — T — —	UNDERGROUND TELEPHONE LINE
	FIRE HYDRANT	— —OHE— —	UNDERGROUND GAS LINE
	POWER POLE	— — W — —	WATER LINE

0 40 80
SCALE IN FEET

MONITORING WELL LOCATION MAP
ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
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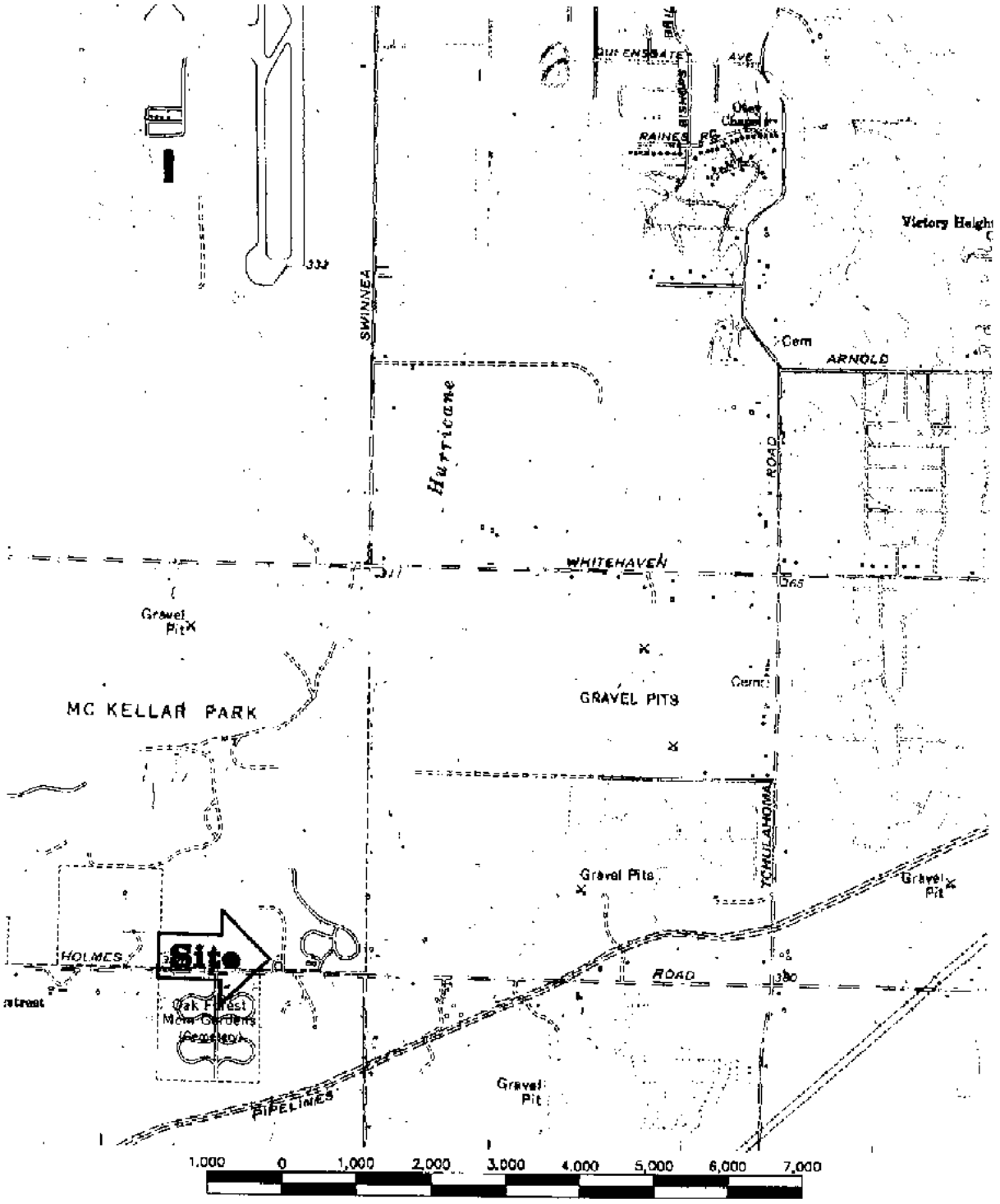


SOURCE: SOUTHEAST MEMPHIS, TENNESSEE U.S.G.S. 7.5 MINUTE SERIES TOPOGRAPHIC QUADRANGLE DATED: 1965; PHOTOREVISED: 1983.

SITE LOCATION TOPOGRAPHIC MAP

NATIONAL GUARD ARMORY OMS #015
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
1995.0043	4		DRAWN BY: ALW 07-27-98
DRAWING FILE: 1995004.3\T-2\0043-4.DWG			REVISED BY:

ATC

building. A 10,000-gallon above ground storage tank (AST) which stores diesel fuel is located adjacent to the former tankhold. The remaining central and northern portion of the property serves as a parking area for various military vehicles. This parking area consists of a mixture of asphalt and gravel

An underground water line, telephone line, and electric line intersect the southwest corner of the Administration building and terminate at Holmes Road. An underground water line intersects the west central portion of the Administration building and terminates at the southeast corner of the OMS building. Overhead electric lines intersect the southwest and southeast portion of the site and terminate near the entrance to the site near Holmes Road. The location of the subsurface utilities are illustrated in Figure 2.

C. SOIL INVESTIGATION

ATC completed a subsurface investigation during the assessment of this site. The subsurface investigation was required to define the extent of hydrocarbon impact in soil and groundwater. During April 1998, monitoring wells MW-1 through MW-5 were installed onsite.

C.1 Geology

a) The National Guard Armory OMS #15 is located in the Gulf Coastal Plain Physiographic Province. This area is characterized by gently rolling topography formed by erosion, and includes alluvial, fluvial, and sedimentary units from the Tertiary and Quaternary age geologic formations. The area is covered by a blanket of loess sediments (clayey and sandy silt) which make up the present land surface in most areas of the Mississippi River flood plain. Underlying the loess blanket is a sequence of elastic sedimentary units that range from low energy environmental sand and gravels.

b) Published Geologic maps of the southeast Memphis Quadrangle, Tennessee, currently are not available. According to the Soil Conservation District Map for Shelby County, the site is located within the Memphis-Grenada-Loring Association.

This association is common throughout the Shelby County. It is characterized by nearly level to sloping, well drained and moderately well drained, silty soils on broad uplands. The soils in this association formed in silt deposits 5 to 30 feet deep.

Memphis soils are on the narrower ridge tops and steeper hillsides and are well drained. Memphis soils have a surface layer of brown silt loam and a subsoil of brown to reddish-brown silty clay loam or silt loam.

Grenada soils are commonly on nearly level ridgetops and sloping hillsides. They have a surface layer of brown silt loam, a subsoil of yellowish-brown silt loam, and a fragipan at a depth of 15 to 30 inches.

Loring soils are on ridgetops and hillsides and are moderately well drained. They have a surface layer of brown silt loam, a subsoil of brown to dark-brown silt loam or heavy silt loam, and a weak fragipan at a depth of 12 to 30 inches.

c) The soils penetrated during drilling at this site consisted of three recognizable sections which are in descending order: 1) silty clay, 2) gravel, and 3) poorly sorted sands.

The uppermost section consists of light brown to reddish brown silty clay to an average depth of 15.34 feet below land surface (bls). This uppermost unit ranges from soft to stiff and slightly moist. Groundwater saturation is present in this section at an average depth of 12.5 feet bls.

The second section consist of a poorly sorted gravel layer ranging from an average depth of 15.34 feet bls to 15.88 feet bls. This unit sometimes contains coarse sand.

The underlying section penetrated consists of a poorly sorted sand ranging from an average depth of 15.88 feet to the terminal depths of the borings. This section is brown to reddish-brown.

d) A bedrock contour map was not provided due to the absence of bedrock.

e) No dip and strike measurements were made due to the absence of bedrock.

C.2 Soil Boring Results

On site wells MW-1 through MW-5 were drilled by Tri-State Drilling Services using a truck mounted drill rig equipped with 8.25 inch outside diameter (O.D.) hollow stem augers. A 5.0 foot length split spoon sampler was used to collect soil samples from ground surface to the approximate total depth of each boring.

All soil samples retrieved during each phase of the investigation were logged by the onsite geologist. Standard boring logs for each boring are included as Appendix A.

The drilling rig, sampling tools, and all downhole equipment were decontaminated prior to each use with a high pressure steam cleaner. All drilling

and sampling activities were completed in accordance with TDUST Environmental Assessment Guidelines (EAG, 1996).

The EAG protocols for selecting soil samples for laboratory analysis were followed during all sampling activities. Upon opening the soil sampler, the sample was split and one portion was placed in a laboratory container and immediately stored on ice for possible analysis. The remaining portion of the sample was placed in a sealable plastic bag, for headspace screening, and allowed to volatilize for a minimum of fifteen minutes. The onsite geologist then used a Foxboro Organic Vapor Analyzer (OVA) Flame Ionization Detector (FID) to measure and record relative levels of volatile organics which were present in the headspace portion. A minimum of two samples were selected from most of the borings for laboratory analysis; the sample with the highest OVA-FID reading, and the sample collected at the point of initial contact with groundwater. Proper chain-of-custody procedures were followed during sample collection and handling activities.

C.3 Analytical Results

a) Soil samples collected during this investigation were submitted for analysis of benzene, toluene, ethyl-benzene, and xylenes (BTEX) with Methyl-tert-butyl ether (MTBE) by EPA method 5030/8020, and Total Petroleum Hydrocarbons - Gasoline Range Organics (TPH-GRO) and total Petroleum Hydrocarbons - Diesel Range Organics (TPH-DRO) by Tennessee standard method. Laboratory services were provided by Hygeia Laboratories, a subsidiary of ATC, located in Marietta, Georgia.

b) The soil sample analytical results are summarized in Table 1. The laboratory reports and corresponding chain-of-custody forms are included as Appendix B.

TABLE 1
Soil Analytical Summary
ARMY NATIONAL GUARD OMS # 15
TDUST Facility I.D. #0-790983

Boring Well	Interval Sampled (feet bls)	Date Sampled	Analytical Parameters							
			Benzene	Toluene	Xylenes	MTBE	Total BTX	TPH-GRO	TPH-DRO	Total TPH
Method Detection Limits			0.002	0.002	0.002	0.025	---	0.5	4.0	---
MW-1	8-10	4-7-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-1	6-8	4-7-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	6-8	4-7-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-2	8-10	4-7-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-3	5-7	4-6-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-3	10-12	4-6-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-4	3-5	4-6-98	ND	ND	ND	ND	ND	ND	5.0	5.0
MW-4	10-12	4-6-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-5	5-7	4-6-98	ND	ND	ND	ND	ND	ND	ND	ND
MW-5	10-12	4-6-98	ND	ND	ND	ND	ND	ND	ND	ND

NOTES:
Results listed in parts-per-million (ppm)
Benzene clean-up level = 50 ppm
TPH clean-up level = 500 ppm
ND - None Detected
MW - Monitoring Well
Shaded areas exceed applicable clean-up levels

C.4 Soil Properties

a) Two shelby tubes were collected from boring SB-5 at intervals of 9-11 feet bls to 11-13 feet bls. The 11 to 13 foot bls sample was collected as the most permeable zone and the zone just above the water table. The 9 to 11 foot bls sample was collected as the second most permeable zone.

b) The samples were collected by direct-push shelby tube techniques. The soil boring was advanced to the top of a desired sample interval. A shelby

tube was then lowered into the boring, and an undisturbed soil sample was collected by pushing the shelby tube through the desired interval.

c) The shelby tube samples were tested in accordance with method 9100 of test methods for evaluating solid waste, Third Edition (SW-486) and in general accordance with ASTM D-5084. Fractional Organic Carbon was tested in accordance with ASTM D-2974-90 (Method C).

d) Tri-State Testing Services, Inc. In Memphis, Tennessee, performed the analysis.

e) Soil permeability data is summarized in Table 2.

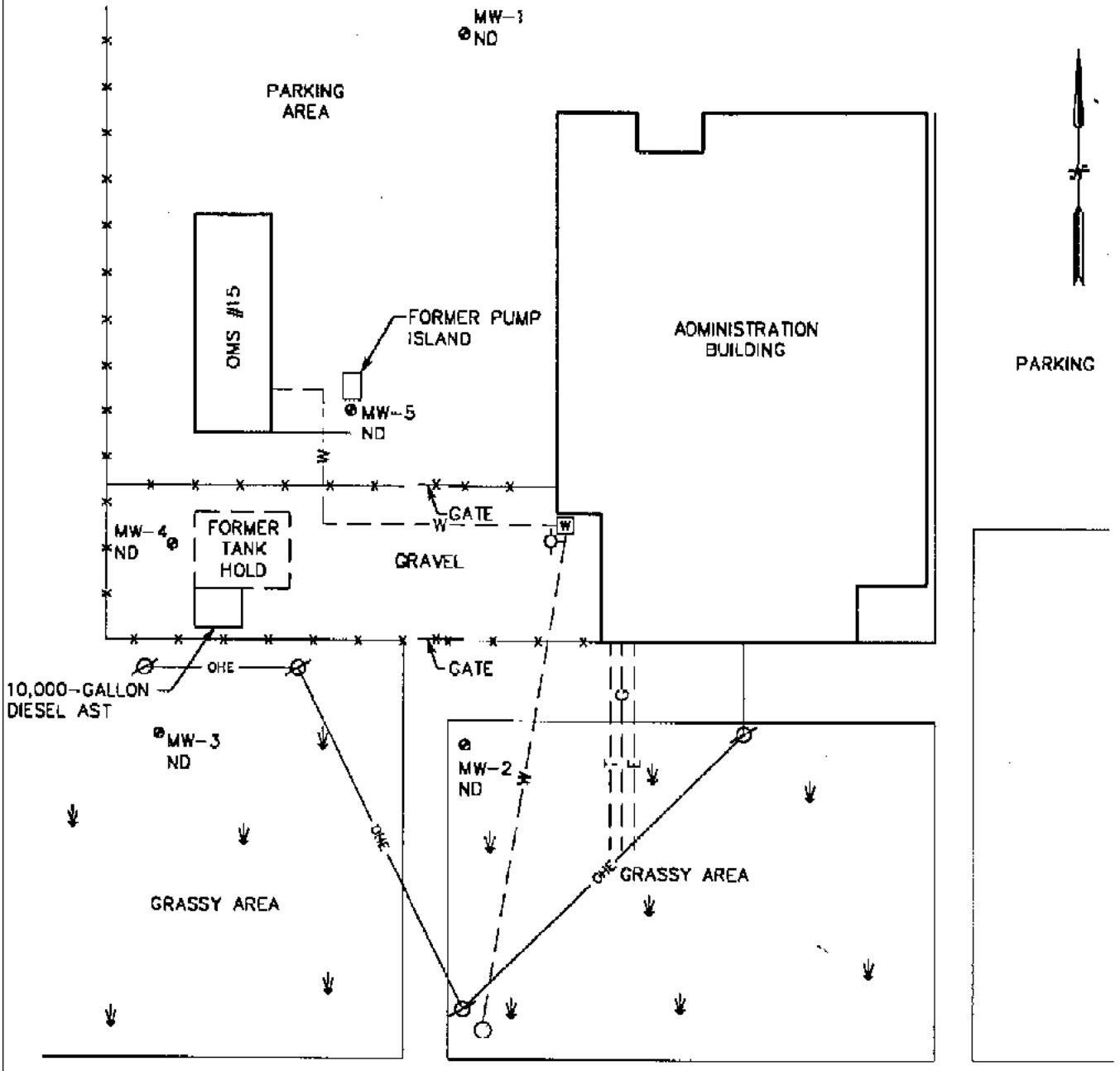
C.5 Soil Containment Plume Maps

Plume maps depicting the estimated lateral extent and concentrations of BTEX and TPH in soil beneath the site are included as Figures 5 and 6, respectively. BTEX and TPH-GRO concentrations were not detected in the immediate vicinity of monitoring wells MW-1 through MW-5. The highest concentrations of TPH-DRO are present within the immediate vicinity of monitoring well MW-5 adjacent to the former dispenser island. TPH-DRO concentrations were not detected in the vicinity of monitoring wells MW-1 through MW-4. The containment area of the plume and general plume morphology, indicate that plume migration is minimal. Soil analytical results indicate TPH levels below site action limits.

TABLE 2
Soil Properties Summary
NATIONAL GUARD ARMORY OMS #15
TDUST Facility I.D. #0-790983

Boring Depth (bls) Zone		SB5A-1 9-11 Vadose Zone	SB5A-2 11-13 Capillary Fringe
Parameters	units		
Permeability	cm/sec	2.3×10^{-7}	4.1×10^{-6}
Volumetric Air Content	cm^3-air/cm^3-soil	0.017	0.012
Volumetric Water Content	cm^3-air/cm^3-soil	0.334	0.316
Total Soil Porosity	cm^3/cm^3-soil	0.351	0.328
Soil Bulk Density (wet)	g-soil/cm^3-soil	2.04	2.06
Fractional Organic Carbon	g-carbon/g-soil	0.009	0.009

f) Based on the most permeability sample of 4.1×10^{-6} and the groundwater classification of non-drinking water, the applicable clean-up levels were determined. The levels are 50 parts-per-million (ppm) benzene and 500 ppm TPH. Appendix C contains the soil properties report from Tri-State Testing Services, Inc.



LEGEND

- MONITORING WELL LOCATION
- WATER METER
- FIRE HYDRANT
- POWER POLE
- OHE — OVERHEAD ELECTRIC LINE
- T — UNDERGROUND TELEPHONE LINE
- OHE — UNDERGROUND GAS LINE
- W — WATER LINE

0 40 80
SCALE IN FEET

SOIL BTX PLUME MAP (04-06-98)

ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
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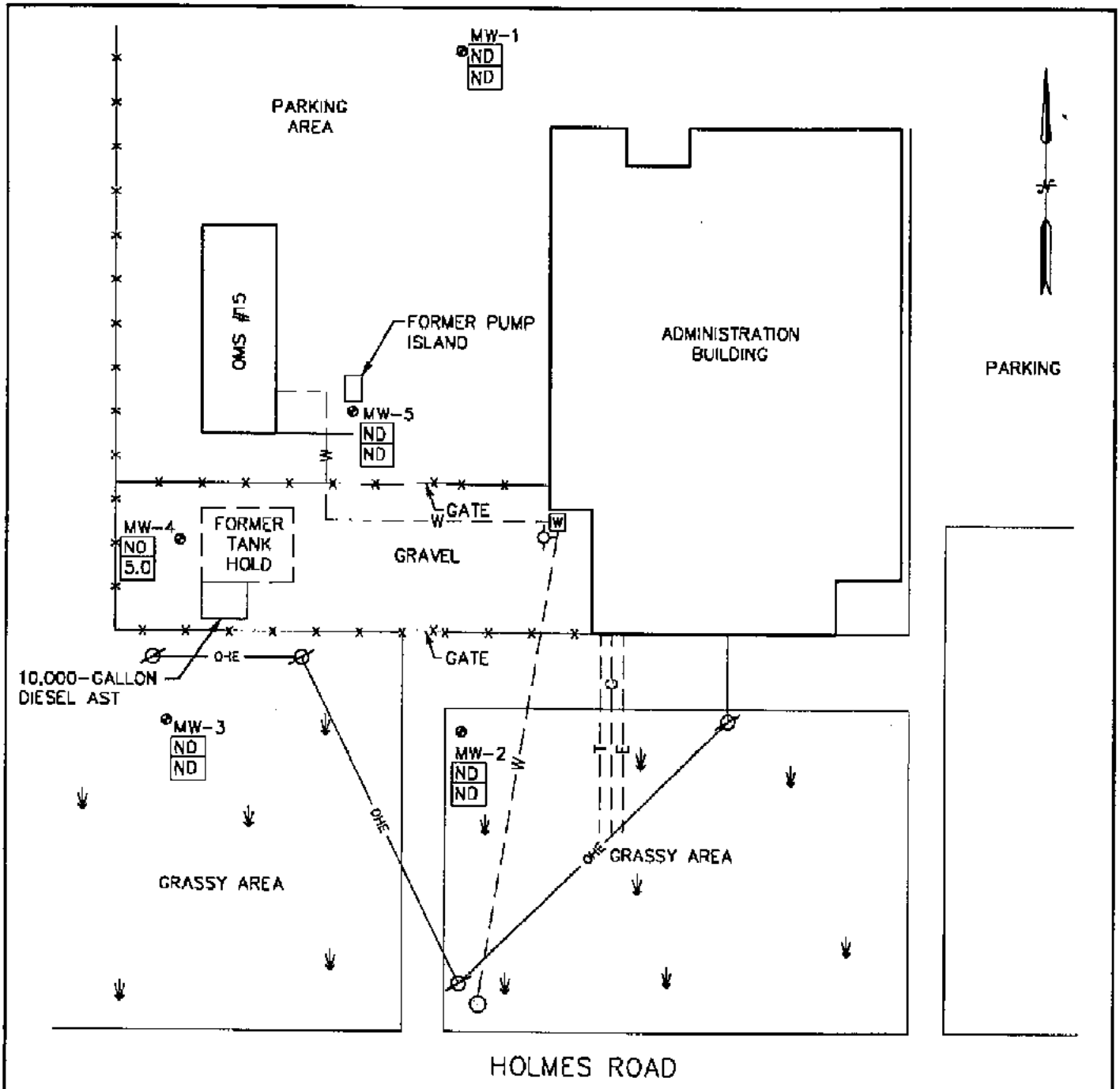

LEGEND

- MONITORING WELL LOCATION
- WATER METER
- FIRE HYDRANT
- POWER POLE
- OHE — OVERHEAD ELECTRIC LINE
- T — UNDERGROUND TELEPHONE LINE
- G — UNDERGROUND GAS LINE
- W — WATER LINE
- GRO / DRO — TPH

0 40 80
SCALE IN FEET

SOIL TPH PLUME MAP (04-06-98)

ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
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DRAWING FILE: 19950043\T-2\0043-6.DWG			REVISED BY:

ATC

D. GROUNDWATER INVESTIGATION

Five groundwater monitoring wells, MW-1 through MW-5, were installed during the investigation phase during April 1998, to assess conditions in the vicinity of and laterally from the suspected point of hydrocarbons release. Monitoring well MW-1 was located in an inferred upgradient position. Wells MW-2 and MW-3 were located in inferred downgradient and lateral directions. MW-4 was installed adjacent to the suspected point of release. MW-5 was installed adjacent to the former pump island.

Laboratory analysis of groundwater samples collected from groundwater monitoring wells MW-1 through MW-5 indicated that the groundwater contaminate plume had been adequately defined and that groundwater beneath the site had not been impacted. Analytical results indicated that BTEX, TPH-GRO, and TPH-DRO parameters were not detected in monitoring wells MW-1 through MW-5.

D.1 Hydrogeology

a) Saturated conditions occur at an average depth of approximately 12.5 feet bls within the underlying silty clays. The inferred direction of groundwater flow is westerly. Primary aquifer recharge is believed to be from associated tributaries of Hurricane Creek, McKellar Lake, and from infiltrating meteoric water. Preferential pathways for infiltrating water were not identified.

b) Free product was not observed during the site investigation.

c) Historic water levels measured at the site area summarized in Table 3.

d) Potentiometric maps for water levels measured in April 24, 1998, and June 11, 1998, are illustrated in Figures 7 and 8 respectively. The inferred direction of groundwater flow April 24 and June 11, 1998, was westerly.

e) The hydraulic gradient (i) is defined as the loss of head (dh) over the linear distance (dl) dh/dl = di. The hydraulic gradient (i) was an average determined between wells MW-2 and MW-3 from the potentiometric data collected from April 24, 1998, and between wells MW-2 and MW-4 from the Potentiometric data collected from June 11, 1998.

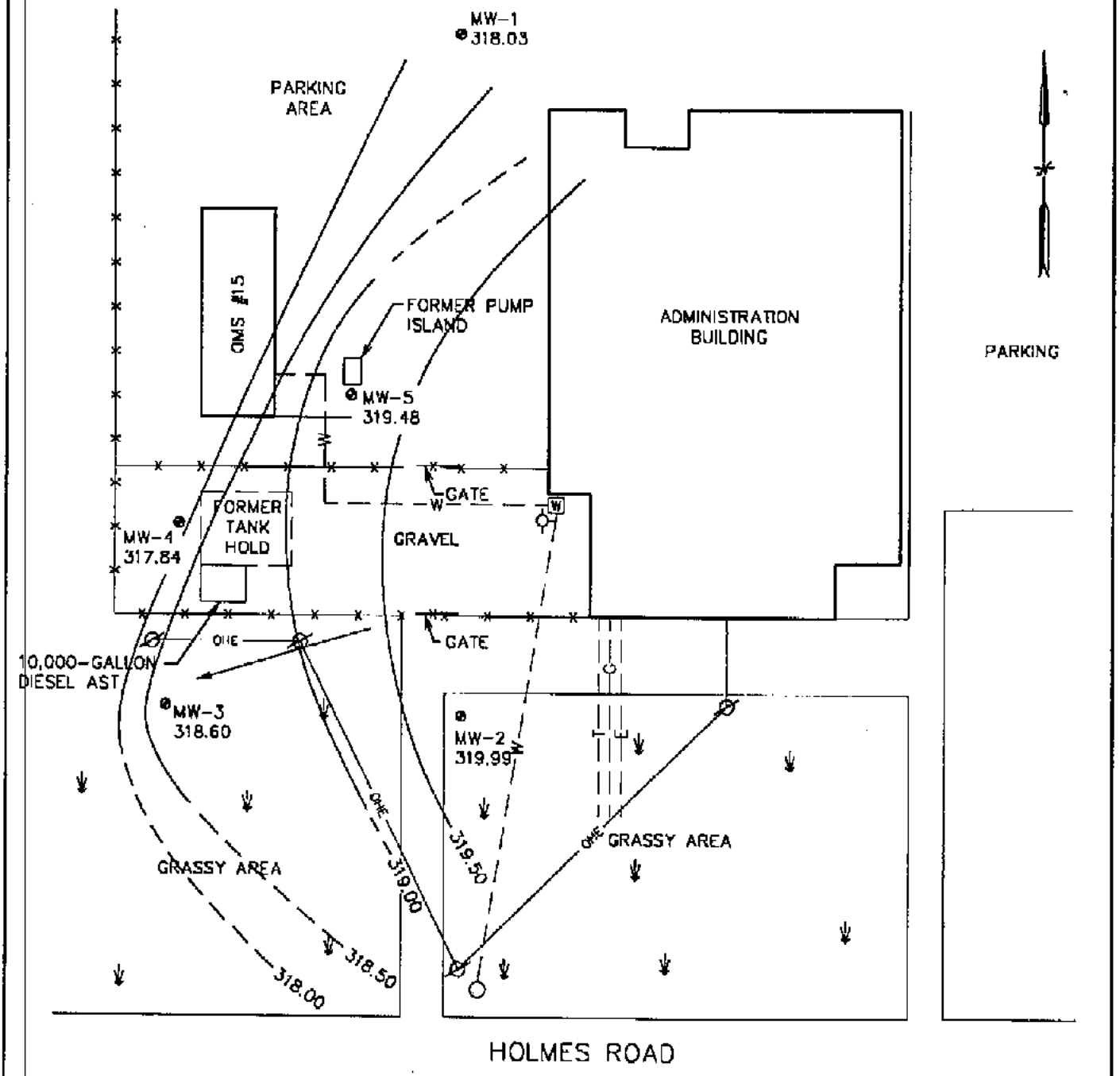
4/24/98	6/11/98
319.998 (MW-2 static elevation)	319.00 (MW-2 static elevation)
-318.60 (MW-3 static elevation)	-316.76 (MW-4 static elevation)
1.39 (dh)	2.24(dh)
dh = 1.39 ft	dh = 2.24 ft
dl = 150 ft	dl = 172.5 ft
$i = 9.26 \times 10^{-3}$	$i = 1.29 \times 10^{-2}$

Average hydraulic gradient, (i_{avg}) $= (9.26 \times 10^{-3} + 1.29 \times 10^{-2}) / 2$
$= 1.11 \times 10^{-2}$

TABLE 3
Water Level Data Summary
NATIONAL GUARD ARMORY OMS #15
TDUST Facility I.D. #0-790983

Well	Well Depth	TOC Elevation	Date Measured	Depth from TOC to Free Product	Depth from TOC to Water	Thickness of Free Product	Potentiometric Surface Elevation	Adjusted Potentiometric Surface Elevation
MW-1	17.68	324.07	4-23-98	NP	6.04	NP	318.03	318.03
MW-1	17.68	324.07	6-11-98	NP	7.09	NP	316.98	316.98
MW-2	17.77	323.40	4-23-98	NP	3.41	NP	319.99	319.99
MW-2	17.77	323.40	6-11-98	NP	4.40	NP	319.00	319.00
MW-3	17.45	321.18	4-23-98	NP	2.58	NP	318.60	318.60
MW-3	17.45	321.18	6-11-98	NP	4.60	NP	316.58	316.58
MW-4	17.09	321.82	4-23-98	NP	3.98	NP	317.84	317.84
MW-4	17.09	321.82	6-11-98	NP	5.06	NP	316.76	316.76
MW-5	17.52	322.77	4-23-98	NP	3.29	NP	319.48	319.48
MW-5	17.52	322.77	6-11-98	NP	4.69	NP	318.08	318.08

NOTES:
All measurements in feet
NP= No product encountered



LEGEND

- MONITORING WELL LOCATION
- WATER METER
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- POWER POLE
- OHE — OVERHEAD ELECTRIC LINE
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- OHE — UNDERGROUND GAS LINE
- W — WATER LINE
- GROUNDWATER FLOW DIRECTION

0 40 80
SCALE IN FEET

POTENTIOMETRIC SURFACE MAP (04-24-98)
ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
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DRAWING FILE: 19950043\T-2\0043-7.DWG			REVISED BY:

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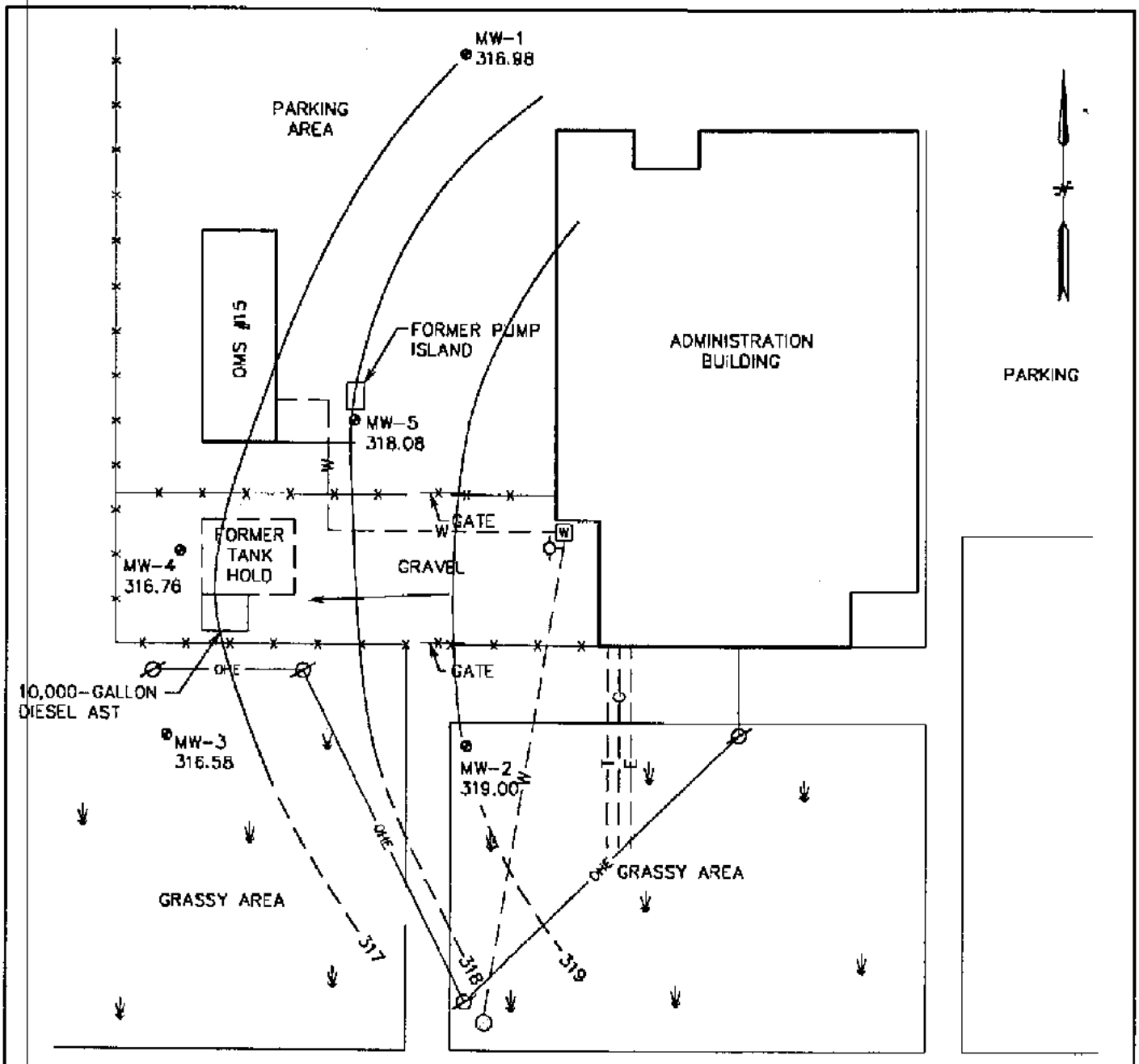

LEGEND

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- WATER METER
- FIRE HYDRANT
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- OHE — OVERHEAD ELECTRIC LINE
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- OHE — UNDERGROUND GAS LINE
- W — WATER LINE
- GROUNDWATER FLOW DIRECTION

0 40 80
SCALE IN FEET

POTENTIOMETRIC SURFACE MAP (06-11-98)
ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
1995.0043	8		DRAWN BY: ALW 07-27-98
DRAWING FILE: 19950043\T-2\0043-8.DWG			REVISED BY:

ATC

f) Using Darcy's Law, the apparent groundwater velocity (v) in centimeters per second (cm/sec) is the hydraulic conductivity (K) times the hydraulic gradient (I) divided by the efficient porosity (Ne).

$$V = \frac{K(i)}{Ne}$$

A 20 percent porosity was used in the equation. Using a published hydraulic conductivity for clayey sands of 1.0×10^{-3} cm/sec, and the hydraulic gradient of 1.11×10^{-2}, the groundwater velocity is calculated as:

$$\frac{.001 \text{ cm/sec } (.011) \text{ ft/ft}}{0.20}$$

$= 5.5 \times 10^{-5}$ cm/sec

Converted to a yearly rate, the anticipated groundwater flow based on the above calculation is approximately 1,734.48 cm/yr.

TABLE 4
Well Construction Usage Summary
NATIONAL GUARD ARMORY OMS #15
DUST Facility I.D. #0-790983

Well	Fill Sand (lbs)		Bentonite (lbs)		Grout (gal)		Concrete
	Estimate	Used	Estimate	Used	Estimate	Used	Used (lbs)
MW-1	312.5	300	46	50	6.4	7.0	160
MW-2	312.5	300	46	50	6.4	7.0	160
MW-3	312.5	287.5	46	50	8.4	9.0	160
MW-4	312.5	300	46	50	8.2	8.0	160
MW-5	312.5	287.5	46	50	7.9	8.0	160

NOTES:
* More grout required due to uneven annulus.

D.3 Well Development

Upon Completion of well installation activities, the wells were developed by removing water with a disposable bailer. Each well was bailed until relatively clear of sediment. Although relatively clear of visible sediment, the development water retained a reddish-brown color that is believed to be due to the high iron content of the host sediments. No odors were detected from wells MW-1 through MW-5.

D.4 Monitoring Well Sampling

Prior to sample collection, each monitoring well was opened, water was allowed to reach static levels, and the resulting depth to water was measured and recorded.

This information was then used to calculate the standing well volume, and a minimum of three well volumes were purged from the well prior to sampling.

Groundwater samples were collected with single-use disposable bailers and new nylon string. Upon retrieval, the samples were placed in the appropriate laboratory sample containers, labeled, and placed on ice until delivery to the laboratory. Proper chain-of-custody procedures were followed during all sample collection and handling activities. Laboratory services were provided by Hygeia Laboratory of Marietta, Georgia. The groundwater samples were analyzed for BTEX, MTBE, TPH-GRO, and TPH-DRO.

D.5 Analytical Results

a) Historical analytical results for groundwater samples collected at this site are summarized in Table 5. Benzene, TPH-GRO, and TPH-DRO were not detected for MW-1 through MW-5.

b) Groundwater Analytical Reports are located in Appendix D.

TABLE 5
Groundwater Analytical Summary
NATIONAL GUARD ARMORY OMS #15
DUST Facility I.D. #0-790983

Well Boring	Date Sampled	Analytical Parameters						
		Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE	TPH-GRO	TPH-DRO
Method Detection Limit		0.0004	0.0004	0.0004	0.0004	0.005	0.1	0.1
MW-1	4-24-98	ND	ND	ND	ND	ND	ND	ND
MW-2	4-24-98	ND	0.0045	ND	0.0006	ND	ND	ND
MW-3	4-24-98	ND	ND	ND	ND	ND	ND	ND
MW-4	4-24-98	ND	ND	ND	ND	ND	ND	ND
MW-5	4-24-98	ND	ND	ND	ND	ND	ND	ND

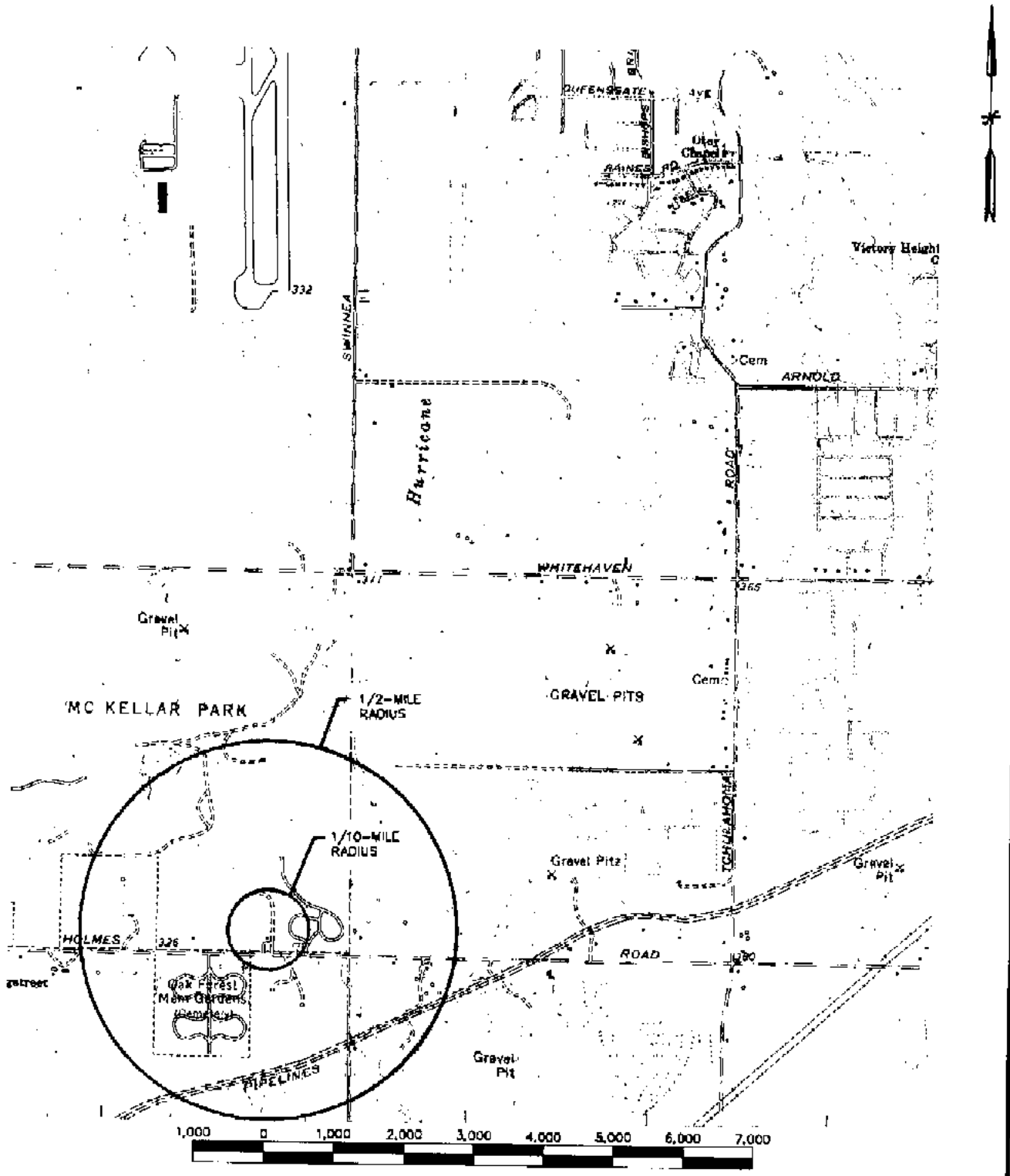
NOTES:
All results listed in parts-per-million (ppm)
Applicable benzene clean-up level = 0.07
Applicable TPH clean-up level = 1.0 ppm
Shaded areas exceed applicable clean-up levels

D.6 Groundwater Classification Procedure

a) Data from the water use survey.

i. The location of wells and springs is illustrated in Figure 9.

ii. No drinking water supplies were identified within a one-half mile radius of the site.



SOURCE: SOUTHEAST MEMPHIS, TENNESSEE U.S.G.S. 7.5 MINUTE SERIES TOPOGRAPHIC QUADRANGLE DATED: 1965; PHOTOREVISED: 1983.

DRINKING WATER WELL LOCATION MAP

ARMY NATIONAL GUARD - OMS #015
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
1995.0043	9		DRAWN BY: ALW 07-27-98
DRAWING FILE: 19950043\T-2\0043-9.DWG			REVISED BY:

ATC

iii - iv. Completed water use survey forms for all water supplies (wells and springs) identified within a one-half mile radius of the tank hold are located in Appendix E.

v. ATC personnel conducted a reconnaissance of the vicinity and located no private, domestic, or commercial drinking water wells. Drinking water supplies for the site and vicinity are publicly provided by the Memphis Light, Gas, and Water Utility Department.

A water well database printout was obtained from the Tennessee Division of Water Supply. Based on recorded latitudes and longitudes, there are two drinking water production wells within an approximate one-half mile radius of the site. These drinking water wells include the Haisch residence located approximately three-tenths of a mile west of the site and the Anderson residence located approximately four-tenths of a mile east of the site. However, these residences have been abandoned due to the southward expansion of the Memphis International Airport. Therefore, a "non-drinking water" classification is applicable.

vi. No alternative water supplies or systems are required.

b) Data from Analytical Sampling

Since a drinking water supply was not located within a one-half mile of the site, no analytical sampling was performed.

c) Data from the Pump Test

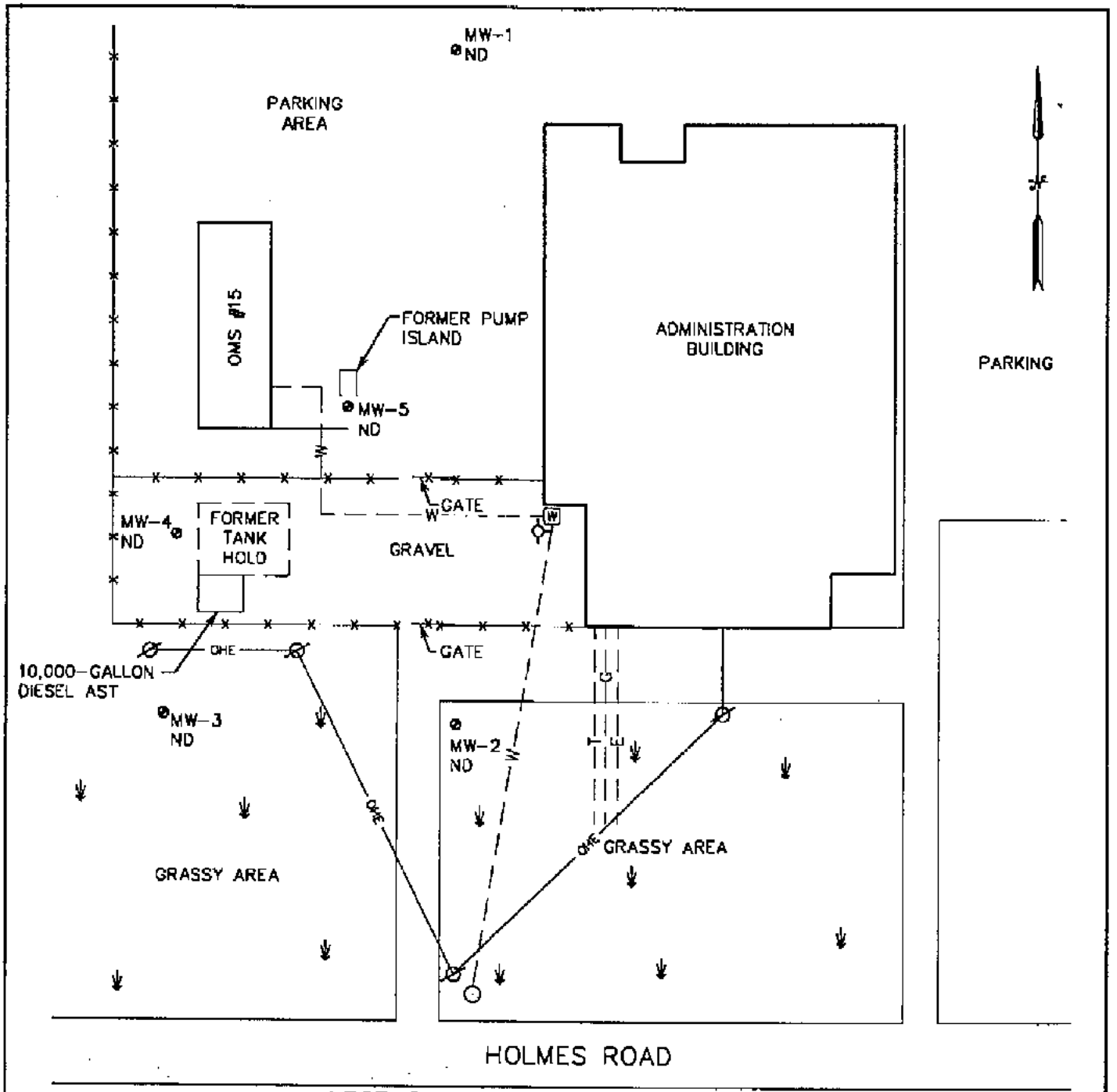
Pump tests were not conducted during the investigation of this site.

d) Applicable Clean-up Levels

The data collected during the investigation indicates that a "non-drinking water" status is appropriate for the study aquifer. ATC recommends that groundwater clean-up levels of 0.07 ppm benzene and 1.0 TPH be applied for interpretation of the site data.

D.7 Groundwater Containment Plume Maps

Benzene, TPH-GRO, and TPH-DRO groundwater plume maps are depicted in Figures 10 and 11, respectively. Analytical results for all parameters indicate no detectable levels of hydrocarbons in the groundwater. Topography for the site slopes toward the west and north.



LEGEND

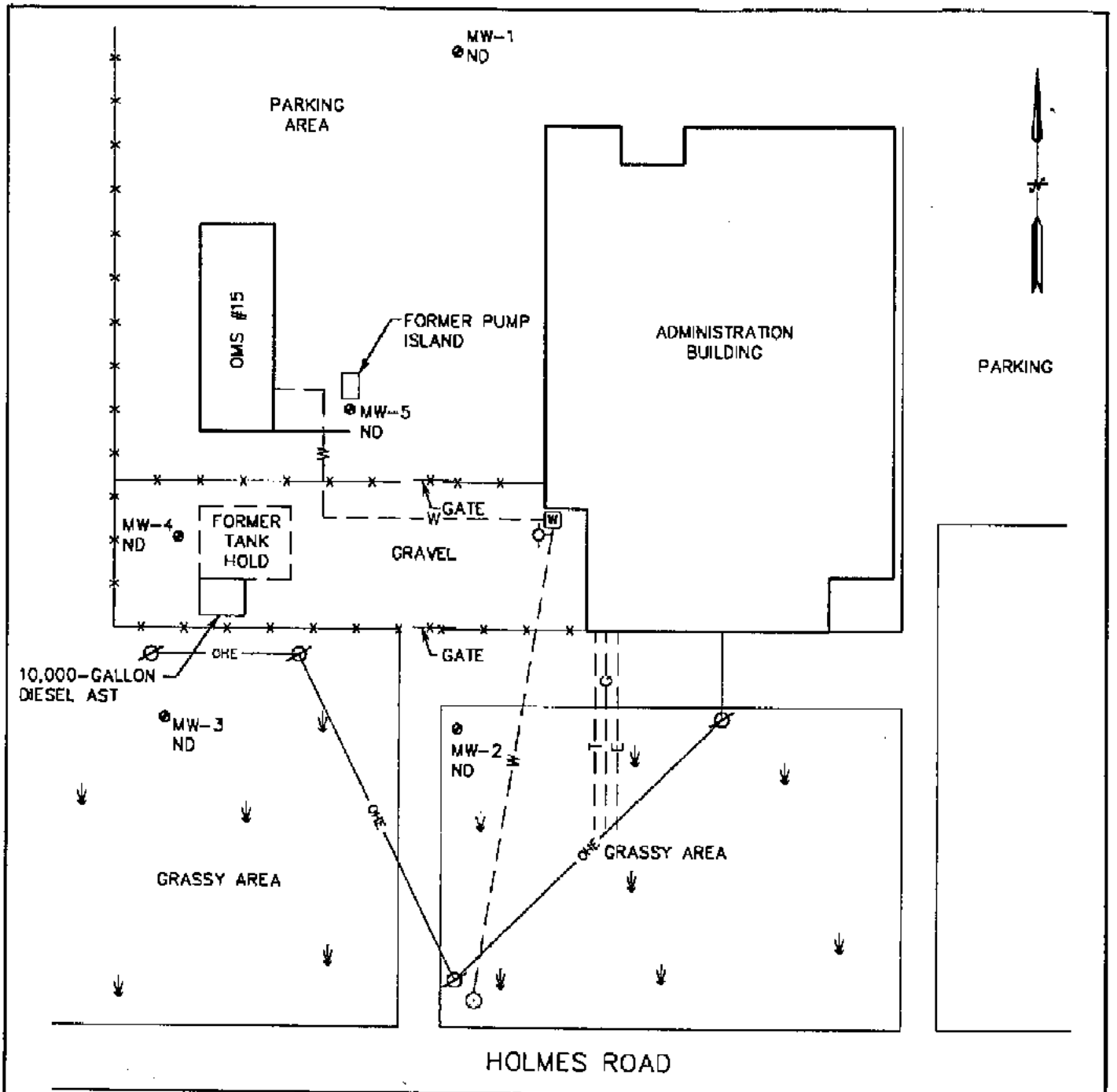
⊘	MONITORING WELL LOCATION	—OHE—	OVERHEAD ELECTRIC LINE
W	WATER METER	— T —	UNDERGROUND TELEPHONE LINE
	FIRE HYDRANT	—GAS—	UNDERGROUND GAS LINE
	POWER POLE	— W —	WATER LINE

0 40 80
SCALE IN FEET

BENZENE CONTAMINATION PLUME MAP (04-24-98)
ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
1995.0043	10		DRAWN BY: ALW 07-27-98
DRAWING FILE: 19950043\T-2\0043-10.DWG			REVISED BY:

ATC



LEGEND

- MONITORING WELL LOCATION
- WATER METER
- FIRE HYDRANT
- POWER POLE
- OHE — OVERHEAD ELECTRIC LINE
- T — UNDERGROUND TELEPHONE LINE
- OHE — UNDERGROUND GAS LINE
- W — WATER LINE

0 40 80
SCALE IN FEET

TPH CONTAMINATION PLUME MAP (04-24-98)
ARMY NATIONAL GUARD - OMS #15
MEMPHIS, TENNESSEE
FACILITY I.D. #0-790983

PROJECT NUMBER:	FIGURE	CHECKED BY:	SCALE: AS SHOWN
1995.0043	11		DRAWN BY: ALW 07-27-98
DRAWING FILE: 19950043\T-2\0043-11.DWG			REVISED BY:

ATC

E. SITE RANKING

Appendix G contains the completed Site Ranking Form. The score for the site was 138.

F. PROPOSED ADDITIONAL MONITORING WELLS

No additional monitoring wells are warranted.

G. ASSESSMENT ACTIVITIES COST

Appendix H contains the completed cost forms for this investigation.

H. SIGNATURE PAGE

I certify under penalty of law, including but not limited to penalties for perjury, that the information contained in this report and on any attachments, is true, accurate and complete to the best of my knowledge, in formation, and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional violations.

STATE OF TENNESSEE

Steven L. Westerman — Owner/Operator (Print)

Signature

8/5/98 — Date

STATE OF TENNESSEE

Sworn to and subscribed before me by Steven L. Westerman on this date

8/5/98

My commission expires My Commission Expires MAY 28, 2002

Sharon S. Willis
Notary Public - Print Name

Sharon S. Willis
Signature

John W. Hargraves — P.E. or P.G. (Print)

Signature

07-30-98 — Date

4116
TN Lic./Reg. #

STATE OF TENNESSEE

Sworn to and subscribed before me by John W. Hargraves on this date

7/30/98

My commission expires My Commission Expires MAY 28, 2000

Marcie A. Allen
Notary Public - Print Name

Marcie A. Allen
Signature

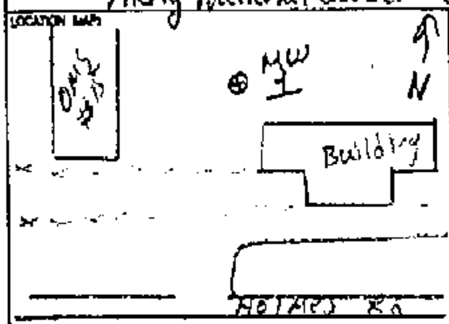
------- ‡ -------

APPENDIX A

STANDARD BORING LOGS

------- ‡ -------

FACILITY NAME: Army National Guard OMS #15		TN FAC. ID#: 0-790983	WELL#/BORING#: MW1
LOCATION MAP:	START DATE & TIME: 4-7-98 1003	PROJECT #: 495.0043	
	COMP. DATE & TIME: 4-7-98 1047	Standard Boring Log	
	LOGGED BY: James McCabe TN LIC# 0534	State of Tennessee	
	DRILLER: Joe TRI-STATE	Underground Storage Tank Division	
	DRILLING METHOD: 4¼" ID HSA	Department of Environment and Conservation	
	ELEV (MSL): T.D. (MSL):		
	COMMENTS:		



MSL	COMPLETION DIAGRAM (BOREHOLE DIAMETER: 8")	WATER LEVEL	PENETRATION RATE	DEPTH	GRAPHIC LITHOLOGY	OVD	TYPE	RECOVERY	ANAL	DESCRIPTION (Color, Texture, Structure, etc.)
	grout; 2" PVC riser			0		42	CS		out	CS gravels
										Slty Cl, Lt. Brn, Soft to Med Stiff, Saturated, organics
	bentonite			2.9		2.9	CS		out; BTX GR DRO	Slty Cl, Lt Brn, Med Stiff to Stiff, Saturated, Sd, v. Fine grained, Fe Staining, root holes
	coarse Sd	▼ ▽		7.9		1.9	CS		out; BTX GR DRO	Slty Cl, Sdy, Rdsh Brn Stiff, saturated, poorly sorted Sds, rounded to Sub-rounded
	2" PVC screen 0.01			12.9		3.6	CS		out	Slty Sdy Cl, Rdsh Brn stiff, wetter, poorly sorted Sds, sub-rounded
				16.6 / 16.9						Pebbles and Sd (coarse)
17.9				17.9						Sd, Rdsh Brn, poorly sorted
										BOH 17.9

Depth scale: 0, 5, 10, 15, 20, 25, 30

FACILITY NAME: Army National Guard OMS #15

TN FAC. ID#: 0-790983

WELL # / B/H: MW2 | 2 1

LOCATION MAP: OMS #15

Building

N

MW2

Holmes Rd

START DATE & TIME: 4-7-97 0842

COMP. DATE & TIME: 4-7-97 0940

LOGGED BY: James McCabe TN LIC#: 0234

DRILLER: Joe TRI-STATE

DRILLING METHOD: 4¼" ID HSA

ELEV (MSL):

T.D. (MSL):

COMMENTS:

PROJECT #: 1995.0045

Standard Boring Log

State of Tennessee

Underground Storage Tank Division

Department of Environment and Conservation

COMPLETION DIAGRAM — BOREHOLE DIAMETER: 8"

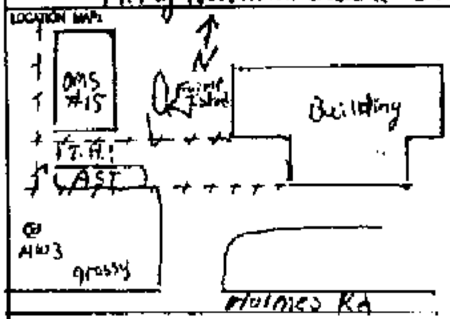
DEPTH	PID	SAMPLE TYPE	ANAL.	DESCRIPTION (Color, Texture, Structure, etc.)
0 – 2.9	1.3	CS		Slty Clay, Lt Rdsh Brn, some greyish mix, v. moist, stiff, organics (roots), blocky
2.9	1.2			Slty Cl, Rdsh Brn, v. moist, organics, blocky, stiff
5	1.3	CS	BTX GRO DRO	Slty Clay, greyish, v. moist, stiff, Fe staining, root holes
7.9	2.2	CS	BTX GRO DRO	Slty Cl, greyish, stiff, v. moist to saturated, Sd, Fine grained, Fe staining. water
12.9	2.0	CS		Slty Clay, greyish, Sdy, poorly sorted
16.3				pebbles & Sd
16.4				Sd, Rdsh Brn, poorly sorted
17.9				BOH 17.9

Completion diagram notes: grout; bentonite; 2' blank riser; coarse Sd; 2" PVC screen 0.01; MSL 17.9

FACILITY NAME: Army National Guard OMS #15

TN FAC. ID#: 0-790983 | WELL # / B/ BORING #: MW3 | PG 1

LOCATION MAP:



START DATE & TIME: 4-6-98 1245

COMP. DATE & TIME: 4-6-98 1341

LOGGED BY: James McGee TN LIC#: 0534

DRILLER: Joe TRI-STATE

DRILLING METHOD: 4¼" I.D. HSA

ELEV (MSL): T.D. (MSL):

COMMENTS:

PROJECT #: 1995.0043

Standard Boring Log

State of Tennessee
Underground Storage Tank Division
Department of Environment and Conservation

COMPLETION DIAGRAM — BOREHOLE DIAMETER: 8"

MSL	DEPTH	PID	SAMPLES & CORES TYPE	DESCRIPTION (Color, Texture, Structure, etc.)
	0	3.4	CS	Fill Clay Brn/Rdsh Brn; Slty Clay, Lt Brn, stiff, Moist, very organic (roots)
	2.84	5.4	CS	Slty Cl, Brn, organics (roots) stiff to med stiff, V. moist
3.8	4.3	8.4	CS	Slty Clay, greyish, med stiff, V. moist, Sd, Fine grained, Fe staining
5.8 / 7.8	7.8	5.2	CS	Slty Clay, Sdy, Brn/greysh mix, Fine to med. grain sd, sm pebbles, Fe staining
		5.2		Slty Clay, greysh, stiff, So. pebbles, rounded, Sd, poorly sorted
	12.8	3.8		Pebbles
	13.8	7.0	CS	Sand, poorly sorted, Rdsh, rounded to sub-Rounded, water
17.8	17.8			BOH 17.8

FACILITY NAME: Army National Guard OMS #15

TN FAC. ID #: 0-790983

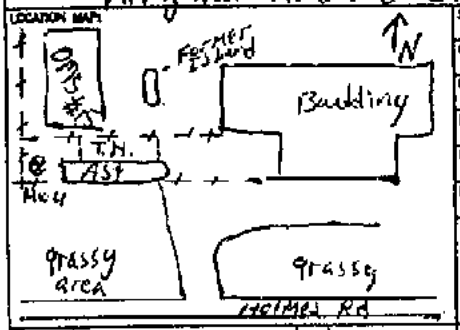
WELL #/E: MW4 #1

PROJECT #: 1995.0043

Standard Boring Log

State of Tennessee
Underground Storage Tank Division
Department of Environment and Conservation

LOCATION MAP:



START DATE & TIME: 4-6-98 1007

COMP. DATE & TIME: 4-6-98 1145

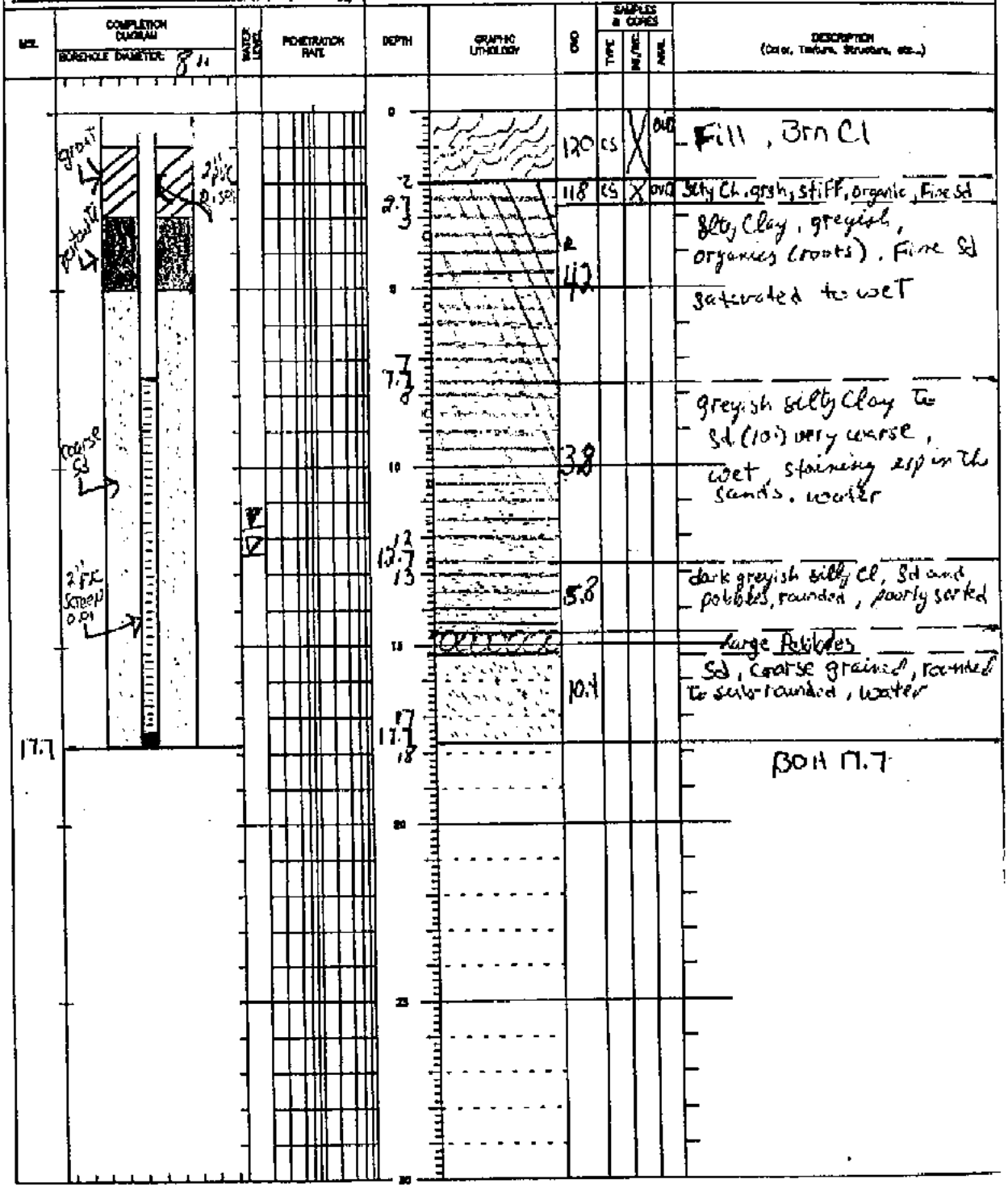
LOGGED BY: James McGehee TN LIC# 0534

DRILLER: Joe TRI-STATE

DRILLING METHOD: 4¼" ID HSA

ELEV (MSL): T.D. (MSL):

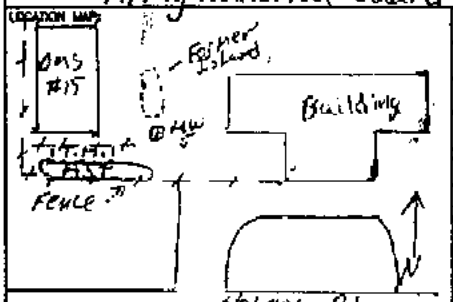
COMMENTS:



FACILITY NAME: Army National Guard OMS #15

TN FAC. ID#: 0-790883 | WELL #/ID#: MW5 | 2 of 2

PROJECT #: 1995.0043

LOCATION MAP: 

START DATE & TIME: 4-6-98 0900

COMP. DATE & TIME: 4-6-98 1008

LOGGED BY: James McCabe TN LIC# 2534

DRILLER: Joe TRI-STATE

DRILLING METHOD: 4¼" ID HSA

ELEV (MSL): T.D. (MSL):

COMMENTS:

Standard Boring Log

State of Tennessee
Underground Storage Tank Division
Department of Environment and Conservation

MSL	COMPLETION DIAGRAM (BOREHOLE DIAMETER: 8")	WATER LEVEL	PENETRATION RATE	DEPTH	GRAPHIC LITHOLOGY	PID	SAMPLES & CORES: TYPE	SAMPLES & CORES: NO./REC.	SAMPLES & CORES: APPAR.	DESCRIPTION (Color, Texture, Structure, etc.)
				0						asphalt
				0.5						C.S. gravels
						2.0	CS		BRN	Silty Clay, Lt Rdsh Brn/Brn Mlv, Saturated, blk nodules, Fe staining, organics, blocky
				1.8						
						2.0			GRA	Silty Clay, Lt Rdsh Brn, Saturated, Sd, Fine grained, Fe staining and concretions (upper 2'), blocky
				5			CS			
						4.2			GRA BRN GRA BRN	
				7.8						Silty Sdy Cl, Lt Rdsh Brn, Soft, Fine grained Sd, sl staining, wtr
				10			CS		GRA	
						4.6			BRN GRA BRN	
				12.8						Silty cl w/ sd, greyish, fine grained
									GRA	Sandy Clay, Rdsh Brn, med stiff, wet, Pebbles
				15		2.8	CS			
				17		4.0				Large Pebbles w/ Sd - Sd, med to coarse grained, rounded to sub-rounded, wtr
				17.8						BOH 17.8
				20						
				25						
				30						

Grout
Bent
Coarse Sd
2" pvc Screen 0.01

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APPENDIX B

SOIL ANALYTICAL REPORT

------- ‡ -------

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

CLIENT: ATC Associates Inc. - Nashville, TN

ATTENTION: James McCabe

CLIENT PROJECT #: 1995.0043 - OMS # 15; Fac. I.D. # 0-790983

CLIENT I.D. #: 10-67-11887

LAB PROJECT #: 23317 DATE SAMPLED: 04/06/98

MATRIX: Soil DATE SAMPLE RECEIVED: 04/08/98

METHOD: SW-846 8020 (BTEX) DATE SAMPLE ANALYZED: 04/10/98

UNITS: mg/kg (ppm) DATE REPORT: 04/17/98

PARAMETER	EQL	SAMPLE I.D. LAB:	182525	182526	182527
		STATION:	MW 5 09:24	MW 5 09:32	MW 4 10:17
Benzene	0.002		ND	ND	ND
Toluene	0.002		ND	ND	ND
Ethylbenzene	0.002		ND	ND	ND
Total Xylenes	0.002		ND	ND	ND
MTBE	0.024		ND	ND	ND
Surrogate Recoveries %					
Fluorobenzene			100	104	102

ND-None Detected

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

Reviewed by:

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

CLIENT: ATC Associates Inc. - Nashville, TN

ATTENTION: James McCabe

CLIENT PROJECT #: 1995.0043 - OMS # 15; Pac. I.D. # 0-790983

CLIENT I.D. #: 10-67-11887

LAB PROJECT #: 23317 DATE SAMPLED: 04/06/98

MATRIX: Soil DATE SAMPLE RECEIVED: 04/08/98

METHOD: SW-846 8020 (BTEX) DATE SAMPLE ANALYZED: 04/10/98

UNITS: mg/kg (ppm) DATE REPORT: 04/17/98

PARAMETER	EQL	SAMPLE I.D. LAB:	182528	182529	182530
		STATION:	MW 4 10:24	MW 3 13:01	MW 3 13:10
Benzene	0.002		ND	ND	ND
Toluene	0.002		ND	ND	ND
Ethylbenzene	0.002		ND	ND	ND
Total Xylenes	0.002		ND	ND	ND
MTBE	0.024		ND	ND	ND
Surrogate Recoveries %					
Fluorobenzene			103	101	101

ND-None Detected

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

Reviewed by: gnb

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

CLIENT: ATC Associates Inc. - Nashville, TN

ATTENTION: James McCabe

CLIENT PROJECT #: 1995.0043 - OMS # 15; Fac. I.D. # 0-790983

CLIENT I.D. #: 10-67-11887

LAB PROJECT #: 23317 DATE SAMPLED: 04/06-07/98

MATRIX: Soil DATE SAMPLE RECEIVED: 04/08/98

METHOD: SW-846 8020 (BTEX) DATE SAMPLE ANALYZED: 04/10-13/98

UNITS: mg/kg (ppm) DATE REPORT: 04/17/98

PARAMETER	EQL	SAMPLE I.D. LAB:	182531	182532	182533
		STATION:	MW 2 09:00	MW 2 09:07	MW 1 10:15
Benzene	0.002		ND	ND	ND
Toluene	0.002		ND	ND	ND
Ethylbenzene	0.002		ND	ND	ND
Total Xylenes	0.002		ND	ND	ND
MTBE	0.024		ND	ND	ND
Surrogate Recoveries %					
Fluorobenzene			103	97	98

ND-None Detected

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

Reviewed by: gpd.

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

CLIENT: ATC Associates Inc. - Nashville, TN

ATTENTION: James McCabe

CLIENT PROJECT #: 1995.0043 - OMS # 15; Fac. I.D. # 0-790983

CLIENT I.D. #: 10-67-11887

LAB PROJECT #: 23317 DATE SAMPLED: 04/07/98

MATRIX: Soil DATE SAMPLE RECEIVED: 04/08/98

METHOD: SW-846 8020 (BTEX) DATE SAMPLE ANALYZED: 04/13/98

UNITS: mg/kg (ppm) DATE REPORT: 04/17/98

PARAMETER	EQL	SAMPLE I.D. LAB: 182534 STATION: MW 1 10:20
Benzene	0.002	ND
Toluene	0.002	ND
Ethylbenzene	0.002	ND
Total Xylenes	0.002	ND
MTBE	0.024	ND
Surrogate Recoveries %		
Fluorobenzene		98

ND-None Detected

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

Reviewed by: JH

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

CLIENT: ATC Associates Inc. - Nashville, TN

ATTENTION: James McCabe

CLIENT PROJECT #: 1995.0043 - OMS # 15; Fac. I.D. # 0-790983

CLIENT I.D. #: 10-67-11887

LAB PROJECT #: 23317 DATE SAMPLED: 04/06-07/98

MATRIX: Soil DATE SAMPLE RECEIVED: 04/08/98

METHOD: TPH-8015B (GRO) DATE SAMPLE ANALYZED: 04/10-13/98

UNITS: mg/kg (ppm) DATE REPORT: 04/17/98

SAMPLE I.D.	STATION	EQL	PARAMETER TOTAL PETROLEUM HYDROCARBONS CONC. RANGE
182525	MW 5 (09:24)	0.5	ND
182526	MW 5 (09:32)	0.5	ND
182527	MW 4 (10:17)	0.5	ND
182528	MW 4 (10:24)	0.5	ND
182529	MW 3 (13:01)	0.5	ND
182530	MW 3 (13:10)	0.5	ND
182531	MW 2 (09:00)	0.5	ND
182532	MW 2 (09:07)	0.5	ND
182533	MW 1 (10:15)	0.5	ND
182534	MW 1 (10:20)	0.5	ND

ND-None Detected

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

Reviewed by: [illegible]

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

CLIENT: ATC Associates Inc. - Nashville, TN

ATTENTION: James McCabe

CLIENT PROJECT #: 1995.0043 - OMS # 15; Fac. I.D. # 0-790983

CLIENT I.D. #: 10-67-11887

LAB PROJECT #: 23317 DATE SAMPLED: 04/06-07/98

MATRIX: Soil DATE SAMPLE RECEIVED: 04/08/98

METHOD: TPH-8015B (DRO) DATE SAMPLE ANALYZED: 04/10/98

UNITS: mg/kg (ppm) DATE REPORT: 04/17/98

SAMPLE I.D.	STATION	EQL	PARAMETER TOTAL PETROLEUM HYDROCARBONS CONC.	RANGE
182525	MW 5 (09:24)	4	ND	
182526	MW 5 (09:32)	4	ND	
182527	MW 4 (10:17)	4	5	Diesel
182528	MW 4 (10:24)	4	ND	
182529	MW 3 (13:01)	4	ND	
182530	MW 3 (13:10)	4	ND	
182531	MW 2 (09:00)	4	ND	
182532	MW 2 (09:07)	4	ND	
182533	MW 1 (10:15)	4	ND	
182534	MW 1 (10:20)	4	ND	

ND-None Detected

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

Reviewed by: JH

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

CLIENT: ATC Associates Inc. - Nashville, TN **LAB PROJECT #:** 23317

CLIENT I.D. #: 10-67-11887

ANALYTICAL REPORT
CASE NARRATIVE

1. All holding times were met and no QA problems were encountered.

2. The analytical results and EQL's for soil samples are based on wet weight. Dry weight calculations are available upon request.

NOTES:
- This "Analytical Report" may not be reproduced, except in full, without the written approval of the laboratory.
- Results relate only to the items tested as received (see chain-of-custody).
- EQL = Estimated Quantitation Limit
- ND = Not Detected within the calibration range of the test method down to the EQL

Respectfully submitted,

Randy Brown

CHEMISTRY LABORATORY DIVISION

CERTIFICATIONS

A2LA - No. 0330-01; AIHA - Lab ID 09072; Alabama - Lab ID 40970; Arkansas; Connecticut - Lab ID PH-0208; Delaware; Florida - No. 97056 (EW), No. 97268 (DW); Georgia - No. 804; Indiana - Lab ID C-GA-01; Kansas - E-10212 (SW); Kentucky - Lab ID 90053; Maryland - No. 251; Massachusetts - Lab ID M-GA040; North Carolina - No. 409; South Carolina - No. 98012; Tennessee - Lab ID 02827 (DW), UST Program; Virginia - Lab ID 0024

CHAIN OF CUSTODY RECORD

PROJ. NO. 1995.0043 | PROJECT NAME OMS #15 | CLIENT TN FAA/BIC Facility ID# 0-790983 | LAB PROJ. NO. 9330

SAMPLERS: (Signature) James D. McGee

SAMPLING METHOD: Continuous Sampling

SAMPLE I.D. NO.	DATE	TIME	COMPOSITE	GRAB	WATER	SOIL	FILTERED	ACIDIFIED	ICED	NUMBER OF CONTAINERS	LAB I.D. NUMBER	BTEX (602.8020) w/MTBE	TPH 418.1	TPH-GRO (5030) TN Method	TPH-DRO (3550) TN Method	LEAD	PAHS	SAMPLE LOCATION / REMARKS
MW 5	4-6-98	0924		X		X			X	2		X		X	X			5'-7'
MW 5	4-6-98	0932		X		X			X	2		X		X	X			10'-12'
MW 4	4-6-98	1017		X		X			X	2		X		X	X			3'-5'
MW 4	4-6-98	1024		X		X			X	2		X		X	X			10'-12'
MW 3	4-6-98	1301		X		X			X	2		X		X	X			5'-7'
MW 3	4-6-98	1310		X		X			X	2		X		X	X			10'-12'
MW 2	4-7-98	0900		X		X			X	2		X		X	X			6'-8'
MW 2	4-7-98	0907		X		X			X	2		X		X	X			8'-10'
MW 1	4-7-98	1015		X		X			X	2		X		X	X			6'-8'
MW 1	4-7-98	1020		X		X			X	2		X		X	X			8'-10'

REMARKS: Normal Turnaround

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
James D. McGee	4/7/98 1045				
Relinquished by: (Signature)	**Date / Time**	**Received for Laboratory by: (Signature)**	**Date / Time**	**Project Manager / Phone #:**	
			4/8		

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A
Marietta, Georgia 30066-6299
(770) 514-6933
FAX (770) 514-6966

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APPENDIX C

SOIL PERMEABILITY REPORT

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TRI-STATE
TESTING SERVICES, INC.

Measurement of Hydraulic Conductivity

Client: ATC Associates Project No.: E-4-090

Date of Report: 04/30/98

Project Name: Army National Guard, 2610 East Holmes Road, Memphis, Tennessee

Sample I.D.: Boring No.: SB5A1, Shelby tube, Depth: 9' - 11'

Soil Description: Brown Silty Clay

Test Media: City of Memphis Water

TN Facility I.D. No.: 0-790983

Volumetric Air Content	.017 cm^3-air/cm^3-soil
Volumetric Water Content	.334 cm^3-H_2O/cm^3-soil
Total Soil Porosity	.351 cm^3/cm^3-soil
Soil Bulk Density (wet)	2.04 g-soil/cm^3-soil
Moisture Content	21.4 Percent

PERMEABILITY

Temperature Correction, R_t = .925

$K_1 = 2.7 \times 10^{-7}$ cm/sec
$K_2 = 2.0 \times 10^{-7}$ cm/sec
$K_3 = 2.1 \times 10^{-7}$ cm/sec
$K_4 = 2.2 \times 10^{-7}$ cm/sec

Coefficient of Permeability, $K_{20} = 2.3 \times 10^{-7}$ cm/sec

Test in accordance with Method 9100 of Test Methods for evaluating Solid Waste, Third Edition, (SW-846) and in general accordance with ASTM D-5084-90. Fractional Organic Carbon tested in accordance with ASTM D-2974-87 (Method C).

Lab No.: P-98-025 Reviewed By: David D. McCray

6756 Buckles Cove Memphis, TN 38133 901-385-1199 FAX 901-386-6614

TRI-STATE
TESTING SERVICES, INC.

Measurement of Hydraulic Conductivity

Client: ATC Associates Project No.: E-4-090

Date of Report: 04/30/98

Project Name: Army National Guard, 2610 East Holmes Road, Memphis, Tennessee

Sample I.D.: Boring No.: SB5A2, Shelby tube, Depth: 11' - 13'

Soil Description: Brown Silty Clay with trace of Fine Sand

Test Media: City of Memphis Water

TN Facility I.D. No.: 0-790983

Volumetric Air Content	.012 cm^3-air/cm^3-soil
Volumetric Water Content	.316 cm^3-H_2O/cm^3-soil
Total Soil Porosity	.328 cm^3/cm^3-soil
Soil Bulk Density (wet)	2.06 g-soil/cm^3-soil
Moisture Content	18.1 Percent

PERMEABILITY

Temperature Correction, R_t = .979

$K_1 = 4.0 \times 10^{-6}$ cm/sec
$K_2 = 3.9 \times 10^{-6}$ cm/seo
$K_3 = 4.4 \times 10^{-6}$ cm/sec
$K_4 = 4.0 \times 10^{-6}$ cm/sec

Coefficient of Permeability, $K_{20} = 4.1 \times 10^{-6}$ cm/sec

Test in accordance with Method 9100 of Test Methods for evaluating Solid Waste, Third Edition, (SW-846) and in general accordance with ASTM D-5084-90. Fractional Organic Carbon tested in accordance with ASTM D-2974-87 (Method C).

Lab No.: P-98-026 Reviewed By: David D. McCray

6756 Buckles Cove Memphis, TN 38133 901-385-1199 FAX 901-386-6614

TRI STATE
TESTING SERVICES, INC.

Report of Fractional Organic Carbon

Client: ATC

Project No.: E-4-090

Project: Army National Guard
2610 East Holmes Road
Memphis, Tennessee

Date of Report: 28 April '98

Sample I.D.: Jar sample, Boring No.: 1, Sample No.: 1

Fractional Organic Carbon .009 g-carbon/g-soil

Tested in accordance with ASTM D-2974-87 (Method C).

Lab No.: FOC-E4090

Reviewed By: David D. McCray

6756 Buckles Cove Memphis, TN 38133 901-385-1199 Fax 901-386 6614

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APPENDIX D

GROUNDWATER ANALYTICAL REPORT

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HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

Client: **ATC Associates - NASHVILLE, TN**
5217 Linbar Drive
#306
Nashville, TN 37211-3662
Attention: **James McCabe**

Project Name: **OMS #15 Facility ID # 0-790983**
Project ID: 1995.0043
Received: 6/12/98
Lab Project No. 24061

Report Date: 7/1/98

CASE NARRATIVE

1 The holding times for each sample were met.
2 Where applicable, results & reporting limits are based on wet weight; dry weight calculations available.

Reviewed by: DWH

Respectfully Submitted,
Randy Brown
Hygeia Laboratories, Inc.

LAB ID	CLIENT ID	MATRIX	COLLECTED
188213	MW-1	WATER	6/11/98
188214	MW-4	WATER	6/11/98

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 24061 Report Date: 7/1/98

Total Petroleum Hydrocarbons-Diesel Units: **mg/L (ppm)** Method: **EPA 8015 B**

Matrix: Water Analysis Date: 6/23/98 Prep. Date: 6/19/98 Analyst: DBT

Lab ID:	188213		188214	
Client ID:	MW-1		MW-4	
Analyte	**Result**	**RL**	**Result**	**RL**
TPH-Diesel	ND	0.1	ND	0.1
Surrogate Recovery (%)				
PZ-49	41 %		64 %	

NOTES:

- Results relate only to the samples tested as received (see chain-of-custody).
- ND = "Not Detected" within the calibration range of the test method down to the reporting limit
- RL = "Reporting Limit"
- Dates are presented in the format "month/day/year"

Certifications

American Association for Laboratory Accreditation (A2LA) - No. 0330-01; American Industrial Hygiene Association (AIHA) - Lab ID 09072 Alabama - Lab ID 40970; Arkansas; Connecticut - Lab ID PH-0206; Delaware; Florida - No. 97058 (EW), No. 97258 (DW); Georgia - No. 804; Indiana - Lab ID C-GA-01; Kansas - E-10212 (SW); Kentucky - Lab ID 90053; Maryland - No. 251; Massachusetts - Lab ID M-GA040; North Carolina - No. 409; South Carolina - No. 98012; Tennessee - Lab ID 02827 (DW), UST Program; Virginia - Lab ID 0024

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A
Marietta, Georgia 30066-6299
(770) 514-6933 FAX (770) 514-6966

CHAIN OF CUSTODY RECORD

PROJ. NO. 1995(?)0043	PROJECT NAME CMG # 15 Facility ID # 0-790983
	CLIENT ATC Nashville
LAB PROJ. NO. 24CC1(?)	
SAMPLERS: (Signature) [signature]	
SAMPLING METHOD Bailer	

LABORATORY ANALYSIS

SAMPLE I.D. NO.	DATE	TIME	COMPOSITE	GRAB	WATER	SOIL		FILTERED	ACIDIFIED	ICED		NUMBER OF CONTAINERS	LAB I.D. NUMBER	BTEX (602 8020)	TPH 418.1	TPH-GRO (5030)	TPH-DRO (3550)	LEAD	PAHS					SAMPLE LOCATION/REMARKS
MW-1	6-11-98	1355		X	X				X	X		1					X							
MW-4	6-11-98	1340		X	X				X	X		1					X							

REMARKS:

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	6/11/98 1405				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Project Manager / Phone #:
		[signature]	6/12/98 10:40	

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

Client: **ATC Associates - NASHVILLE, TN**
5217 Linbar Drive
#306
Nashville, TN 37211-3662
Attention: **Ken Johnson**

Project Name: **Memphis OMS #15/ Fac ID# 0-790983**
Project ID: 1995.0043
Received: 4/27/98
Lab Project No. 23512

Report Date (m/d/y): 5/22/98

LAB ID	CLIENT ID	COLLECTED
183802	MW-1	4/24/98
183803	MW-2	4/24/98
183804	MW-3	4/24/98
183805	MW-4	4/24/98
183806	MW-5	4/24/98

CASE NARRATIVE

1. The holding times for each sample were met.
2. Where applicable, results & reporting limits are based on wet weight; dry weight calculations available.
3. Samples MW-1 (183802) and MW-4 (183805) 1 Liter Amber bottles for Diesel Range Organics were broken in transit. Ken Johnson was notified 4/27/98.

Reviewed by: _____

Respectfully Submitted,

Hygeia Laboratories, Inc.

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 23512 Report Date (m/d/y): 5/22/98

Volatile Organics (BTEX)

Matrix: Water Units: ug/L (ppb) Method: EPA 602
Analysis Date: 5/5/98 Prep. Date: 5/5/98 Analyst: MZ

Lab ID:	183802		183803		183804		183805	
Client ID:	MW-1		MW-2		MW-3		MW-4	
Analyte	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
Benzene	ND	0.4	ND	0.4	ND	0.4	ND	0.4
Ethylbenzene	ND	0.4	ND	0.4	ND	0.4	ND	0.4
Toluene	ND	0.4	4.5	0.4	ND	0.4	ND	0.4
Total Xylenes	ND	0.4	0.6	0.4	ND	0.4	ND	0.4
MTBE	ND	5	ND	5	ND	5	ND	5
Surrogate Recoveries (%)								
Fluorobenzene	101 %		102%		104 %		101 %	

Volatile Organics (BTEX)

Matrix: Water Units: ug/L (ppb) Method: EPA 602
Analysis Date: 5/5/98 Prep. Date: 5/5/98 Analyst: MZ

Lab ID:	183806	
Client ID:	MW-5	
Analyte	**Result**	**RL**
Benzene	ND	0.4
Ethylbenzene	ND	0.4
Toluene	ND	0.4
Total Xylenes	ND	0.4
MTBE	ND	5
Surrogate Recoveries (%)		
Fluorobenzene	101 %	

Total Petroleum Hydrocarbons-Gasoline

Matrix: Water Units: mg/L (ppm) Method: EPA 8015B
Analysis Date: 5/5/98 Prep. Date: 5/5/98 Analyst: MZ

Lab ID:	183802		183803		183804		183805	
Client ID:	MW-1		MW-2		MW-3		MW-4	
Analyte	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
TPH-Gasoline	ND	0.1	ND	0.1	ND	0.1	ND	0.1
Surrogate Recovery (%)								
Isopropyltoluene	116 %		110 %		118 %		108 %	

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 23512 Report Date (m/d/y): 5/22/98

Total Petroleum Hydrocarbons-Gasoline

Units: mg/L (ppm) Method: EPA 8015B
Matrix: Water Analysis Date: 5/5/98 Prep. Date: 5/5/98 Analyst: MZ

Lab ID:	183806	
Client ID:	MW-5	
Analyte	**Result**	**RL**
TPH-Gasoline	ND	0.1
Surrogate Recovery (%)		
Isopropyltoluene	110 %	

Total Petroleum Hydrocarbons-Diesel

Units: mg/L (ppm) Method: EPA 8015B
Matrix: Water Analysis Date: 5/6/98 Prep. Date: 4/28/98 Analyst: DBT

Lab ID:	183803		183804		183806	
Client ID:	MW-2		MW-3		MW-5	
Analyte	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
TPH-Diesel	ND	0.1	ND	0.1	ND	0.1
Surrogate Recovery (%)						
PZ-49	38 %		47 %		65 %	

NOTES:
- Results relate only to the samples tested as received (see chain-of-custody).
- ND = "Not Detected" within the calibration range of the test method down to the reporting limit
- RL = "Reporting Limit"

Certifications

American Association for Laboratory Accreditation (A2LA) - No. 0330-01; American Industrial Hygiene Association (AIHA) - Lab ID 09072
Alabama - Lab ID 40870; Arkansas; Connecticut - Lab ID PH-0206; Delaware; Florida - No. 97056 (EW), No. 97268 (DW); Georgia - No. 804;
Indiana - Lab ID C-GA-01; Kansas - E-10212 (SW); Kentucky - Lab ID 90053; Maryland - No. 251; Massachusetts - Lab ID M-GA040;
North Carolina - No. 409; South Carolina - No. 98012; Tennessee - Lab ID 02827 (DW), UST Program; Virginia - Lab ID 0024

Page 1 of 1

CHAIN OF CUSTODY RECORD

HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A
Marietta, Georgia 30066-6299
(770) 514-8933 FAX (770) 514-6966

PROJ. NO. 1193-0043

PROJECT NAME Memphis OMS #15 / Fac ID# 0-790935

CLIENT TN Dept Finance & Administration

LAB PROJ. NO. 03053

SAMPLERS: (Signature) [illegible]

SAMPLING METHOD Grab

LABORATORY ANALYSIS

SAMPLE I.D. NO	DATE	TIME	COMPOSITE	GRAB	WATER	SOIL		FILTERED	ACIDIFIED	ICED		NUMBER OF CONTAINERS	LAB I.D. NUMBER	BTEX MTBE	TPH GRO	TPH DRO	SAMPLE LOCATION / REMARKS
MW-1	4-23-98	0830		X	X				X	X		3		X	X	X	1L Amber bottle [illegible]
MW-2		0900															
MW-3		0930															
MW-4		1000															1L Amber bottle [illegible]
MW-5		1030															

Informed Ken Johnson 1/14/98 [illegible] bottles [illegible] 1/14/98

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[illegible]	[illegible]				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Project Manager / Phone #:
		[illegible]	4/27/98	

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APPENDIX E

GROUNDWATER CLASSIFICATION PROCEDURES

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TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS IN SELECTED AREAS OF TENNESSEE

EXPLANATION OF COLUMN HEADINGS

QUAD/NIN - Designation by number, Quadrant and ninth of the 2.5 - minute quadrangle area in which the well is located. The leading numbers identify the 15-minute quadrangle, the next two letters identify the 7.5-minute quadrant and the last digit identifies the one-ninth subdivision of the latter.

COUNTY = County in which the well is located.

WELL NUM = Identification number assigned to the well by the State.

TAG NUM = An inspection number assigned to the well at the time of inspection by the State.

OWNER'S NAME = Name of person or organization for whom the well was drilled.

LOCATION ROAD = Name of street or road from which to access the well. Blank if unknown.

COMP DATE = Month, day and year the well was completed.

INSPT DATE = Month, day and year the well was inspected by TDHE. Blank if well has not been inspected.

TOT DEPTH = Total depth of the well in feet.

AQ DEPTH = Depth, in feet, below land surface to the top of the shallowest aquifer or water-bearing zone tapped by the well.

TOT YIELD = Total yield of the well in gallons per minute (gpm). Yields less than one-half gpm reported as zero.

STAT LEVEL = Static water-level: depth, in feet, from the land surface to the surface of the water standing in an idle well.

CSE DEPTH = Casing depth: depth, in feet, to the bottom of the water tight casing installed in the well.

CSE TYPE = Casing type: PLAST = Plastic; STEEL = Steel; OTHER = any other material such as concrete, fiberglass or tile.

WELL FINISH = Construction of the well in the interval supplying water to the well: OPEN = Uncased or open hole; SLOT = Hand perforated or slotted pipe; SCREEN = Manufactured device designed to maintain the wall of the borehole and allow ground water to enter the well.

INTERVAL = The depth, in feet, from the top to the bottom of the interval that is open to the well.

WAT QUAL = Water Quality: a word to describe the relative quality of the well water such as GOOD, FAIR, BAD, LIME, IRON, SULFUR, SALT, OIL, GAS, OTHER.

GEO FORM = Name of the geologic formation tapped by the well (not generally reported).

LATITUDE = Latitude of well site in degrees, minutes, and seconds.

LONGITUDE = Longitude of well site in degrees, minutes, and seconds.

A/C = Accuracy Code for latitude and longitude: S = Nearest second; F = nearest 15 seconds; T = nearest 30 seconds; M = nearest minute; Blank = nearest 2.5 minutes.

LOG = Refers to availability of drillers log: Y = yes; N = no.

DRILLER = License number of driller who supervised construction of the well. Names provided upon request.

USE = Purpose for which the well was constructed: HOME = residential; COMM = commercial; etc.

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ	TOT YIELD STAT LEVEL	CSG DEPTH CSG TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 1 SHELBY	15700218	LEHMA-ROBERTS CO EXPRESSWAY LAMAR	06/29/1964 / /	233 --	-- 66	-- 	200 - 233		35-05-30 89-58-00	T	00108 IND
0409SW 1 SHELBY	15700514	MID-SWREFRIGERATED	02/21/1967 / /	499 --	-- 154	459 STEEL	459 - 499		35-06-54 89-58-56	S	00108 IND
0409SW 1 SHELBY	15700953	MID SOUTH REFR WHS	10/29/1971 / /	496 460	23 155	460 STEEL	460 - 496	UNK	35-06-52 89-58-57	S	00108 COMM
0409SW 1 SHELBY	15709010	PRISCO RRR SH K-9K-	06/00/1927 / /	371 311	500 65	-- 	311 - 371		35-05-39 89-59-10	S	 IND
0409SW 1 SHELBY	15709011	PRISCO RR SH K-10-1	06/00/1927 / /	386 --	-- 76	-- 	336 - 386	GOOD	35-05-38 89-59-14	S	 IND
0409SW 1 SHELBY	15709012	MEMPHIS CC SHSK-111	00/00/1920 / /	392 --	-- --	-- 	-- - --	UNK	35-06-57 89-57-44	S	 MUN
0409SW 1 SHELBY	15709013	MEMPHIS C C SHHK-12	00/00/1941 / /	376 --	290 119	-- 	330 - 376	GOOD	35-06-57 89-57-36	S	 MUN
0409SW 1 SHELBY	15709014	RAILWAYS ICE SH:K-1	00/00/1928 / /	380 355	-- 118	330 STEEL	330 - 380		35-05-41 89-58-58	S	 OTHR
0409SW 1 SHELBY	15709015	RAILWAYS ICE SH:K-1	03/06/1947 / /	390 --	-- 107	-- 	-- - --	GOOD	35-05-40 89-58-58	S	 IND
0409SW 1 SHELBY	15709016	RAINBOW LAKE SH:K-1	06/00/1936 / /	464 434	750 --	403 STEEL	403 - 464		35-05-23 89-57-59	S	 MUN
0409SW 1 SHELBY	15709017	RAINBOW LAKE SH:K-1	05/30/1937 / /	458 408	-- --	407 STEEL	407 - 458		35-05-24 89-57-59	S	 MUN
0409SW 1 SHELBY	15709018	MID.S.REFRIG SH:K-1	00/00/1921 / /	554 --	500 --	-- 	-- - --	GOOD	35-06-54 89-58-57	S	 OTHR
0409SW 1 SHELBY	15709019	MID S REFRIG SH:K-1	/ /19 / /	500 --	-- --	-- STEEL	-- - --	GOOD	35-06-55 89-58-56	S	 OTHR
0409SW 1 SHELBY	15709020	SWIFT & CO SHSK-191	/ /19 / /	443 391	-- 73	391 STEEL	-- - --	GOOD	35-06-17 89-59-23	S	 OTHR
0409SW 1 SHELBY	15709021	SWIFT & CO SHSK-202	/ /19 / /	220 --	-- 121	-- 	-- - --	GOOD	35-06-16 89-59-23	S	 IND
0409SW 1 SHELBY	15709022	SWIFT & CO SHSK-212	03/00/1951 / /	459 --	1720 115	-- 	-- - --	GOOD	35-06-16 89-59-24	S	00029 IND

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / KTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 1 SHELBY	15709033	KELLOGG CO SHSK-233	/ /19 / /	389 --	-- 100	-- 	 -- - --	GOOD	35-05-45 89-59-24	S	IND
0409SW 1 SHELBY	92002802	WASSUM_____CHAR WARD RD	08/31/1990 / /	126 --	20 2	60 PLAST	SLOT 60 - 116	GOOD	- - - -	 Y	00036 HOME
0409SW 1 SHELBY	92002187	LOCT_____DAVI TALL FOREST LN	01/30/1992 / /	150 100	30 90	140 PLAST	SCREEN 140 - 150	GOOD	- - - -	 Y	00296 HOME
0409SW 2 SHELBY	15700119	MEMPHIS COUNTRY CLU 	03/03/1964 / /	356 295	680 106	295 STEEL	 300 - 350	 	35-07-16 89-57-25	S	00029 MUN
0409SW 2 SHELBY	15700857	MEMPHIS LG & W normanl	05/15/1970 / /	456 --	1000 124	365 STEEL	 350 - 450	GOOD	- - - -	 	00029 MUN
0409SW 2 SHELBY	15701081	MEMPHIS LG & W GETWELL/RHODES	10/23/1974 / /	798 --	-- --	685 STEEL	SCREEN 692 - 792	GOOD	35-05-45 89-55-45	T Y	00029
0409SW 2 SHELBY	15701084	MEMPHIS LG & W ZH CURLIN ST	11/15/1974 / /	706 --	-- --	539 STEEL	SCREEN 600 - 700	OTHR	35-07-00 89-56-00	T Y	00029 MUN
0409SW 2 SHELBY	15701085	MEMPHIS LG & W RHODES/GETWELL	12/20/1974 / /	796 --	-- --	684 STEEL	SCREEN 690 - 790	GOOD	35-05-45 89-55-45	T Y	00029 MUN
0409SW 2 SHELBY	15701086	MEMPHIS LG & W POPLAR AVE	11/27/1974 / /	757 --	-- --	745 STEEL	SCREEN 651 - 751	OTHR	35-07-30 89-56-15	T Y	00029 MUN
0409SW 2 SHELBY	15701102	MEMPHIS LG & W GETWELL & PARK	01/23/1975 / /	883 777	-- 101	774 STEEL	 777 - 877	GOOD	- - - -	 	00029 MUN
0409SW 2 SHELBY	15701445	MEMPHIS LG & W PARK & GETWELL	06/01/1987 / /	594 --	1200 117	485 STEEL	SCREEN 491 - 591	GOOD	35-10-00 89-50-00	S Y	00632 MUN
0409SW 2 SHELBY	15701473	MEMPHIS LG & W GOODLETT IN AUD	09/25/1987 / /	574 470	1400 138	464 STEEL	SCREEN 470 - 570	GOOD	35-05-00 89-55-00	S Y	00632 MUN
0409SW 2 SHELBY	15701465	MEMPHIS LG & W SOUTHERN IN AUD	11/09/1987 / /	623 0	1400 130	515 STEEL	SCREEN 520 - 620	GOOD	35-05-00 89-55-00	S Y	00632 MUN
0409SW 2 SHELBY	15701510	MEMPHIS LG & W LOEB ST	12/14/1987 / /	-- --	1400 --	350 STEEL	SCREEN 355 - 455	GOOD	35-05-00 89-55-00	S Y	00168 MUN
0409SW 2 SHELBY	15709002	MCALEXANDER JIMH:K- 	03/11/1982 / /	100 --	15 60	92 PLAST	 -- - --	 	35-07-11 89-56-19	S 	00005 HOME
0409SW 2 SHELBY	15709004	MSU SH K-3 SH:K- 	/ /19 / /	461 --	-- --	-- 	 -- - --	GOOD	35-07-12 89-56-19	S 	

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 2 SHELBY	15709023	WALLS ESSOSH K-22-2	/ /19 / /	-- --	237 --	-- STEEL	-- - --		35-06-57 89-56-44	S	CTHR
0409SW 2 SHELBY	15709037	MEMPHIS LG & W SH:K	03/10/1932 / /	1310 1288	-- --	-- STEEL	-- - --	UNK	35-07-21 89-56-00	S	MUN
0409SW 2 SHELBY	15709038	MEMPHIS LG & W SH:K	02/11/1932 / /	547 471	-- --	471 STEEL	466 - 547		35-07-21 89-56-00	S	MUN
0409SW 2 SHELBY	15709039	MEMPHIS LG & W SH:K	/ /19 / /	540 --	-- --		-- - --		35-07-13 89-56-01	S	MUN
0409SW 2 SHELBY	15709040	MEMPHIS LG & W SH:K	01/03/1932 / /	1313 1231	500 --	-- STEEL	-- - --		35-07-12 89-56-01	S	MUN
0409SW 2 SHELBY	15709041	MEMPHIS LG & W SH:K	01/26/1932 / /	442 --	450 67	--	-- - --	GOOD	35-07-07 89-56-01	S	MUN
0409SW 2 SHELBY	15709042	MEMPHIS LG & W SH:K	05/31/1940 / /	409 382	450 81	382 STEEL	378 - 439	GOOD	35-07-06 89-56-01	S	MUN
0409SW 2 SHELBY	15709043	MEMPHIS LG & W SH:K	00/00/1933 / /	485 407	450 48	407 STEEL	407 - 485	GOOD	35-06-59 89-56-01	S	MUN
0409SW 2 SHELBY	15709044	MEMPHIS LG & W SH:K	04/12/1943 / /	485 415	450 100	415 STEEL	415 - 485	GOOD	35-06-58 89-56-01	S	MUN
0409SW 2 SHELBY	15709045	MEMPHIS LG & W SE:K	/ /19 / /	1370 --	-- --	--	-- - --	GOOD	35-06-58 89-56-00	S	00029 MUN
0409SW 2 SHELBY	15709046	MEMPHIS LG & W SE:K	/ /19 / /	442 --	-- --	--	-- - --		35-06-58 89-55-53	S	MUN
0409SW 2 SHELBY	15709047	MEMPHIS LG & W SH:K	/ /19 / /	420 359	-- --	--	-- - --		35-06-58 89-55-54	S	00029 MUN
0409SW 2 SHELBY	15709048	MEMPHIS LG & W SH:K	09/00/1950 / /	420 359	-- --	--	-- - --		35-06-59 89-55-54	S	00029 MUN
0409SW 2 SHELBY	15709049	MEMPHIS LG & W SH:K	11/00/1961 / /	449 369	-- 125	-- STEEL	369 - 449	GOOD	35-06-58 89-55-54	S	MUN
0409SW 2 SHELBY	15709050	MEMPHIS LG & W SH:K	00/00/1933 / /	489 --	450 83	--	386 - 489	GOOD	35-06-58 89-55-51	S	MUN
0409SW 2 SHELBY	15709051	MEMPHIS LG & W SH:K	03/21/1935 / /	366 305	-- 116	-- STEEL	-- - --		35-06-58 89-55-40	S	MUN

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 2 SHELBY	15709052	MEMPHIS LG & W SH:K	/ /19 / /	1305 1225	-- --	-- STEEL	224 - 1303	GOOD	35-06-58 89-55-41	S	MUN
0409SW 2 SHELBY	15709053	MEMPHIS LG & W SH:K	/ /19 / /	595 --	-- --	--	-- - --		35-06-58 89-55-34	S	MUN
0409SW 2 SHELBY	15709054	MEMPHIS LG & W SH:K	06/00/1944 / /	375 --	450 117	--	314 - 375	GOOD	35-06-59 89-55-33	S	MUN
0409SW 2 SHELBY	15709055	MEMPHIS LG & W SH:K	04/08/1932 / /	1301 1223	450 84	-- STEEL	-- - --		35-07-02 89-55-36	S	00029 MUN
0409SW 2 SHELBY	15709056	MEMPHIS LG & W	/ /19 / /	428 308	1925 --	-- STEEL	-- - --		35-07-02 89-55-40	S	00029 MUN
0409SW 2 SHELBY	15709057	MEMPHIS LG & W SH:K	06/30/1941 / /	1307 1223	500 98	--	-- - --		35-07-06 89-56-00	S	00029 MUN
0409SW 2 SHELBY	15709058	MEMPHIS LG & W SH:K	12/00/1941 / /	1305 1243	450 112	-- STEEL	250 - 1305	UNK	35-07-02 89-55-41	S	MUN
0409SW 2 SHELBY	15709059	MEMPHIS LG & W SH:K	08/13/1943 / /	508 447	-- 92	-- STEEL	447 - 508	GOOD	35-07-16 89-56-09	S	MUN
0409SW 2 SHELBY	15709060	MEMPHIS LG & W SH:K	08/03/1943 / /	362 319	-- 104	319 STEEL	219 - 362	GOOD	35-07-16 89-56-04	S	MUN
0409SW 2 SHELBY	15709061	MEMPHIS LG & W SH:K	11/00/1943 / /	472 425	-- 98	425 STEEL	429 - 472	GOOD	35-07-17 89-55-47	S	MUN
0409SW 2 SHELBY	15709062	MEMPHIS LG & W SH:K	/ /19 / /	580 --	-- --	--	-- - --		35-07-17 89-55-58	S	MUN
0409SW 2 SHELBY	15709063	MEMPHIS LG & W SH:K	07/01/1944 / /	514 451	-- 125	451 STEEL	465 - 514	GOOD	35-07-26 89-56-06	S	MUN
0409SW 2 SHELBY	15709064	MEMPHIS LG & W SH:K	07/15/1944 / /	470 416	-- 99	-- STEEL	421 - 470	GOOD	35-07-25 89-55-48	S	MUN
0409SW 2 SHELBY	15709065	MEMPHIS LG & W SH:K	10/00/1943 / /	474 413	-- 87	-- STEEL	-- - --		35-07-19 89-55-38	S	MUN
0409SW 2 SHELBY	15709066	MEMPHIS LG & W SH:K	/ /19 / /	459 436	-- --	--	-- - --		35-07-23 89-55-52	S	MUN
0409SW 2 SHELBY	15709067	MEMPHIS LG & W SH:K	/ /19 / /	525 --	-- --	--	-- - --		- - - -		MUN

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) EN.

QUAD / CNTY / COUNTY	WELL NUM / REG NUM	OWNER'S NAME / LOCATION ROAD	COMP DATE / INSPT DATE	TOT DEPTH / AQ DEPTH	TOT YIELD / STAT LEVEL	CSE DEPTH / CSE TYPE	WELL FINISH INTERVAL	WAT QUAL / TAG NUM	LATITUDE / LONGITUDE	A/C	DRILLER / USE
0409SW 2	15709068	MEMPHIS LG & W SH:K	/ /19	596	--	--			- -		
SHELBY			/ /	--	--		-- - --		- -		TEST
0409SW 2	15709069	MEMPHIS LG & W SH:K	07/21/1947	388	1425	--		GOOD	35-05-42	S	
SHELBY			/ /	328	--	STEEL	328 - 388		89-55-41		MUN
0409SW 2	15709070	MEMPHIS LG & W SH:K	05/00/1947	301	580	--			35-05-33	S	
SHELBY			/ /	235	71	STEEL	235 - 301		89-55-52		MUN
0409SW 2	15709071	MEMPHIS LG & W SH:K	09/12/1946	360	1500	--		GOOD	35-05-23	S	
SHELBY			/ /	260	--		260 - 360		89-55-53		MUN
0409SW 2	15709072	MEMPHIS LG & W SH:K	/ /19	293	1450	--		GOOD	35-05-14	S	
SHELBY			/ /	--	--		212 - 293		89-55-53		MUN
0409SW 2	15709073	MEMPHIS LG & W SH:K	11/13/1946	915	1550	--			35-05-18	S	
SHELBY			/ /	273	--		-- - --		89-55-44		MUN
0409SW 2	15709074	MEMPHIS LG & W SH:K	11/04/1946	273	1600	--		GOOD	35-05-14	S	
SHELBY			/ /	213	--	STEEL	213 - 273		89-55-36		MUN
0409SW 2	15709075	MEMPHIS LG & W SH:K	00/00/1958	91	--	--		GOOD	35-05-13	S	
SHELBY			/ /	--	49	STEEL	-- - --		89-55-36		TEST
0409SW 2	15709076	MEMPHIS LG & W SH:K	12/18/1950	374	--	--			35-07-12	S	
SHELBY			/ /	--	101		-- - --		89-55-47		MUN
0409SW 2	15709077	MEMPHIS LG & W SH:K	11/02/1950	479	450	--			35-07-12	S	
SHELBY			/ /	419	124	STEEL	419 - 479		89-55-43		MUN
0409SW 2	15709082	MEMPHIS LG & W SH:K	06/00/1961	480	--	--		GOOD	35-07-24	S	
SHELBY			/ /	420	122		420 - 480		89-55-47		MUN
0409SW 2	15709088	MEMPHIS LG & W SH:K	06/25/1963	538	--	--		GOOD	35-07-25	S	
SHELBY			/ /	--	--		-- - --		89-56-06		MUN
0409SW 2	15709089	MEMPHIS LG & W SH:K	08/02/1963	540	--	--		GOOD	35-07-19	S	
SHELBY			/ /	--	--		-- - --		89-55-39		MUN
0409SW 2	15709090	MEMPHIS LG & W SH:K	09/26/1963	312	--	--		GOOD	35-07-05	S	
SHELBY			/ /	--	--		-- - --		89-55-56		MUN
0409SW 2	15709703	MEMPHIS LG & W SH:K	00/00/1965	350	--	--			35-07-12	S	
SHELBY			/ /	--	--		-- - --		89-56-00		MUN
0409SW 2	15709704	MEMPHIS LG & W SH:K	10/18/1966	372	1166	306			35-07-12	S	
SHELBY			/ /	306	129	STEEL	306 - 366		89-55-47		MUN

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) 2N.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 2 SHELBY	15709705	V A HOSP SH:K-9	/ /19 / /	94 --	0 --	-- 	 -- - --		35-06-17 89-55-26	S	 OTHR
0409SW 2 SHELBY	15709706	MEMPHIS LG & W SH:K	09/24/1969 / /	617 ...	-- ...	-- 	 -- - --		35-06-53 89-55-30	S	 TEST
0409SW 2 SHELBY	15709708	MEMPHIS LG & W SH:K	00/00/1969 / /	618 --	-- --	-- 	 -- - --		35-06-27 89-55-33	S	 TEST
0409SW 2 SHELBY	15709709	MEMPHIS LG & W SH:K	09/18/1965 / /	620 --	-- --	-- 	 -- - --		35-07-02 89-55-35	S	 TEST
0409SW 2 SHELBY	15709710	MEMPHIS LG & W SH:K	07/21/1972 / /	428 380	-- --	-- 	 -- - --		35-05-33 89-55-54	S	 MUN
0409SW 2 SHELBY	15709750	MEMPHIS LG & W SH:K	00/00/1970 / /	500 --	-- --	-- 	 -- - --		35-07-07 89-56-00	S	00029 TEST
0409SW 2 SHELBY	94001160 D0006276	MLGW 3824 POPLAR AVE	03/11/1994 / /	530 526	1400 147	406 PLAST	SCREEN 411 - 526	GOOD	- - - -	 Y	00674 MUN
0409SW 2 SHELBY	95002033 D0004036	PATTON & TAYLOR GERMANTOWN	05/03/1995 / /	210 --	40 60	190 PLAST	SLOT 190 - 210	GOOD	- - - -	 Y	00565 IRR
0409SW 2 SHELBY	95002034 D0004037	PATTON & TAYLOR GERMANTOWN	05/04/1995 / /	210 --	40 30	190 PLAST	SLOT 190 - 210	GOOD	- - - -	 Y	00565 IRR
0409SW 3 SHELBY	15709024	COLONIAL CC SHHK-23	/ /19 / /	385 --	-- 115	-- STEEL	 -- - --	GOOD	35-06-47 89-54-19	S	00030 OTHR
0409SW 3 SHELBY	15709025	COLONIAL CC SHEK-24	03/00/1942 / /	410 --	300 --	387 STEEL	 349 - 410		35-06-45 89-54-19	S	 MUN
0409SW 3 SHELBY	15709030	MEMP PARK C.SHEK-30	00/00/1959 / /	308 --	-- 113	-- 	 -- - --	GOOD	35-06-37 89-54-47	S	00029
0409SW 3 SHELBY	15709086	SOUTHERN BTT SE:K-8	/ /19 / /	270 --	-- --	-- 	 -- - --	GOOD	35-06-52 89-53-44	S	 IND
0409SW 3 SHELBY	15709707	MEMPHIS LG & W SH:K	10/08/1969 / /	619 --	-- --	-- 	 -- - --		35-06-35 89-54-39	S	 TEST
0409SW 3 SHELBY	91000953	MEMPHIS LG & W PARK	10/17/1990 / /	454 445	2000 141	335 STEEL	SCREEN 339 - 445	GOOD	- - - -	 Y	00674 MUN
0409SW 3 SHELBY	97002136 D0023072	DIXON GALLERY PARK AVE 4339	05/28/1997 / /	283 --	-- 120	253 OTHER	SLOT 253 - 283	GOOD	- - - -	 Y	00565 IRR

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPC DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 4 SHELBY	15700217	METAL BLDGS CO	07/08/1964 / /	53 --	-- --	-- 	 48 - 52		35-03-37 89-59-57	S	00108 OTHR
0409SW 4 SHELBY	15700871	CATFISH MODEL	02/20/1969 / /	210 165	295 42	180 STEEL	 -- - --	GOOD	35-04-34 89-57-40	S	00036 MUN
0409SW 4 SHELBY	15709029	W NORRIS SH K-29K-2	/ /19 / /	406 --	-- --	-- 	 -- - --	GOOD	35-02-58 89-59-30	S	00108
0409SW 4 SHELBY	15709036	MEMP MUN AIR SH:K-3	01/14/1959 / /	70 --	-- --	3 	 -- - --		35-03-08 89-58-36	S	 TEST
0409SW 5 SHELBY	15700308	CONNELLY B	/ /19 / /	109 --	-- 93	105 STEEL	 105 - 109		35-02-47 89-56-26	S	 HOME
0409SW 5 SHELBY	15700318	MCCALL E	05/11/1965 / /	108 --	-- 92	104 STEEL	 104 - 108		35-02-50 89-56-26	S	00108 HOME
0409SW 5 SHELBY	15700648	BOISE J	06/21/1968 / /	101 --	-- 86	93 STEEL	 93 - 101		35-03-12 89-55-13	S	00108 HOME
0409SW 5 SHELBY	15701378	MCCLAY_____NILE FOREST HILL RD	11/14/1985 / /	178 --	16 80	158 PLAST	SCREEN 158 - 178	GOOD	- - - -	 Y	00052 FARM
0409SW 5 SHELBY	15709005	OAKVILLE HOSP SH:K-	06/19/1920 / /	502 --	-- 60	-- 	 -- - --	GOOD	35-03-25 89-56-15	S	 MUN
0409SW 5 SHELBY	15709006	OAKVILLE HOSP SH:K-	00/00/1929 / /	413 --	-- 53	-- 	 -- - --	GOOD	35-03-25 89-56-14	S	 FARM
0409SW 5 SHELBY	15709007	J GARAVELLI SH8K-6	00/00/1934 / /	101 --	275 285	-- 	 -- - --	GOOD	35-03-07 89-55-42	S	00029 COMM
0409SW 5 SHELBY	15709008	J GARAVELLI SH8K-7-	00/00/1935 / /	109 --	325 --	-- 	 -- - --	GOOD	35-03-05 89-55-41	S	00029 COMM
0409SW 5 SHELBY	15709026	L VACCARIO SH8K-252	10/01/1953 / /	229 --	-- 41	200 	 200 - 229	GOOD	35-04-39 89-55-42	S	00108 FARM
0409SW 5 SHELBY	15709035	S D ODELL SH K-35-3	/ /19 / /	279 --	50 --	-- STEEL	 247 - 279		35-04-26 89-56-52	S	 HOME
0409SW 5 SHELBY	90000222	MEMPHIS LG & W 3890 HICKORY HI	11/30/1989 / /	1340 1257	133 13	1255 STEEL	SCREEN -- - 1340	GOOD	- - - -	 Y	00614 OTHR
0409SW 6 SHELBY	15700043	S BELL TELEPHONE CO	11/04/1963 / /	140 108	20 92	83 	 129 - 139		35-02-52 89-54-10	S	00029 IND

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	CONP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOC YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 6 SHELBY	15700417	TEXACO OIL COMPANY	03/11/1966 / /	92 --	-- --	92 PLAST	74 - 92	UNK	35-04-52 89-53-26	S	00047 OTHR
0409SW 6 SHELBY	90000659	PROTEIN_TECHNOL MENDENHALL RD	04/20/1989 / /	479 415	750 11	410 STEEL	SCREEN 415 - 475	GOOD	- - - -	 Y	00674 COMM
0409SW 6 SHELBY	90001550	PROPERTIE_____ TREZ 2166 S PERKINS	05/21/1990 / /	140 --	0 6	140 PLAST	-- - --	OTHR	- - - -	 N	00686 OTHR
0409SW 6 SHELBY	91001002	TREVANT DELTA IRRI AMERICAN WAY	02/04/1990 / /	240 240	250 50	200 PLAST	OPEN 200 - 240	GOOD	- - - -	 Y	00441 IRR
0409SW 7 SHELBY	15700069	MEMPHIS LG & W / /	10/28/1963 --	51 33	-- --	-- 45 - 51			35-02-30 89-59-22	S	00108 OTHR
0409SW 7 SHELBY	15700210	ANDERSON D / /	09/01/1964 --	338 145	-- --	-- 329 - 338			35-00-21 89-58-07	S	00108 HOME
0409SW 7 SHELBY	15700213	MEMPHIS PARK COMM / /	07/21/1964 --	347 145	-- --	-- 339 - 347			35-00-24 89-58-27	S	00108 MUN
0409SW 7 SHELBY	15700249	VISCOVI V / /	10/07/1964 --	255 76	-- --	-- 246 - 255			35-02-14 89-58-18	S	00108 OTHR
0409SW 7 SHELBY	15700262	BROWN T / /	11/02/1964 45	66 45	3 45	60 STEEL	50 - 66	GOOD	35-00-24 89-57-36	S	00285 HOME
0409SW 7 SHELBY	15700367	BAPTIST HOSPITAL / /	08/31/1965 --	286 157	-- --	-- 264 - 286			35-00-19 89-59-08	S	00108 MUN
0409SW 7 SHELBY	15700433	ALLENBERG OIL CO / /	04/20/1966 --	310 98	-- --	-- 263 - 310			35-01-17 89-59-25	S	00108 IND
0409SW 7 SHELBY	15700464	AIRWAYS EQUIPMENT C / /	10/03/1966 276	302 85	200 --	270 STEEL	276 - 296	GOOD	35-08-41 35-08-41	S	00029 IND
0409SW 7 SHELBY	15700577	OAK FORES C SR:K-10 / /	07/25/1967 10	43 10	10 10	43 PLAST	33 - 43	GOOD	35-00-22 89-58-40	S	00198 COMM
0409SW 7 SHELBY	15700581	MOUGEY C / /	07/31/1967 33	44 33	2 33	40 PLAST	40 - 44	GOOD	35-00-00 89-59-24	S	00286 HOME
0409SW 7 SHELBY	15700703	HAISCH L / /	10/18/1968 51	82 61	5 61	72 PLAST	72 - 82	GOOD	35-00-28 89-58-56	S	00286 HOME
0409SW 7 SHELBY	15700751	RASP W / /	02/26/1969 --	313 148	-- --	305 305 - 313			35-00-08 89-59-21	S	00108 HOME

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / COUNTY	NTH	WELL NUM / REG NUM	OWNER'S NAME / LOCATION ROAD	COMP DATE / INSPT DATE	TOT DEPTH AQ / DEPTH	TOT YIELD / STAT LEVEL	CSE DEPTH / CSE TYPE	WELL FINISH INTERVAL	WAT QUAL / TAG NUM	LATITUDE / LONGITUDE	A/C / LOG	DRILLER / USE
0409SW SHELBY	7	15700872	RIDGECREST B CHURCH	05/25/1979 / /	338 302	15 151	318 PLAST	318 - 338	GOOD	35-00-25 89-57-39	S	00108 MDOM
0409SW SHELBY	7	15700963	CHURCH OF GOD	09/24/1971 / /	80 27	-- 27	80 PLAST	60 - 80	GOOD	35-00-28 89-57-44	S	00198 MDOM
0409SW SHELBY	7	15709028	HARRISON D SH:K-2	/ /19 / /	318 --	-- 116	--	-- - --		- - - -		
0409SW SHELBY	7	15709079	MEM PARK COM SH:K-7	12/00/1961 / /	370 360	-- 92	-- STEEL	360 - 370		35-00-23 89-58-28	S	00030 MUN
0409SW SHELBY	7	15709080	SMITH DAIRY SH:K-30	/ /19 / /	360 --	-- 70	-- STEEL	-- - --		35 02 09 89-59-25	S	FARM
0409SW SHELBY	7	15709087	MEM PARK COM SH:K-8	/ /19 / /	-- --	400 134	-- STEEL	-- - --		35-00-24 89-58-26	S	00030 FARM
0409SW SHELBY	7	91003851	MEMPHIS LG & W 4869 AIRWAYS BL	11/14/1991 / /	570 530	125 130	525 STEEL	SCREEN 530 - 540	GOOD	- - - -	 Y	00674 MON
0409SW SHELBY	8	15700039	WHITAKER E	11/12/1963 / /	180 --	-- 89	172 STEEL	173 - 180		35-02-11 89-56-17	S	00193 HOME
0409SW SHELBY	8	15700182	BELLA COUNTRY CLUB	06/10/1964 / /	296 --	-- 136	-- 	258 - 296		35-00-17 89-55-32	S	00108 MUN
0409SW SHELBY	8	15700211	JOE BNNIS	/ /19 / /	-- --	-- --	-- 	-- - --		35-00-15 89-57-19	S	
0409SW SHELBY	8	15700252	CLIFFORD RUSH AIRWAYS	05/29/1964 / /	52 --	-- 43	-- 	47 - 52		35-02-00 89-56-00	T	00108 HOME
0409SW SHELBY	8	15700573	DAVENPORT	07/14/1967 / /	94 80	10 80	94 PLAST	64 - 94	GOOD	35-00-25 89-57-16	S	00196 HOME
0409SW SHELBY	8	15700612	HOLMES A	02/15/1968 / /	268 --	-- 155	261 STEEL	261 - 268		35-00-25 89-55-31	S	00108 HOME
0409SW SHELBY	8	15701367	BROWNING_FERRIS HOLMES RD	06/03/1985 / /	140 --	-- --	130 PLAST	SCREEN 130 - 140	OTHR	- - - -	 Y	00029 MON
0409SW SHELBY	8	15701368	BROWNING_FERRIS HOLMES RD	06/05/1985 / /	135 --	-- --	125 PLAST	SCREEN 125 - 135	OTHR	- - - -	 Y	00029 MON
0409SW SHELBY	8	15701369	BROWNING_FERRIS HOLMES RD	06/12/1985 / /	28 --	-- --	18 PLAST	SCREEN 18 - 28	OTHR	- - - -	 Y	00029 MON

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (C409SW) IN.

QUAD / MTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH DEPTH AQ	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 8	15701370	BROWNING_FERRIS	06/10/1985	36	--	26	SCREEN	OTHR	- -		00029
SHELBY		HOLMES RD	/ /	--	--	PLAST	26 - 36		- -	Y	MON
0409SW 8	15701371	BROWNING_FERRIS	06/12/1985	28	--	18	SCREEN	OTHR	- -		00029
SHELBY		HOLMES RD	/ /	--	--	PLAST	18 - 28		- -	Y	MON
0409SW 8	15701372	BROWNING_FERRIS	06/13/1985	22	--	12	SCREEN	OTHR	- -		00029
SHELBY		HOLMES RD	/ /	--	--	PLAST	12 - 22		- -	Y	MON
0409SW 8	15701373	BROWNING_FERRIS	06/14/1985	25	--	15	SCREEN	OTHR	- -		00029
SHELBY		HOLMES RD	/ /	--	--	PLAST	15 - 25		- -	Y	MON
0409SW 8	15701374	BROWNING_FERRIS	06/14/1985	22	--	12	SCREEN	OTHR	- -		00029
SHELBY		HOLMES RD	/ /	--	--	PLAST	12 - 22		- -	Y	MON
0409SW 8	15701523	ZELLARS_____MARK	06/22/1988	190	25	150	SCREEN	GOOD	35-00-00	-	00198
SHELBY		HOLMES OAK DR	/ /	190	95	PLAST	150 - 190		89-50-00	Y	HOME
0409SW 8	15709081	W PARRISH SH:K-81-8	02/20/1962	315	--	--			35-01-02	S	
SHELBY			/ /	306	--	STEEL	306 - 315		89-57-18		HOME
0409SW 8	15709091	BURDETTE CH SH:K-91	00/00/1963	155	--	--		GOOD	35-00-48	S	00212
SHELBY			/ /	--	--		-- - --		89-55-10		MDOM
0409SW 8	15709092	MEMPHIS LG & W SH:K	05/08/1964	551	--	--			35-07-34	S	
SHELBY			/ /	--	--		-- - --		89-56-04		CEST
0409SW 8	15709093	MEMPHIS LG & W SH:K	09/30/1964	528	--	--			35-07-31	S	
SHELBY			/ /	--	--		-- - --		89-55-51		MUN
0409SW 8	92000495	JACKSON_____LARR	10/15/1991	72	15	62	SCREEN	GOOD	- -		00007
SHELBY		CHULAHOMA RD	/ /	25	57	PLAST	62 - 72		- -	Y	HOME
0409SW 9	15700452	DELTA IRRIGATION CO	06/29/1965	251	--	--			35-02-09	S	00108
SHELBY			/ /	--	98		230 - 251		89-54-02		IND
0409SW 9	15700715	FISHER CONCRETE CO	11/29/1968	273	--	229			35-00-12	S	00108
SHELBY			/ /	--	132	STEEL	229 - 273		89-54-51		IND
0409SW 9	15700716	FISCHERCONCRETE CO	11/29/1968	264	--	222			35-00-11	S	00108
SHELBY			/ /	--	130	STEEL	222 - 264		89-54-51		IND
0409SW 9	15700846	FULLIAM NURSERY	02/23/1970	227	--	207		GOOD	35-00-31	S	00052
SHELBY			/ /	200	120	PLAST	207 - 227		89-54-05		COMM
0409SW 9	15700945	MAYLE.D. SH:K-10	06/13/1974	166	10	166		GOOD	35-02-03	S	00400
SHELBY			/ /	100	50	PLAST	156 - 166		89-53-22		HOME

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH AQ DEPTH	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
C409SW 9 SHELBY	15700946	J SCHL BR SH:K:10	07/21/1971 / /	489 500	1001 93	390 STEEL	403 - 483	GOOD	35-01-56 89-53-21	S	00030 IND
C409SW 9 SHELBY	15700947	SCHLITZ SH:K-10	07/21/1971 / /	485 500	1001 84	390 STEEL	399 - 479	GOOD	35-01-50 89-53-27	S	00030 IND
C409SW 9 SHELBY	15700948	J SCHL BREW SH:K-10	07/21/1971 / /	495 500	1001 91	404 STEEL	412 - 492	GOOD	35-01-50 89-53-38	S	00030 IND
C409SW 9 SHELBY	15700949	SCHLITZ SH:K-10	07/21/1971 / /	473 500	1001 93	381 STEEL	387 - 467	GOOD	35-01-58 89-53-37	S	00030 IND
C409SW 9 SHELBY	15700989	RALSTON PURINA K-10	06/02/1972 / /	477 419	-- --	410 STEEL	419 - 469	GOOD	35-01-55 89-53-00	S	00029
C409SW 9 SHELBY	15700990	RALSTON PURINA K-10	07/19/1972 / /	473 417	600 82	410 STEEL	417 - 467		35-01-53 89-53-00	S	00029 MUN
C409SW 9 SHELBY	15700996	RALSTN PURINA TEST	/ /19 / /	192 --	-- --	-- 	-- - --	GOOD	- - - -		00029 IND
C409SW 9 SHELBY	15701070	ALLEN MATERIALS HUNGERFORD	6/ 7/1974 / /	180 156	10 87	156 STEEL	SCREEN 156 - 180	IRON	35-01-00 89-53-00	T Y	00108 IND
C409SW 9 SHELBY	15701073	CAS.SCHLITZ BREJOSE RAINES ROAD	08/23/1974 / /	467 --	-- --	375 STEEL	SCREEN 244 - 324	GOOD	35-02-00 89-58-30	T Y	00029 IND
C409SW 9 SHELBY	15701082	RALSTON PURINA MENDENHALL	11/06/1974 / /	462 --	-- --	400 STEEL	SCREEN 405 - 456	GOOD	35-02-00 89-58-00	T Y	00029
C409SW 9 SHELBY	15701268	WHITEHEAD PROPERTIE	11/24/1981 / /	260 200	-- 143	210 PLAST	210 - 260	GOOD	35-00-09 89-53-55	S	00570 HOME
C409SW 9 SHELBY	15701568	MEMPHIS LG & W 3899 HICKORY HI	04/03/1989 / /	787 680	1400 118	678 STEEL	SCREEN 680 - 783	GOOD	35-00-00 89-52-30	S Y	00029 MUN
C409SW 9 SHELBY	15701569	MEMPHIS LG & W 3911 HICKORY HI	02/09/1989 / /	475 471	1400 116	366 STEEL	SCREEN 369 - 471	GOOD	35-00-00 89-52-30	S Y	00029 MUN
C409SW 9 SHELBY	15701570	MEMPHIS LG & W 3901 HICKORY HI	03/08/1989 / /	-- --	-- --	-- OTHER	-- - --		35-00-00 89-52-30	S N	00029 OTHR
C409SW 9 SHELBY	15701584	MEMPHIS LG & W 4269 CRUMP	06/12/1989 / /	575 568	-- 148	468 STEEL	SCREEN 468 - 568	GOOD	35-00-00 89-52-30	S Y	00029 MUN
C409SW 9 SHELBY	15709031	FRISCO RR SH K-31-3	/ /19 / /	176 --	-- 76	-- STEEL	-- - --	GOOD	35-01-42 89-53-52	S	

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION - DIVISION OF WATER SUPPLY
RECORDS OF WATER WELLS ON THE SOUTHEAST-MEMPHIS QUADRANGLE (0409SW) TN.

QUAD / NTH COUNTY	WELL NUM REG NUM	OWNER'S NAME LOCATION ROAD	COMP DATE INSPT DATE	TOT DEPTH TOT AQ	TOT YIELD STAT LEVEL	CSE DEPTH CSE TYPE	WELL FINISH INTERVAL	WAT QUAL TAG NUM	LATITUDE LONGITUDE	A/C LOG	DRILLER USE
0409SW 9	15709079	R C CAN CO SH:K-787	00/00/1958	--	--	--		UNK	35-01-06	S	00109
SHELBY			/ /	--	--		-- - --		89-53-13		IND
0409SW 9	15709083	WHITE STONE SH:K-8	04/23/1962	169	--	--			35-01-26	S	00108
SHELBY			/ /	--	58	STEEL	-- - --		89-53-05		IND
0409SW 9	15709084	R M WOOD SH:K-84K-8	08/00/1961	214	--	--		GOOD	35-01-25	S	
SHELBY			/ /	--	80	PLAST	200 - 214		89-53-05		HOME
0409SW 9	15709085	C E BOWS	/ /19	24	--	--		GOOD	35-01-15	S	
SHELBY			/ /	--	15		-- -		89-54-36		HOME
0409SW 9	97002872	APAC TN INC	06/27/1997	180	250	140	SCREEN	GOOD	- -		00570
SHELBY	DD025144	TUTTLES	/ /	90	90	PLAST	140 - 180		- -	Y	COMM

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APPENDIX F

WATER QUALITY LABORATORY REPORTS

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NO DRINKING WATER ANALYTICAL
WAS PERFORMED

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APPENDIX G

UST SITE RANKING FORM

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UST SITE RANKING FORM

Facility ID Number: 0-790983

Facilty Name: Army National Guard OMS #015

Facility Address: Memphis, TN

Date Ranking Form Completed: 7/16/98

Geologic and Hydrogeologic Factors

1	Minimum depth to the water table		
	<5.0 Feet	X	50
	5.1 to 10.0 Feet		45
	10.1 to 15.0 Feet		40
	15.1 to 30.0 Feet		35
	30.1 to 50.0 Feet		25
	50.1 to 75.0 Feet		15
	75.1 to 100.0 Feet		10
	> 100.0 Feet		5
ISCR, 07/29/98, p. 19, Table 3		Score	50

2	Minimum distance between water table & contaminated soil		
	<5.0 Feet		50
	5.1 to 10.0 Feet		45
	10.1 to 15.0 Feet		40
	15.1 to 30.0 Feet		35
	30.1 to 50.0 Feet		25
	50.1 to 75.0 Feet		15
	75.1 to 100.0 Feet		10
	> 100.0 Feet		5
	No soil contamination	X	0
ISCR, 07/29/98, p. 12, Table 1		Score	0

3	Soil Permeability		
	Undetermined		30
	> 10^-4 cm/sec		30
	10^2-4 to 10^-6 cm/sec	X	20
	<10^-6 cm/sec		10
ISCR, 07/29/98, p. 14, Table 2		Score	20

4	Calculated Groundwater Flow Rate		
	<10 Feet/day	X	3
	10 to 40 feet/day		6
	40 to 90 Feet /day		12
	90 to 130 Feet /day		18
	130 to 260 Feet/day		24
	> 260 Feet/day		30
	KARST		30
ISCR, 07/29/98, p. 18		Score	3

Receptor Factors

5	Basements/Crawl Spaces/Utility Vaults		
	<50.0 Feet from known contamination		150
	50.1 to 100.0 Feet from known contamination		75
	100.1 to 200.0 Feet from known contamination		50
	200.1 to 300.0 Feet from known contamination		25
	> 300.1 Feet	X	0
	ISCR, 07/29/98, p. 8	Score	0

6	Sanitary sewer mains and service lines		
	<50.0 Feet from known contamination		75
	50.1 to 100.0 Feet from known contamination		40
	100.1 to 200.0 Feet from known contamination		20
	200.1 to 300.0 Feet from known contamination	X	10
	> 300.1 Feet from known contamination		0
	ISCR, 07/29/98, p. 8 and Figure 2 on p. 5	Score	10

7	Storm Water Sewers		
	<50.0 Feet from known contamination		50
	50.1 to 100.0 Feet from known contamination		30
	100.1 to 200.0 Feet from known contamination		10
	200.1 to 300.0 Feet from known contamination		5
	> 300.1 Feet	X	0
	ISCR, 07/29/98, p. 8 and Figure 2 on p. 5	Score	0

8	Other Subsurface Utilities (i.e. natural gas, water, electric, telephone, etc.)		
	<50.0 Feet from known contamination		75
	50.1 to 100.0 Feet from known contamination	X	40
	100.1 to 200.0 Feet from known contamination		20
	200.1 to 300.0 Feet from known contamination		10
	> 300.1 Feet from known contamination		0
	ISCR, 07/29/98, p. 8 and Figure 2 on p. 5	Score	40

9	Public Water Supply Source		
	<0.1 miles		300
	0.1 to 0.25 miles		200
	0.25 to 0.5 miles		100
	>0.51 miles	X	0
	ISCR, 07/28/98, p. 26-28	Score	0

10	Private Water Supply Source		
	<0.1 miles		200
	0.1 to 0.25 miles		150
	0.25 to 0.5 miles		100
	>0.51 miles	X	0
	ISCR, 07/28/98, p. 26-28	Score	0

11	Distance to Surface Water		
	<.1 miles		25
	0.1 to 0.25 miles	X	15
	0.25 to 0.5 miles		5
	>0.51 miles		0
	ISCR, 07/28/98, p. 27, Figure 9	Score	15

Contaminant Factors

	Contaminant Concentration	A. Max. Contam. Levels	B. App. Cleanup Levels		C. Cont. Conc. Ratio A/B
	Benzene In ground water	0.00	0.07		0.0
	TPH in ground water	0.0	1.00		0.0
	BTX in Soil	0.000	50.00		0.0
	TPH in Soil	5.0	500.00		0.0

ISCR, 07/28/98, Table 1, p. 12 (SOIL)

ISCR, 07/28/98, Table 5, p. 26 (GW)

12	Benzene in ground water		
	<1.0	X	0
	1.1 to 10.0		25
	10.1 to 50.0		50
	50.1 to 100.0		100
	100.1 to 500.0		200
	> 500.1		300
		Score	0

13	TPH on groundwater		
	<1.0	X	0
	1.1 to 10.0		20
	10.1 to 50.0		40
	50.1 to 100.0		80
	100.1 to 500.0		120
	> 500.1		200
		Score	0

14	Benzene in soil		
	<1.0	X	0
	1.1 to 5.0		25
	5.1 to 10.0		50
	10.1 to 50.0		100
	>50.1		200
		Score	0

15	TPH in soil		
	<1.0	X	0
	1.1 to 5.0		20
	5.1 to 10.0		40
	10.1 to 50.0		80
	>50.1		100
		Score	0

17	Total site score	138

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APPENDIX H

TN UST COST ESTIMATE COVER SHEET

AND

REPORT PREPARATION COST ESTIMATE FORM

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INITIAL SITE CHARACTERIZATION REPORT COST FORM

Submit with ISCR	Estimated Costs	Actual Costs
Site Check		N/A
Initial Abatement/Emergency Response		N/A
Free Product Recovery		N/A
Initial Site Characterization	$26,001.00	$17,389.00
Monitoring (per event)	N/A	
Additional Assessment Activities	N/A	
Environmental Assessment	N/A	

ASSESSMENT ACTIVITIES COST ESTIMATE FORM

Provide a brief description of the tasks included in this estimate. (Expand this form as necessary)

1. No new work is planned, except for well abandonment
2.
3.
4.
5.

Professional Services			
Personnel (List Below)	Hours	Cost Per Hour	TOTAL
		GRAND TOTAL	

ASSOCIATED CHARGES	
Drilling	
Excavation	
Trucking	
Surveying	
Analytical Samples $/Sample	
Rentals (List Below)	
Disposal - Free Product	
Water	
Soil	
Capital Expenditures (List Below)	

Permitting	
Lodging and Per Diem Days x $	
Mileage Miles $ /mile	
Miscellaneous (List Below)	
GRAND TOTAL	

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH ROAD
MEMPHIS, TENNESSEE 38115-1520
PHONE (901) 368-7939 STATEWIDE 1-888-891-8332 FAX (901) 368-7979

May 6, 1999

Mr. Steve Westerman
Tennessee Department of Finance and Administration
Capital Projects Management
312 Eighth Avenue, North Suite 2200
Nashville, Tennessee 37243-0300

RE: Case Closure
National Guard Armory OMS # 15
2610 E. Holmes Road, Memphis, Shelby County, TN
Facility ID # 0-790983

Dear Mr. Westerman:

The Division of Underground Storage Tanks has reviewed the Well Abandonment/Site Closure letter dated April 15, 1999 for the above referenced facility. Based on the information available, this case is considered closed. However, the Division reserves the right to require additional action if necessary.

If you have questions concerning this correspondence, call me at (901) 368-7971.

Sincerely,

Cynthia J. Patton

Cynthia J. Patton
Division of Underground Storage Tanks

c: John Hargraves – ATC Associates Inc. – Nashville
UST Memphis Environmental Assistance Center (a)
Debbie Mann - UST Nashville Central Office - Technical Review Section

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH ROAD
MEMPHIS, TENNESSEE 38115-1520
PHONE (901) 368-7939 STATEWIDE 1-888-891-8332 FAX (901) 368-7979

January 26, 1999

TECHNICAL FILE

Mr. Steve Westerman
Tennessee Department of Finance and Administration
Capital Projects Management
312 Eighth Avenue, North Suite 2200
Nashville, Tennessee 37243-0300

RE: Monitoring Well Abandonment
National Guard Armory OMS # 15
2610 E. Holmes Road, Memphis, Shelby County, TN
Facility ID # 0-790983

Dear Mr. Westerman:

The Division of Underground Storage Tanks has reviewed the file for the referenced facility. Based upon the submitted data, additional monitoring and corrective action are not required.

The Tennessee Department of Finance and Administration, Capital Projects Management is required to properly abandon all of the monitoring wells in accordance with Section II.N. of the Environmental Assessment Guidelines. Before this case can be considered closed, a report documenting the well abandonment procedures shall be submitted to this office by **March 26, 1999**.

If the wells have already been properly abandoned, a report documenting the procedure shall be submitted to the Division by **February 26, 1999**. A clean closure letter will then be issued to the Department of Finance and Administration.

If site conditions change and petroleum vapors, free product or other public health and/or environmental problems arise, then corrective action shall be immediately initiated and the Division notified within 72 hours. If you have questions concerning this correspondence, call me at (901) 368-7974.

Sincerely,

Cynthia Patton

Cynthia J. Patton
Division of Underground Storage Tanks

c: UST Memphis Environmental Assistance Center (a)
Debbie Mann - UST Nashville Central Office - Technical Review Section

STATE OF TENNESSEE
Department of Finance and Administration
Division of Capital Projects Management / Real Property Management

Capital Projects Management
Tennessee Tower, Suite 1300
312 Eighth Avenue, North
Nashville, TN 37243-0300

Real Property Management
Tennessee Tower, Suite 1500
312 Eighth Avenue, North
Nashville, TN 37243-0299

Telephone
615-741-1563

Facsimile
615-741-2335

TECHNICAL FILE

December 23, 1997

Mr. John Hargraves
ATC Associates, Inc.
5217 Linbar Drive, Suite 306
Nashville, TN 37211

RE: REQUEST FOR SERVICES
OMS #15 - Memphis
Fac. I.D. #0-790983

John:

As a result of the removal of the UST at the above facility, the analytical results provided readings which exceed the most stringent clean-up levels. Consequently, the DUST Memphis Field Office directs that an Initial Site Characterization Report (ISCR) be submitted per DUST guidelines. I request your firm proceed with this work as defined in your UST Regional Consultant Contract (including providing to me the customary task/budget letter.)

Please find enclosed a copy of the Permanent Closure Report filed for the site, which includes site maps and a summary report of analyses; and, a copy of the letter (N.O.V.) from Cynthia Patton with the Memphis Field Office, dated December 12, 1997; which states in part that the ISCR is due by February 27, 1998. If you require anything further, please do not hesitate to contact me.

Sincerely,

Steven L. Westerman
Environmental Program Administrator

pc: Ralph Harder, Tenn. Dept. of Military
Curtis Hopper, DUST Central Office, Nashville
Cynthia Patton, DUST, Memphis Field Office

TECHNICAL FILE

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
MEMPHIS ENVIRONMENTAL FIELD OFFICE
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH
MEMPHIS, TENNESSEE 38115-1520

June 3, 1997

CERTIFIED MAIL P 182 143 780

Mr. Ralph S. Harder C.P.E.
Tennessee Army National Guard (STARC)
Houston Barracks, P.O. Box 41052
Nashville, Tennessee 37204-1502

RE: Release Response
OMS # 15 - Memphis
2610 East Holmes Road, Memphis, Shelby County, TN
Facility ID # 0-790983

Dear Mr. Harder:

The Division of Underground Storage Tanks (the Division) has reviewed the Permanent Closure Report dated May 15, 1997 for the referenced facility. According to the report water in the tank pit recharged within 24 hours. The water was sampled on February 12, 1997. The level of total petroleum hydrocarbons (TPH), diesel range organics (DRO) was 595 parts per million (ppm). This level is above the 1.0 ppm clean up level for non-drinking water.

Rule 1200-1-15-.06 of the Tennessee Petroleum Underground Storage Tank Regulations requires that Tennessee Army National Guard take immediate action to prevent any further release of petroleum into the environment and to identify and mitigate fire, explosion, and vapor hazards.

> Rule 1200-1-15-.06 requires that the Responsible Party, in response to a confirmed release from an underground storage tank system, perform initial abatement measures.

Since the underground storage tanks have been removed at this site, it will not be necessary to submit an **Initial Abatement Report (IAR)**.

The Tennessee Army National Guard shall submit an **Initial Site Characterization Report (ISCR)** to this office by **September 8, 1997** following the ISCR Guidelines. This report must contain all data gathered during the field activities and identify the applicable cleanup levels. One well closest to the release shall be installed, instead of four wells as stated in the ISCR Guidelines.

Environmental assessment activities and evaluation of the subsurface investigation shall be directed by a registered professional geologist under the Tennessee Geologist Act (T.C.A. 62-36-101 et seq.) or a registered professional engineer under the Tennessee Architects, Engineers, Landscape Architects, and Interior Designers Law and Rules (T.C.A. 62-2-101 et seq.). All assessment activities shall be conducted in accordance with the **1996 UST Reference Handbook**.

All fund eligible work must be conducted and/or overseen by an UST Approved Corrective Action Contractor to be eligible for reimbursement from the Tennessee Petroleum Underground Storage Tank Fund. The current list of approved contractors is enclosed. To determine if a site is Fund eligible, the enclosed Authorization for Fund Eligibility Form must be completed and submitted to the Nashville Central office.

T.C.A. 68-215-121(a)(1) states:

> Any person who violates or fails to comply with any provision of this chapter, any order of the commissioner or board, any rule, regulation, or standard pursuant to this chapter shall be subject to a civil penalty not to exceed ten thousand dollars ($10,000) per day for each day of violation. This civil penalty may be assessed by the commissioner, the board or the court. Each day such violation continues shall constitute a separate punishable offense, and such person shall also be liable for any damages to the state resulting therefrom.

Rule 1200-1-15-.09(11) states that a fund eligible owner or operator conducting UST corrective action is entitled to fund coverage for reasonable costs; subject to certain provisions. The owner or operator must comply with the requirements in rule 1200-1-15-.06 as outlined in this letter. If this facility is Fund eligible, failure to comply with these requirements may result in the loss of fund coverage of the release investigation and/or corrective action costs associated with this release.

This office must be notified at least one working day in advance of any major field activities.

Send one copy of all correspondence, including reports, to this office and one copy to:

Division of Underground Storage Tanks
4th Floor, L & C Tower
401 Church Street
Tennessee Department of Environment and Conservation
Nashville, Tennessee 37243-1541

If you have any questions concerning this correspondence, call me at (901)368-7974.

Sincerely,

Cynthia J. Patton

Cynthia J. Patton
Division of Underground Storage Tanks

Enclosures: UST Approved CAC List
Authorization For Fund Eligibility

c: Memphis UST Field Office (active file)
Curtis Hopper - Nashville UST Central Office - Technical Review Section

fo-004h

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
MEMPHIS ENVIRONMENTAL FIELD OFFICE
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH
MEMPHIS, TENNESSEE 38115-1520

October 30, 1996

Mr. Ralph S. Harder, C.P.E.
Tennessee Army National Guard (STARC)
Houston Barracks, P.O. Box 41502
Nashville, TN 37204-1502

RE: Permanent Closure Application - Approved
OMS # 15 - Memphis
2610 East Holmes Road, Memphis, TN
Facility ID #0-790983, Shelby County

Dear Mr. Harder:

The Division of Underground Storage Tanks has approved your application for Permanent Closure of Underground Storage Tank Systems dated October 14, 1996 for the above referenced facility. Enclosed is a copy of the approved application. This copy must be kept at the site during all closure activities.

This office must be notified at least one working day in advance of any major field activities.

If a release is identified during closure procedures, then the following initial response actions must be performed by Tennessee Army National Guard as required by Rule 1200-1-15-.06(2):

(a) Report the release to the Division within 72 hours (e.g., by telephone or electronic mail);

(b) Take immediate action to prevent any further releases of the petroleum into the environment; and

(c) Take immediate action to identify and mitigate fire, explosion, and vapor hazards.

All Fund eligible work shall be conducted and/or overseen by an UST Approved Corrective Action Contractor. The current list of approved contractors is enclosed. Also refer to the Authorization for Fund Eligibility form.

Tennessee Army National Guard must comply with all applicable federal, state, and local requirements during tank closure activities, including treatment and disposal of contaminated soil and/or groundwater. For information regarding the treatment of petroleum contaminated soils, refer to the enclosed Technical Guidance Document 009.

Enclosed is a copy of the Permanent Closure Report Form, Technical Guidance Document 005 and Technical Guidance Document 009. The Permanent Closure Report Form must be completed and submitted with original or carbon copies of the analytical results. Photocopies will NOT be accepted.

Before the closure of your UST system can be considered complete, an amended UST Notification Form must be completed, signed, and submitted to the UST Central Office in Nashville. Failure to properly submit the form may result in the assessment of additional UST fees. To assist you in properly completing the Notification Form, the following instructions should be followed:

1. If tanks are being removed and no additional tanks are being installed, then complete only sections I, II, VIII, and X. The tank identification numbers should correspond with the numbers for these tanks on the previous Notification Form.

2. If additional tanks are to be installed at this facility, then sections IX and XI must also be completed. The identification numbers for the new tanks must be different from the numbers of the tanks which were removed (e.g., Tanks 1, 2, and 3 were removed, Tanks 4, 5, and 6 are to be installed).

If you have any questions concerning this correspondence, contact me at (901) 368-7974.

Sincerely,

Cynthia J. Patton

Cynthia J. Patton
Division of Underground Storage Tanks

CJP\79016304\ag

Enclosure: Approved Closure Application (copy)
Permanent Closure Report Form (1/94)
Technical Guidance Document 005 (1/94)
Technical Guidance Document 009 (1/94)
Authorization For Fund Eligibility

c: Nashville UST Central Office - Fee & Notification Section
Memphis UST Field Office

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
MEMPHIS ENVIRONMENTAL FIELD OFFICE
SUITE E-645, PERIMETER PARK
2510 MT. MORIAH
MEMPHIS, TENNESSEE 38115-1520

December 12, 1997

CERTIFIED MAIL P 612 846 973

Mr. Ralph S. Harder C.P.E.
Tennessee Army National Guard (STARC)
Houston Barracks, P.O. Box 41052
Nashville, Tennessee 37204-1502

NOTICE OF VIOLATION

RE: Failure to Meet Compliance Deadline
OMS # 15 - Memphis
2610 East Holmes Road, Memphis, Shelby County, TN
Facility ID # 0-790983

Dear Mr. Harder:

On June 3, 1997, the Division of Underground Storage Tanks notified the Tennessee Army National Guard by certified letter that the Initial Site Characterization Report (ISCR) for the referenced facility was to have been submitted to this office by September 8, 1997. To date, the document has not been received. The failure to submit the document is a violation of the Tennessee Petroleum Underground Storage Tank Regulations.

Rule 1200-1-15-.03(5) states:

> Owners and/or operators of UST systems must cooperate with inspections, monitoring, and testing conducted by the Division, as well as, requests for document submission, testing, and monitoring by the owner or operator pursuant to the Tennessee Petroleum Underground Storage Tank Act Tennessee Code Annotated Section 68-215-107.

T.C.A. Section 68-215-121(a)(1) states:

> Any person who violates or fails to comply with any provision of this chapter, any order of the commissioner or board, any rule, regulation, or standard pursuant to this chapter shall be subject to a civil penalty not to exceed ten thousand dollars ($10,000) per day for each day of violation. This civil penalty may be assessed by the commissioner, the board, or the court. Each day such violation continues shall constitute a separate punishable offense, and such person shall be liable for any damages to the state resulting therefrom.

Rule 1200-1-15-.09(11)(a) and (j) state:

> An eligible owner or operator conducting UST corrective actions is entitled to coverage of reasonable costs from the Fund, subject to the following provisions:
>
> (a) Upon confirmation of a release in accordance with Rule 1200-1-15-.05(3) or after a release from the UST system is identified in any other manner, owners and operators must perform initial response actions required in Rule 1200-1-15-.06(2), initial abatement measures required in Rule 1200-1-15-.06(3)(a)1 through 4 and Rule 1200-1-15-.06(3)(b), and initial free product removal according to Rule 1200-1-15-.06(5) and Rule 1200-1-15-.06(3)(a)6 necessary to properly stabilize a site and to prevent significant continuing damage to the environment or risk to human health.
>
> (j) Any corrective action which is carried out in response to any discharge, release, or threatened release of petroleum from an UST must be conducted in accordance with the requirements of Rules 1200-1-15-.06(1) through 1200-1-15-.06(7) and subparagraphs (a) through (d) of this paragraph.

The Tennessee Army National Guard shall submit the ISCR by **February 27, 1998**. Send one copy of all documents to this office and one copy to:

Division of Underground Storage Tanks
4th Floor, L & C Tower
401 Church Street
Tennessee Department of Environment and Conservation
Nashville, TN 37243-1541

If you have any questions concerning this correspondence, call me at (901)368-7974.

Sincerely,

Cynthia J. Patton

Cynthia J. Patton
Division of Underground Storage Tanks

c: Memphis UST Field Office (active file)
Curtis Hopper - Nashville UST Central Office - Technical Review Section

fo-084h

750336	12491	ARMY AVIATION	B CD 603 GRUBBS KYLE TNG CTR	Smyrna	TN	37167	1997	JV193779	$125.00	Payment	
750336	12491	ARMY AVIATION	B CD 603 GRUBBS KYLE TNG CTR	Smyrna	TN	37167	1997	JV193779	$125.00	Payment	
750336	12491	ARMY AVIATION	B CD 603 GRUBBS KYLE TNG CTR	Smyrna	TN	37167	1997	JV193779	$125.00	Payment	
750336	12491	ARMY AVIATION	B CD 603 GRUBBS KYLE TNG CTR	Smyrna	TN	37167	1997	JV193779	$125.00	Payment	
750336	12491	ARMY AVIATION	B CD 603 GRUBBS KYLE TNG CTR	Smyrna	TN	37167	1997	JV193779	$125.00	Payment	
											($750.00)
790983	12491	OMS #15	2610 E HOLMES RD	Memphis	TN	38118	1997		($125.00)	Base Fee	
790983	12491	OMS #15	2610 E HOLMES RD	Memphis	TN	38118	1997		($125.00)	Base Fee	
790983	12491	OMS #15	2610 E HOLMES RD	Memphis	TN	38118	1997	JV193779	$125.00	Payment	
790983	12491	OMS #15	2610 E HOLMES RD	Memphis	TN	38118	1997	JV193779	$125.00	Payment	
											($250.00)
920097	12491	OMS #11	100 VOLUNTEER DRIVE	Martin	TN	38237	1997		($125.00)	Base Fee	
920097	12491	OMS #11	100 VOLUNTEER DRIVE	Martin	TN	38237	1997		($125.00)	Base Fee	
920097	12491	OMS #11	100 VOLUNTEER DRIVE	Martin	TN	38237	1997	JV193779	$125.00	Payment	
920097	12491	OMS #11	100 VOLUNTEER DRIVE	Martin	TN	38237	1997	JV193779	$125.00	Payment	
											($250.00)

Doc 185007 Batch 227 Dec 95

PAGE 1 14:27:54 29 NOV 1995

FEES.....	Owner ID	Location Name and Address	Registration Fee, Total
0090081*1995	12491	UNIT TRAINING EQUIP SITE #1 RT 1 TN HWY 220 LAVINIA , TN 38348	$50.00
0120019*1995	12491	OMS #14 (HHC 4-117TH IN 9MO) HWY 100 EAST HENDERSON, TN 38340	$25.00
0160084*1995	12491	OMS #07 1202 E CARROLL ST TULLAHOMA, TN 37388	$25.00
0260093*1995	12491	OMS #08 FAYETTEVILLE HWY US 64 WINCHESTER, TN 37396	$25.00
0270160*1995	12491	OMS #12 ARMORY ST TRENTON, TN 38382	$25.00
0330094*1995	12491	OMS #05 1801 HOLTZCLAW AVE CHATTANOOGA, TN 37404	$75.00
0370104*1995	12491	OMS #17 4401 W STONE STREET KINGSPORT, TN 37662-1429	$25.00
0540101*1995	12491	OMS #03 HWY 30 EAST ATHENS, TN 37303	$25.00
0570213*1995	12491	OMS #13 AMERICAN DR JACKSON, TN 38302	$50.00
0600130*1995	12491	OMS #10 INDUSTRIAL PARK RD COLUMBIA, TN 38401	$50.00
0710181*1995	12491	OMS #04 505 GOULD DRIVE COOKEVILLE, TN 38502	$50.00
0750010*1995	12491	AASF #1 SMYRNA AIRBASE SMYRNA, TN 37167	$75.00
0750265*1995	12491	OMS #16 GRUBBS/KYLE TRAINING CENTER SMYRNA, TN 37167	$50.00
0750336*1995	12491	ARMY AVIATION SUPPORT FACILITY B CO 603 GRUBBS KYLE TNG CTR SMYRNA, TN 37167	$75.00
0790983*1995	12491	OMS #15 2610 E HOLMES RD MEMPHIS, TN 38116	$50.00
0900287*1995	12491	OMS #01 2117 W MARKET ST JOHNSON CITY, TN 37601	$50.00
0920097*1995	12491	OMS #11 100 VOLUNTEER DRIVE P.O. BOX 147 MARTIN, TN 38237	$50.00
0950139*1995	12491	OMS #06 604 W ADAMS	$25.00

PAGE 2 14:27:58 29 NOV 1995

FEES.....	Owner ID	Location Name and Address	Registration Fee, Total
		LEBANON, TN 37087	
***			$800.00

18 Records Processed

J | 12/29/95 | 341.01 | 701
DOC TYPE | INPUT DATE | DEPT/DIV | BATCH NO.

PAYING DEPT. Military

ACCOUNT NAME TN Army/Nat Guard

EFFECTIVE DATE 12/1/95

DIVISION OF ACCOUNTS
Department of Finance and Administration
State of Tennessee

JOURNAL VOUCHER

Document No. 185007

J | 12/26/95 | 32701 | 227
DOC. TYPE | INPUT DATE | DEPT/DIV | BATCH NO.

BILLING DEPT. Environment & Conservation

ACCOUNT NAME UST

EFFECTIVE DATE 12/1/95

CONTACT PERSON: Wanda Taylor (532-0301)

	DEBIT												CREDIT											
SEQ	TC	FFY	F FD	SUB ACCT.	DEPT/DIV	COST CENTER	GRANTS/SUB PROJ/SUB	OBJ/AGY SOURCE/AGY		M	REF. NO.	AMOUNT	SEQ	TC	FFY	F FD	SUB ACCT.	DEPT/DIV	COST CENTER	GRANTS/SUB PROJ/SUB	OBJ/AGY SOURCE/AGY		REF. NO.	AMOUNT
1	114	96	11		341.07	11650	-	089				800.00	CR01	147	96	20		32741	07		295	615		800.00

COMMENTS:
1995 Underground Storage Tank Registration Fees
Owner I.D. #12491
341 07
11150

The reverse side of this form is to be prepared and signed by the Billing Department and sent to the Paying Department for approval. The Paying Department will then prepare and sign the Debit side and forward to the Division of Accounts (3 copies).

I certify that the items described above were received and inspected by me; that the quantities were as stated; and that the condition was satisfactory except as otherwise noted.

Paying Department Head

Paying Department Budget Officer

PROCESSED
JAN 23 1996
DIRECTOR OF ACCOUNTS

Commissioner Finance and Administration

I hereby certify that the items listed above were furnished to the organization unit indicated and that the prices charged are proper.

Billing Department Budget Officer

White Copy—Accounts File
Green Copy—Return to Paying Dept.
Canary Copy—Return to Billing Dept.
Pink Copy—Paying Dept. File Copy
Goldenrod Copy—Billing Dept. File Copy

PAGE 1 08:59:26 28 DEC 1994

FEES.....	Registration Fee, Total	Late Penalty	Total Due Amount	Balance Due	
0030078*1994	$.00	$.00	$.00	$.00	
0090081*1994	$50.00	$.00	$50.00	$50.00✓	
0120019*1994	$25.00	$.00	$25.00	~~$25.00✓~~	
0160084*1994	$25.00	$.00	$25.00	$-25.00	Should be ∅
0190743*1994	$.00	$.00	$.00	$.00	
0260073*1994	$.00	$.00	$.00	$.00	
0260093*1994	$25.00	$.00	$25.00	$25.00✓	
0270160*1994	$25.00	$.00	$25.00	$25.00✓	
0330094*1994	$75.00	$.00	$75.00	$75.00✓	
0370104*1994	$25.00	$.00	$25.00	$25.00✓	
0470484*1994	$.00	$.00	$.00	$.00	
0540101*1994	$25.00	$.00	$25.00	$25.00✓	
0570213*1994	$50.00	$.00	$50.00	$50.00✓	
0600130*1994	$50.00	$.00	$50.00	$50.00✓	
0710181*1994	$50.00	$.00	$50.00	$50.00✓	
0710182*1994	$.00	$.00	$.00	$.00	
0750010*1994	$75.00	$.00	$75.00	$75.00✓	
0750265*1994	$50.00	$.00	$50.00	$50.00✓	
0750336*1994	$75.00	$.00	$75.00	$75.00✓	
0790983*1994	$50.00	$.00	$50.00	$50.00✓	
0900287*1994	$50.00	$.00	$50.00	$50.00✓	
0920097*1994	$50.00	$.00	$50.00	$50.00✓	
0950139*1994	$25.00	$.00	$25.00	~~$25.00✓~~	Did not pay for this Facility
***	$800.00	$.00	$800.00	$750.00	

35 Records Processed

doc# 157283

DOC TYPE | INPUT DATE | DEPT/DIV | BATCH NO.

PAYING DEPT. Military

ACCOUNT NAME TN Army/National Guard

EFFECTIVE DATE

DIVISION OF ACCOUNTS
Department of Finance and Administration
State of Tennessee

JOURNAL VOUCHER

Document No. 157283

Keyed

1 | 1/10/95 | 32701 | 305
DOC. TYPE | INPUT DATE | DEPT/DIV | BATCH NO.

BILLING DEPT. Environment & Conservation

ACCOUNT NAME UST

EFFECTIVE DATE 1/6/95

CONTACT PERSON: Wanda Taylor (532-0301)

DEBIT

SEQ	TC	FFY	F FD	SUB. ACCT	DEPT/DIV	COST CENTER	GRANTS/SUB PROJ/SUB	OBJ/AGY SOURCE/AGY	M	REF. NO.	AMOUNT

CREDIT

SEQ	TC	FFY	F FD	SUB ACCT.	DEPT/DIV	COST CENTER	GRANTS/SUB PROJ/SUB	OBJ/AGY SOURCE/AGY		REF. NO.	AMOUNT
	147	95	20		32741	07		295	G15		750.00

Fdr Stam Rep
2nd JV Sent in
March 95

COMMENTS: 1994 Underground Storage Registration Fees

Owner I. D. #12491

The Credit side of this form is to be prepared and signed by the Billing Department and sent to the Paying Department (4 copies). The Paying Department will then prepare and sign the Debit side and forward to the Division of Accounts (3 copies).

I certify that the items described above were received and inspected by me; that the quantities were as stated; and the the condition was satisfactory except as otherwise noted.

Paying Department Head

Paying Department Budget Officer

Commissioner Finance and Administration

I hereby certify that the items listed above were furnished to the organization unit indicated and that the prices charged are proper.

Thomas W. Eckert
Billing Department Budget Officer

White Copy—Accounts File
Green Copy—Return to Paying Dept.
Canary Copy—Return to Billing Dept.
Pink Copy—Paying Dept. File Copy
Goldenrod Copy—Billing Dept. File Copy

FACILITY NO.

State of Tennessee

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

UNDERGROUND STORAGE TANK REGISTRATION CERTIFICATE

THIS CERTIFICATE MUST BE POSTED AT THE FACILITY

This certifies that the facility listed below has been duly registered with the State of Tennessee.

Facility Address:

COMMISSIONER

This certificate effective and expires

This certificate may be revoked if the Owner/Operator violates any of the lawful rules or regulations promulgated under Tennessee Code Annotated Section 68-53-101 et seq.

The following tanks have been duly registered at the above facility:

Tank Number	Description	Substance Stored

CN-0864 (Rev. 2/92)

COPY

Appendix F
Miscellaneous Supporting Documents

Melvin Burgess
Assessor Of Property
Shelby County Government

Property Location and Owner Information

Parcel ID	094400 00129
Property Address	0 HOLMES RD
Municipal Jurisdiction	MEMPHIS
Neighborhood Number	00808B00
Tax Map Page	227
Land Square Footage	174240
Acres	4
Lot Dimensions	4AC 50/368.05X460+350/510IRR
Subdivision Name	
Subdivision Lot Number	
Plat Book and Page	
Number of Improvements	0
Owner Name	MEMPHIS SHELBY COUNTY AIRPORT AUTHORITY
In Care Of Owner Address	2491 WINCHESTER
Owner City/State/Zip	MEMPHIS TN 38116

Appraisal and Assessment Information

Class	EXEMPT
Land Appraisal	$50,300
Building Appraisal	$0
Total Appraisal	$50,300
Total Assessment	$0
Greenbelt Land Appraisal	$0
Homesite Land Appraisal	$0
Homesite Building Appraisal	$0
Greenbelt Appraisal	$0
Greenbelt Assessment	$0

Improvement/Commercial Details

Stories	
Exterior Walls	
Land Use	- VACANT LAND
Year Built	
Total Rooms	
Bedrooms	
Bathrooms	
Half Baths	
Heat	
Fuel	
Heating System	
Fireplace Masonry	
Fireplace Pre-Fab	
Ground Floor Area	
Total Living Area	
Car Parking	

Permits

Date of Permit	Amount of Permit	Permit Number	Reason
09/02/1989	$0	250061	
10/12/1981	$7,000	15370	

Sales

Date of Sale	Sales Price	Deed Number	Instrument Type
09/23/1988	$0	AS4457	WD
09/24/1981	$0	S79383	QC

Melvin Burgess
Assessor Of Property
Shelby County Government

Property Location and Owner Information

Parcel ID	094400 00128
Property Address	0 HOLMES RD
Municipal Jurisdiction	MEMPHIS
Neighborhood Number	00808B00
Tax Map Page	227
Land Square Footage	6359760
Acres	146
Lot Dimensions	146AC
Subdivision Name	
Subdivision Lot Number	
Plat Book and Page	
Number of Improvements	0
Owner Name	MEMPHIS SHELBY COUNTY AIRPORT AUTHORITY
In Care Of Owner Address	2491 WINCHESTER
Owner City/State/Zip	MEMPHIS TN 38116

Appraisal and Assessment Information

Class	EXEMPT
Land Appraisal	$100
Building Appraisal	$0
Total Appraisal	$100
Total Assessment	$0
Greenbelt Land Appraisal	$0
Homesite Land Appraisal	$0
Homesite Building Appraisal	$0
Greenbelt Appraisal	$0
Greenbelt Assessment	$0

Improvement/Commercial Details

Stories	
Exterior Walls	
Land Use	- VACANT LAND
Year Built	
Total Rooms	
Bedrooms	
Bathrooms	
Half Baths	
Heat	
Fuel	
Heating System	
Fireplace Masonry	
Fireplace Pre-Fab	
Ground Floor Area	
Total Living Area	
Car Parking	

Permits

Date of Permit	Amount of Permit	Permit Number	Reason
09/07/1989	$0	250060	

Sales

Date of Sale	Sales Price	Deed Number	Instrument Type
06/27/1988	$0	AM7860	WD
09/24/1981	$0	S79383	QC

Melvin Burgess
Assessor Of Property
Shelby County Government

Property Location and Owner Information

Parcel ID	094400 00107
Property Address	5478 SWINNEA RD
Municipal Jurisdiction	MEMPHIS
Neighborhood Number	00808B00
Tax Map Page	227
Land Square Footage	4356000
Acres	100
Lot Dimensions	
Subdivision Name	
Subdivision Lot Number	
Plat Book and Page	
Number of Improvements	0
Owner Name	MEMPHIS SHELBY COUNTY AIRPORT AUTHORITY
In Care Of Owner Address	2491 WINCHESTER
Owner City/State/Zip	MEMPHIS TN 38116

Appraisal and Assessment Information

Class	EXEMPT
Land Appraisal	$727,800
Building Appraisal	$0
Total Appraisal	$727,800
Total Assessment	$0
Greenbelt Land Appraisal	$0
Homesite Land Appraisal	$0
Homesite Building Appraisal	$0
Greenbelt Appraisal	$0
Greenbelt Assessment	$0

Improvement/Commercial Details

Stories	
Exterior Walls	
Land Use	- VACANT LAND
Year Built	
Total Rooms	
Bedrooms	
Bathrooms	
Half Baths	
Heat	
Fuel	
Heating System	
Fireplace Masonry	
Fireplace Pre-Fab	
Ground Floor Area	
Total Living Area	
Car Parking	

Sales

Date of Sale	Sales Price	Deed Number	Instrument Type
10/25/1995	$0	FK6971	WD
09/14/1995	$0	FK6970	CD
07/21/1994	$0	EN2864	QC
07/20/1994	$0	EN2172	QC
10/14/1993	$0	290-676	PC
10/16/1990	$0	CM0533	QC
05/18/1988	$0	AM7518	QC

Appendix G
Photo Log

Phase I Environmental Site Assessment
Holmes Road Development Project Property
Southeast Corner of East Holmes Road and Swinnea Road
Shelby County, Tennessee

Photo 1: View of metal roofing observed on the ground within the southwest portion of the subject property.

Photo 2: View of the broken concrete presumed to be from a former building structure in the north-central portion of the subject property.

Photo 3: Partial view of the former gravel pit area in the northeast portion of the subject property.

Photo 4: View of used tires observed along the west portion of the subject property.

Photo 5: View of livestock feeding trough/ring observed in the northwest portion of the subject property.

Photo 6: View of trash and debris observed in the north-central portion of the property. Materials observed suggest a residential building may have been located in the area.

Photo 7: View of north utility easement looking west toward Swinnea Road.

SOLID WASTE CAPACITY INFORMTION

SHELBY COUNTY, TN

Active Solid Waste Facilites in Shelby County, Tennessee as of April 17, 2020

	Facility	Permit Number	Permit Type	Status	Permittee	Location	City	County	Issuance
1	South Shelby Landfill	SNL790000135	CLASS I	Active	BFI WASTE SYSTEMS OF NORTH AMERICA LLC	5494 Malone Road	Memphis	Shelby	JAN-01-1978
2	North Shelby Landfill Class I	SNL790000224	CLASS I	Active	BFI WASTE SYSTEMS OF NORTH AMERICA LLC	7111 Old Millington Rd	Millington	Shelby	JAN-01-1988
3	North Shelby Landfill Class III	DML790000122	CLASS III	Active	BFI WASTE SYSTEMS OF NORTH AMERICA LLC	7111 Old Millington Rd	Millington	Shelby	JUN-29-2009
4	Frayser Business Development Center Demolition Landfill	DML790000123	CLASS III	Active	Steven L. Williamson and Carol Williamson	2948 Thomas Street	Memphis	Shelby	JUL-02-2009
5	Blaylock Brown Construction, Inc.	DML790000050	CLASS III	Active	BLAYLOCK & BROWN CONSTRUCTION, INC.	10636 Shelton Road	Collierville	Shelby	JUN-09-1997
6	North Memphis Landfill, Inc.	DML790000109	CLASS III	Active	NORTH MEMPHIS LANDFILL, INC.	382 Klinke Rd	Memphis	Shelby	MAR-11-2002
7	Chandler Demolition Company, Inc.	DML790000074	CLASS IV	Active	CHANDLER DEMOLITION COMPANY, INC.	1223 North Watkins Street (Office) 955 Levee Road (Site)	Memphis	Shelby	SEP-26-1997
8	Shelby County Recycle Center	CCC790001522	CONVENIENCE	Active	SHELBY COUNTY GOVERNMENT	1075 Mullins Station Road	Memphis	Shelby	JUL-27-2005
9	South Shelby Landfill Processing Facility	SWP790001430	PROCESSING	Active	BFI WASTE SYSTEMS OF NORTH AMERICA LLC	5494 Malone Road	Memphis	Shelby	-
10	Combs Industrial Services DBA Onsite Environmental	SWP790001528	PROCESSING	Active	Combs Industrial Services, Inc. dba Onsite Environ	2605 Chelsea & 2730 Mathews	Memphis	Shelby	APR-13-2018
11	Switch Medical Waste Services, LLC	SWP790001537	PROCESSING	Active	Switch Medical Waste Services, LLC	2706 Huntley Drive	Memphis	Shelby	MAY-08-2017
12	Stericycle, Inc.	SWP790000213	PROCESSING	Active	STERICYCLE, INC.	540 Rivergate Drive	Memphis	Shelby	JUL-12-1990
13	North 2Nd Street Incinerator	SWP790001036	PROCESSING	Active	CITY OF MEMPHIS	2401 North Second Street	Memphis	Shelby	DEC-03-1990
14	Earth Complex City of Memphis	SWP790001168	PROCESSING	Active	CITY OF MEMPHIS	2389 Hennington Avenue	Memphis	Shelby	SEP-13-1994
15	Blaylock & Brown Construction	SWP790001178	PROCESSING	Active	BLAYLOCK & BROWN CONSTRUCTION	10636 Shelton Road	Collierville	Shelby	MAY-03-1994
16	North Shelby Solidification Facility	SWP790001358	PROCESSING	Active	BFI WASTE SYSTEMS OF NORTH AMERICA LLC	7111 Old Millington Rd	Millington	Shelby	MAY-05-2003
17	City Of Bartlett Solid Waste Complex-Incinerator	SWP790001402	PROCESSING	Active	CITY OF BARTLETT	5250 Shelter Run Lane	Bartlett	Shelby	NOV-21-2006
18	Aftermath Services LLC - TN	TRF790001504	TRANSFER	Active	Aftermath Services LLC	3086 Summer Avenue	Memphis	Shelby	JUL-23-2015
19	Trilogy MedWaste Southeast - Memphis TN	TRF790001539	TRANSFER	Active	MedSafe Waste, LLC	5565 E. Raines Road	Memphis	Shelby	JUN-30-2017
20	Medical Waste Services, LLC	TRF790001543	TRANSFER	Active	Medical Waste Services, LLC	129 W. Trigg Avenue	Memphis	Shelby	JUN-22-2017
21	Bellevue Transfer Station	TRF790000099	TRANSFER	Active	CITY OF MEMPHIS	1500 North Bellevue	Memphis	Shelby	JAN-01-1973
22	Collierville Transfer Station	TRF790000231	TRANSFER	Active	TOWN OF COLLIERVILLE	450 East South Street	Collierville	Shelby	JUL-12-1990
23	Waste Connections Of Tenn.Inc. Transfer Station	TRF790001022	TRANSFER	Active	WASTE CONNECTIONS OF TENNESSEE, INC.	621 East Brooks Road	Memphis	Shelby	OCT-29-1990
24	Scott Street Transfer Station	TRF790001024	TRANSFER	Active	CITY OF MEMPHIS	309 Scott St.	Memphis	Shelby	OCT-29-1990
25	Waste Management Of Tennessee Transfer Station	TRF790001072	TRANSFER	Active	WASTE MANAGEMENT INC. OF TENNESSEE	3750 Hatcher Circle	Memphis	Shelby	JUL-03-1991
26	Liberty Tire Recycling, LLC	TRF790001397	TRANSFER	Active	Liberty Tire Recycling, LLC	3000 Elvis Presley Blvd	Memphis	Shelby	SEP-26-2006
27	City Of Bartlett Solid Waste Complex	TRF790001400	TRANSFER	Active	CITY OF BARTLETT	5250 Shelter Run Lane	Bartlett	Shelby	AUG-30-2006
28	City Of Memphis Farrisview Transfer Station	TRF790001403	TRANSFER	Active	CITY OF MEMPHIS	3211 Farrisview Blvd.	Memphis	Shelby	NOV-09-2006

Source:
https://www.tn.gov/environment/program-areas/solid-waste/maps.html

CLASS I disposal facility accepts non-hazardous municipal solid wastes such as household wastes, approved special wastes, and commercial wastes.
CLASS II disposal facility accepts non-hazardous industrial wastes, commercial wastes and fill.
CLASS III disposal facility accepts Class IV wastes plus landscaping, land clearing and farming wastes.
CLASS IV disposal facility accepts construction/demolition wastes, shredded tires and waste with similar characteristics.

STAFF REPORT

AGENDA ITEM:

CASE NUMBER: ZTA 18-001 **L.U.C.B. MEETING:** April 12, 2018

APPLICANT: Memphis and Shelby County Office of Planning and Development

REPRESENTATIVE: Josh Whitehead, Planning Director/Administrator

REQUEST: Adopt Amendments to the Memphis and Shelby County Unified Development Code

EXECUTIVE SUMMARY

1. Items 2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 15, 16 and 19 are relatively minor in nature and further explained in this staff report.

2. Item 1 will require construction debris landfills in the Heavy Industrial zoning districts to obtain a Special Use Permit from the Memphis City Council or Shelby County Board of Commissioners rather than be permitted by right. It will also require a 500-foot separation between landfills and schools and parks.

3. Item 4 will require a public hearing for any change in the controlling interest in ownership of a used car lot that has received a Special Use Permit from the Memphis City Council or Shelby County Board of Commissioners.

4. Item 9 will amend the opening paragraph of the Medical, University and Midtown Overlay Districts to clearly stipulate that the use tables of these districts apply, regardless if there is any new construction.

5. Item 14 will require signs to be posted along the portions of a street subject to a Residential Corridor Deletion application.

6. Item 17 provides that the Planning Director, rather than the Building Official, shall issue written interpretations of the Zoning Code (the UDC). The latter's focus is primarily on the Building Code.

7. Item 18 will allow an up to 10% increase to a building setback to be processed administratively; currently, only *decreases* of up to 10% are permitted.

RECOMMENDATION

Approval

Staff Writer: ***Josh Whitehead*** **E-mail:** *josh.whitehead@memphistn.gov*

Proposed language is indicated in **bold, underline**; deleted language is indicated in ~~strikethrough~~.

1. 2.5.2 and 2.6.4D(2)(c) (new section): Landfills

   During the deliberations for the expansion of a construction debris landfill at the corner of Thomas and Stage in Frayser earlier this year (OPD Case No. PD 17-14 for Memphis Wrecking Co.), the applicant's agent stated he would investigate sites zoned Heavy Industrial in an effort to locate a property that would permit a construction debris landfill "by right" without the need to obtain a zoning entitlement through a public hearing process. This culminated with a public meeting held by the applicant in Hickory Hill where several "by right" sites within that neighborhood were allegedly discussed. This, in turn, resulted in a six-month moratorium passed by both the Memphis City Council and the Shelby County Board of Commissioners that affects any construction debris landfills that would be permitted by right in the Heavy Industrial zoning districts. When the Board of Commissioners passed its version of the moratorium, its members asked for several pieces of information to accompany any ordinance that would be promulgated pursuant to the moratorium. As this zoning text amendment is the ordinance resulting from that moratorium, responses to those inquiries are listed below.

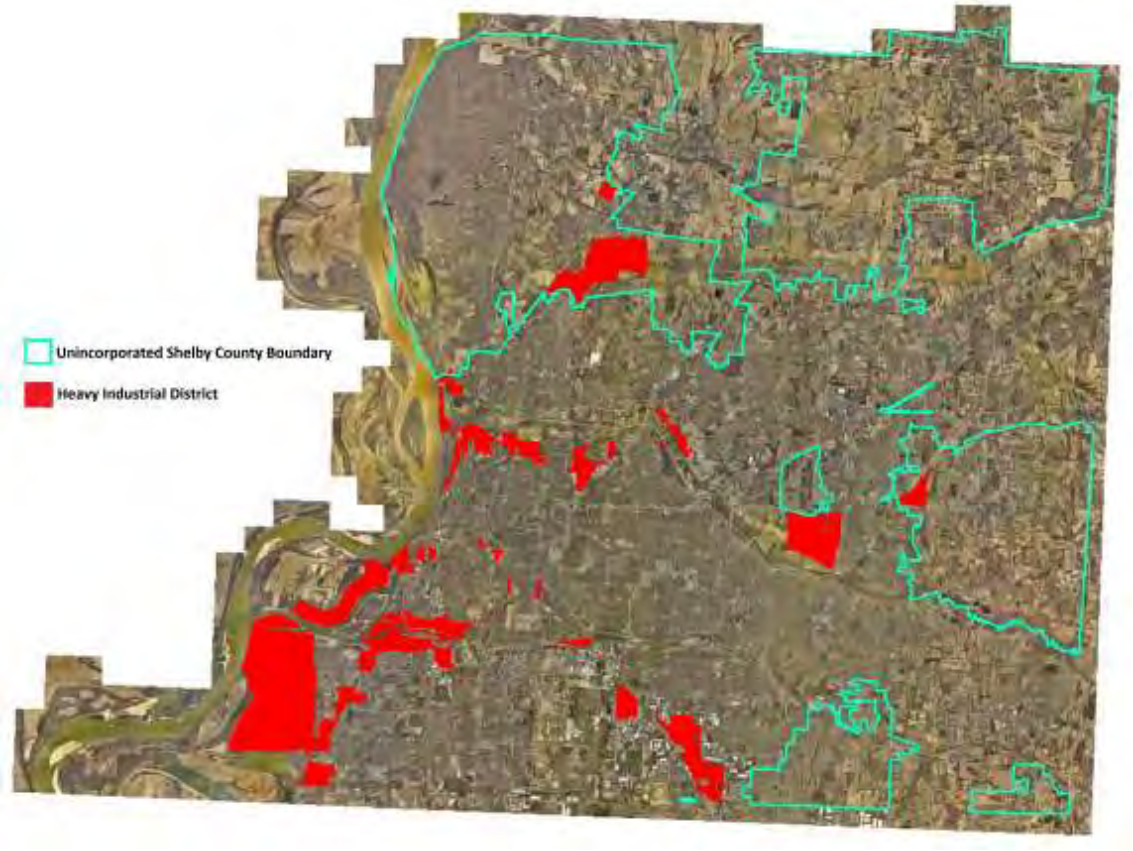
   a. History of the Zoning Code.
      During its deliberations on the landfill moratorium on January 22, 2018, the Board of Commissioners asked for a history of how the zoning code has treated construction debris landfills over the years. See table below; the 1972 Zoning Code made no distinction between construction debris and sanitary landfills and required a Special Use Permit for both in both industrial zoning districts unless operated by a municipal government. In 1981, the Zoning Code was amended to reflect a new type of landfills, construction debris landfills, and permitted them by right in both industrial zoning districts. This was further changed with the current Zoning Code, which allows construction debris landfills by right in only the Heavy Industrial zoning district.

Code	Type of Landfill	Light Industrial Zoning District	Heavy Industrial Zoning District
1972 Code	All Landfills*	Not permitted unless operated by a municipality	Special Use Permit
1981 Code	Construction Debris Landfills	By Right	By Right
1981 Code	Sanitary landfills	Special Use Permit	Special Use Permit
2018 Code	Construction Debris Landfills	Special Use Permit	By Right
2018 Code	Sanitary Landfills	Special Use Permit	Special Use Permit

*The 1972 Zoning Code made no distinction between construction debris landfills and sanitary landfills.

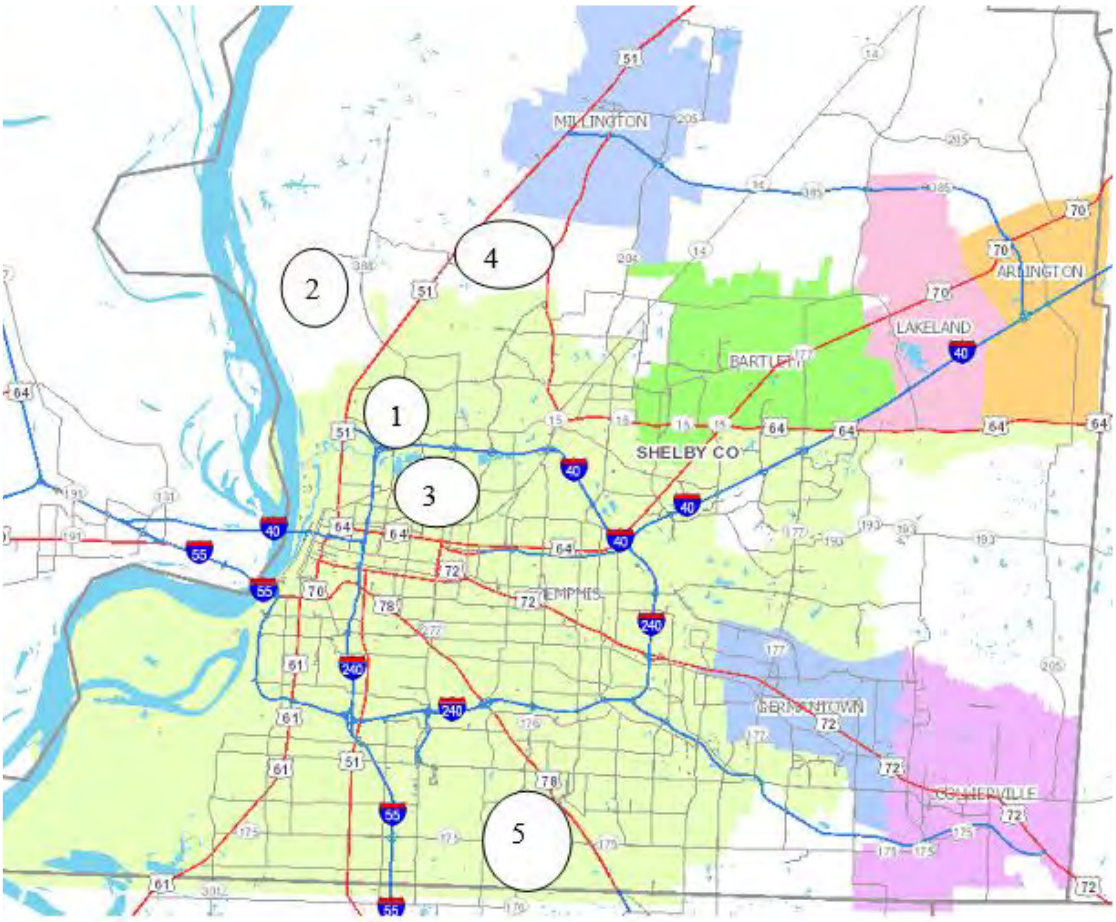
b. Location of Heavy Industrial Zoning Districts
The areas shown in red in the map below indicate the location of the Heavy Industrial zoning district in Memphis and unincorporated Shelby County. The significant vacant parcels within these red areas are as follows:

i. Woodstock, just south of the Millington City Limits
ii. Woodstock at Fite Road and US 51
iii. Cordova, Macon and Berryhill Roads
iv. Cordova, near and around Fisher Steel Road
v. Frank Pidgeon Industrial Park



c. Hazardous Waste
The Unified Development Code highlights several hazardous uses that require review under the Special Use Permit process, such as radioactive waste storage, waste incineration and others, but the Tennessee Department of Environment and Conservation (TDEC) is the primary government agency that regulates hazardous waste. TDEC has a tiered system for landfills based on the toxicity of the materials being stored at the landfill.

d. Capacity of Existing Landfills
The map below shows the landfills that fall under the jurisdiction of the Office of Planning and Development, the Unified Development Code, the Memphis City Council and the Shelby County Board of Commissioners. Below is a list of the names of the landfill, as well as the date they are expected to reach capacity.



1. **Memphis Wrecking Co., Class III**: capacity date: ca. 2025
2. **North Memphis Landfill – Fullen Dock, Class III**: capacity date: ca. 2030
3. **Chandler Demolition, Class III**: currently only open to Chandler
4. **Republic (formerly BFI) North Shelby Landfill, Class I** capacity date: ca. 2140
5. **Republic (formerly BFI) South Shelby Landfill, Class I**: capacity date: ca. 2055

The recommendation below would be to require a Special Use Permit for construction debris landfills in both the Light and Heavy Industrial zoning districts, which is the current requirement for sanitary landfills under the UDC. This will involve changing the symbol for Construction Debris Landfills in the EMP, Light Industrial, zoning district in the Use Table from a solid box ("■") to a hollow box ("□"). This recommendation also proposes to change the use known as "Construction Debris Landfill" to "Construction **and Organic** Debris Landfill" since both are regulated similarly by the State.

In addition, a new section of the Code is recommended that would mandate a 500-foot separation between all types of landfills and schools and parks, a requirement that the Code currently contains for buffers between landfills and residential areas (which is found in Item 2.6.4D(2)(b)). This would involve the addition of a new Item, 2.6.4D(2)(c), which would read:

2.6.4D(2)(c): Landfill excavation or filling shall not be located within a minimum of 500 feet of any school or park, as measured from the property line of the landfill excavation or filling site to the property line of the school or park.

2. 2.5.2: Other Items related to the Use Table

Sub-Section 2.9.3I and Section 12.3.1 (the definitions section) includes solar farms in the list of items that fall under the definition of "major utilities." However, under the Use Table in Section 2.5.2, solar farms are listed as separate uses and permitted by right in many more districts than major utilities. The following corrective action will address this:

Minor utilities**, except as listed below**
Major utilities**, except as listed below**

Also, "message therapy" under "retail sales and service" needs to read "m**a**ssage therapy:"

Hair, nail, tanning, ~~message~~ **massage** therapy and personal care service, barber shop or beauty salon

3. 2.6.1 and 12.3.1: Manufactured, Modular and Mobile Homes

Sub-Sections 2.6.1C and 2.6.1D contain use standards related to manufactured, modular and mobile homes. Section 12.3.1 contains definitions of these terms. There is some inconsistency between these three sections, particularly with regards to mobile homes, which are described as structures built after 1976 in Sub-Section 2.6.1D and as structures built before 1976 in Section 12.3.1. The following language addresses this inconsistency:

2.6.1C(8) (new section): **See Section 12.3.1 for distinctions between manufactured and modular homes.**

12.3.1: **MOBILE HOME, CONFORMING: see Sub-Section 2.6.1D.**

12.3.1: MOBILE HOME**, NONCONFORMING**: A structure manufactured before June 15, 1976, that is not constructed in accordance with the National Manufactured Home Construction and Safety Standards Act of 1974, (42 U.S.C. § 5401 et seq.). It is a structure that is transportable in one or more sections that in the traveling mode is eight body feet or more in width and 40 body-feet or more in length, or, when erected on site, is 320 or more square feet and that is built on a chassis and designed to be used as a dwelling with or without a permanent foundation when connected to the required utilities and includes any plumbing, heating, air conditioning and electrical systems contained in the structure.

4. 2.6.3P(3)(h) (new section): Ownership of used car lots

Under the current ordinance, any new car lot requires the issuance of a Special Use Permit outside of the industrial zoning districts. However, one concern that the City Council has expressed during its last few reviews of used car lots is the efficacy of the conditions placed on the Special Use Permit when a change in ownership occurs. The language proposed below would require the approval of a Major Modification for any change in ownership of a used car lot:

ATTACHMENT 6
Historical

PANAMERICAN REPORT NO. 40035

PANAMERICAN CONSULTANTS, INC.

PHASE I CULTURAL RESOURCES SURVEY FOR THE MEMPHIS SHELBY COUNTY AIRPORT AUTHORITY HOLMES ROAD ENVIRONMENTAL ASSESSMENT SHELBY COUNTY, TENNESSEE

PREPARED FOR:

ENSAFE, INC.
5724 SUMMER TREES DRIVE
MEMPHIS, TENNESSEE 38134

PREPARED BY:

PANAMERICAN CONSULTANTS, INC.
91 TILLMAN STREET
MEMPHIS, TENNESSEE 38111

DRAFT REPORT
MAY 2020

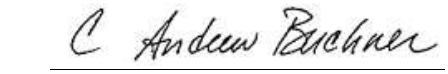
DRAFT REPORT

PHASE I CULTURAL RESOURCES SURVEY FOR THE MEMPHIS SHELBY COUNTY AIRPORT AUTHORITY HOLMES ROAD ENVIRONMENTAL ASSESSMENT SHELBY COUNTY, TENNESSEE

Lead Agency:
Federal Aviation Administration

Prepared for:
Ensafe, Inc.
5724 Summer Tree Drive
Memphis, Tennessee 38134

Panamerican Consultants, Inc.
91 Tillman Street
Memphis, Tennessee 38111
Panamerican Report No. 40035



C. Andrew Buchner, RPA
Principal Investigator

MAY 2020

ABSTRACT

At the request of Ensafe, Inc. and the Memphis Shelby County Airport Authority, Panamerican Consultants, Inc. performed a Phase I cultural resources survey of a 244. ac. (98.74 ha, or 0.38125 mi.^{2}) tract located southeast of the intersection of Holmes Road and Swinnea Road. Except for three energy transmission corridors, the property is wooded and the terrain is hilly to rolling, and dissected and typical of the west Tennessee loess region. Review of TDOA records revealed that there are no previously archaeological sites within the tract, but THC has recorded two ca. 1935-1940 one-story plain traditional residences on Swinnea Road within the tract (SY-31708A and SY-31607A). Inspection of various archival sources revealed that the tract was likely not occupied until after Holmes Road and Swinnea Road were constructed ca. 1888-1927, and that at least five residences were once within the tract along these roads. A four-person crew conducted the fieldwork from April 7 to 21, 2020 using shovel testing at 30 m intervals as the primary site detection method. During the course of the survey 937 shovel test locations were documented within the tract, including two positive, 768 negative, and 167 "no-test" locations were planned tests were not excavated due to principally due to slope, water and past disturbances. The survey resulted in the identification of five twentieth-century Historic loci; four former house or farmstead sites and a breached earthen dam. Site forms were completed for these and submitted to the TDOA; however they declined to assign them site numbers (i.e., trinomials).

All five identified cultural resources are recommended as not eligible for the NRHP. As there are no NRHP listed, eligible or potentially eligible properties within the MSCAA Holmes Road tract, no further cultural resources work is recommended.

ACKNOWLEDGEMENTS

Panamerican Consultants, Inc. appreciates the opportunity to have provided the Ensafe, Inc. with our archaeological services. Kristin Lehman, CHMM was the Senior Project Manager.

Panamerican Consultants, Inc. personnel who contributed to the project include the following individuals. Mitch Childress, RPA coordinated the Tennessee Division of Archaeology research. Andrew Saatkamp, RPA served as Field Director, with Alex Derrera, Jacob Mabray, and Savanna Moore being the Archaeological Technicians. Kate Gilow provided administrative support during all phases of the project, and prepared some of the report graphics.

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I. INTRODUCTION

At the request of Ensafe, Inc. and the Memphis Shelby County Airport Authority (MSCAA), Panamerican Consultants, Inc. (Panamerican) performed a Phase I cultural resources survey of a 244. ac. tract located southeast of the intersection of Holmes Road and Swinnea Road. The purpose of the survey was to identify any archaeological sites or historic properties that are listed on, eligible for, or potentially eligible for the National Register of Historic Places (NRHP) present within the area of potential effect (APE), and to provide appropriate management recommendations for any such resources identified.

The fieldwork was conducted from April 7 to 21, 2020 under the direction of Andrew Saatkamp, RPA with a crew of three Archaeological Technicians including Alex Derrera, Jacob Mabray, and Savanna Moore. The principal field method consisted of shovel testing at 30 m intervals.

PROJECT BACKGROUND

The MSCAA proposes to conduct site preparations within a 244 ac. tract located southeast of the intersection of Holmes Road and Swinnea Road in southeast Memphis. The tract will be prepared for potential future lease to a distribution warehouse or a light industrial tenant.

PROJECT LOCATION

The study tract is a rectangular 244 ac. (98.74 ha, or 0.38125 $mi.^2$) wooded parcel located 1.6 km south of Runway 36 R at the Memphis International Airport. The tract is bounded by Holmes Road on the north, Swinnea Road on the west, the Tennessee-Mississippi state line on the south, and a half section line within Section 17 Township 1 South Range 7 West (T1S R7W) of the Chickasaw Meridian on the east. The tract can be identified on the Southeast Memphis, TN 7.5-min. quad (409 SE) and the Pleasant Hill, MS-TN 7.5-min. quad (Figure 1-01).

Except for three energy transmission corridors, the property is wooded, and the terrain is hilly and dissected with elevations ranging from 390 ft. to <350 ft. (Figure 1-02). An open 100 ft. wide Texas Gas pipeline corridor bisects the northern portion of the tract. An open 200 ft. wide MLGW corridor containing two electrical high-volume transmission lines and a 24-in. natural gas pipeline bisects the southern portion of the tract. An open 50 ft. wide Valero petroleum pipeline corridor is located on the western edge of the tract; it is adjacent to and parallel to Swinnea Road. Drainage is principally to the northeast via Hurricane Creek, but the southwestern corner of the tract is drained by a tributary of Rocky Creek.

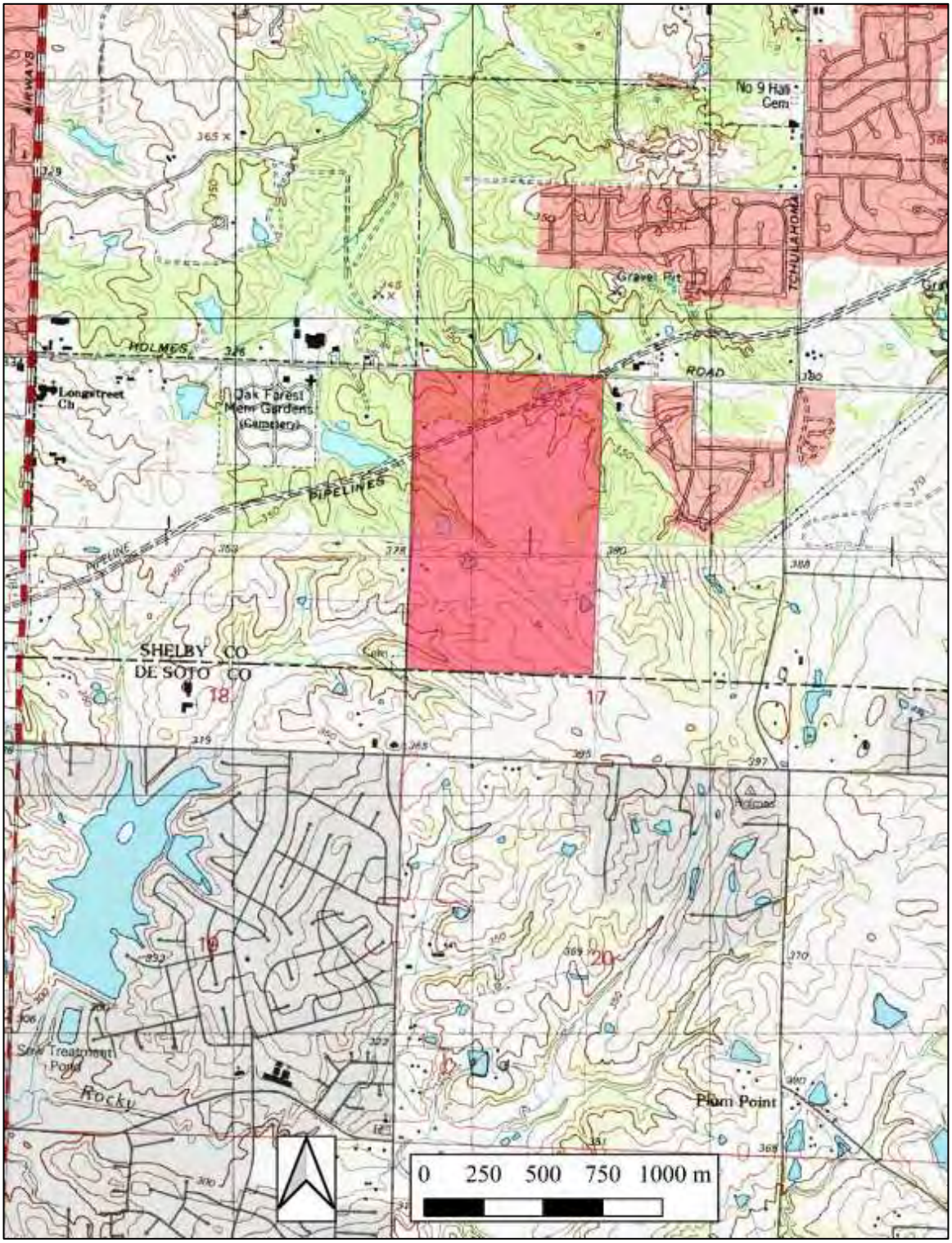

Figure 1-01. Quad map locator for the MCSAA Holmes Road study area (2016 Southeast Memphis, TN 7.5-min. quad. and 2016 Pleasant Hill, MS-TN 7.5-min. quad).

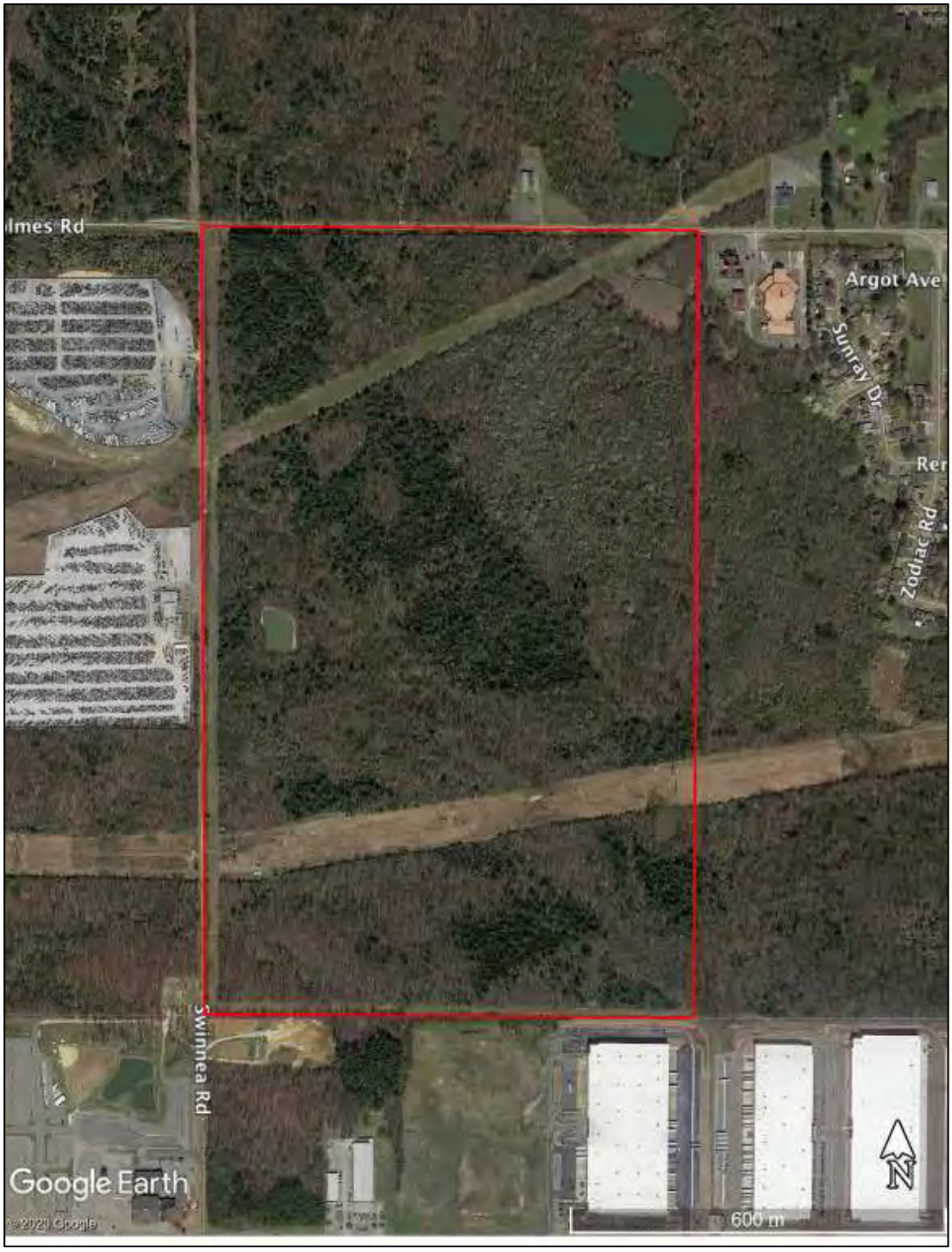

Figure 1-02. Google Earth imagery showing the MCSAA Holmes Road study area.

II. ENVIRONMENTAL SETTING

GEOLOGY

The project area is located on the western Tennessee loess sheet. Stearns (1975) refers to the loess sheet as the West Tennessee Plain, and views it as a subregion of the Gulf Coastal Plain physiographic province (Fenneman 1938). A more recent ecoregion map refers to this area as the Loess Plains (74b), a Level IV ecoregion within the Mississippi Valley Loess Plains (a Level III ecoregion; Griffith et al. 2004; Figure 2-01). The Loess Plains cover 4,023 mi.^{2} in Tennessee, and the topography consists of level to gently rolling terrain that is the result of sequential deposition and erosion of Pleistocene (Late Wisconsin) loess. Wide, flat bottomlands and floodplains are present within the Loess Plains and they harbor low gradient silt and sand bottomed steams; most of which have been channelized.

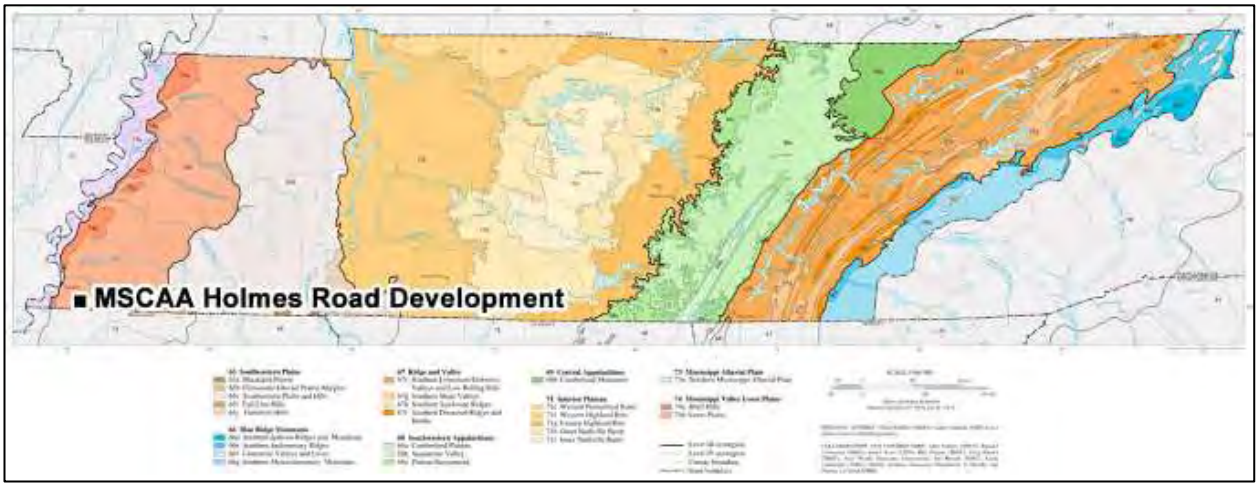

Figure 2-01. Project location shown on an ecoregions map of Tennessee (Griffith et al. 2004).

The loess deposit is thickest (24 m) along the Mississippi River—this is the reason for the various Chickasaw bluffs—and it thins to the east (Stearns 1975). Well logs from the Memphis Defense Depot reveal that the loess ranges 7.0–10.1 m thick in this area (Law Environmental 1990). Geologic studies of the loess sediments along Nonconnah Creek reveal that the loess is stratigraphically equivalent to the Late Wisconsin Peoria loess of the Upper Mississippi Valley (Cowell 1977). Remains of American mastodon and other now-extinct Late Pleistocene megafauna have been discovered deeply buried within Memphis's loess (Corgan and Breitburg 1996). Brister et al. (1981) date one such find on Nonconnah Creek to 17,000–23,000 years before present (YBP).

SOILS

There are two major soil regions in Shelby County. The majority of the county, including the project area, is associated with "Soils of the Loess Region" which include alfisols, entisols, and ultisols (Springer and Elder 1980:19). The soils in Loess Region are silty and fertile, and support some of the largest acreage of cropland in Tennessee (Springer and Elder 1980:19). However, these soils are prone to erosion if not managed carefully, and can result in gullied land and stream head cutting.

Examination of the "General Soil Map of Shelby County, Tennessee" (Sease et al. 1989) reveals the study tract lies within the Memphis-Grenada-Loring soil association. This association is described

as "nearly level to sloping, well drained and moderately well drained, silty soils on broad uplands" (Sease et al. 1989:7).

More specifically, review of soil survey maps (Sease et al. 1989:Sheet 86) reveals the study tract contains nine soil types or phases, as well as gullied land and water covered areas (Figure 2-02). The extent of these soils within the tract was calculated using the Web Soil Survey area on-line application (Table 2-01). Loring silt loam is the most extensive soil type within the APE (31.0 percent), and including four other phases of Loring soils that are represented within the tract, the Loring series covers 50.5 percent of the tract. Loring series soils formed in loess, and are deep, moderately well drained and exhibit a fragipan (Sease et al. 1989:25).

Table 2-01. Soils represented within the study tract.

Soil Type	Soil Code	Capability Unit	Percent of APE
Collins silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration	Co	IIw-2	10.6%
Falaya silt loam	Fm	IIw-1	8.2%
Grenada complex, 5 to 12 percent slopes, eroded	GgD3	VIe-2	15.1%
Gullied land silty (udorthent)	Gs	None	9.6%
Loring silt loam, 2 to 5 percent slopes	LoB	IIe-1	31.9%
Loring silt loam, 5 to 8 percent slopes, eroded	LoC2	IIIe-1	3.5%
Loring silt loam, 8 to 12 percent slopes	LoD	IVe-1	0.7%
Loring silt loam, 8 to 12 percent slopes, eroded	LoD2	IVe-1	4.6%
Loring silt loam, 5 to 12 percent slopes, severely eroded	LoD3	VIe-1	9.8%
Memphis silt loam, 2 to 5 percent slopes, moderately eroded	MeB2	IIIe-1	1.9%
Water	W	None	4.0%

The Grenada series is represented by only one soil type (Grenada complex, 5 to 12 percent slopes, eroded), however it ranks second in extent across the tract (15.1 percent). Grenada series soils are moderately well drained, silty soils with a fragipan, and formed in loess >4 ft. thick (Sease et al. 1989:17).

The third best represented soil, Collins series (10.6 percent), are deep, level, moderately well drained and silty, and are first bottoms of streams (Sease et al. 1989:14). They formed in silt loam sediments washed from adjacent loess hills.

Falaya series rank fourth (8.2 percent), and are poorly drained silty soils on bottoms. Memphis series, which are poorly represented in this tract, are similar to Loring soils, although they so not exhibit a fragipan.

Note that five of the soil type-phases listed in Table 2-01 are characterized as eroded to severely eroded. These soils are unlikely to contain significant archaeological deposits, because the surface soil horizon has been carried away by erosion.

Because soils are indicators of past environments, soil types and/or phases can be used to predict a given tract's potential for containing archaeological deposits. The Natural Resources Conservation Service's "Capability Unit/Class" classification is a measure of the limitations of each soil type that can restrict its use. These Capability Unit/Class can be used by archeologists as indicators of the potential that a given soil type has for containing an archaeological deposit, because soils with few limitations are more likely to yield evidence of human occupation than soils with moderate or severe limitations.

Figure 2-02. Soil map for the MSCAA Holmes Road tract.

From an archaeological standpoint, Capability Units/Classes are evaluated as followed:

- Unit/Class I soils have few limitations that restrict their use, and are considered to have a high probability of containing archaeological resources.
- Unit/Class II soils have moderate limitations, and are considered to have a moderate probability of containing archaeological resources.
- Unit/Class III and IV soils have severe limitations, and are considered to have a low probability of containing archaeological resources.
- Unit/Class V through VIII soils have very severe limitations, and are considered to have little to no probability of containing archaeological resources.

A total of 50.7 percent of the APE is composed of Capability Unit II soils and has a moderate probability of containing archaeological resources; however 10.6 percent of this is associated with Collins silt loam, 0 to 2 percent slopes, occasionally flooded. Class III and IV soils form 10.7 percent of the project area, and Class VI soils form 24.9 percent of the project area. The latter, which combined cover 36.6 percent of the tract, are considered low probability settings.

DRAINAGE

The MSCAA Holmes Road tract is located on a local drainage divide. The principal drainage within the tract is Hurricane Creek, which flows northeasterly. It is a short feeder stream—the study tract is essentially at its headwaters—that empties into Nonconnah Creek about 7 km to the northeast.

Nonconnah Creek is one of the three major tributaries of the Mississippi River in Shelby County (the others being the Wolf and Loosahatchie rivers). The Nonconnah Creek Watershed is located in northwest Mississippi and southwest Tennessee. Nonconnah Creek flows for approximately 56 km (35 mi.) from its headwaters in Marshall County, Mississippi to its mouth at McKellar Lake in Shelby County, Tennessee.

The southwestern portion of the tract drained by a southwesterly flowing unnamed tributary that feeds into Rocky Creek in De Soto County, Mississippi. Rocky Creek flows west then northwest, emptying into Horn Lake Creek in Shelby County, Tennessee. Horn Lake Creek was a tributary of the Mississippi River, but its hydrogeology is highly modified.

FLORA

Shelby County is part of the Mississippi Embayment Section of the Western Mesophytic Forest Region as described by Braun (1964:157), and the Tulip-Oak Forest as described by Shelford (1974:35). Oak and Oak-Hickory floral communities predominate in this region along stream and river terraces, with swamp forest species predominating along low-lying floodplain areas. However, much of the modern landscape is so modified that the flora is in no way reflective of a natural setting. Floral species within the former Oak and Oak-Hickory communities include white oak (*Quercus alba*), southern red oak (*Quercus falcata*), hickory (*Carya* sp.), and tuliptree (*Liriodendron tulipifera*) at higher elevations, with beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), and bald cypress (*Taxodium distichum*) occurring at only very low elevations such as those immediately abutting local drainages. Undergrowth in these communities is characteristically sparse, with dogwood (*Cornus florida*), winged elm (*Ulmus alata*), persimmon (*Diospyros virginiana*), sassafras (*Sassafras albidium*), mulberry (*Morus* sp.), white ash (*Fraxinus americana*), and holly (*Ilex* sp.) accounting for the majority of species (Braun 1964:157). In particular, mast-producing species such as the various oaks and hickories represented an important subsistence resource for humans occupying this region.

FAUNA

Faunal species occupying these communities include large mammals such as the white-tailed deer (*Odocoileus virginianus*) and black bear (*Ursus americanus*); smaller mammals such as opossum (*Didelphis marsupialis*), raccoon (*Procyon lotor*), rabbit (*Syvilagus* sp.), beaver (*Casor canadensis*), otter (*Lutra canadensis*), and squirrel (*Sciurus* sp.); and large terrestrial birds including wild turkey (*Meleagris gallapavo*). Migratory waterfowl such as ducks (*Anas* sp.) and geese (*Branta* sp.) undoubtedly also frequented these communities on a seasonal basis. Riverine species within these communities would have included fish species such as bass (*Micropterus* sp.), catfish (*Ictalurus* sp.), sunfish (*Lepomis* sp.), drum (*Aplodinotus grunniens*), and gar (*Leisosteus* sp.). All the faunal species described immediately above would have offered important subsistence resources for humans occupying the area during prehistoric and historic times.

PALEOCLIMATE/VEGETATION

Paleoenvironmental conditions were substantially different in the late Pleistocene through the middle Holocene. Delcourt et al. (1999) have synthesized current data and mapped vegetation reconstructions for the Central Mississippi Valley. The discussion that follows is drawn from this summary. During the Late Wisconsin full-glacial interval (18,000 YBP) the central Mississippi River valley was covered by boreal forest communities and a Spruce-Willow Forest was on the valley train surfaces that were fed by glacial meltwater from the Ohio River. Post-glacial warming caused jack pine population to collapse about 14,000 YBP, but the area east of Crowley's Ridge remained a Spruce-Willow Forest. By 12,000 YBP warming temperatures lead to an expansion of Oak-Hickory Forest on abandoned braided steam terraces and the Spruce-Willow Forest became more restricted as the active channel of the Ohio River shifted east.

By 10,000 YBP "the vegetation had become temperate to warm temperate in character" (Delcourt et al. 1999:25). Sweetgum-Elm Forest and Willow-Cane Forest developed along and near the now-meandering Mississippi River, while the Oak-Hickory Forest continued to expand on abandoned braided stream terraces.

At 8,000 YBP the effects of a warm and dry interval referred to as the Hypsithermal begin to be seen in the pollen record. Drought-tolerant species expanded and the Oak-Hickory Forest that formerly covered the valley train to the west of the project area developed into an Oak-Hickory Savannah. However, along and near the Mississippi River, Sweetgum-Elm Forest and Willow-Cane Forest remained and Cypress-Tupelo Forest expanded in the backswamps.

Regionally, the Hypsithermal was most strongly felt around 6,000 YBP and the arid conditions continued until after 4,000 YBP (Delcourt et al. 1999). McNutt (1996) suggests that during 7,500–5,500 YBP the strongest cultural impacts of the Hypsithermal were felt. Willow-Cane Forest and Cypress-Tupelo Forest became "confined to the easternmost portion of the Eastern Lowlands along a relatively narrow meander belt" that would have included the Barnes Ridge area (Delcourt et al. 1999:26). Within the backswamps, mesic lowland forest probably expanded into Cypress-Tupelo Forests because of dropping water tables.

Modern floristic regions developed between 4,000 and 3,000 YBP with a return to wetter conditions. The Sweetgum-Elm Forest re-expanded along drainages and Willow-Cane Forest "occupied a broadening and shifting Mississippi meander belt" (Delcourt et al. 1999:27). Changes in the locations of Willow-Cane, Sweetgum-Elm and Cypress-Tupelo Forests became dependent on shifts in channel morphology.

In discussing the 1,000 YBP environment, Delcourt et al. (1999) note that portions of the Eastern Lowlands would have been covered by Ragweed-Grass Old Field vegetation. This refers to "anthropogenically disturbed landscapes" (Delcourt et al. 1999:28), such as Native American

(Mississippian period) cornfields with early secessional grassland and thickets for cover. Delcourt et al. (1999:28) state, the "paleoecological 'signature' of cultural impact is characterized by occurrence of pollen grains of cereals such as maize; weedy herbs including ragweed, chenopods, and grasses; and spores of old-field ferns, such as bracken."

MODERN CLIMATE

Shelby County's climate is typical of the central Mississippi River valley, with hot summers and mild winters and abundant rainfall. The average annual temperature in Memphis is 62˚ F, although extremes of 106˚ F and -11˚ F were recorded during 1931–1960 (Sease et al. 1989:2). The growing season is long (238 days), extending from late March to mid-November (Sease et al. 1989:3). July is the warmest month, with daily average maximum and minimum temperatures of 92.1˚ F and 71.5˚. January is the coldest month, with daily average maximum and minimum temperatures of 50.6˚ F and 33.4˚ (Sease et al. 1989:Table 1).

Rainfall amounts vary throughout the county, with differences of up to 2 in. per annum recorded between the western and eastern portions (Sease et al. 1989:2). The average precipitation per annum is 49.73 in. (Sease et al. 1989:Table 1). Precipitation is normally heaviest during the winter and early spring months, with January, on average, having 6.07 in. (Sease et al. 1989:Table 1). Fall is the driest season and October, with an average of 2.72 in. of precipitation, is the driest month (Sease et al. 1989:Table 1).

III. CULTURAL BACKGROUND

The following is a summary of the prehistoric and historic cultural sequence of western Tennessee. Each of these periods is defined by characteristic artifact assemblages and patterns of subsistence and settlement. The prehistoric period in the southeastern U.S. is traditionally divided into four major periods: Paleoindian, Archaic, Woodland, and Mississippian.

PREHISTORIC SEQUENCE

PALEOINDIAN PERIOD

Paleoindian occupations represent the first well-accepted occurrence of humans in the Western Hemisphere. These populations are generally thought of as highly adaptive, mobile hunter-gatherers whose recent ancestors were Upper Paleolithic Siberians who migrated across the present Bering Strait during the Late Pleistocene, when sea levels were ca. 60 m lower. During the Late Glacial era, when initial human colonization of the Southeast is postulated (ca. 11,000–8000 B.C.), climatic changes followed the receding of the continental ice sheets, and there was a widespread extinction of megafauna. The environment at this time is usually interpreted to have been spruce and/or pine-dominated boreal forest (Saucier 1978).

Research on Paleoindian diagnostics (Anderson et al. 1990) indicates that the period may be subdivided into Early (ca. 9500–9000 B.C.), Middle (ca. 9000–8500 B.C.), and Late (ca. 8500–8000 B.C.) stages, based on changes in hafted biface morphology. No radiocarbon dates are available to confirm independently the accuracy of the subdivision.

Aboriginal groups of the period were likely small, mobile bands dependent upon a hunting-and-gathering economy. Although they may have hunted some of the megafauna that became extinct at the end of the Pleistocene, such as mastodon (*Mammut americanum*), bison (*Bison bison antiquus*), and ground sloth (*Megalonyx* sp.), it is likely that the subsistence base was varied and included a number of plant and animal foods. One of the nearest firm associations of a fluted point with mastodon remains is well north of western Tennessee at the Kimmswick bone bed in Missouri (Graham et al. 1981), although a possible association at Mississippi River Island No. 35 to the south should be noted as well (S. Williams 1957). No artifacts are associated with the Nonconnah Creek Mastodon find (Brister et al. 1981).

DALTON PERIOD

The Dalton period is considered a transitional phase between the Paleoindian and Archaic traditions. The key distinguishing feature of the material culture is the unfluted, serrated Dalton point, but the Dalton tool kit includes a number of other diagnostic special-function tools and a woodworking adz (Morse and Morse 1983, 1996). Dalton points recovered from a Forked Deer River context are noted by G.P. Smith (1996:101) as being long, thin forms with only a minimal amount of constriction in the hafting area. Goodyear (1982) suggests that Dalton represents a distinct temporal horizon dating to 8500–7900 B.C. While technologically similar to Paleoindian, Dalton assemblages suggest an adaptive pattern more akin to later Archaic cultures. One of the most important game species from this time to the contact era seems to have been the white-tailed deer (Morse and Morse 1983:71). During the Dalton period, the Mississippi River meander system was established in the lower valley and was working northward, but a braided stream regime still existed.

Dalton components are better represented in northwestern Tennessee than are the preceding Early and Middle Paleoindian diagnostics, although much is yet to be learned about this temporal period. Mainfort (1996a:80) notes that the only two examples of Dalton components recovered

from the Reelfoot Basin of extreme northwestern Tennessee were collected from predominantly Mississippian-component sites. Sites 40OB123 and 40OB127, approximately 1 mi. apart, have yielded one Dalton artifact each. Mainfort (1996a) further notes that a "fairly large Dalton site" has been reported by a local collector in the Reelfoot area, although the location of that site has yet to be determined. In Fayette County, G.P. Smith (1996:101) notes the presence of a Dalton component in a relatively shallow context at 40FY13.

In the 1960s the Ford-Redfield survey project identified a concentration of Dalton components in northeastern Arkansas (Redfield 1971; Redfield and Moselage 1970). Important sites such as Brand (Goodyear 1974), Sloan (Morse 1975, 1997), and Lace (Morse and Morse 1983) produced evidence for some of the oldest cemeteries in the New World and revealed other features interpreted as living floors and shelter remains. The distribution of sites and site types along the major drainages has also led to the formulation of competing settlement-pattern models for band-level societies (Morse 1975, 1977; Price and Krakker 1975; Schiffer 1975), which have been succinctly commented upon by McNutt (1996:191–192).

ARCHAIC PERIOD

The Archaic is usually thought of in terms of three subperiods: Early (ca. 8000–5000 B.C.), Middle (5000–3000 B.C.), and Late (3000–1500 B.C.). Temporal divisions of the Archaic are primarily based on the occurrence of distinctive projectile points. Throughout Archaic times a hunter-gatherer lifeway appears to have continued, and it was focused on essentially the same flora and fauna as represented in the natural environment today. The Archaic is perceived as a time of regional "settling in," when an efficient utilization of the environment was keyed to highly cyclical, repetitive seasonal activities continued by indigenous groups over thousands of years (Caldwell 1958). Some seasonal movement to exploit econiches was probably required, but Archaic populations, compared to Paleoindian, are generally portrayed as being attached to localities, river valleys, or regions. A total of 31 sites with known or probable Archaic components have been recorded in the Reelfoot Basin of extreme northwestern Tennessee (Mainfort 1996a:80). Additionally, numerous other sites with Archaic components have been recorded in all the major river valleys in western Tennessee (G.P. Smith 1979). Relatively little is known about this temporal period in this area of the Southeast. In the Central Mississippi Valley, virtually no Archaic sites have been excavated, and indeed these components appear to have been overlooked by archaeologists more concerned with ceramic-period adaptations (McNutt 1996:194; S. Williams 1991).

Concerning the Early Archaic period, McNutt (1996:194) notes that "we can see several projectile points coming into the Valley from the west and north, probably in conjunction with the prairie expansion and dry econiches during the Hypsithermal." Point forms considered diagnostic for the Early Archaic include Big Sandy, Hardin, Plevna, and Lost Lake (G.P. Smith 1996:101). For northeastern Arkansas, Morse and Morse (1983) proposed a series of horizon markers that grade from classic Early Archaic Corner-Notched forms (ca. 7500–7000 B.C.) into Middle Archaic Basal Notched forms.

The Middle Archaic period was marked by a shift in subsistence modes. This was possibly due to environmental changes caused by a climatic episode called the Hypsithermal which is dated 7000–3000 B.C. (McNutt 1996) or 8000–4000 B.C. (Morse and Morse 1983). This change resulted in restricted deciduous forest occurrence, limiting the availability of certain floral and faunal resources. The cultural impact of this warming trend appears to have been most strongly felt from 5500–3500 B.C. Several settlement models regarding human adaptation during the climatic optimum have been posited. Morse and Morse (1983) propose that the western lowlands of northeastern Arkansas were largely abandoned for the uplands (Ozark Plateau and its escarpment). However, in the lower Tennessee/Cumberland region, populations appear to have congregated at a limited number of floodplain locations, producing deep middens (Nance

1987). M.J. Higgins (1990) proposed that the drying of the uplands forced people into the floodplain (American Bottom). Cypress Creek II, Eva, and perhaps some side-notched forms are noted as the diagnostic point forms from this temporal period (G.P. Smith 1996:101).

The Late Archaic began at the end of the Hypsithermal climatic episode (ca. 3000 B.C.) and the establishment of the modern climatic regime. The Mississippi River was by then a well-entrenched meander belt-type fluvial system and adapting to this type of environment was critical for human occupation. There is evidence for more sedentary lifeways and possibly limited horticulture was being employed, as sunflower, squash, and other cultivated native starchy seed annuals appear in the archaeobotanical record at this time in the other areas of the Southeast. Late Archaic settlement models typically have a seasonal round aspect, and there is evidence that the substantial "winter" villages, typically located on major streams, were actually occupied year round. Both earthen and shell mounds appear in the archaeological record in the Southeast at this time.

The Late Archaic is characterized by a substantial increase in the number of sites, cultural elaboration, and widespread trade. The period opened with the Benton culture, represented in the diagnostic material record by the Benton projectile point. G.P. Smith (1996:102) notes that two sites in western Tennessee yielded settlement-pattern information regarding Benton culture. Geographical positioning of these sites appears to represent a Benton trend toward the habitation of low stream terraces in western Tennessee. Excavations at 40FY13 and 40GB42 revealed a heavy dependence on mast-bearing species such as the hickory, and 40FY13 further revealed Benton structural remains, interpreted as bent-pole rectilinear to ovate dwellings. Flexed burials at 40GB42 are at present tentatively tied to the Benton component at this site. Subsequent cultures of the Late Archaic in western Tennessee are very poorly understood. Such cultures may be represented by the Bartlett and Macintire, *variety A* projectile points as described by G.P. Smith (1979), although little is known about the Late Archaic cultures that produced these lithic artifacts.

POVERTY POINT

Poverty Point, or Terminal Late Archaic, components are distinguished by the appearance of large mounds, earthworks, clay balls or "Poverty Point Objects," microlithics, lapidary work, raw material trade, and specialized manufacturing sites. The Poverty Point period (1500–500 B.C.) is considered one of three cultural "zeniths" in prehistoric Southeastern studies. In other portions of the Southeast, these components are referred to as Gulf Formational (Walthall 1990 [1980]) and include fiber-tempered ceramics as a diagnostic (Morse and Morse 1983:124). In western Tennessee, fiber-tempered ceramics occur only occasionally in the Nonconnah and Lambert complexes of the Terminal Late Archaic, and most likely represent trade items obtained from groups farther to the south (G.P. Smith 1996:104).

Midden mounds and gathering camps appear in the archaeological record at this time and reflect semi-sedentary populations (McNutt 1996; Morse and Morse 1983). G.P. Smith (1996:104) notes the presence of a Lambert complex component at 40FY13, possibly representing a Terminal Late Archaic mast-collection site. Site 40GB42 yielded similar components, although there they are attributable to the Kenton complex of the Terminal Late Archaic.

Clay balls are thought to have been a substitute for boiling stones and have considerable time depth, apparently extending into the early Middle Woodland; thus they cannot be used as exclusively Poverty Point component markers. A variety of stemmed projectile points are characteristic of the period, including Burkett-Etley-Gary forms, similar to Ledbetter-Pickwick-Mulberry Creek points, and the Weems-Wade-Dyroff-McIntire forms, which lead into the Early Woodland.

G.P. Smith (1979, 1996; G.P. Smith and McNutt 1988) has repeatedly proposed a series of Poverty Point complexes for the interior drainages (loess region) of western Tennessee. The nine complexes he delineates are based primarily on pre-1975 fieldwork. His complexes are spatially discrete and distributed along the terraces of the smaller river bottoms that characterize the region. They are distinguished by variations in baked clay ball and preliminary projectile point types and varieties. The complexes are akin to phases and have been strongly criticized by Mainfort (1994) who remarks "While such a fine-scale typology may be useful, Smith does not demonstrate its value beyond documenting intra-regional variation and even that may be premature considering the fact that most of the data are derived from surface collections" (J.K. Johnson 1993:67).

WOODLAND PERIOD

During the Woodland period, intensification in horticultural methods, construction of earthworks, elaboration of artistic expression, and burial rituals are all thought to be related to the reorganization of social structure. For at least part of the year, a sedentary group was needed to plant, tend, and harvest crops. Sedentism and communal labor efforts promoted territorial circumscription. This period was also characterized by increased variety and use of ceramics. Ceramic types and varieties are thus a primary consideration in interpreting settlement patterns and chronological progression of the Woodland period. Considerable archaeological attention has been focused on these ceramic cultures, and a number of phases and phase sequences have been proposed. However, the reader should be aware that these phase assignments are highly problematic and have received strong criticism in the recent past (Mainfort 1994).

The Early Woodland or Tchula period is viewed by G.P. Smith (1996:104–105) as a continued occupation by the distinct cultural complexes of the previous Poverty Point period. Tchula period diagnostic ceramics, including Tammany Punctated, Cormorant Cord Impressed, Twin Lakes Punctated, and Withers Fabric Impressed, are poorly represented in the archaeological assemblage from western Tennessee and Kentucky (Lewis 1996:51–53; Mainfort 1996a:81–82). According to Mainfort and R.B. Lewis, this poor representation is most likely attributable to the lack of temporally specific research projects aimed at the recovery of data regarding Tchula period occupations.

The most intensively investigated Early Woodland component in western Tennessee is the Fulmer site (40SY527), located on a finger ridge on the margin of the Loosahatchie floodplain near Arlington, Tennessee (Weaver et al. 1996, 1999). Approximately 62 percent of this small, essentially single-component open-habitation site was formally excavated, resulting in detailed data regarding Tchula period site structure. Activity and midden areas in the lee of the prevailing wind around a central hearth were suggested by artifact distributions. Numerous reconstructed vessel sections recovered here revealed that the conoidal bowl/beaker was overwhelmingly the most common vessel form (n=35), followed by medium jars (n=11), large flaring-rim bowls (n=5), and other bowl and jar forms. Fabric impression was the most common surface decoration, but slipped, punctated, and cord-impressed vessels were also manufactured, often with folded rims. Several ^{14}C samples were dated, but the resulting dates (A.D. 970, 980, 1060, 1520, 1750, and 1780; uncalibrated) were considered invalid (i.e., rejected). Most features at the site were heavily disturbed by tree roots, rodent burrowing, and other processes, including early twentieth-century plowing, and the radiocarbon dates may date these post-depositional disturbances. Comparative review of the regional literature led the authors to suggest that Fulmer was affiliated with the Turkey Ridge phase of the Lake Cormorant Horizon, with a likely occupation ca. 400–100 B.C.

Another important late Tchula period component is a large site within the Reelfoot Basin, the MacDonald High site (40LK44). This site may have originally contained as many as 40 mounds; however, it has now been completely destroyed by agricultural activity (Mainfort 1996a:81–82).

The Middle Woodland period featured elaborate burial ceremonialism and artistic expression, and represents the second major cultural zenith in the prehistoric Southeast. In the Ohio Valley, the Middle Woodland period is referred to in terms of Hopewell, while in the Lower Mississippi Valley this period is characterized as Marksville. Diagnostic ceramics from the Middle Woodland period include sand-tempered ceramics including Marksville Stamped and Marksville Incised (McNutt 1996:213). Two major Marksville sites are located within the Reelfoot Basin of Southwestern Kentucky: the Amberg and Hickman Earthworks, 15FU37 and 15FU39–44 respectively.

The major Middle Woodland site of the region is Pinson Mounds (40MD1). Originally considered to be a Mississippian period site, subsequent archaeological investigations at Pinson (Fischer and McNutt 1962; Mainfort ed. 1980; Morse and Polhemus 1963) have provided ample radiocarbon dating evidence for a Middle Woodland temporal assignment. Site 40MD1 is interpreted as a large Middle Woodland ceremonial center utilized by "relatively small groups of semi-sedentary peoples" (Mainfort 1986) on a seasonal and/or infrequent basis. Middle Woodland settlement-pattern information has also been recovered (Broster and Schneider 1977) from 23 sites in the vicinity of Pinson.

The Late Woodland or Baytown period represents a period of change characterized by a population increase accompanied by decentralization and the continuing adaptation of agriculture to riverine environments (B.D. Smith 1986). Both characteristics of this temporal period may have represented a response to over-exploitation of local resources (McNutt 1996:217). Diagnostic Late Woodland ceramics consist entirely of clay-tempered types including Baytown Plain, Mulberry Creek Cord Marked, and Larto Red Filmed (Phillips 1970). Morse and Morse (1983) note that small, triangular projectile points such as the Hamilton and Madison types are diagnostic of the Late Woodland period and subsequent temporal periods as well. However, the general paucity of lithic artifacts from the Late Woodland may be related to the introduction of the bow and arrow ca. 700 A.D. (Blitz 1988), which may have reduced "the production of stone points to near zero" (Dunnell and Feathers 1991:26).

MISSISSIPPIAN PERIOD

Hallmarks of the Mississippian period include population increase, intensive floodplain settlement, greater emphasis on agricultural activity, earthwork construction on celestial alignments, inter-regional exchange of exotic items, shell-tempered ceramics, and possibly bow warfare. These factors and the development of a distinctive elite iconography are associated with the rise of conscripted, complex sociopolitical systems, which we now refer to as chiefdoms. A complex mosaic of competing chiefdoms dominated the late prehistoric Southeastern political landscape. These chiefdoms were documented by the Spanish explorers at the close of the Mississippian period, which is the final Native American cultural development.

Early Mississippian cultures initiated a shift toward the production of sparse shell-tempered ceramic vessels, construction of rectilinear domestic structures, and a heavy dependence upon maize-based agriculture for subsistence. The distribution of Early or "emergent" Mississippian occupations on the loess sheets of northwestern Tennessee is relatively poorly understood when compared to the remainder of the Central Mississippi Valley, with the exception of the Samburg (40OB1) and Foxhole (40LK10) sites in the Reelfoot Basin. Farther south, however, excavations at the Shelby Forest site (40SY489) revealed a Varney horizon occupation, the earliest cultural horizon in the Mississippian period, characterized by a prevalence of red-filmed ceramics (Varney Red) in the assemblage (McNutt 1988, 2015; McNutt and Fain 1990).

The Middle Mississippian period is characterized by the appearance of palisade-fortified villages, geographically expressed across the landscape in relation to an increasing adaptation to

maize agriculture. Population density, house and storage pit size, vessel forms, and tool types visible in the archaeological assemblage further reflect an adaptation to and concentration upon agrarian subsistence (McNutt 1996:230). Middle Mississippian components in western Tennessee are, once again, poorly understood in comparison to surrounding areas. Two sites in the Reelfoot Basin, 40LK2 and 40LK3, offer the only Middle Mississippian occupational expressions in this portion of the state. Not until traveling much farther south does one encounter evidence of another Middle Mississippian occupation, the Chucalissa site (40SY1), located in extreme southwestern Tennessee.

The Late Mississippian period represents the final prehistoric cultural climax in the Southeastern U.S. and is predominantly characterized by a wide variety of elaborately decorated ceramic vessel types. A large number of Late Mississippian sites have been located and investigated in western Tennessee, although a surprising amount of information has yet to be published regarding these sites (Mainfort 1996b:172). G.P. Smith (1996:112–117) has defined three primary phases of the Late Mississippian period in western Tennessee. Smith's phases include (1) the Walls Phase, located in extreme southwestern Tennessee and northern Mississippi; (2) the Tipton Phase, located in middle western Tennessee; and (3) the Jones Bayou Phase, located immediately north of the Tipton Phase, representing the closest of these three phases to the current project area. Mainfort (1996b) presents the most complete account of this temporal period for western Tennessee to date, although he notes that much work is needed before a complete understanding of the Late Mississippian cultures will be possible. Important Late Mississippian sites in western Tennessee include Sweat, Porter, Jones Bayou, Fullen, Graves Lake, Hatchie, Richardson's Landing, Wilder, Rast, Jeter, and Chucalissa. However, northwestern Tennessee is relatively devoid of Late Mississippian period sites, a notion that has been addressed by S. Williams (1980, 1990) in his "Vacant Quarter Hypothesis."

PROTOHISTORIC PERIOD

This period is generally considered to have begun with the first appearance of European peoples in the Southeast. The De Soto expedition is thought to have crossed the Mississippi River near Walls, Mississippi, in June 1541, after following an upland trail from their 1540 winter camp with the proto-Chickasaw in northeastern Mississippi (Dye 1993). Sites along the Mississippi River that were occupied after initial European contact have been termed Armorel phase components, and a number of horizon markers are proposed (S. Williams 1980).

Protohistoric sites in western Tennessee (A.D. 1541–1650) produce low frequencies of European trade goods (rarely Spanish, more typically French beads and brass) in association with Late Mississippian artifact types, including quantities of the ceramic type Campbell Appliqué (Mainfort 1996b:179). Protohistoric components are relatively infrequent in comparison to southeastern Missouri and northeastern Arkansas, and are essentially absent from the interior drainages of the loess sheet. The key sites for this period in western Tennessee, Otto Sharpe and Graves Lake, are both located near the Mississippi River.

HISTORIC ABORIGINAL PERIOD

Terming seventeenth-century aboriginal occupations as "historic" versus "protohistoric" is a rather arbitrary division, as by this point Native American culture had irreversibly changed from pre-European contact lifeways. Western Tennessee is noteworthy for its general absence of historic aboriginal tribes, although the Chickasaw claimed the region as a hunting ground (Satz 1979:11).

The Chickasaw were a Muskogean group that occupied the northeastern portion of Mississippi "between the heads of the Tombigbee and Tallahatchie Rivers" (Swanton 1946:116). The De Soto expedition is believed to have encountered the Chickasaw in 1540. During the late seventeenth-century they were armed by English traders, and became aligned with British

interests. Their population ca. 1700 is estimated to have been 3,000–5,000 (Swanton 1946:119). Chickasaw slave raiding parties "were responsible for much of the disturbance along the lower Mississippi" during the colonial period (Swanton 1946:117).

The Chickasaw claimed territory far to north of Mississippi as hunting grounds (including the Memphis area), and in a 1786 treaty their northern boundary was fixed at the Ohio River. Increasing pressure from American settlers lead to a series of treaties (land cessions) during the early nineteenth century that culminated in 1832 with the Treaty of Pontotoc. The actual removal of the Chickasaws from Mississippi "extended from 1837 to 1847" and they settled on Choctaw lands Indian Territory (Oklahoma; Swanton 1946:118). In 1855 they were granted their own land within Indian Territory (Yenne 1986:40).

Galloway (1995:267) laments, "only limited archaeological excavation has been conducted on Chickasaw sites in the vicinity of Tupelo, Mississippi". One of the more spectacular amateur finds made in the vicinity of Tupelo was the 1956 discovery of a Chickasaw burial that is interpreted as the remains of Pomingo (Atkinson 2000). This elaborate burial contained a silver Washington Peace Medal; silver arm and wrist bands; a silver cross; two silver gorgets; a flintlock rifle; and various other European trade goods.

HISTORIC ERA

COLONIAL PERIOD

In the waning sixteenth and seventeenth centuries, more or less continuous contact was established between European and aboriginal populations. Initial Spanish, French, and English settlements were all located on the coast. The English established Jamestown in 1607, and in 1609 King James I granted a charter to the London Company for a vast region that included present-day western Tennessee. The coastal Virginians armed the local Westo Indians, who proceeded to raid the Muscogee, or Creeks, who lacked firearms (Braund 1993:28). Such direct and indirect European-induced social disruptions, such as introduced disease (Ramenofsky 1987), would characterize the entire Colonial period and lead to shifting allegiances as the European powers struggled for territory and profits in North America.

In 1665, all land south of 36° 30' was granted to the Lord Proprietors of Carolina by King Charles II, including what is present day Tennessee. The English established Charlestown in 1670, and in 1685 Henry Woodward's packtrain traveled overland from Charlestown to the Lower Creek towns, an act that is generally regarded as the formal opening of the English deerskin trade.

In the early eighteenth century, the deer and slave trades continued to expand, as interior aboriginal populations became increasingly dependent on European goods such as flintlock muskets, metal tools, and textiles. Carolina companies "reaped huge benefits as hides and furs from interior tribes soon became the colony's major export" (Braund 1993:29). For example, in the period from 1699 to 1705, Charleston traders shipped an average of 45,000 deerskins annually to London. Above it was noted that in 1701 a group of French Canadian traders ascended the Tennessee River.

While deerskins were the staple exchange, the sale of captive enemies was also profitable, fostering the breakdown of ancient traditions and a profound change in the nature of aboriginal warfare. Western groups such as the Choctaw and disrupted, weak coastal groups became targets for Creek-English slave raids.

During the 1740s tensions between the colonial powers mounted, and alliances with Indians were critical for seizing and holding both territory and deerskin-trading profits. The French launched

raids on the Chickasaw during 1736–1740 in retaliation for the Chickasaw raiding of their shipping (primarily Illinois wheat-laden barges) on the Mississippi River. In 1739, Fort Assumption (now Memphis) was built by the French on the Chickasaw Bluffs in an attempt to curb the Chickasaw. Also at about this time the introduction of significant numbers of Negro slaves began along the coast, supplying the colonists with a more stable and controlled supply of labor.

In 1756, the French and Indian War (Seven Years' War) broke out, partly as a result of French efforts to fortify the Ohio Valley. France was defeated and signed the Treaty of Paris on February 10, 1763, ending the war. However, the English colonists were still forbidden to settle west of the Appalachians. English traders began infiltrating pro-French tribes in Louisiana in the 1770s; for example, in 1773 a Quapaw chief adopted an English trader, and they attended a conference at Pensacola together (Arnold 1991:109).

No significant activity took place in western Tennessee during the American Revolution. The nearest known engagement was the Englishman James Colbert's attack on Arkansas Post with a Chickasaw war party in April 1783 (Arnold 1991:111–112). This action took place well after Cornwallis surrendered at Yorktown (October 1781), essentially forcing the British to abandon the war effort and sign a preliminary peace treaty at Versailles in November 1782. The peace treaty that ended the American Revolution was formally ratified in Paris on September 3, 1783.

After the American Revolution, significant numbers of settlers from North Carolina and Virginia began to migrate over the Blue Ridge Mountains into Tennessee and Kentucky. Tennessee at this time was still part of North Carolina, as specified in the charter issued by the British Crown. In 1785, there were significant tensions between the settlers in the Cumberland and the legislators in North Carolina; a separate assembly was formed, resulting in the birth of the "Lost State" of Franklin (Gerson 1968:36). In 1790, George Washington established the Territory of the U.S. South of the River Ohio, which provided a formal federal separation. In 1796, Tennessee became a state.

ANTEBELLUM PERIOD

The early nineteenth century is better understood and represented in the archaeological record in Middle and East Tennessee, as this is where most settlements were located. In 1812 western Tennessee was rocked by a series of massive earthquakes known as the New Madrid earthquakes (Fuller 1912). The town of New Madrid, Missouri, was destroyed, Reelfoot Lake was formed, and the aftershocks continued for months. After the War of 1812 ended (in 1815) and the British-Creek Confederacy was defeated, immigration increased again.

In 1818, the Jackson Purchase Treaty resulted in the acquisition of western Tennessee from the Chickasaw Indians in Mississippi. Shelby County was created by the Tennessee General Assembly on November 24, 1819. The county is named for Isaac Shelby, one of the Jackson Purchase Treaty commissioners. Neighboring Fayette County was established by the Tennessee Legislature on September 19, 1824, and was named for Marquis de Lafayette, the French general and statesman (Morton 1998). Settlement of the area along the Shelby-Fayette county line began as early as 1820. Memphis, the largest city in Shelby County, was laid out in 1819 and incorporated in 1826.

Early settlements in eastern Shelby County include the following (Davies-Rodgers 1990; Magness 1994; Van West 1998). In 1807, the log house that would later become *Davies Manor* in Brunswick was built. The Davies did not acquire the eventual plantation until 1851, but the "manor" portion had been added to the log house by 1831. In 1825, Frances Wright founded the utopian plantation, *Neshoba*, on 2,000 ac. along the Wolf River; the plantation failed in 1829. In 1826, the Shelby County Court authorized the Memphis to Somerville Stage Road (now US-64).

In 1830, the Morning Sun Post Office was established in the Wash Store, located at the intersection of Seed Tick and Old Stage Coach roads. Around 1835 Stephen Jones, Jr. moved his family from Halifax County, Virginia to Brunswick; a log house built by Stephen's son, Russell, around 1860 still stands today. Also in 1835, Thomas C. Crenshaw built *Mount Airy*, a two-story plantation home southeast of Morning Sun. Other plantations, such as the Eklin family's *Woodlawn* existed in East Shelby County in the 1830s as well.

Historically, the economy of Shelby County outside of Memphis was based on agriculture, in particular cotton and corn production (Morton 1998:303). Large plantations and small farms existed throughout the county, and the adjacent sections of Fayette County. During the Antebellum era, the plantations were worked using slave labor, and the slave population of the county rose steadily during 1830–1860 (Table 3-01). In the early 1800s, the Shelby County population lagged behind that of the neighboring Fayette County. However, the rise of Memphis as an important river port eventually lead to Shelby County becoming one of the most populated areas of the state. On the eve of the Civil War, African-American slaves formed 26 percent of the Shelby County population, while they formed more than 63 percent of Fayette County's total population. The eastern portions of Shelby County (i.e., rural areas outside of Memphis) were more akin to Fayette County.

Table 3-01. Antebellum Census Data for Shelby and Fayette counties.

Census	Shelby County Total Population	Shelby County Slave Population	Fayette County Total Population	Fayette County Slave Population
1830	5,648	2,049	8,652	3,178
1840	14,721	7,043	21,501	10,885
1850	31,157	14,360	26,719	15,264
1860	48,092	16,953	24,327	15,473

The Ames Plantation, located near LaGrange, has been the focus of historical archaeological research, and 190 archaeological sites are documented o the property (DuVall and Evans 1995; Byrne and Moreland 2007). The Ames Plantation covers >18,000 ac. in Fayette and Hardeman counties, and contains an agricultural complex centered on the nineteenth century Cedar Grove Plantation of John W. Jones Family. During the ante-bellum period the Cedar Grove Plantation covered >2,000 ac. and employed the labor of >240 slaves. Hobart Ames, an industrialist from Massachusetts, purchased the Cedar Grove Plantation in the early twentieth century and then expended the estate.

Railroad development came in the 1850s. The Memphis to Charleston Railroad construction began in 1852 (Magness 1994:213) and by 1853 the tracks reached Moscow. The line was completed in 1857, connecting Memphis directly with the Atlantic Coast for the first time. The Memphis and Ohio Railroad was established through Shelby Depot (renamed Brunswick Depot after 1880; Davies-Rodgers 1990:123). This became part of the Louisville and Nashville (L&N; now Seaboard) Railroad.

CIVIL WAR AND RECONSTRUCTION

Following Lincoln's election, the initial vote for secession failed, but after the war began Tennessee seceded. In 1861–1862, several skirmishes took place along the Mississippi River during the Federal campaign to seize control of the river. New Madrid was captured by Confederate forces under General Pillow in 1861. Island No. 10 was fortified by the Confederates and was the scene of a battle in March 1862 (Daniel and Bock 1996).

Fort Pillow was originally constructed just above the mouth of the Hatchie River by Confederate forces in 1861, but was abandoned and seized by Union forces in June 1862. Also in June 1862, the Federal forces captured Memphis. In April 1864, the Confederate cavalry, under General Forrest, raided Fort Pillow and routed the Union troops. Following the battle for Fort Pillow, sporadic guerrilla activity characterized combat of the latter war years.

During 1992–1993, TDOA conducted a thematic survey to identify Civil War period military sites in western Tennessee (Prouty and Barker 1996). As a result of this survey, 89 sites were identified, and 19 types of archaeological sites were recognized (Prouty and Barker 1996:22). Thirteen Civil War era military sites were identified within Shelby County as a result of this study (40SY5, 40SY515–40SY524, and 40SY532–40SY533), and 18 were identified in Fayette County (40FY214–40SY231). A variety of military sites types are reported in Shelby County, most are associated with the Union Army. The most common site type is "long term encampment" (n=11). The most significant well-preserved Civil War period military sites in Shelby County include Fort Pickering (40SY5) on the Memphis bluffs and Fort Germantown (40SY533) (Prouty and Barker 1996; Smith and Nance 2003).

W.G. Brownlow was selected as the governor by the military occupation forces (Folmsbee et al. 1969:353). He took office in April 1865 and immediately disenfranchised all former Confederates. However, owing to Federal occupation of most of the significantly populated areas of Tennessee (esp. Memphis, Nashville, and Knoxville) for most of the war, Reconstruction was a relatively short affair in Tennessee, ending in 1869.

During Reconstruction railroad construction began to open the interior portions of Western Tennessee. During 1855–1950 communication and transportation became dominated by the railroads. The period is "foremost characterized by a drastic reorganization of non-farming settlement pattern keyed to extremely narrow corridors … " (Stewart-Abernathy and Watkins 1982:HA18-19). From an archaeological viewpoint the Railroad period is summarized as:

> … aside from the increased presence of consumer goods and increased general information level, the Railroad period is reflected by scores of nucleated settlements whose end or beginning date correspond to the coming of the railroad, and by some of the greatest landscape modifications made by people. These modifications take the form of embankments, cuttings, bridges, and support complexes, and exist on an intensive and extensive scale matched only by the construction after 1950 of highways and levees [Stewart-Abernathy and Watkins 1982:HA18-19].

Railroads were critical to the late nineteenth-century development of Memphis as a regional distribution center and transportation hub. Railroad construction boomed after the Civil War, and by 1900 there were 3,131 mi. of track in Tennessee (E.A. Johnson 1998:771). By the 1890s, most of the railroads in Tennessee were consolidated into three major systems: the Southern Railway Security Company (Southern); the L&N; and the Illinois Central (IC).

TENANT PERIOD

The period from 1870–1950 is known as the Tenant period (Stewart-Abernathy and Watkins 1982), and is named for the sharecropping or tenant farm labor system that was a significant characteristic of southern U.S. agriculture after the Civil War. This decentralization of the old plantation system developed during Reconstruction as a means of stabilizing labor relations between former slaves and landowners. M. Prunty (1955) has interpreted tenancy as a post-bellum modification of the plantation system.

Tennessee's farm tenancy percentage peaked during 1930–1935 at 46.2 percent, and was higher than the Southern average (Holley 2000:27). The importance of the Tenant farm period in the archaeological record is that it represents the maximum occupation of the study area prior to the

1950s developments. The dispersed settlement pattern of the Tenant period contrasts sharply with the clustered settlement pattern prior to 1865 (Orser and Nekola 1985:68). The Tenant settlement pattern can be observed on 1930s–1940s aerial photographs, with alignments along roads and bayous at regular spacing. Sites dating to this period are numerous, and the issue of these sites' NRHP significance status has generated some commentary (S. Wilson 1990).

The Tenant Farm Activity period is defined as:

> …the phase within the history of commercial agriculture in which the rural landscapes dominated by mono-culture are composed of small farms of minimal size operated by white and black renter or sharecropper families. These small farms are tied to the plantation complex and represent a decentralized stage in this development. In this stage the use of capital for the production of a base crop is routed through an extra step consisting of the several families who are responsible for raising the crop. While the direction of capital use and power obviously flows from top to bottom in this stage, the extent to which the tenant family, in fact, exercises control over various of their affairs is problematical, with archaeological implications ranging from source of supply for table ceramics and architectural environment to responsibility for social and physical community patterning and maintenance of ethnic identity [Stewart-Abernathy and Watkins 1982:HA16-HA17].

Stewart-Abernathy (1999:240) has reviewed a number of "intriguing" investigations at Tenant farmsteads in the "delta" area around Memphis that were conducted by contract archaeologists (Buchner 1992; Buchner and Childress 1991; Buchner and Weaver 1990; Childress 1990). Nearly all of this work was CRM investigations funded by the USACE Memphis District. Examination of "Delta" Tenant period archaeological site data has lead to the development of a distinctive "Tenant Period Artifact Pattern" (Buchner 1992), when assemblages are analyzed using South's (1977) functional groups. While some deviations can be observed in the frequency patterns identified based on surface collected assemblages versus excavated assemblages, in general, the pattern is one where Kitchen Group artifacts dominate. Excavated assemblages tend to produce more nails, thus the proportional representation of the Architecture group increases at the expense of the Kitchen Group.

The ceramics are typically cheaper types, often from mismatched sets, and many of these types can be identified following C.R. Price (1979). Mean ceramic dates are often not calculated for these sites due to the long span of whiteware production, as well as problems relating to temporal lag. Garrow et al. (1989:60) note that "South's (1977) mean ceramic date (MCD) formula tends to break down after ca. 1860…the primary reason is that neither manufacturing or popularity date ranges have been firmly established for the post-1860 period." Only trace frequencies of other artifact groups are found (Arms, Clothing, Personal, Furniture, Tobacco), and in small assemblages these minority group types are often not represented.

The cultural deposits at Tenant period sites are typically near surface, often plowzone only contexts, as a result of the buildings being frame structures elevated on brick, concrete, or cypress stump piers. If a house did not have a substantial chimney, it was more likely to be swept away during a flood. Occasionally, tenant sites are multi-component (i.e., co-occur with prehistoric material), this is largely dependent on the natural setting of the site. Many Tenant period sites are located on silty clay backswamp soils that were not suitable for human habitation until after drainage improvements were made.

MEMPHIS AIRPORT HISTORY

The origin of the Memphis airport dates to 1927, when Mayor Watkins Overton created a municipal Airport Planning Commission (Memphis International Airport 2015). The 200 ac. Ward Farm tract, located 7 mi. south of the city was selected, as the open country would allow for growth.

The Memphis Municipal Airport was dedicated on June 14, 1929, and consisted of three hangers and a sod runway (Memphis International Airport 2015). A modern terminal was added in 1938. During World War II the Army assumed control of the airport.

An Airport Planning Commission was created in 1956 to address the need for a new terminal and facilities to meet the demands of the "Jet Age" (Memphis International Airport 2015). Roy Harrover (1928-2016), of the Memphis firm Mann & Harrover, was the architect of the new terminal that was dedicated in 1963. The Memphis airport was among the first airports to make use of jetways and a two-level system, and is particularly noted for its distinctive "martini glass" shaped columns (Connolly 2016). The new facility was re-named the Memphis Metropolitan Airport. In 1969 the name was changed again to Memphis International Airport (MEM), and the Memphis-Shelby County Airport Authority (MSCAA) was created.

In 1973, Federal Express (now FedEx) was established and made Memphis International Airport their headquarters (Memphis International Airport 2015). This lead to extensive expansion of the airport and FedEx's package sorting complex, now known as the "Super Hub." Memphis International Airport was the busiest cargo airport in the world from 1992 to 2009, and is currently the second-busiest cargo airport in the world behind Hong Kong.

The existing Plough Blvd. entrance to the Memphis International Airport was constructed in 1974 (Smith 2009). The road is named for Abe Plough (1892-1984), a legendary Memphis philanthropist who made a fortune in the pharmaceutical industry, after starting the Plough Chemical Company at age sixteen (Lewis 1998).

In 1985, Republic Airlines chose Memphis International Airport as one of its hubs, dramatically boosting commercial passenger service. In 1986, Republic merged with Northwest Airlines, setting into motion a flurry of construction projects as the airport sought to keep up with the resulting increase in traffic and service (Memphis International Airport 2015).

Also in 1986, the authority completed work on a new master plan for continued development, the key elements of which included building a third parallel north-south runway; extending an existing runway to 11,100 ft. to better accommodate nonstop international flights; improving existing terminal concourses; building a new International Arrivals Facility; creating additional parking; and making roadway improvements (Memphis International Airport 2015).

In September 2004, the Airport Authority negotiated a land swap among the Tennessee Air National Guard (TANG) and FedEx. The land swap provided TANG the space it needed to construct new facilities to accommodate the significantly larger C-5 Galaxy aircraft that the Guard were flying as part of its new mission. TANG's relocation to the southeast corner of the airport freed space for FedEx to expand and consolidate their operations on the north end of the airport. TANG dedicated its new facilities in September 2008.

In June 2013, Delta Air Lines announced that it would no longer maintain hub operations in Memphis, and MEM began the transition to becoming an origin and destination airport. (Memphis International Airport 2015). Part of this transition involved recruiting new airlines to serve Memphis.

IV. LITERATURE & RECORDS SEARCH

ARCHAEOLOGICAL SITES

Due to the COVID-19 pandemic, the Tennessee Division of Archaeology (TDOA) facility in Nashville was closed during this investigation. Mitch Childress, RPA e-mailed TDOA Site File Curator Satin B. Platt on 6 April 2020, and subsequently she supplied 11 site forms and a spreadsheet with a list of report references in the study vicinity. Additionally, it should be noted that Panamerican conducted surveys of adjacent tracts in 2016 and 2019 (Buchner and Saatkamp 2019; Buchner and Taylor 2016), and thus we maintain a pre-existing set of records regarding the archaeology of this section of our hometown.

Importantly, Ms. Platt's research revealed that there are no previously recorded archaeological sites located within the MSCAA Holmes Road development. Within a 2-km radius of the development there are 11 previously recorded archaeological sites (Table 4-01; Figure 4-01). The majority are Prehistoric and the bulk of these (n=7) are of undetermined affiliation; the only identified components are Archaic/Woodland and Woodland. The local Prehistoric settlement pattern reveals that most sites occur on higher terrain within about 200 to 400 m of Hurricane Creek; note however that Sites 40SY501—507 occur too far north to be shown on Figure 4-01. The only Historic sites are two farmsteads (40SY762 and 40SY844) and an isolated find at 40SY843. However, note that the Hildebrand House (40SY615), which was the subject of Phase II and III studies funded by the MSCAA, is located just outside the 2 km search radius.

Table 4-01. Previously recorded archaeological sites within a 2-km radius.

Site	Type	NRHP Status	Date Reported
40SY85	Woodland camp along Hurricane Creek	Undetermined	1963
40SY91	Archaic/Woodland village along Days Creek	Undetermined	1966
40SY307	Lithic scatter along Hurricane Creek	Undetermined	?
40SY501	Lithic scatter along Hurricane Creek	Undetermined	1988
40SY502	Lithic scatter along Hurricane Creek	Undetermined	1988
40SY503	Lithic scatter along Hurricane Creek	Undetermined	1988
40SY506	Lithic scatter along Hurricane Creek	Undetermined	1988
40SY507	Lithic scatter along Hurricane Creek	Undetermined	1988
40SY762	Historic twentieth-century farmstead	Not eligible	2016
40SY843	Low-density lithic scatter and isolated Historic find along Hurricane Creek.	Not eligible	2019
40SY844	Historic late nineteenth to early twentieth-century farmstead	Not eligible	2019

PREVIOUS INVESTIGATIONS

The MSCAA Holmes Road tract has not been previously surveyed for archaeological resources. Past archaeological investigations in this section of south Memphis are reviewed below; note that Panamerican conducted six of these studies.

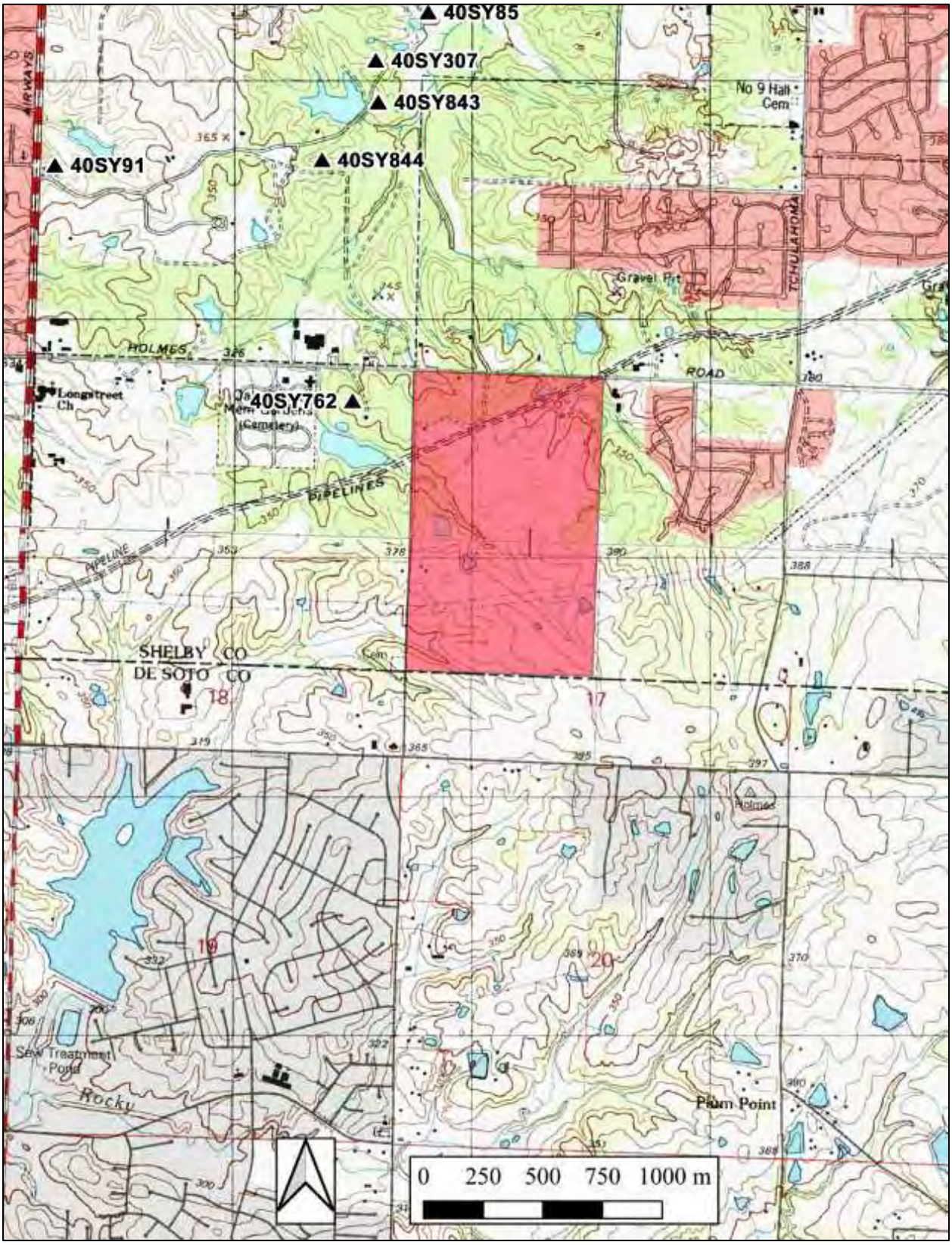

Figure 4-01. Previously recorded archaeological sites in Tennessee within 2 km of the study tract (map sources: Southeast Memphis, TN and Pleasant Hill, MS-TN 7.5-min. quads).

MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY

The Memphis Archaeological and Geological Society conducted the earliest reported archaeological investigations in this area of Memphis during the 1950s. During this investigation, a 17-mi. reach of Nonconnah Creek from its mouth to the Kirby Road Bridge was examined "either on foot or on bicycle," and 19 prehistoric sites were recorded (Kee et al. 1952:1). These sites are discussed in Kee et al. (1952) using temporary site numbers. Official state site numbers were later assigned to these sites (this was apparently done by archaeologists from Memphis State University [now The University of Memphis] during the 1960s).

Kee et al. (1952:1) remarked that several of the sites they recorded were already "effaced by the earth moving operations of contractors putting up new subdivisions to the East of town; so it can be seen that the efforts…[were] well spent and very much to the point." Today, most, if not all, of the sites along Nonconnah Creek that have been recorded in the early 1950s by the Memphis Archaeological and Geological Society have been destroyed; however, the project is significant for documenting, prior to the bulldozers, that the Nonconnah valley once harbored an abundance of prehistoric Native American sites.

MEMPHIS STATE UNIVERSITY

During the 1960s and early 1970s, archaeologists from Memphis State University (now The University of Memphis) conducted additional reconnaissance level survey work along Nonconnah Creek. During this time, site forms for some of the sites identified by the Memphis Archaeological and Geological Society during the 1950s were completed. Surface inspection was the primary method of site detection, as these investigations were non-intensive and had not been conducted for compliance purposes (i.e., this was research). The site survey forms that were completed (and the accompanying artifact analysis sheets) are the only records that document this effort, since a report had never been prepared. The assemblages from most of the sites identified by the Memphis State University (now the University of Memphis) are curated at Chucalissa Indian Village C.H. Nash Museum. Sites 40SY227—40SY230, located along and near Hurricane Creek, southeast of the airport, were recorded during this period.

MALFUNCTION JUNCTION SURVEY

During 1980, Tennessee Department of Transportation (TDOT) archaeologists assessed the Interstate 240/Interstate 55 (I-240/I-55) Interchange, better known locally as "Malfunction Junction." One previously recorded site (40SY35) in the interchange was not relocated and was reported as destroyed (DuVall 1980).

NONCONNAH CREEK BASIN RECONNAISSANCE

During 1981, Gilbert/Commonwealth conducted an archaeological reconnaissance of selected areas along the Nonconnah Creek Basin for the USACE, Memphis District (Kern 1981). No prehistoric archaeological site was newly recorded during this project, which was largely a literature review.

NONCONNAH CREEK SURVEY

During 1987, Coastal Environments, Inc. conducted a cultural resources survey of Nonconnah Creek from its mouth (McKellar Lake) upstream for 18.2 mi. (Smith and Weinstein 1987). This work was conducted for the USACE, Memphis District, prior to the proposed channel-improvements. The survey relied on visual inspection of the creek banks and the shovel testing of intact portions of the floodplains. No newly recorded archaeological site was identified during this project. Smith and Weinstein (1987) reported that they were unable to relocate most of the previously recorded sites along Nonconnah Creek, because the sites were destroyed by commercial developments and the I-240 construction. The report does have one outstanding

contribution; a detailed synthesis of the prehistoric archaeology of the Nonconnah Creek basin was prepared (Smith and Weinstein 1987:27-67).

HURRICANE CREEK SURVEY

During August 1988, G.P. Smith conducted an archaeological survey along the portion of Hurricane Creek that lies southeast of Memphis International Airport. No report documenting this work could be found on file at the TDOA facility in Nashville, or at the C.H. Nash Museum in Memphis, despite the site survey forms that suggest some type of compliance study was undertaken for the MSCAA. Seven prehistoric sites (40SY501—40SY507) were reported, and all lie within the 2-km search radius for this project (see Table 4-01). All are lithic scatters of undetermined cultural affiliation. The TDOA assigned the site numbers several months after the fieldwork, in March 1989. Sites 40SY501—40SY507 were identified in close proximity to four prehistoric sites (40SY227—40SY230) that were recorded by G. Smith and Kirth Rennick, a collector, during March 1972. The latter four sites were recorded as a part of Memphis State University's additional survey work along Nonconnah Creek, as noted above.

FEDEX BURIALS DISCOVERY

During 1998, a construction crew unearthed two poorly preserved Historic burials in a drainage ditch within the FedEx complex of the Memphis International Airport. Construction was halted and an archaeological removal of the burials, designated as 40SY619, was undertaken by Weaver & Associates, LLC (W&A; Weaver 1998). Archival research suggested that the burials were part of a church cemetery, shown on a 1916 map, that was thought to have been relocated "before or during the 1940s" (Weaver 1998:14). Skeletal analysis by Dr. Symes revealed that Burial 1 was a robust white male 35–45 years of age, and Burial 2 was a gracile, white male fewer than 40 years of age. Beyond fragments of coffin wood (cypress or yellow pine), few artifacts were recovered. An unreported number of 8d cut nails was recovered from both burials (Weaver 1998:12). Two partial shoes were recovered from Burial 1 with "sided lasted and wire nails" (Weaver 1998:13). The type of nails and shoes found suggest that these burials date after 1862 and before 1890. Weaver (2002) suggested that the deceased were yellow fever victims, but later research by Oster et al. (2005) determined the cemetery dated to 1899-1933 (i.e., after the yellow fever epidemic).

HILDEBRAND HOUSE PHASE II AND III

Also during 1998, W&A conducted archaeological testing at the Hildebrand House (40SY615), a standing nineteenth-century structure located near the airport at 4571 Airways Boulevard, for the Memphis-Shelby County Airport Authority (Weaver et al. 1998). Magness (1983:167) describes the Hildebrand House as a "plantation-style built of hand-hewn hickory logs pegged together, with a central hall plan and veranda with two-story columns facing east." Weaver et al. (1998) suggest that the structure was built ca. 1850–1855 to replace an earlier home, in contrast to Magness (1983) suggestion that it was built in 1838. Test excavations revealed a dense historic midden in the yard surrounding the home. Six related structures or outbuildings were archaeologically identified, including a twentieth-century garage (Structure-2), two twentieth-century barns (Structure-3 and Structure-4), two possible slave quarters (Structure-5 and Structure-6), and a twentieth-century well house (Structure-7).

The site was recommended as eligible for NRHP nomination, and a data recovery (Phase III) project was conducted in early 1999 prior to the demolition of the home (Weaver et al. 2011).

LIGHT RAIL CORRIDOR ALTERNATES ANALYSIS

During 2002–2003, Panamerican conducted a cultural resources alternative analysis of the proposed Memphis Area Transit Authority (MATA) Downtown-Airport Light Rail Corridor alternates (Buchner and Albertson 2003). In addition to assessing the viability of the two

primary alternates, this project resulted in the recovery of numerous cartographic sources from the Memphis Room (Special Collections) of the Shelby County Library. The project is also significant for resulting the preparation of a history of street railways in Memphis.

PROVIDENCE BAPTIST CEMETERY REMOVAL

During March 2003, a construction crew working at FedEx Runway C exposed additional burials within a 103-x-103 ft. stripped area in close proximity to the two previously discovered burials (i.e., 40SY619). As a result, W&A conducted an archaeological removal of 65 burials that were aligned in eight rows (Oster et al. 2005). Oster et al. (2005) conducted archival research that revealed the cemetery was associated with the Providence Baptist Church, and was in use from 1899-1933. Runway construction ca. 1939-1940 resulted in a portion of the cemetery being covered and forgotten. Analysis of the casket types and coffin hardware revealed that the western section of the cemetery dated ca. 1899-1915, and these burials were largely unadorned. The later burials in the central portion of the cemetery dated ca. 1915-1933, and exhibited more elaborate mortuary treatment, suggestive of higher socio-economic status. Some of the burials contained associated artifacts (i.e., saucers, bottles) associated with folk beliefs. Osteological analysis conducted by the University of Tennessee Knoxville revealed that the remains were African-Americans of various ages.

HOLMES ROAD SURVEY

During 2009, Panamerican conducted a Phase I archaeological assessment of a 6.8-km segment of Holmes Road in association with a planned widening project (Clifton 2010). The survey revealed that the majority of the archaeological APE, which lay within a heavily urbanized and industrial portion of the city, had been disturbed extensively. Negative findings were reported and no further work was recommended.

TCHULAHOMA ROAD SURVEY

Also during 2009, TRC conducted a survey of a 4,344 ft. section of Tchulahoma Road that was slate for improvements (Hockersmith 2009). This is the section of Tchulahoma Road that extends south of Holmes Road to the Mississippi state line. Work conducted included a visual inspection; no shovel tests were excavated because the "soils in the project area had been disturbed as a result of the construction of the existing road and commercial and residential development" (Hockersmith 2009:19). Negative findings were reported.

SHELBY & TCHULAHOMA CELL TOWER

In January 2014, Panamerican conducted a survey of the proposed Shelby & Tchulahoma Cell Tower site (Buchner 2014). The survey tract consisted of a 0.22-ac. lot located behind a modern building housing a grocery and vacant liquor store at the Shelby Drive and Tchulahoma Road. Work conducted included the excavation of nine shovel tests at 5-m, 10-m, and 15-m intervals, and a visual survey. Negative findings were reported.

TVA EMISSION CONTROL PROJECT SURVEY

During May 2014, Tennessee Valley Archaeological Research (TVAR) conducted a survey of a 224 ac. tract and a 13 mi. pipeline corridor for TVA in advance of the construction of a natural gas powered power plant (a combustion turbine/combine cycle [CT/CC] facility) to replace TVA's aging coal fired Allen Generating Plant (de Gregory et al. 2014). The nearest portion of these survey areas is the eastern end of the TVAR pipeline corridor, which is located approximately 0.6 mi. west of the MSCAA Holmes Road tract and is within the same 200 ft. wide high-voltage/natural gas corridor that bisects the southern portion of our study area.

De Gregory et al. (2014:10) utilized shovel testing at 30 m intervals as the primary site detection method, and delineated all archaeological finds at 10 m intervals. The locations of all 1,096 excavated shovel tests were recorded using GPS equipment, and maps of the shovel test distributions are provided in the report (de Gregory et al. 2014:Figures 8-34).

The TVAR Emission Control survey resulted in the identification of one previously recorded site in the Ensley Bottom (40SY554), four newly recorded sites in the loess uplands (40SY750, 40SY751, 40SY752, and 40SY753), and 14 isolated finds. Isolated finds 1 and 2 were recorded near Airway Blvd. (de Gregory et al. 2014:Figure 8).

TVA Laydown Yards Survey

In 2015, Tennessee Valley Archaeological Research conducted a survey of laydown yards and access roads associated with the Tennessee Valley Authority (TVA) Allen Fossil Plant Emission Control Project (Rosenwinkel et al. 2015). Laydown Yard 2 was a 14.47 ac. tract located southwest of the intersection of Airways Blvd. and Shelby Drive. Negative findings were reported.

Copart Tract Survey

In March 2016, Panamerican conducted a survey of a 44 ac. undeveloped tract located southwest of the Holmes Road and Swinnea Road intersection that was slated for improvements by Copart, a used auto parts company (Buchner and Taylor 2016). This tract is immediately west of the MSCAA Holmes Road tract that is the subject of this investigation. During the course of the survey 93 shovel test locations were documented, including three positive, 84 negative, and six no-test location where transect shovel tests were planned, but not excavated. The survey of the Copart tract resulted in the identification of one newly recorded twentieth-century domestic site (40SY762) that was recommended not eligible for the NRHP.

Rosenwald Fund Thematic Study

During 2015-2018, the TDOA conducted a thematic study of Rosenwald Fund facilities in Tennessee that were built for African-Americans (Nance and Eckhardt 2018). Rosenwald Fund constructions in Tennessee included 354 schools, nine teacher homes and ten industrial shops. Shelby County contained a concentration of these because of its high African-American population. 40SY793 was recorded south of Winchester Road and west of the airport during this study.

Meltech Survey

During October 2017, Panamerican conducted a survey of the 55 ac. Meltech tract under contract with DHL Supply Chain (Buchner 2017). A review of the TDOA, THC, MDAH, and NRHP databases revealed that there is no previously recorded archaeological site or Historic property within the tract. A cartographic review of nineteenth- and twentieth-century sources failed to produce evidence for any structure existing within the tract. More generally, the tract was likely cleared for farming by Francis Holmes (1839–1916)—a Civil War veteran and resident of the Plum Point, Mississippi, located approximately 1 mi. to the south—and remained farmland or pasture until ca. 2007 when it began to become overgrown. The tract was surveyed using 30 m interval shovel testing. During the course of the survey, 212 shovel test locations were documented, including no positive, 164 negatives, and 48 no-test locations where transect shovel tests were planned, but not excavated, primarily due to the presence of standing water or drainages, and disturbances on the natural gas pipeline corridor.

To summarize, the cultural resource survey of the Meltech tract produced negative findings. This is not surprising given the absence of high-probability terrain within the tract, coupled with soil erosion and a lack of archival evidence for Historic occupation of the tract.

NATIONAL GUARD READINESS CENTER SURVEY

During January 2019, MRS Consultants, LLC conducted a cultural resources survey of the 30.7 ac. National Guard Memphis Readiness Center located on Holmes Road (Ryba and Spry 2019). The undeveloped portions of the property were subjected to shovel testing at 30 to 40 m intervals, and 24 tests were excavated, principally in the hilly and wooded terrain north and west of the existing buildings and parking lots. The archaeological survey produced negative findings. MRS evaluated the NRHP status of a ca. 1960 Colonial Revival dwelling that is now occupied by the Central U.S. Earthquake Consortium, a non-profit, as not eligible. MRS concluded that the "Memphis Readiness Center will have no effect upon the identified historic resource" (i.e., the Colonial Revival dwelling).

AIRPORT TREE OBSTRUCTION SURVEY

During April 2019 Panamerican performed a Phase I archaeological assessment for the MSCAA McKellar Park Tree Obstruction Clearing undertaking at the request of EnSafe, Inc. (Buchner and Saatkamp 2019). The archaeological APE was limited to areas where ground-disturbing activities will take place (i.e., tree stump removal, grubbing, and access road construction), and consisted of 283 ac. (0.4422 mi.^{2}) of non-contiguous forested areas in the uplands south of Runways 36L, 36C and 36R. The APE is located within the former McKellar Park, which at 554 ac. was once Memphis' largest city park and contained an 18-hole golf course from ca. 1972 to 1995. A literature and records check revealed that there were three previously recorded archaeological sites with McKellar Park (40SY85, 40SY91 and 40SY307), however they may or may not be within the APE. During the course of the field work, 1,207 shovel test locations were documented, including nine that were positive for cultural material, 494 that were negative for cultural material, and 704 planned tests that were not dug, mainly due to standing water and steep slopes.

The McKellar Park Tree Obstruction survey resulted in the identification of two newly recorded sites: 40SY843 was a low-density undifferentiated Prehistoric lithic scatter and isolated historic find, and 40SY844 was a late nineteenth to mid twentieth century farmstead. 40SY843 is interpreted as a peripheral element of 40SY307 (a Poverty Point and Late Woodland site), that otherwise no longer appears to exist. Sites 40SY843 and 40SY844 were recommended as ineligible for the NRHP.

TENNESSEE HISTORICAL COMMISSION

Review of the on-line Tennessee Historical Commission GIS database reveals that two standing structures are documented within the study tract: SY31708A and SY31607A (Figure 4-02). Structure SY31708A is on Swinnea Road, to the north of the high-voltage transmission corridor. It a ca. 1935 traditional single-family rectangular residence that was in a deteriorated condition with the windows missing when recorded. Structure SY31607A lies short distance east of Structure SY31708A, and is a ca. 1935 traditional single-family rectangular residence.

Within 0.5-mi. of the tract there are three additional previously recorded properties: two twentieth century residences and a ca. 1920 cemetery. Across Swinna Road from Structure SY31708A, Structure SY31707A is recorded. It is a ca. 1940 traditional single-family rectangular residence; its windows were missing when recorded. On the other side of Swinna Road, opposite the southwestern corner of the MSCAA Holmes Road tract, property SY31606A is found. It is the ca. 1920 Brown Missionary Baptist Cemetery, and it is indicated on the Pleasant Hill, MS-TN 7.5-min. quad. Approximately 0.5-mi. east of the southeastern corner of the MSCAA Holmes Road tract, Structure SY-31705A is recorded at 1920 Tchulahoma Road. It is a 1920 traditional single-family rectangular residence, and the porch roof is supported by plain square columns.

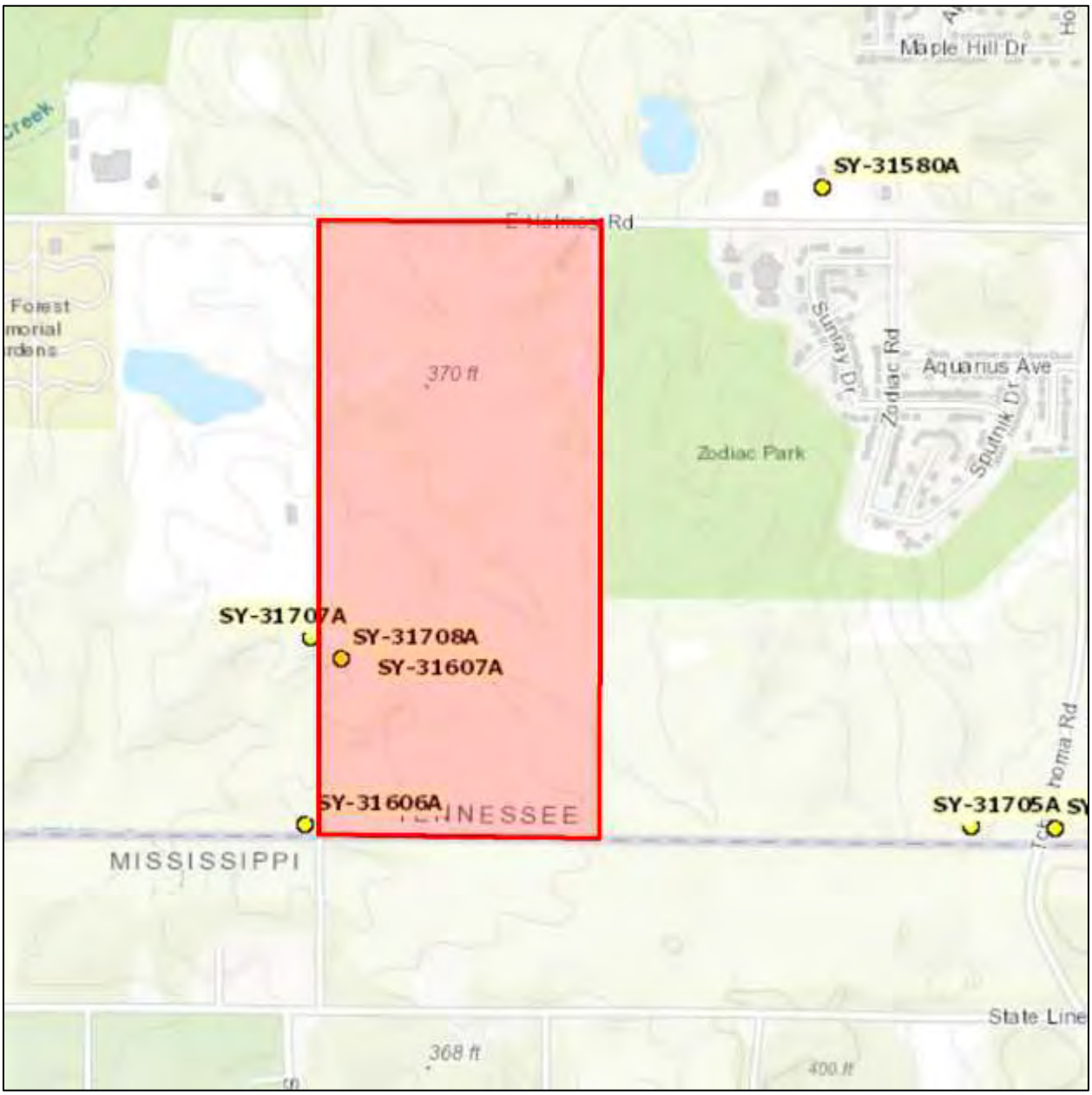

Figure 4-02. Screen shot of the Tennessee Historical Commission viewer with the MSCAA Holmes Road tract added.

NRHP LISTINGS

There are currently 195 NRHP listed properties within Shelby County, Tennessee, including four National Landmarks. Importantly, there is no NRHP listed property within the MSCAA Holmes Road tract. The nearest NRHP listed property to the study area is Graceland, the home of the "King of Rock and Roll" Elvis Presley (1935-1977), which is 7 km to the northwest.

BLM LAND PATENTS

To investigate the early history of private land ownership in the study area, land patent reports were obtained from the Bureau of Land Management (BLM) web page. This was accomplished by searching for patents issued for Section 17 in T1S R7W. The land patent reports use an 1820-1908 electronic database; only partial data is available for land patents issued after 1908.

This search resulted in the identification of one land patent dated 11 November 1840 for 640 ac. The patent was issued to *HUL LUP PA CHA* for all of Section 17 of T1S R7W under the authority of the 1832 Chickasaw Treaty (i.e., Treaty of Pontotoc), and was dispensed at the Pontotoc land office. By the terms of the Treaty of Pontotoc, the Chickasaws agreed to cede the United States all their lands east of the Mississippi and, and procure a new home for themselves west of the Mississippi. In payment for the cession, the United States agreed to pay over to the nation all the money arising from the sale of their former lands in the easy, after deducting sale costs. So presumably *HUL LUP PA CHA* was paid by the United States after Section 17 of T1S R7W was sold.

CARTOGRAPHIC REVIEW

Below various archival maps are reviewed to document the land use patterns and developments in and near the MSCAA Holmes Road tract.

1835 GLO PLAT MAP

Due to a surveying mistake, during the early nineteenth century APE tract was part of Mississippi. The 1835 General Land Office (GLO) plat map for T1S R7W of the Chickasaw Meridian reflects this, as the tract is located within Section 17 of that township, which was then part of Mississippi (Figure 4-03). No improvements are shown within the APE. Hurricane Creek is shown, but not labeled. Note Pigeon Roost Road, now Lamar Ave., in the northeastern portion of the township; this was an old Chickasaw trail.

In 1838, the state line—which was then at Winchester Road—was resurveyed, and the state boundary was moved south. At this time the 1835 GLO plat map of T1S R7W was amended, and "New Tennessee State Line" was added; observe that it is located approximately 0.25 mi. south of the MSCAA Holmes Road tract (see Figure 4-03). Today this is where State Line Road is in Mississippi, as the state boundary was later re-surveyed again prior to 1888 and finally established at its current location.

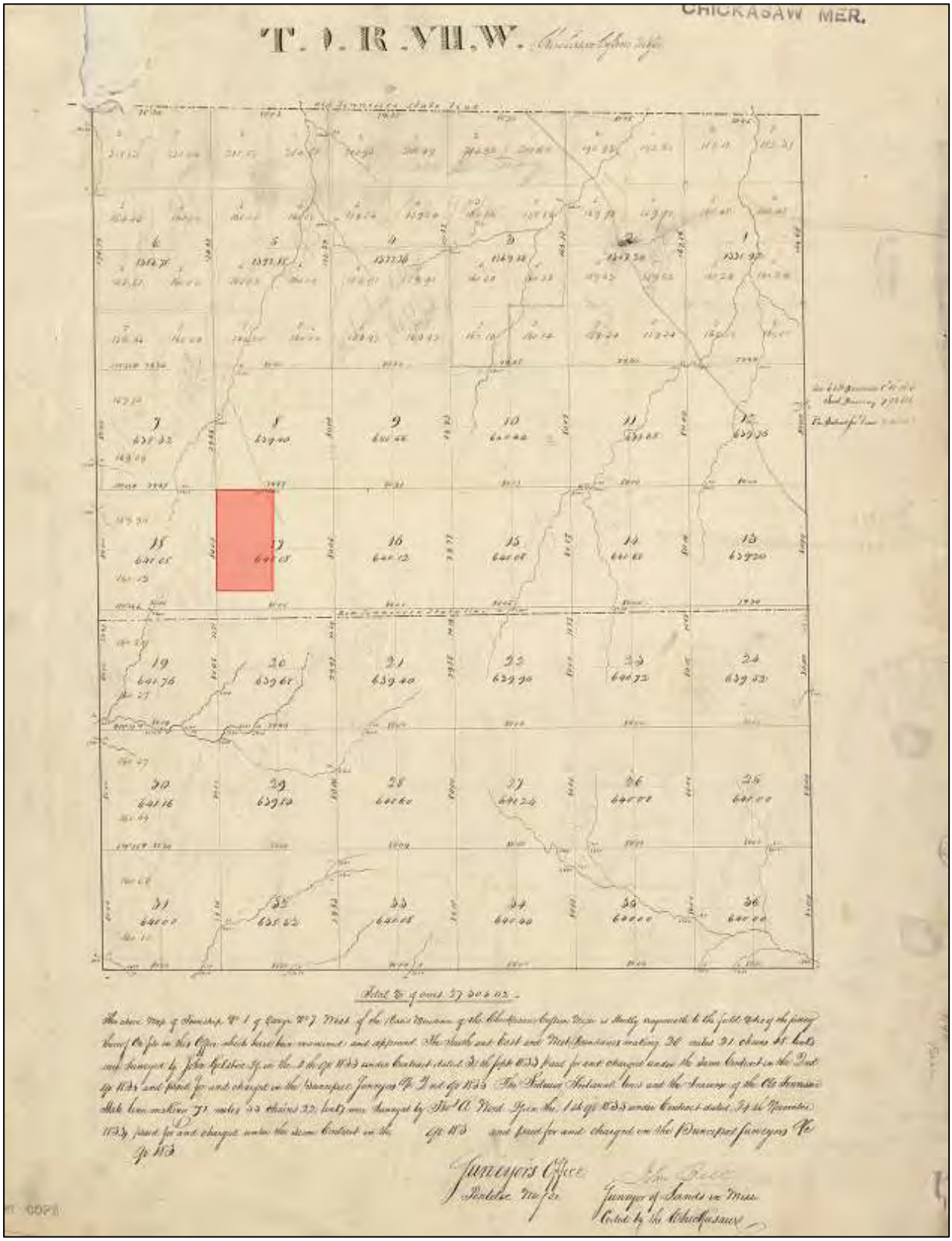

Figure 4-03. The 1835 GLO plant map for T1N R7W with the MSCAA Holmes Road tract highlighted in Section 17 (map courtesy: BLM web page).

1888 W.T. WILLIAMSON MAP OF SHELBY COUNTY

The 1888 W.T. Williamson map of Shelby County is an important archival resource because it shows landowners, and property boundaries and acreages (Figure 4-04). Note that Holmes Road and Swinnea Road did not exist at this date. Examination of the 1888 map reveals that the MSCAA Holmes Road is part of a large parcel owned by Francis Holmes.

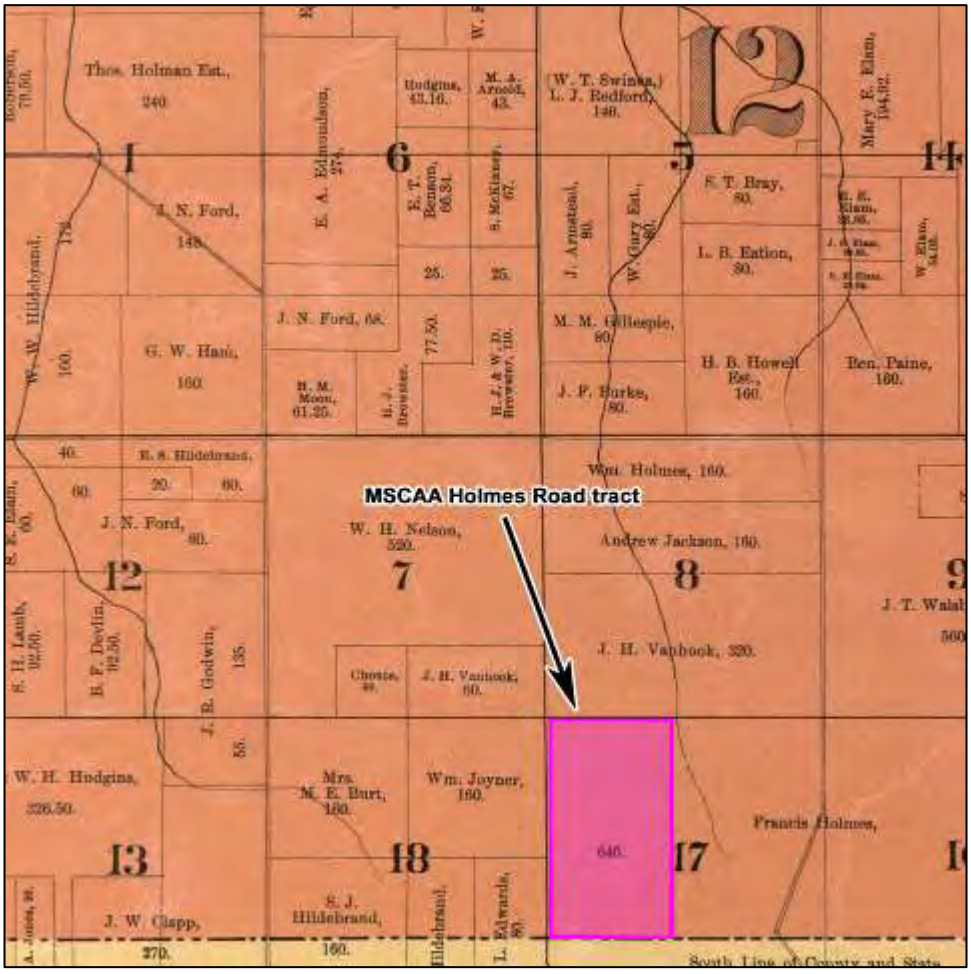

Figure 4-04. A portion of the 1888 W.T. Williamson Map of Shelby County with the MSCAA Holmes Road tract overlaid (map courtesy: Library of Congress).

Francis Holmes (1839–1916) was a Civil War veteran and resident of the Plum Point, Mississippi, which is located approximately 1 mi. to the south of the study area. He is buried at the Bethlehem Cemetery on Holmes Road 3.5 mi. east of the study area. Holmes Road is named for Francis Holmes, who was described in 1922 as follows:

> Captain Holmes was true to the best ideals of the old South, and was a great believer in culture and education. After the Civil War he returned to his plantation and lived there until his death. He was chiefly concerned in the promotion of education and was a steadfast believer in religion, being a life-long member of the Methodist Episcopal Church, South. He was interested in a number of Memphis Financial institutions, and throughout his long and useful life he stood as a bulwark for law and order in North Mississippi. He was a man without show or pretense, but his influence reached far beyond the horizon of his native heath [Moore and Jones 1922:774].

1927 SHELBY COUNTY COMMISSIONER'S MAP

H.V. Patton Co. produced a "Map of Shelby County, Tenn." in 1927 for the Shelby County Commissioners. The copy on file at the Memphis Room is a 1932 revision of the 1927 edition that shows the location of white schools in Memphis and Shelby County, and the school names are hand written on the map; the nearest to the study area is "Whitehaven" (Figure 4-05). Importantly this map shows that Holmes Road and Swinnea Road were in placed by 1927, and thus the MSCAA Holmes Road tract can be readily identified. The only feature shown within the tract is an arm of Hurricane Creek.

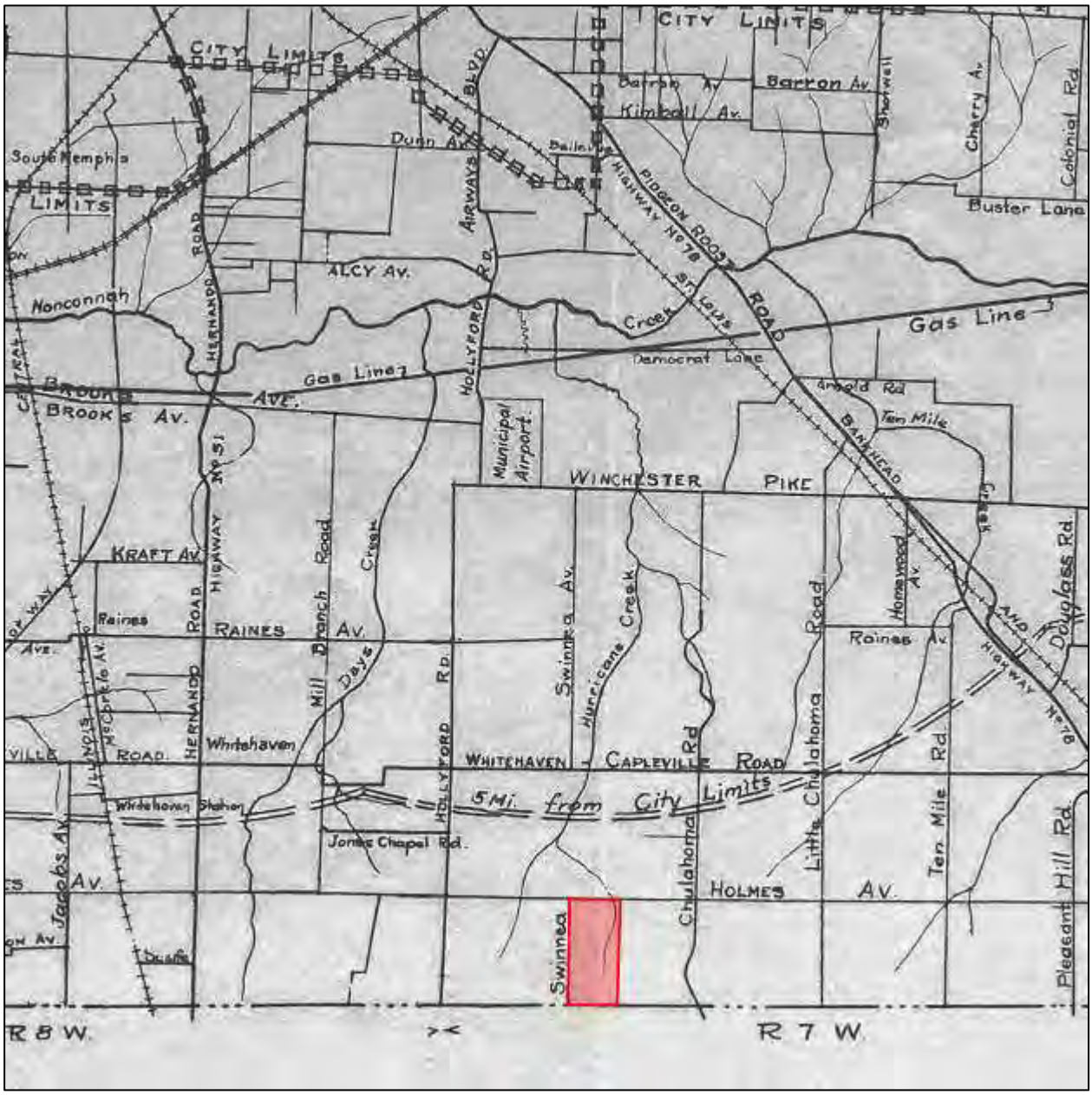

Figure 4-05. A portion of the 1927 revised 1932 "Map of Shelby County, Tenn." by the Shelby County Commissioner's and engraved by H.V. Patton Co. with the MSCAA Holmes Road tract highlighted (map courtesy: Memphis Room, Benjamin L. Hooks Central Library).

1939 HIGHWAY AND TRANSPORTATION MAP

The 1939 Tennessee State Highway Department "General Highway and Transportation Map, Shelby County, Tennessee" is fairly detailed (Figure 4-06). This map shows the local road network was essentially the same on the 1927-1932 map (compare to Figure 4-05). Importantly, five structures are located within the tract: three on Holmes Road west of an arm of Hurricane Creek, and two on Swinnea Road to the south of another arm of Hurricane Creek.

Figure 4-06. A portion of the 1939 Tennessee State Highway Department "General Highway and Transportation Map, Shelby County, Tennessee" with the MSCAA Holmes Road tract highlighted (map courtesy: Memphis Room, Benjamin L. Hooks Central Library).

1956 County Engineering Department Map of Shelby County

During the 1950s the County Engineering Department produced several similar editions (1953, 1954, 1956, and 1959) of a county map that shows the early stages of the modern developments and infrastructure construction in south Memphis. A portion of the 1956 edition is provided below (Figure 4-07). Importantly it reveals that the gas pipeline corridor that traverses the northern portion of the tract was in place by then, and that it contained two 26-in. lines. In contrast, the high voltage power line in the southern portion of the tract, and the petroleum pipeline on the western edge of the tract are not shown.

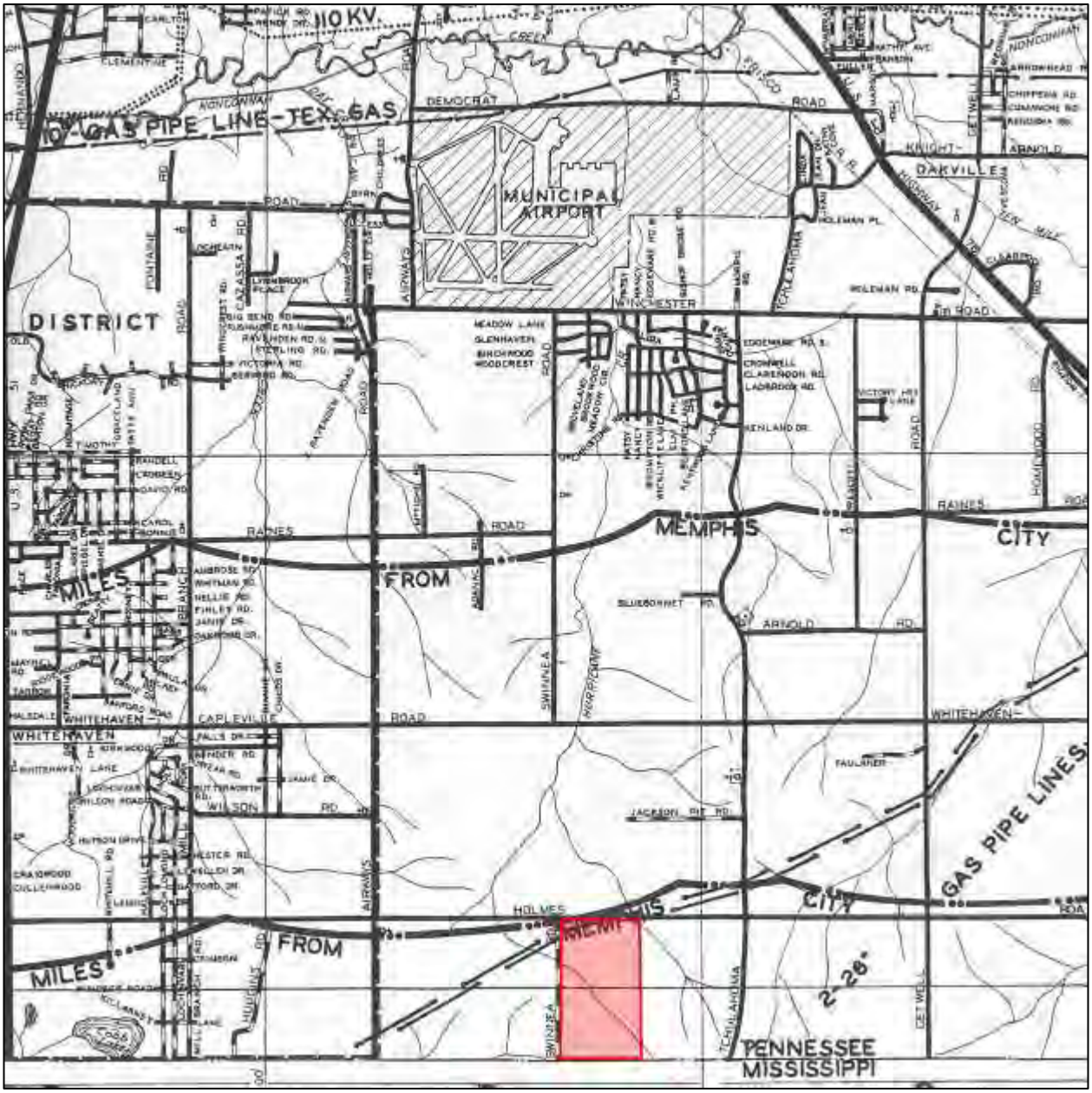

Figure 4-07. A portion of the 1956 "Map of Shelby County, Tennessee" prepared by the County Engineering Department with the MSCAA Holmes Road tract highlighted (map courtesy: Memphis Room, Benjamin L. Hooks Central Library).

1961 BARTLETT 15-MIN. QUAD

The northern portion of the MSCAA Holmes Road tract can be identified on the 1961 Bartlett, TN 15-min. quad (Figure 4-08). This quad shows seven structures, a road and two ponds within the tract. Four structures are clustered south of Holmes Road, and three are roughly evenly distributed along Swinnea Road. The southern portion of the tract is found on the Hernando, MS-TN 15-min. quad, but there is no 1960 edition, the nearest contemporary edition dates to 1944.

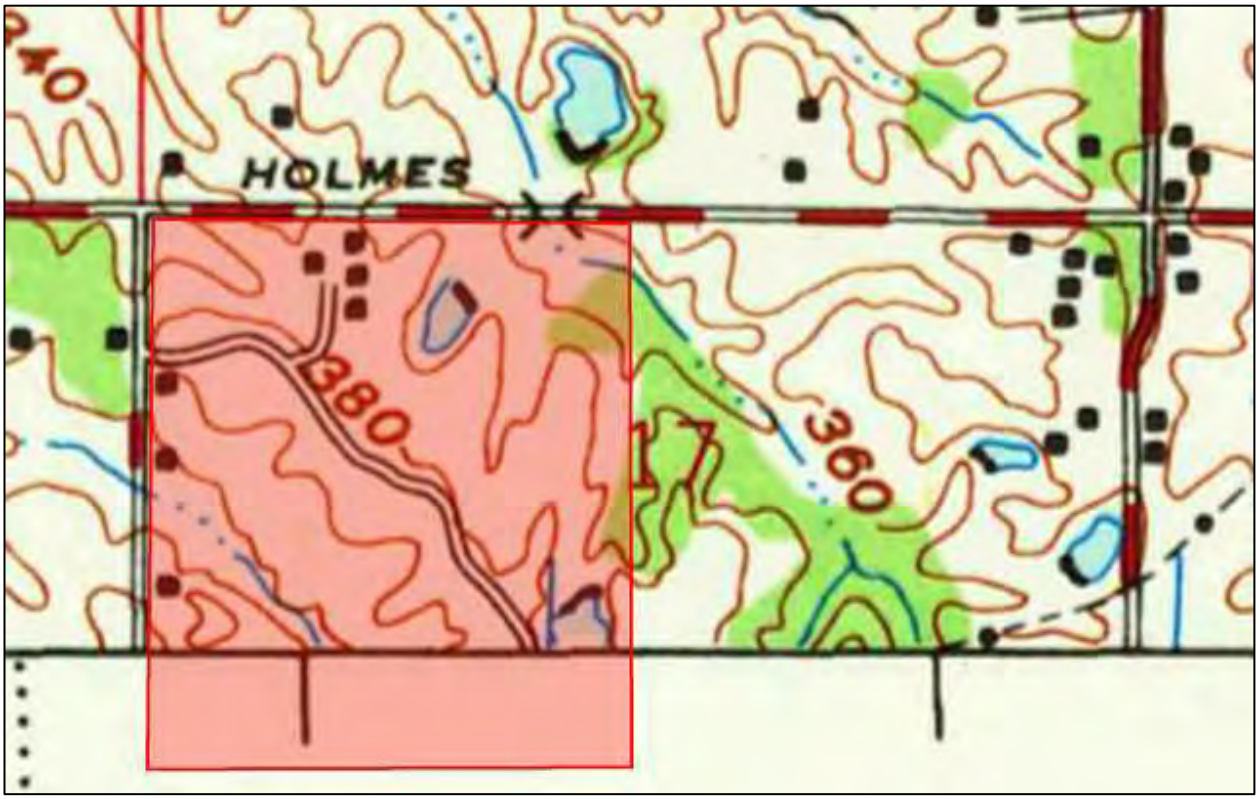

Figure 4-08. An enlarged portion of the 1961 Bartlett 15-min. quad with the MSCAA Holmes Road tract highlighted.

1965 & 1997 SOUTHEAST MEMPHIS 7.5-MIN. QUADS

The northern portion of the MSCAA Holmes Road tract can be identified on the 1965 and 1997 editions of the Southeast Memphis, TN 7.5-min. quad (Figure 4-09). The 1965 edition shows nine structures, the gas pipeline corridor, several ponds and a gravel pit within the tract (Figure 4-09). Five of the structures are residences, including two on Holmes Road and three on Swinnea Road. The other four structures are outbuildings and they are clustered in the central portion of the tract between Holmes Road and the gas pipeline corridor.

Examination of the 1997 edition of the Southeast Memphis, TN 7.5-min. quad reveals that only two of the 1965 structures remained.

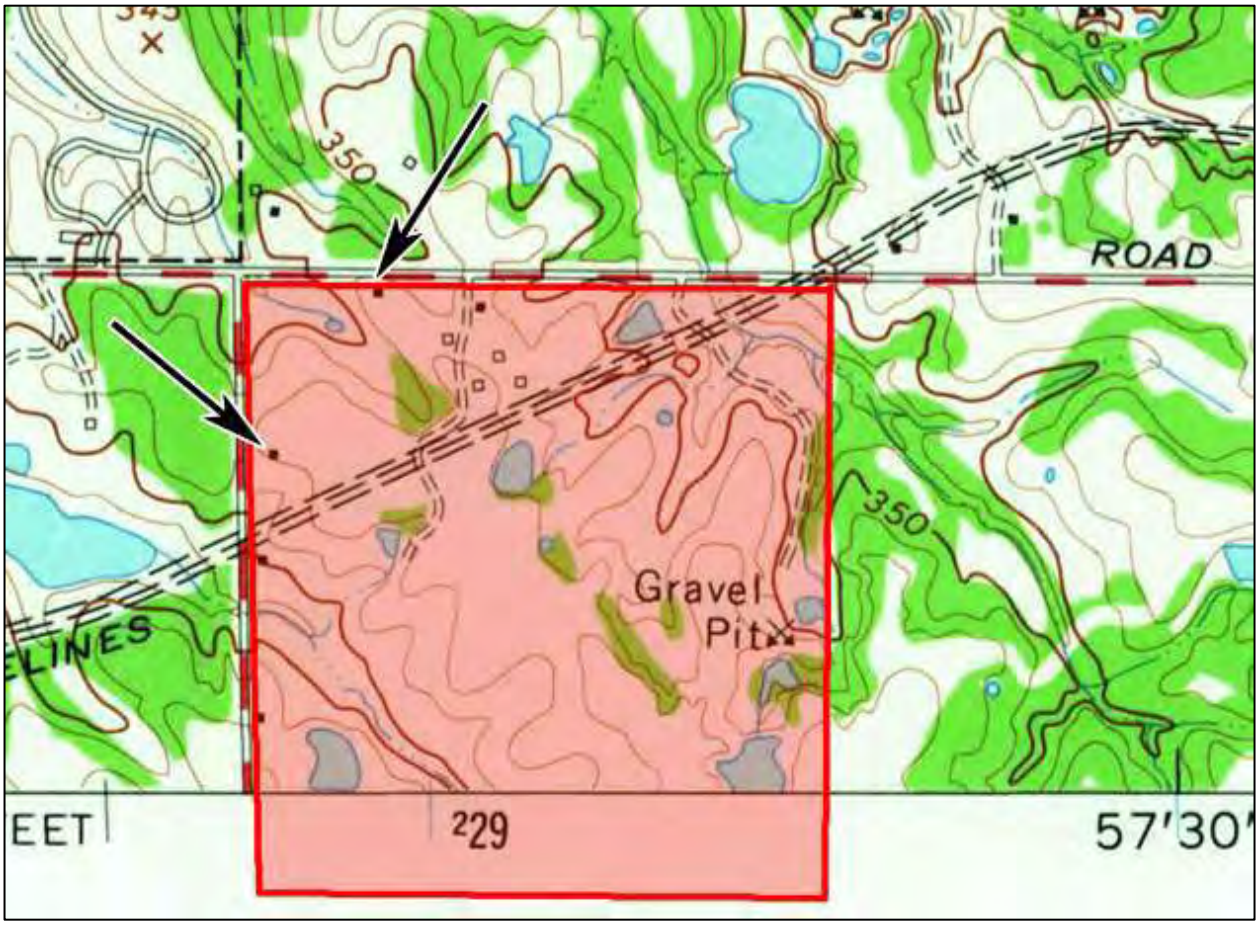

Figure 4-09. An enlarged portion of the 1965 Southeast Memphis, TN 7.5-min. quad with the MSCAA Holmes Road tract highlighted.

Arrows denote the only two structures that remain on the 1997 edition of the same quad.

1982 & 1996 PLEASANT HILL 7.5-MIN. QUAD

The southern portion of the MSCAA Holmes Road tract can be identified on the 1982 and 1996 editions of the Pleasant Hill, MS-TN 7.5-min. quad (Figure 4-10). The 1982 edition reveals two residences and two outbuildings on the western side of the study tract along Swinnea Road. Examination of the 1997 edition of the same quad reveals that only two structures remain.

Additionally, the locations of the tower structures associated with the pair of high-voltage electrical transmission lines are also shown on the 1982 edition. Because the high-voltage transmission line was not shown on a 1975 air photo, see below, it is dated ca. 1976-1981.

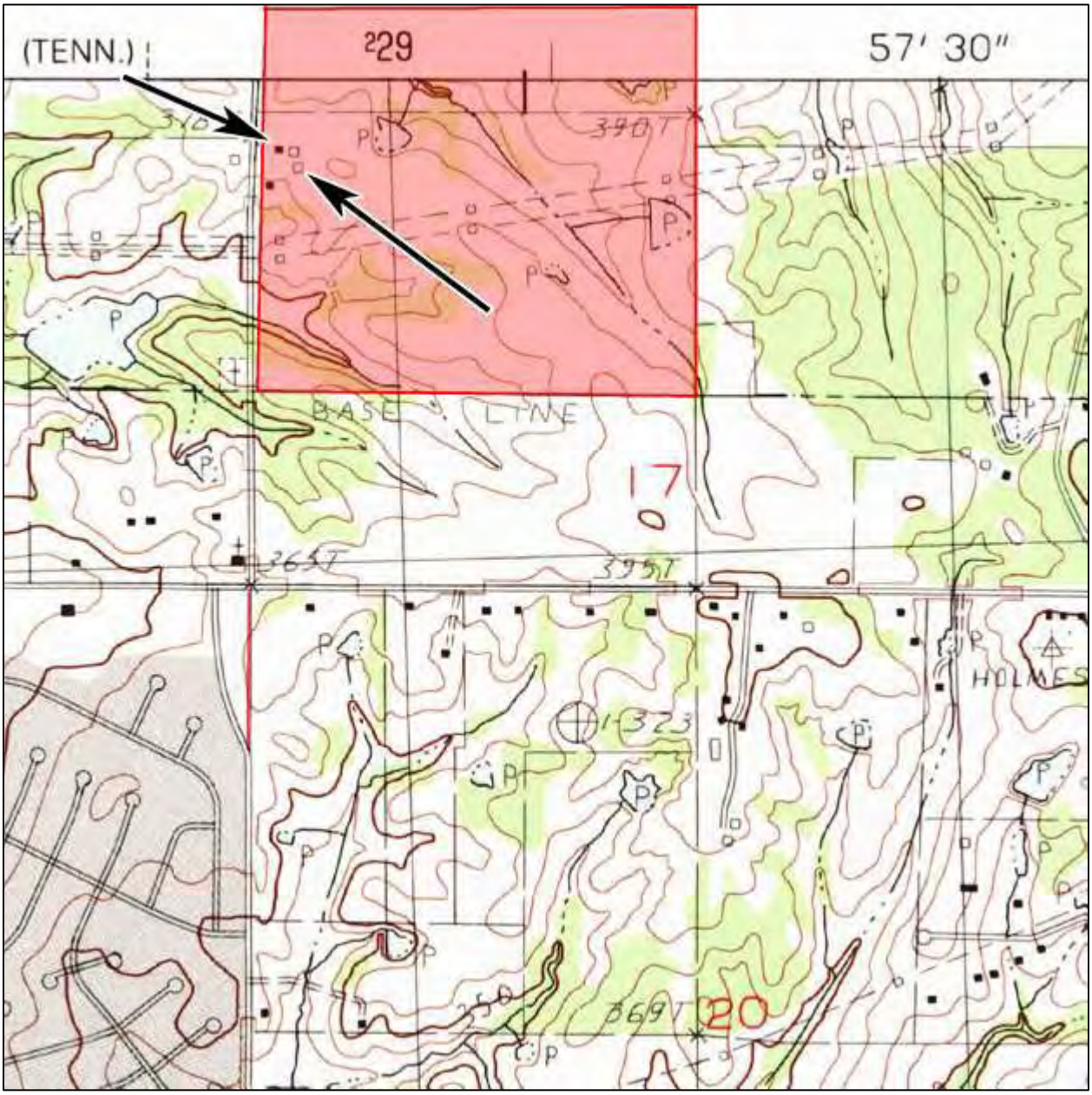

Figure 4-10. An enlarged portion of the 1982 Pleasant Hill, MS-TN 7.5-min. quad with the MSCAA Holmes Road tract highlighted.

Arrows denote the only two structures that remain on the 1996 edition of the same quad.

1975 EARTH EXPLORER AIR PHOTO

An aerial photo dated February 21, 1975 was retrieved from the USGS Earth Explorer web page (image 1VDUY00010098.tif) (Figure 4-11). This image reveals much of the northern portion of the tract was denuded and barren, likely from gravel pit operations, as indicated by the 1965 quad (see Figure 4-09). To the south, along Swinnea Road, a farmstead can be observed where THC properties SY31708A and SY31607A are recorded. Note that the MLGW high-voltage transmission line corridor is not present in 1975.

Figure 4-11. A portion of the 1975 air photo with the MSCAA Holmes Road tract highlighted.

1990 EARTH EXPLORER AIR PHOTO

An aerial photo dated February 12, 1990 was retrieved from the USGS Earth Explorer web page (image 1VFMT00010013.tif) (Figure 4-12). The northeastern portion of the tract is denuded and barren, and exhibits a deep erosional gully. At the location of the 1975 farmstead there is a cluster of structures within a barren area; we suggest that the gravel pit operation has shifted to here. Due to the COVID-19 pandemic, the Memphis Library is closed, thus we can not search Polk's City Directories to established the identify of this compound.

Figure 4-12. A portion of the 1990 air photo with the MSCAA Holmes Road tract highlighted.

GOOGLE EARTH HISTORICAL IMAGERY

Google Earth provides historical imagery for the study tract for the period from 1991-2018. The farmstead on Swinnea Road that may have converted into a gravel operation after 1975 and before 1990 is shown on a February 1991 image, and it appears in basically the same condition as on the 1990 image: a cluster of structures within a denuded area, with piles of material stacked in rows within the area. The next image that is available is dated January 1997, and on this compound is completely gone, and the vegetation has begun to regenerate over the former area. This reveals that the occupation of the compound ceased during the early 1990s. By January 1997 vegetation had also begun to regenerate over the northern portion of the tract, within the former broad barren area with a deep erosional gully.

SURVEY EXPECTATIONS

Given the above, the following survey expectations can be offered. A review of various archival maps suggests five or so twentieth century domestic sites should be located within the tract, and they are distributed along and near Holmes Road and Swinnea Road. Archival sources also suggest that portions of the tract were denuded, eroded and otherwise degraded by gravel pit and/or strip mine operations. Many of the ponds within the tract are likely the by-product this extractive land use.

More generally, the environmental setting (uplands) and eroded loess soils across the majority of the tract led us to conclude that, overall, the tract has a moderate to low probability of containing archaeological resources. The local Prehistoric settlement pattern reveals that most known sites occur on higher terrain within about 200 to 400 m of Hurricane Creek, a tributary of Nonconnah Creek, which has its headwaters in the study area.

The expected archaeological site density for the APE can be inferred from Peterson's (1979) sample survey of the Wolf River basin, the next watershed to the north, which is highly similar both ecologically and archaeologically to the Nonconnah Creek basin. During Peterson's study the Wolf River watershed was stratified into three environmental zones (floodplain, terraces, and uplands) and subdivided into 716 one-minute quadrates. A three percent random sample of the quadrates was surveyed. The results rather dramatically reveal that archaeological sites in the Wolf River watershed—and by inference the Nonconnah Creek basin—are concentrated on terraces, where 3.22 sites were identified per km^2. In contrast, uplands yielded only 0.49 sites per km^2 and floodplain even less (0.22 site per km^2). Since the 244 ac. (0.99 km^2) MSCAA Holmes Road tract is associated with uplands, the number of expected sites is 2.02 (0.99 km^2/0.49 sites per km^2).

V. FIELD INVESTIGATIONS

METHODS

A four-person crew conducted the fieldwork from April 7 to 21, 2020 (see "Acknowledgements" for personnel). Shovel testing at 30 m intervals was the primary site detection method.

OBJECTIVE

The two main objectives in conducting the intensive archaeological survey were as follows: (1) to obtain a complete inventory of all significant cultural resources present; and (2) to evaluate all identified resources relative to eligibility criteria of the NRHP (36 CFR 63). No data recovery beyond the constraints of an intensive (shovel test) survey and site boundary delineation was expected.

STANDARD SHOVEL TEST

A shovel test consisted of the excavation of four-sided hole at least 30 cm in diameter (0.09 m^2). Each shovel test was excavated to culturally sterile deposits or upon reaching the water table. To ensure consistent artifact recovery, all sediment was hand screened through 0.25-in. mesh hardware cloth. All natural and cultural strata revealed in the individual shovel test profiles will be recorded using metric depth measurements, and described in terms of textural class and color (using the Munsell Soil Color Chart). Additional strata descriptions were provided as needed, such as moisture level, and number and size of roots. Panamerican employs a specialized shovel test form to insure consistent shovel test profile recording. All holes were subsequently backfilled as closely as possible to the original condition.

SITE SAMPLING/DELINEATION

When an artifact was encountered in a shovel test, the area was delineated on a 10-m interval cruciform pattern, expanding to a grid pattern if necessary. Shovel tests were excavated in both patterns until there were two consecutive negative shovel tests, at which point the digging was halted.

SURVEY DOCUMENTATION

To ensure appropriate field data management, Panamerican employs a system the company developed for large-scale intensive surveys in the Southeast, and that has been successfully employed during all of Panamerican's past work. Throughout the course of the fieldwork, the crew used specialized forms to individually record the shovel test locations. The status of each shovel test was assessed as positive (■), negative (❑), or not excavated (Ø). In the case of the latter, which are referred to as "no-test" locations, the reason why no shovel test was excavated is provided on the forms. This allows for a complete inventory of shovel tests to be generated. Shovel test profiles, sediment characteristics, and depths of artifact recovery, if any, were recorded on the forms during the fieldwork. At the end of each field day, this information is collected by the field director and reviewed for content.

In addition to the individual shovel test results recorded by the archaeological technicians, the field documentation included, but was not limited to, the following tasks: (1) field notes were maintained; (2) the survey area and all recorded sites were recorded via photography; and (3) a number of logs or lists were maintained, including those for photo records.

GPS DATA COLLECTION

During the survey the locations of all excavated shovel tests and no-test locations were recorded using Global Positioning System (GPS) equipment. Each Archaeological Technician was issued a Garmin eTrex Venture HC GPS with which to record their excavated shovel test locations. The resulting metadata (i.e., shovel test UTM coordinates) was integrated into Geographic Information System (GIS) ArcMap format to produce the shovel test distribution map.

RESULTS

During the course of the survey 937 shovel test locations were documented within the tract, including two that were positive for artifacts, 768 that were negative for artifacts, and 167 "no-test" locations were planned tests were not excavated due to principally due to slope, water and past disturbances (Figure 5-01). Appendix A provides the individual shovel tests data. Among the 770 excavated and screened shovel tests, the depths ranged from 4 cm to 40 cm, and the average depth was 18.06 cm (±4.77 cm).

The survey resulted in the identification of five twentieth-century Historic loci; four former house sites and a breached earthen dam. Site forms were completed for these and submitted to the Tennessee Division of Archaeology (TDOA); however they declined to assign them site numbers (i.e., trinomials) as TDOA does not record historic sites that lack sufficient evidence of pre-1950 occupation. Although historic maps show structures near four of the loci, the lack of below ground pre-1950 archaeological evidence prompted TDOA to decline to issue site numbers (TDOA, personal communication April 2020). The five loci that were recorded during fieldwork are described below.

LOCUS 1

Cultural Affiliation..... Twentieth Century
Site Type .....Razed house site
Site Size .....60-x-50 m
Artifact Recovery Total 0
Recommended NRHP Status .....Not Eligible

Location and Setting

Locus 1 is a newly identified former historic house site located in the northwestern part of the MSCAA Holmes Road tract, near Swinnea Road to the north of the Texas Gas pipeline. There is a low ridge in the area, running northeast from the southwest boundary of the study tract. An unnamed tributary to Hurricane Creek is about 200 m south. Sease et al. (1970) map the Locus 1 area as Loring silt loam, 2 to 5 percent slopes (LoB; see Figure 2-02).

Archaeology

Transects 1 and 2 traversed Locus 1, but the shovel tests were all negative for cultural material (Figure 5-03). The Locus 1 location was wooded in secondary growth and there was poor surface visibility (Figure 5-04). Some displaced brick and modern trash was observed on the ground surface (Figure 5-05). In the north portion of the site there are two parallel barbed-wire fence remnants. These may have marked a drive or road, which is shown archival maps here (see "Additional Remarks" below), or it could be a cattle shoot. The site size is estimated from the observed surface scatter of brick, concrete and the fence lines.

Artifacts

No artifacts were recovered from the nearby shovel tests or the surface.

Figure 5-01. Aerial image of the MSCAA Holmes Road tract with the shovel tests superimposed.

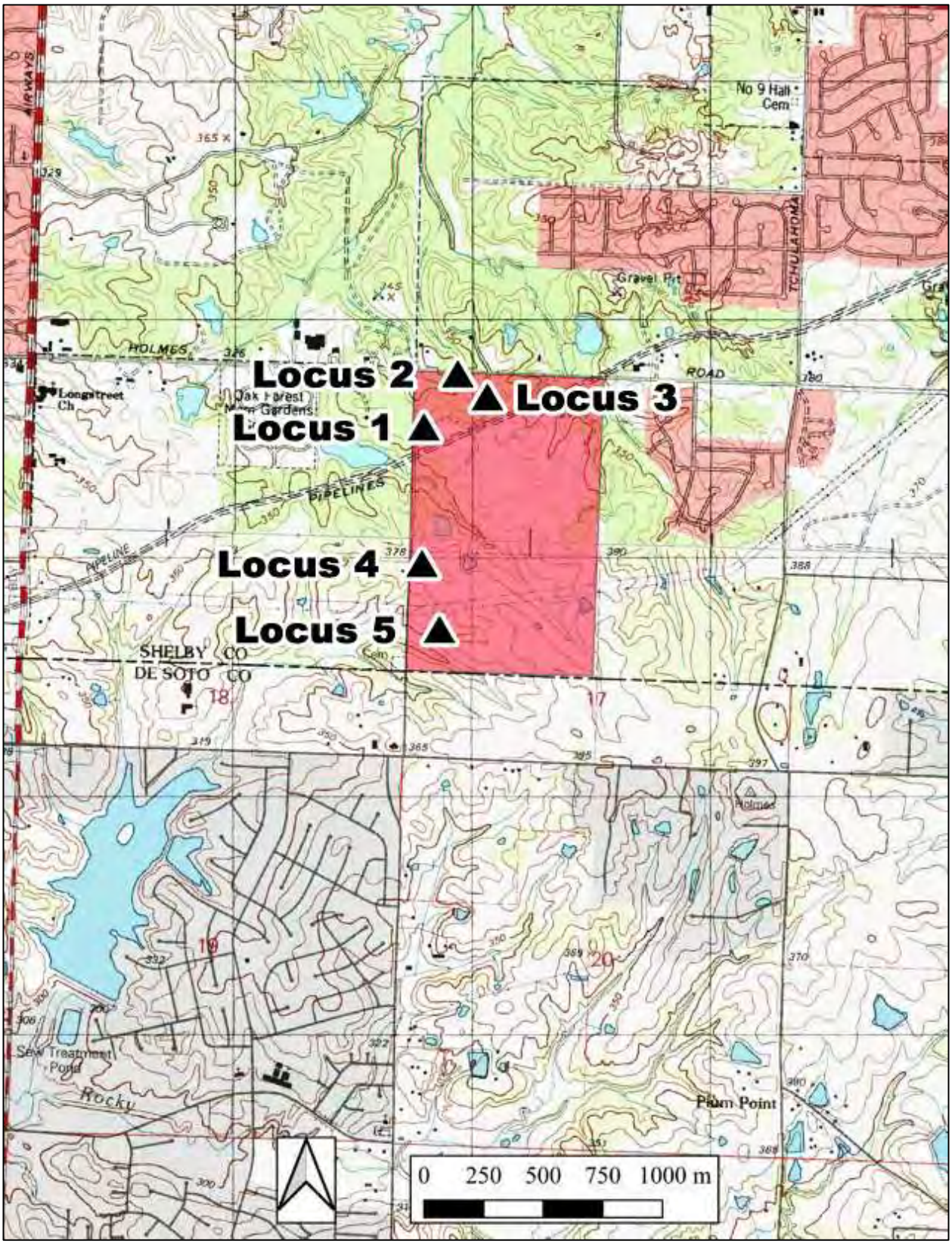

Figure 5-02. Identified archaeological loci shown Southeast Memphis, TN 7.5-min. and 2016 Pleasant Hill, MS-TN 7.5-min. quads.

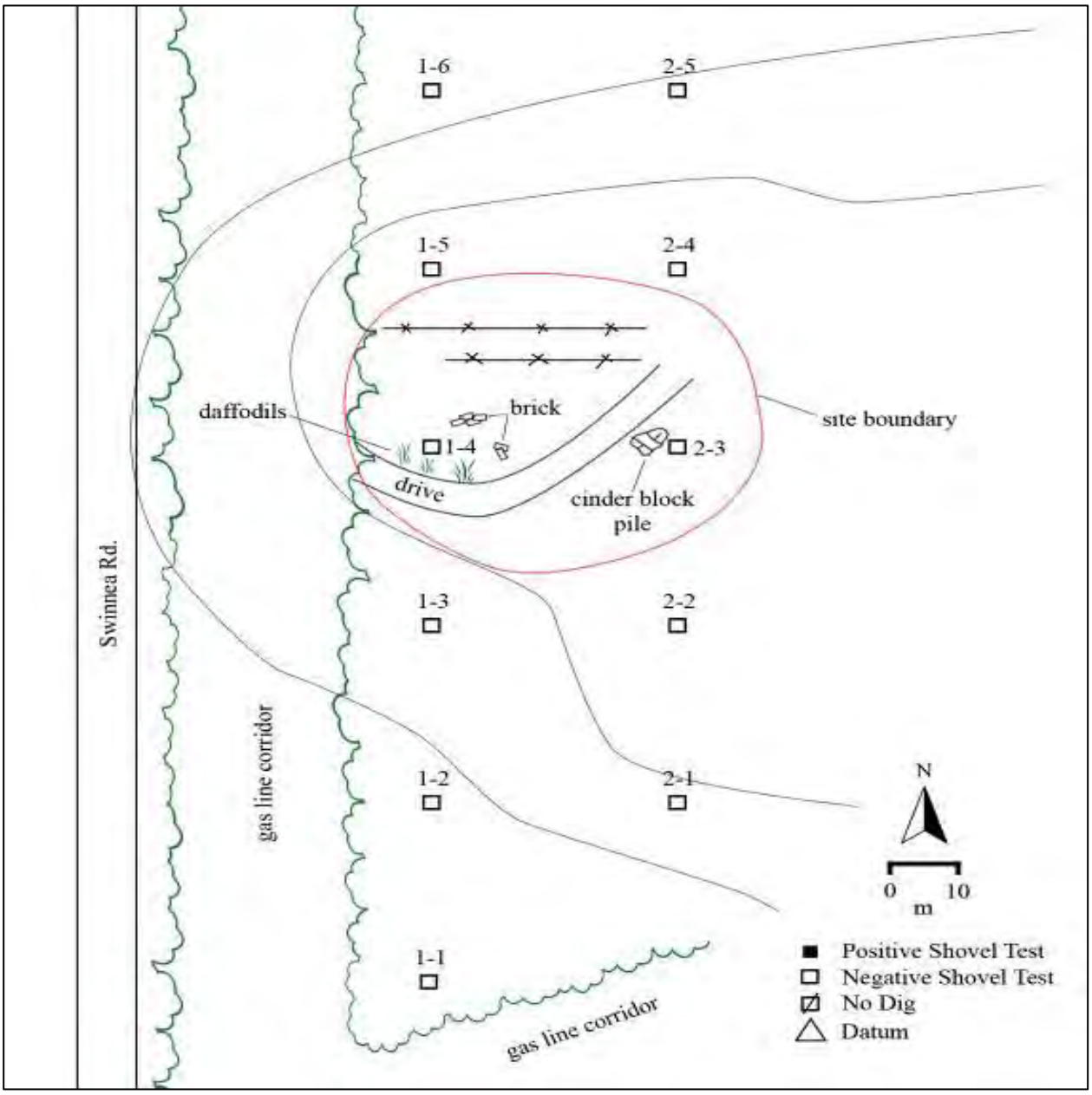

Figure 5-03. Locus 1 sketch map.

Figure 5-04. Photograph of Locus 1, view north across locus (DSCN2567).

Figure 5-05. Pile of brick at Locus 1, view north (DSCN2568).

Additional Remarks

A structure is shown at the Locus 1 location on the 1939 Shelby County highway map, the 1961 Bartlett 15-min. quad, and the 1963, 1973, 1983, 1993 and 1997 editions of the SE Memphis 7.5-min. quad (see Chapter IV). Interestingly, although the 1983 edition of the SE Memphis quad shows a structure, it also depicts the entire site location area as part of the gravel pit.

An aerial photo dating to 1975 reveals much of the northern portion of the tract, including the Locus 1 location, was denuded and barren, likely from gravel pit operations, as indicated by the 1965 quad (see Figure 4-11). An aerial photo dating to 1990 shows the Locus 1 as somewhat wooded, although still disturbed from the gravel quarry.

The structure at Locus 1 was razed some time after 1997.

Recommendation

Locus 1 is recommended not eligible for the NRHP. Although a structure is shown at this location on archival maps dating to 1939, no subsurface remains were encountered during transecting of the area. As noted above, it is TDOA policy to not assign state trinomials to historic scatters lacking a definite pre-1950 occupation in the form of cultural material. No additional cultural resources work is recommended for the Locus 1 location.

LOCUS 2

Cultural Affiliation..... Twentieth Century
Site Type .....Razed house site
Site Size .....35-x-35 m
Artifact Recovery Total 0
Recommended NRHP Status .....Not Eligible

Location and Setting

Locus 2 is a newly identified historic house site located in the northern part of the MSCAA Holmes Road tract, to the south of Holmes Road. There is a low ridge in the area, running northwest to Holmes Road. An unnamed tributary to Hurricane Creek is the drainage in the area and is about 120 m west. Sease et al. (1970) map the Locus 2 area as Loring silt loam, 2 to 5 percent slopes (LoB; see Figure 2-02).

Archaeology

Transects 5, 6, and 7 traversed this locus, but the nearby shovel tests were all negative for cultural material (Figure 5-06). At the time of investigation, the Locus 2 location was wooded in secondary growth, and there was poor surface visibility (Figure 5-07).

During a visual survey of the area some concrete footers were observed just south of Holmes Road, as were two sections of brick that were interpreted as the remains of chimneys (Figure 5-08). There was no obvious turn-in off Holmes Road to the locus location. The site size is estimated from the observed surface scatter of brick and concrete.

Artifacts

No artifacts were recovered from Locus 2.

Additional Remarks

A structure is shown at, or near, the Locus 2 location on the 1939 Shelby County highway map, and the 1963, 1973, 1983, 1993 and 1997 editions of the SE Memphis 7.5-min. quad (see Chapter 4). Interestingly, the 1961 Bartlett 15-min. quad does not show a structure here. Unlike Locus 1, the Locus 2 area is not depicted as a gravel pit, but it is mapped just east of it.

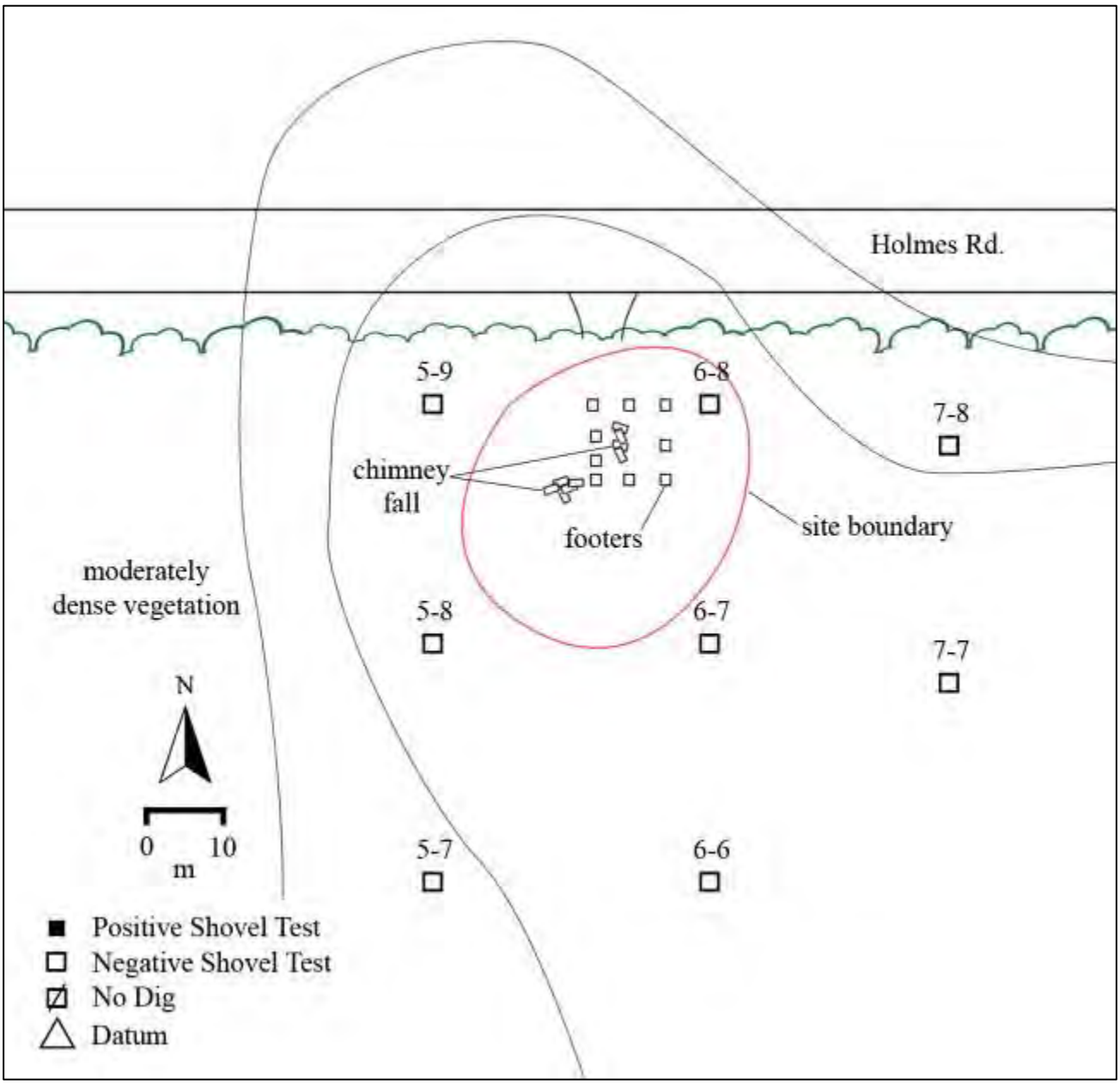

Figure 5-06. Locus 2 sketch map.

Figure 5-07. Photograph of Locus 2, view east across locus (DSCN2574).

Figure 5-08. Chimney fall at Locus 2, view north (DSCN2572).

An aerial photo dating to 1975 reveals much of the northern portion of the tract, including the Locus 2 location, was denuded and barren, likely from gravel pit operations, as indicated by the 1965 quad (see Figure 4-11). An aerial photo dating to 1990 shows the Locus 2 as somewhat wooded, although still disturbed from the gravel quarry.

The structure at Locus 2 was razed some time after 1997.

Recommendation

Locus 2 is recommended not eligible for the NRHP. Although a structure is shown at this location on archival maps dating to 1939, no subsurface remains were encountered during transecting of the area. As noted above, it is TDOA policy to not assign state trinomials to historic scatters lacking a definite pre-1950 occupation in the form of cultural material. No additional cultural resources work is recommended for the Locus 2 location.

LOCUS 3

Cultural Affiliation..... Twentieth Century
Site Type ..... Farmstead; Quarry operation
Site Size .....155-x-100 m
Artifact Recovery Total 0
Recommended NRHP Status .....Not Eligible

Location and Setting

Locus 3 is a newly identified historic farmstead later used by a quarry operation located in the northern part of the Holmes Road study tract. There is a low ridge in the area, running north to Holmes Road. An unnamed tributary to Hurricane Creek is the drainage in the area and is about 240 m south. Sease et al. (1970) map the Locus 3 area as Loring silt loam, 2 to 5 percent slopes (LoB; see Figure 2-02).

Archaeology

Transects 9, 10, and 11 were run over Locus l3, but the nearby shovel tests were all negative for cultural material (Figure 5-09). At the time of investigation, the Locus 3 location was wooded in secondary growth and there was poor surface visibility (Figure 5-10). This area was less dense in vegetation than Loci 1 and 2.

During a visual survey of the area several large piles of concrete, along with some corrugated metal were observed in the locus area, along with modern trash (Figure 5-10). There is a turn-in off Holmes Road, which corresponds with the mapped location of a drive running south along the ridge. The site size is estimated from the observed scatter of concrete and metal, along with the structure locations shown on the quad maps.

Artifacts

No artifacts were recovered; however, there was a great deal of modern trash scattered about the site.

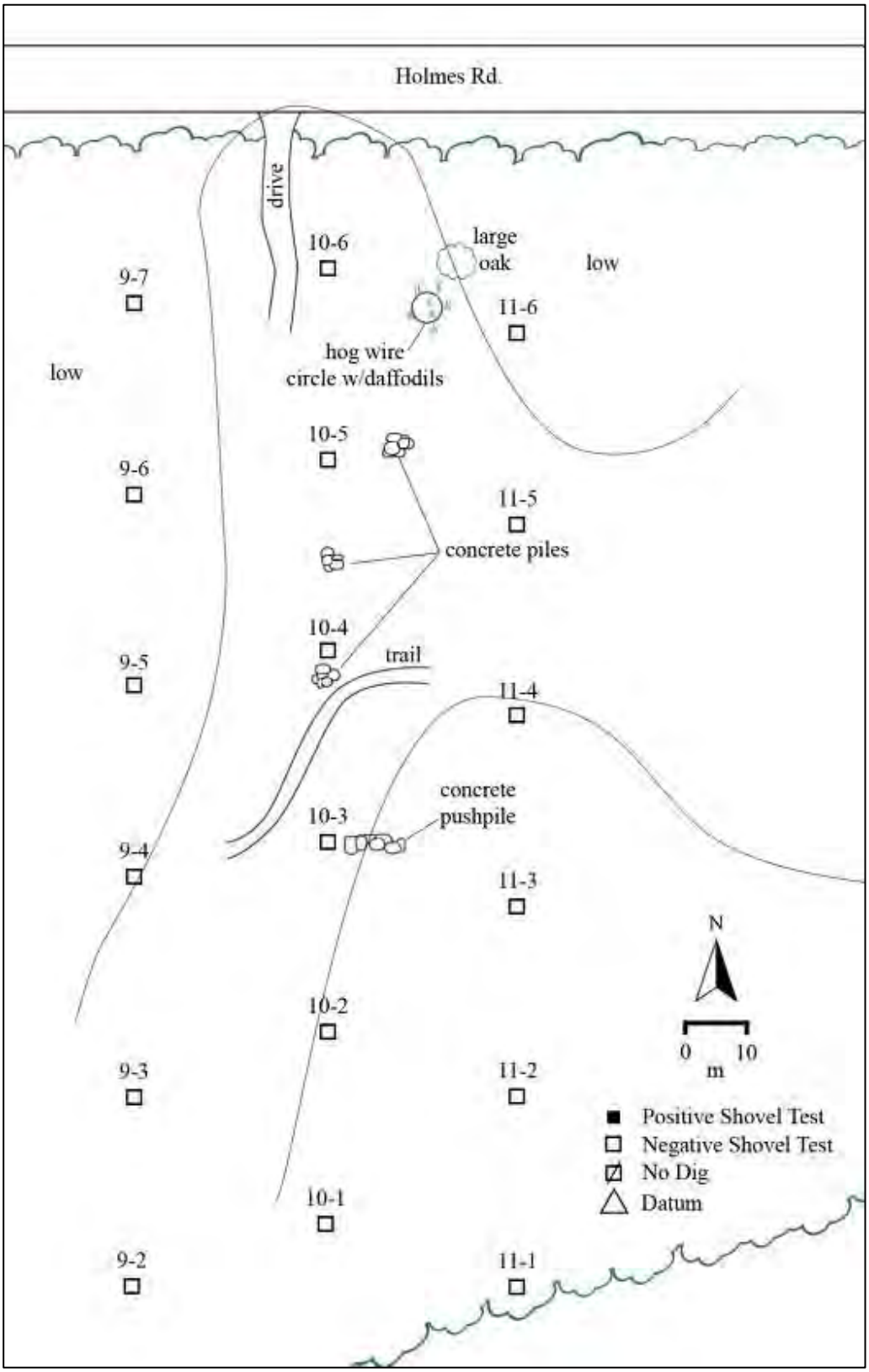

Figure 5-09. Locus 3 sketch map.

Figure 5-10. Photograph of Locus 3, view north-northeast across locus (DSCN2580).

Figure 5-11. Concrete pile at Locus 3, view southeast (DSCN2579).

Additional Remarks

A structure is shown just south of Holmes Road on the 1939 Shelby County Highway map at Locus 3. On the 1961 Bartlett 15-min. quad there are four structures shown at or near Locus 3. Four structures are also shown here on the 1965, 1973, and 1983 SE Memphis 7.5-min. quads.

Only one structure is shown on the 1993 edition, and no structure appears on the 1997 edition. A road or drive leading south from Holmes Road is shown on the maps, and there is a turn-in at this location. During the field visit this road was difficult to distinguish due to vegetation. There are no foundations or brick piles suggesting chimneys, but there are several large piles of concrete that have been dozed into piles. While this area is not shown as part of the gravel pit, it is shown as being just north of it. The collection of structures shown south of Holmes Road, north of the pipeline, may have been related to the gravel quarry and the concrete piles are what are left of them.

An aerial photo dating to 1975 reveals much of the northern portion of the tract, including the Locus 3 location, was generally denuded and barren, likely from gravel pit operations, as indicated by the 1965 quad (see Figure 4-11). There are what appear to be structures (open square icons suggestive of sheds or barns) at the Locus 3 location, north of the pipeline. An aerial photo dating to 1990 shows the Locus 3 as even more disturbed in appearance; the structures do not appear to be present, which would agree with the lack of structures on the 1993 quad.

Recommendation

Locus 3 is recommended not eligible for the NRHP. Although a structure is shown at this location on archival maps dating to 1939, no subsurface remains were encountered during transecting of the area. As noted above, it is TDOA policy to not assign state trinomials to historic scatters lacking a definite pre-1950 occupation in the form of cultural material. No additional cultural resources work is recommended for the Locus 3 location.

LOCUS 4—THC STRUCTURES SY-31607A & SY-31708A

Cultural Affiliation..... Twentieth Century
Site Type ..... Farmstead; Quarry operation
Site Size ..... 70-x-70 m
Artifact Recovery Total 0
Recommended NRHP Status ..... Not Eligible

Location and Setting

Locus 4 is historic farmstead that appears to have been later used as part of a quarry operation. It is located in the western portion of the MSCAA Holmes Road tract where THC recorded structures SY-31607A and SY-31708A (see Figure 4-02). This locus is atop a prominent ridge that runs east/west, and terrain slopes down to the north and south. A Valero petroleum pipeline and Swinnea Road are located immediately west of the site. An unnamed tributary to Rocky Creek is about 270 m southeast. Sease et al. (1970) map the Locus 4 area as Loring silt loam, 2 to 5 percent slopes (LoB; see Figure 2-02).

Archaeology

Transects 21 and 22 were run over the locus location, but the nearby shovel tests were all negative for cultural material (Figure 5-12). At the time of investigation, the Locus 4 location was wooded in secondary growth and there was generally poor surface visibility (Figure 5-13). Near the center of the locus there were a great many limbs from fallen trees.

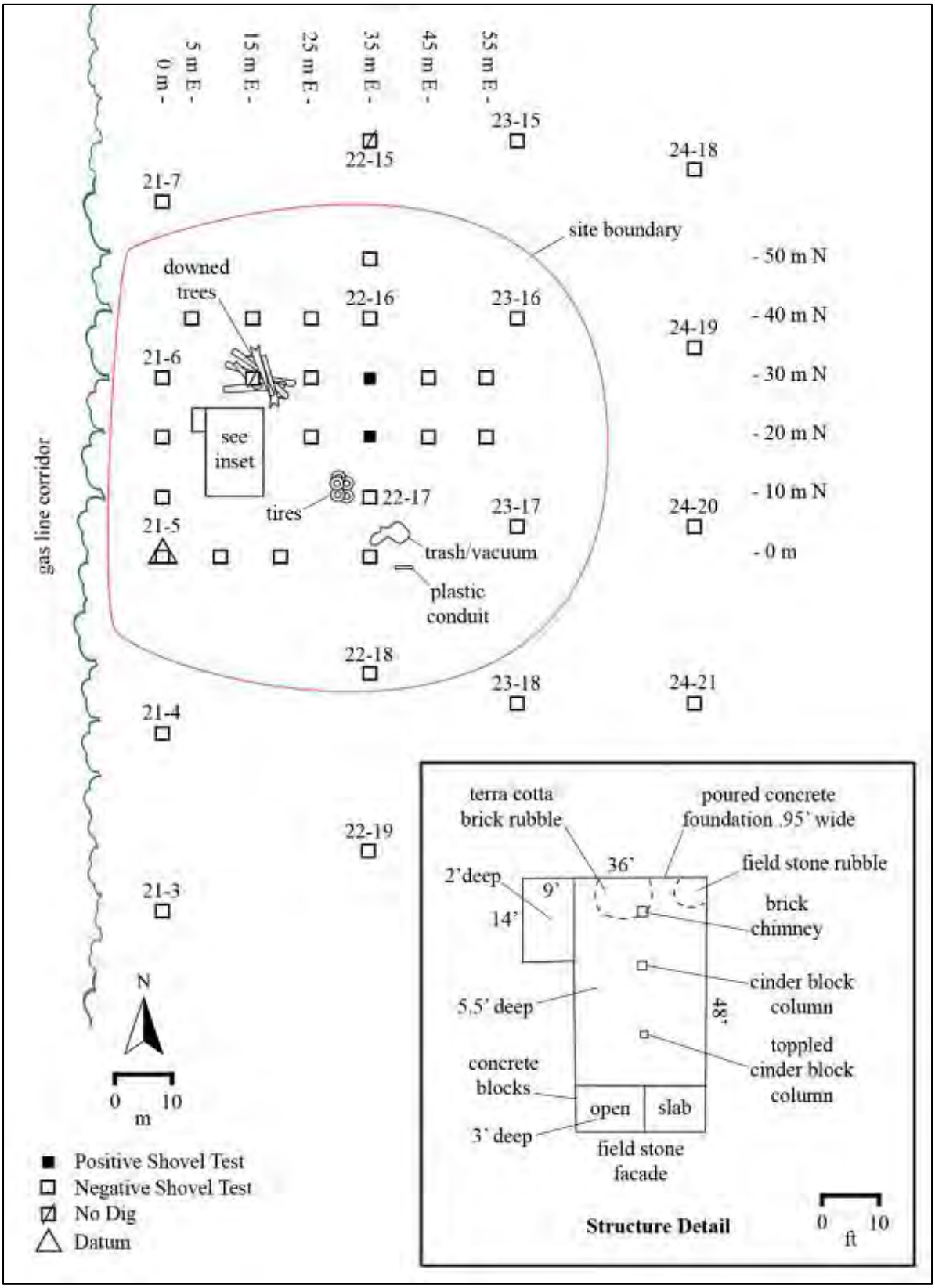

Figure 5-12. Locus 4 sketch map.

Figure 5-13. Locus 4 foundation and free standing chimney, view southwest (DSCN2594).

Figure 5-14. Locus 4 southeast corner of foundation, view southwest (P409641).

A largely intact poured concrete foundation/basement was observed within the wooded area east of the petroleum pipeline (Figure 5-13). This foundation was measured to be 36-x-48 ft. at its largest dimensions, and is about 5.5 ft. deep. The wall line is 0.95 ft. wide. It exhibits is a slight "L" shape, with a 9-x-14 ft. projection/room off the northwest end. The south end has a 12-x-12 ft. open portion on the west side, and a 12-x-12 ft. enclosed "cellar" section on the southeast corner (Figure 5-14). These latter two elements may be additions to the original structure.

Inside the foundation there is a free-standing brick chimney about 4 m tall with a buff-colored terra cotta flue liner at the top. To the south of this, there is a free-standing cinder block column that no doubt supported the floor joists. To the south of it, there is a second collapsed cinder block column.

On the exterior of the southern portion of the possible addition to the foundation there is a decorative flagstone veneer (Figure 5-15). Additional pieces of similar flagstone are casually tossed into a pile within the foundation/basement north of the brick chimney.

Figure 5-15. Flagstone veneer on south portion of the foundation, view northwest (DSCN2592).

A great deal of modern trash was observed across Locus 4, in particular to the west of the foundation, including a television, a vacuum cleaner, a cassette/CD player and large amounts of bottles aluminum cans and plastic items. Concrete demolition debris was abundant on the hill side slope to the south of the foundation, where it was tossed into a deep erosional gully.

Due to the fact that there was an irrelatively intact foundation and the locus was horizontally extensive, addition shovel tests were excavated at 10 m intervals at Locus 4 despite an absence of positive transect tests. Of these 19 delineation tests, two adjacent tests were positive: shovel tests N20 E35 and N30 E35. The soil profile for shovel tests N20 E25, a positive test located

near the center of the site was recorded as: 0-4 cm below surface (bs), 10YR 4/4 silty clay loam with artifacts; and subsoil 4-18 cm bs, 10YR 5/6 silty clay, sterile. The nearby tests also revealed that A horizon is quite thin, no doubt due to extensive past soil erosion.

Artifacts

The recovery from the two shovel tests is presented in Table 5-01. Of the 15 recovered items, over half are small flat pieces of blue plastic. The next most common artifact category is clear bottle glass (n=6), which is probably not even 50 years old. The lone remaining item is a plain whiteware sherd. The assemblage appears to date primarily to the late twentieth century.

Table 5-01. Locus 4 artifact recovery.

Shovel test	Depth (cm)	Artifact Category	Comments	N	Mass (g)
N10 E35	0-8	bottle glass, clear		1	6.1
N20 E35	0-4	flat glass, clear		5	6.7
N20 E35	0-4	whiteware, plain		1	0.6
N20 E35	0-4	plastic	light blue	8	0.3
			Total:	15	

Additional Remarks

The Tennessee Historic Commission recorded two structures at or near the Locus 4: SY-31607A and SY-31708A. Both structures were recorded in 1995, based off Tax Assessor records, and were described as single family, traditional dwellings (see Chapter IV). They were dated ca. 1935 and 1940, and were unoccupied/abandoned when recorded.

The following archival maps show one or two structures at Locus 4: the 1939 Shelby County road map (see Figure 4-06); the 1961 Bartlett, TN 15-min. quad (see Figure 4-08); 1965 Southeast Memphis, TN 7.5 min. quad (see Figure 4-09); and the 2016 Southeast Memphis, TN 7.5 min. quad (see Figure 1-01).

An aerial photo dated February 21, 1975 was retrieved from the USGS Earth Explorer web page (see Figure 4-11). This image reveals a farmstead that can be observed where THC properties SY-31708A and SY-31607A are recorded. An aerial photo dated February 12, 1990 was retrieved from the USGS Earth Explorer web page (see Figure 4-12). This photo shows the location of the 1975 farmstead is now within a barren area with several sheds and piles of material nearby. This leads us to suggest that the former farmstead was being re-used as by a quarry operation; possibly the former residence was an office.

We should also note that across the non-site area on the surrounding property abundant pieces of twisted sheet metal roofing were observed along many transects (Figure 5-16). We speculate that these were tossed from Locus 4 during a windstorm or tornado, likely after 2016 because the structure is shown on a quad of that data.

Recommendation

Locus 4 is recommended not eligible for the NRHP. Although two structures were recorded by the THC as dating to ca. 1935-1940, beyond the one whiteware sherd there is no archaeological evidence for a non-modern occupation of Locus 4. It is TDOA policy to not assign state trinomials to historic scatters lacking a definite pre-1950 occupation in the form of cultural material. No additional cultural resources work is recommended at Locus 4.

Figure 5-16. An example of the corrugated metal roofing found scattered across the MSCAA Holmes Road tract (DSCN2586).

LOCUS 5

Cultural Affiliation..... Twentieth century
Site Type ..... Earthen dam
Site Size ..... 100-x-10 m
Artifact Recovery Total 0
Recommended NRHP Status ..... Not Eligible

Location and Setting

Locus 5 is a newly identified Historic earthen dam located in the southern part of the Holmes Road study tract, south of the MLGW transmission lines and east of Swinnea Road. The locus is a narrow embankment of raised earth running 30° off north-south between higher ridges to the north and south. A small intermittent stream that is a tributary of Rocky Creek bisects the feature. Sease et al. (1970) map the Locus 5 area as Loring silt loam, 8 to 12 percent slopes, eroded (LoD2; see Figure 2-02).

Archaeology

Locus 5 is wooded and there was generally poor surface visibility (Figures 5-17, 5-18 and 5-19). The dam is approximately 100 m long and the top is fairly narrow (2.5 m). It is about 10 m wide at the base, and is about 6 m tall at its highest point overlooking the tributary that bisects it. An ATV trail runs over the top of the northern section of the dam. The antiquity of the dam is indicated by the size of some of the hardwood trees growing out of it. Biologists had recently flagged out a wetland area to the east of the dam feature where the pond is thought to have been located.

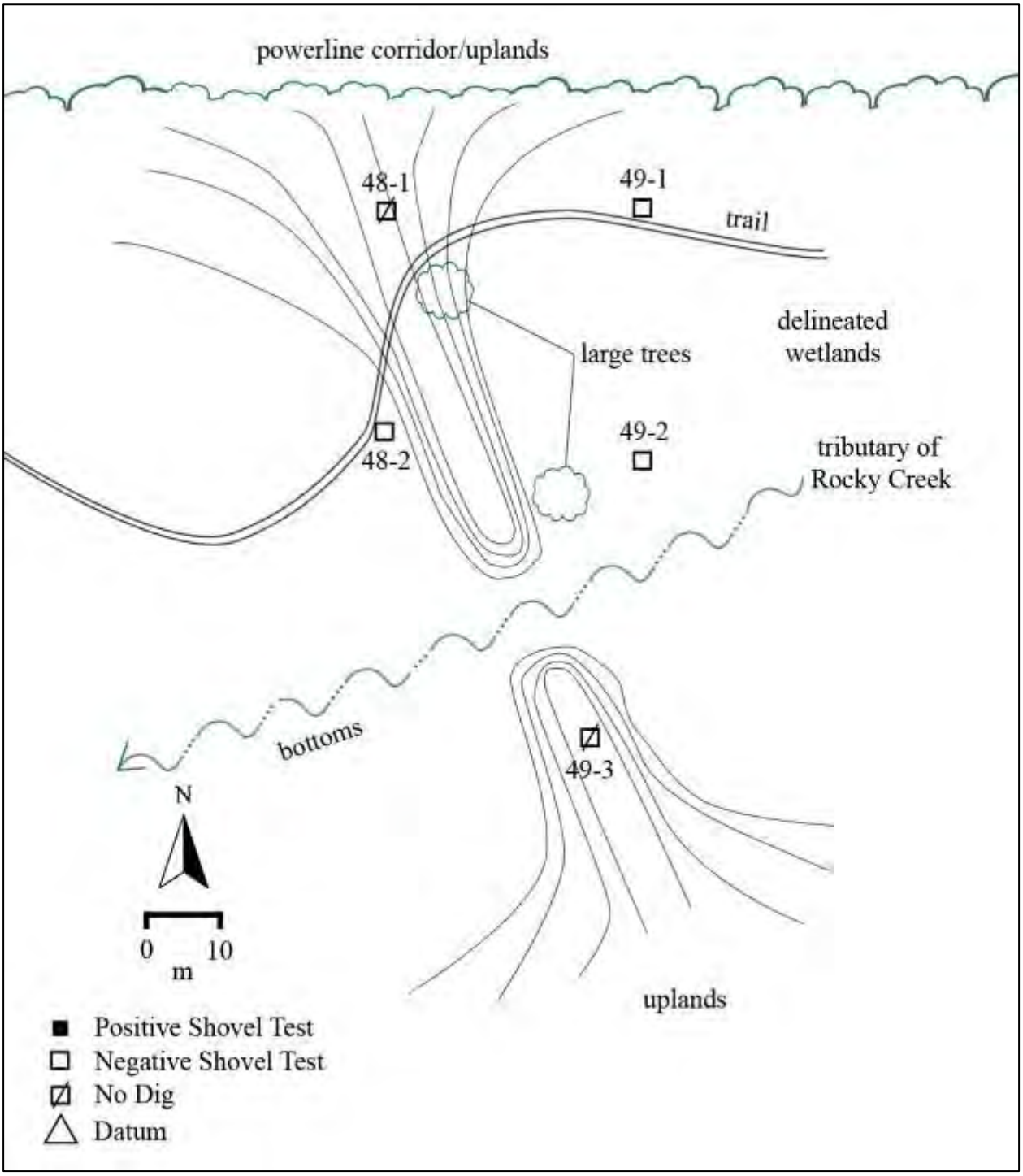

Figure 5-17. Locus 5 sketch map.

Transects 48 and 49 traversed Locus 5, but the nearby shovel tests were all negative for cultural material.

Artifacts

No artifacts were recovered or observed at Locus 5.

Figure 5-18. Photograph of Locus 5, view south (DSCN2614).

Figure 5-19. Locus 5, view southeast (DSCN2613).

Additional Remarks

None of the archival maps that were consulted indicate a dam, or a resulting pond to the east, at this location. However, both the 1982 and 1996 editions of the Pleasant Hill 7.5-min. quad shows contour lines that appear to match up with the dam feature as it exist today, as well as the gap or breach in the center of to where the tributary now flows. Thus the dam appears to have been abandoned before 1982. It was likely built in the early twentieth century, and may be somehow related to one of the gravel pit operations that operated elsewhere within the MSCAA Holmes Road tract.

Recommendation

Locus 5 is recommended not eligible for the NRHP. It is an abandoned probable early twentieth century dam that offers no significant future archaeological research potential. A site form was submitted for it, but the TDOA declined to assign it a trinomial. No additional cultural resources work is recommended at Locus 5.

DISCUSSION

The MSCAA Holmes Road tract failed to produce any evidence for Prehistoric occupation. Based on Peterson's (1979) sample survey of the Wolf River basin, we suggested that the expected number of Prehistoric sites was 2.02 (0.99 km^2/0.49 sites per km^2). Additionally in our "Survey Expectations" (see Chapter IV), it was noted that given the environmental setting (uplands), land-use history and resulting erosion of loess soils, it was concluded that the tract had a moderate to low probability of containing archaeological resources.

The only evidence for utilization of the tract consists of five twentieth-century Historic resources: four former residences or farmsteads (Loci 1, 2, 3 and 4), and one breached earthen dam (Locus 5). Three of the residences were razed and poorly preserved, and had no positive shovel tests. A fourth farmstead, where THC recorded two ca. 1935-1940 structures, exhibited a concrete foundation/basement with a free-standing chimney. Its small artifact assemblage and archival sources reveal that it was occupied late into the twentieth-century, and was possibly re-used by a quarry operation. As expected, the identified Historic resources were encountered along or near Holmes Road and Swinnea Road; these roads were constructed after 1888 and before 1927.

More generally, the interior of the tract has been degraded by past quarry operations and subsequent erosion across denuded areas that were not excavated. The shovel tests generally revealed that the A horizon was thin and eroded, and thus was not conductive for archaeological site preservation. Even well managed soils in the west Tennessee loess region have experienced the loss of up to 2-3 ft. of soil, and the MSCAA Holmes Road tract was not well managed.

The other major Historic utilization of the tract consists of energy transmission corridors (Figures 5-20, 5-21 and 5-22; also see cover illustration). The 100 ft. wide Texas Gas pipeline corridor that bisects the northern portion of the tract has been in place since at least 1956 (see Figure 4-07). The 200 ft. wide MLGW corridor containing two high-volume electric transmission lines was constructed across the southern portion of the tract after 1975 and before 1982. Review of Google Earth imagery suggests that the 50 ft. wide Valero petroleum pipeline corridor that is parallel to Swinnea Road was constructed ca. 1991-1997; its supplies fuel to the Memphis International Airport.

Figure 5-20. Texas Gas corridor, view northeast toward Holmes Road (P4094663).

Figure 5-21. MLGW high-voltage corridor, view east (P4094679).

Figure 5-22. Valero petroleum corridor, view south (P4094678).

VI. SUMMARY & RECOMMENDATIONS

SUMMARY

At the request of Ensafe, Inc. and the Memphis Shelby County Airport Authority, Panamerican Consultants, Inc. performed a Phase I cultural resources survey of a 244. ac. (98.74 ha, or 0.38125 mi.^{2}) tract located southeast of the intersection of Holmes Road and Swinnea Road. The purpose of the survey was to identify any archaeological sites or historic properties that are listed on, eligible for, or potentially eligible for the NRHP present within the APE, and to provide appropriate management recommendations for any such resources identified.

The study tract is a rectangular wooded parcel located 1.6 km south of Runway 36 R at the Memphis International Airport. It is bounded by Holmes Road on the north, Swinnea Road on the west, the Tennessee-Mississippi state line on the south, and a half section line within Section 17 of T1S R7W of the Chickasaw Meridian on the east (see Figure 1-01). Except for three energy transmission corridors, the property is wooded, and the terrain is hilly and dissected with elevations ranging from 390 ft. to <350 ft. (Figure 1-02).

Review of TDOA records revealed that there are no previously archaeological sites within the tract, but there are 11 within a 2-km radius (see Table 4-01). Examination of THC records revels that there are two ca. 1935-1940 one-story plain traditional residences on Swinnea Road within the tract: SY-31708A and SY-31607A (see Figure 4-02). Importantly, there is no NRHP listed property within the MSCAA Holmes Road tract, and the nearest NRHP listed property is Graceland, the home of the "King of Rock and Roll" Elvis Presley (1935-1977), which is 7 km to the northwest.

A number of archival maps were retrieved and assisted in developing a land-use pattern for the tract (see Figure 4-03—4-12); also see "Discussion" in Chapter V. These sources suggested five twentieth century domestic sites could be expected within the tract, and they should be distributed along and near Holmes Road and Swinnea Road. More generally, the environmental setting (uplands) and eroded loess soils across the majority of the tract led us to conclude that, overall, the tract has a moderate to low probability of containing archaeological resources (see "Survey Expectations" in Chapter IV).

A four-person crew conducted the fieldwork from April 7 to 21, 2020 (see "Acknowledgements" for personnel). Shovel testing at 30 m intervals was the primary site detection method. During the course of the survey 937 shovel test locations were documented within the tract, including two that were positive for artifacts, 768 that were negative for artifacts, and 167 "no-test" locations were planned tests were not excavated due to principally due to slope, water and past disturbances (see Figure 5-01). Appendix A provides the individual shovel tests data.

The survey resulted in the identification of five twentieth-century Historic loci; four former house or farmstead sites and a breached earthen dam. Site forms were completed for these and submitted to the TDOA; however they declined to assign them site numbers (i.e., trinomials). Only the farmstead (Locus 4) produced subsurface artifacts (N=15; see Table 5-01); this locus was where THC recorded two ca. 1935-1940 residences than no longer remain (SY-31708A and SY-31607A). No artifacts were collected from the other three house sites (Loci 1, 2 and 3) surfaces because the observed material all appeared modern.

RECOMMENDATIONS

All five identified Historic loci (Locus 1, Locus 2, Locus 3, Locus 4 and Locus 5) are recommended not eligible for nomination to the NRHP. They failed to produce unambiguous

artifactual evidence of pre-1933 occupation, and the TDOA declined to assign them trinomials. Beyond the component and locational data that are already in hand these loci are incapable of producing any significant archaeological data that is relevant to the twentieth-century occupation of southwest Tennessee. No further work is recommended.

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APPENDIX A: SHOVEL TEST DATA

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
1	1	17	❑	0-6 cmbs, 10YR 4/4 silty clay; 6-17 cmbs, 7.5YR 6/4 clay	
1	2	19	❑	0-11 cmbs, 10YR 4/4 silty clay loam; 11-19 cmbs, 10YR 5/6 silty clay; 19 cmbs, root impasse	
1	3	17	❑	0-6 cmbs, 10YR 4/4 silty clay; 6-17 cmbs, 10YR 5/6 clay	
1	4	27	❑	0-16 cmbs, 10YR 4/4 silty clay loam; 16-27 cmbs, 10YR 5/6 clay	
1	5	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 clay	
1	6	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/6 clay	
1	7	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 clay	
1	8	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/8 clay	
1	9	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/8 clay	
1	10	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 clay	
1	11	19	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-19 cmbs, 10YR 6/6 compact silty clay	
1	12	13	❑	0-13 cmbs, 10YR 5/3 + 5/8 mottled silty clay	
2	1	25	❑	0-12 cmbs, 10YR 4/6 silty clay loam; 12-25 cmbs, 10YR 5/8 silty clay	
2	2	22	❑	0-8 cmbs, 10YR 4/4 silty clay loam; 8-22 cmbs, 10YR 5/8 silty clay	
2	3	26	❑	0-2 cmbs, 10YR 3/6 silty clay loam; 2-26 cmbs, 10YR 5/8 silty clay	
2	4	28	❑	0-17 cmbs, 10YR 4/6 silty clay loam; 17-28 cmbs, 10YR 5/8 silty clay	
2	5	31	❑	0-12 cmbs, 10YR 4/6 silty clay loam; 12-31 cmbs, 10YR 5/8 silty clay	
2	6	22	❑	0-6 cmbs, 10YR 4/6 silty clay loam; 6-22 cmbs, 10YR 5/8 silty clay	
2	7	25	❑	0-7 cmbs, 10YR 4/6 silty clay loam; 7-25 cmbs, 10YR 5/8 silty clay	
2	8	21	❑	0-4 cmbs, 10YR 4/6 silty clay loam; 4-21 cmbs, 10YR 5/8 silty clay	
2	9	22	❑	0-4 cmbs, 10YR 4/6 silty clay loam; 4-22 cmbs, 10YR 5/8 silty clay	
2	10	28	❑	0-7 cmbs, 10YR 4/6 silty clay loam; 7-28 cmbs, 10YR 5/8 silty clay	
3	1	34	❑	0-34 cmbs, 10YR 6/6 silty clay loam; 34 cmbs, roots	
3	2	36	❑	0-8 cmbs, 10YR 4/6 silty clay loam; 8-36 cmbs, 10YR 6/6 silty clay loam	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
3	3	12	❑	0-12 cmbs, 10YR 6/4 silty clay; 12 cmbs, roots	large roots
3	4	30	❑	0-6 cmbs, 10YR 4/6 silty clay loam; 6-30 cmbs, 10YR 6/6 silty clay	
3	5	14	❑	0-14 cmbs, 10YR 6/6 silty clay; 14 cmbs, roots	large roots
3	6	38	❑	0-12 cmbs, 10YR 4/6 silty clay loam; 12-38 cmbs, 10YR 6/6 silty clay loam	
3	7	29	❑	0-16 cmbs, 10YR 4/6 silty clay loam; 16-29 cmbs, 10YR 6/6 silty clay loam	
3	8	0	Ø		slope
4	1	23	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-23 cmbs, 10YR 5/6 compact silty clay	
4	2	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 compact silty clay	
4	3	21	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/6 compact silty clay loam; 14 21 cmbs, 10YR 5/8 compact silty clay	
4	4	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/8 saturated silty clay	gravel
4	5	17	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-17 cmbs, 10YR 5/6 silty clay / clay	
4	6	17	❑	0-6 cmbs, 10YR 5/6 silty clay loam; 6-17 cmbs, 10YR 6/4 compact silty clay	
4	7	18	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-18 cmbs, 10YR 6/3 + 5/8 silty clay / clay	
4	8	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 clay	
4	9	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/6 compact silty clay	
4	10	21	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-21 cmbs, 10YR 5/6 compact silty clay	
5	1	13	❑	0-13 cmbs, 10YR 4/6 silty clay loam	
5	2	22	❑	0-8 cmbs, 10YR 3/4 silty clay loam; 8-22 cmbs, 10YR 5/8 silty clay	
5	3	21	❑	0-4 cmbs, 10YR 3/4 silty clay loam; 4-21 cmbs, 10YR 5/8 silty clay	
5	4	19	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-19 cmbs, 10YR 5/8 silty clay	
5	5	27	❑	0-13 cmbs, 10YR 4/4 silty clay loam; 13-27 cmbs, 10YR 5/8 silty clay	
5	6	23	❑	0-4 cmbs, 10YR 3/6 silty clay loam; 4-23 cmbs, 10YR 5/8 silty clay	
5	7	22	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-22 cmbs, 10YR 5/8 silty clay	
5	8	24	❑	0-11 cmbs, 10YR 3/4 silty clay loam; 11-24 cmbs, 10YR 5/8 silty clay	
5	9	27	❑	0-14 cmbs, 10YR 4/4 silty clay loam; 14-27 cmbs, 10YR 5/8 silty clay	
6	1	18	❑	0-18 cmbs, 10YR 5/8 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
6	2	20	❑	0-8 cmbs, 10YR 4/2 + 3/6 silty clay loam; 8-20 cmbs, 10YR 6/3 + 5/8 mottled silty clay	
6	3	17	❑	0-3 cmbs, 10YR 3/6 silty clay loam; 3-17 cmbs, 10YR 5/8 silty clay	
6	4	16	❑	0-4 cmbs, 10YR 3/6 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
6	5	21	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-21 cmbs, 10YR 5/8 silty clay	
6	6	26	❑	0-11 cmbs, 10YR 3/6 silty clay loam; 11-26 cmbs, 10YR 5/8 silty clay	
6	7	21	❑	0-8 cmbs, 10YR 3/4 silty clay loam; 8-21 cmbs, 10YR 5/8 silty clay	
6	8	28	❑	0-14 cmbs, 10YR 3/3 silty clay loam; 14-28 cmbs, 10YR 5/8 silty clay	
7	1	14	❑	0-14 cmbs, 10YR 5/6 + 6/4 compact silty clay mottled	
7	2	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 clay	
7	3	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/6 clay	
7	4	12	❑	0-12 cmbs, 10YR 5/2 + 5/8 saturated silty clay	
7	5	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/8 silty clay / clay	
7	6	15	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-15 cmbs, 10YR 5/6 compact silty clay	
7	7	14	❑	0-14 cmbs, 10YR 5/6 compact silty clay	
7	8	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 compact silty clay	
8	1	18	❑	0-6 cmbs, 10YR 3/6 silty clay loam; 6-18 cmbs, 10YR 5/8 silty clay	
8	2	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 6/4 + 5/8 mottled silty clay	saturated
8	3	29	❑	0-12 cmbs, 10YR 3/4 silty clay loam; 12-29 cmbs, 10YR 5/8 silty clay	saturated
8	4	21	❑	0-9 cmbs, 10YR 3/4 silty clay loam; 9-21 cmbs, 10YR 5/8 clay	
8	5	23	❑	0-7 cmbs, 10YR 3/4 silty clay loam; 7-23 cmbs, 10YR 5/8 silty clay	
8	6	24	❑	0-9 cmbs, 10YR 3/6 silty clay loam; 9-24 cmbs, 10YR 5/8 silty clay	
8	7	19	❑	0-4 cmbs, 10YR 5/4 silty clay loam; 4-19 cmbs, 10YR 5/8 silty clay	
8	8	16	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 mottled silty clay	
9	1	14	❑	0-4 cmbs, 10YR 4/4 silty clay; 4-14 cmbs, 10YR 5/6 clay	
9	2	0	Ø		drainage

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
9	3	12	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-12 cmbs, 10YR 6/3 + 5/6 compact clay	
9	4	12	❑	0-2 cmbs, 10YR 4/4 silty clay; 2-12 cmbs, 10YR 6/3 + 5/6 clay	
9	5	29	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-21 cmbs, 10YR 5/6 silty clay loam; 21-29 cmbs, 10YR 5/8 silty clay	
9	6	25	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 5/6 silty clay; 16-25 cmbs, 10YR 6/4 + 5/6 compact silty clay	
9	7	27	❑	0-17 cmbs, 10YR 5/6 silty clay loam; 17-27 cmbs, 10YR 5/8 clay	
10	1	16	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 5/8 silty clay + gravel	strat II - 90% gravel
10	2	15	❑	0-4 cmbs, 10YR 3/4 silty clay loam; 4-15 cmbs, 10YR 5/8 silty clay + gravel	strat II - 70% gravel
10	3	0	∅		inundated
10	4	28	❑	0-14 cmbs, 10YR 4/4 silty clay loam; 14-28 cmbs, 10YR 5/8 silty clay	
10	5	12	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-12 cmbs, 10YR 5/8 silty clay + gravel	strat II - 90% gravel
10	6	24	❑	0-16 cmbs, 10YR 3/6 silty clay loam; 16-24 cmbs, 10YR 5/8 silty clay	
11	1	19	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-19 cmbs, 10YR 5/6 compact silty clay	
11	2	6	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6 cmbs, gravel impasse	
11	3	18	❑	0-6 cmbs, 10YR 4/4 silty clay; 6-18 cmbs, 10YR 5/6 clay	
11	4	21	❑	0-11 cmbs, 10YR 4/4 silty clay loam; 11-21 cmbs, 10YR 5/8 compact silty clay	
11	5	21	❑	0-12 cmbs, 10YR 4/4 silty clay loam; 12-21 cmbs, 10YR 6/4 clay	few gravel
11	6	12	❑	0-12 cmbs, 10YR 5/6 clay	
11	7	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
12	1	13	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-13 cmbs, 10YR 5/6 + 6/4 compact silty clay	
12	2	21	❑	0-8 cmbs, 10YR 4/4 silty clay loam; 8-13 cmbs, 10YR 6/3 silty clay loam; 13-21 cmbs, 10YR 5/8 compact silty clay	
12	3	26	❑	0-11 cmbs, 10YR 4/4 silty clay loam; 11-26 cmbs, 10YR 5/8 compact silty clay loam	
12	4	19	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-19 cmbs, 10YR 5/8 clay	
12	5	19	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-19 cmbs, 10YR 5/8 compact silty clay	
12	6	17	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-17 cmbs, 10YR 5/8 compact silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
13	1	21	❑	0-8 cmbs, 10YR 5/6 silty clay; 8-21 cmbs, 10YR 5/8 compact silty clay	
13	2	22	❑	0-9 cmbs, 10YR 3/6 silty clay loam; 9-22 cmbs, 10YR 5/8 silty clay	
13	3	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-19 cmbs, 10YR 5/8 silty clay	
13	4	28	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-28 cmbs, 10YR 5/8 + 6/3 mottled silty clay	
13	5	32	❑	0-4 cmbs, 10YR 3/6 silty clay loam; 4-32 cmbs, 10YR 5/8 hydric clay	
13	6	20	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-20 cmbs, 10YR 5/8 silty clay	
14	1	17	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-17 cmbs, 10YR 5/6 silty clay loam; 17 cmbs, root impasse	
14	2	18	❑	0-8 cmbs, 10YR 4/4 silty clay loam; 8-18 cmbs, 10YR 5/6 silty clay	
14	3	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
14	4	16	❑	0-5 cmbs, 10YR 4/4 silty clay loam; 5-16 cmbs, 10YR 5/8 silty clay	
14	5	0	Ø		slope, near road
15	1	15	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-15 cmbs, 10YR 5/6 silty clay	
15	2	24	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 6/4 silty clay loam; 16-24 cmbs, 10YR 5/6 silty clay	
15	3	21	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-21 cmbs, 10YR 5/6 compact silty clay	
15	4	17	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-17 cmbs, 10YR 5/8 silty clay / clay	
16	1	26	❑	0-26 cmbs, 10YR 5/8 silty clay	
16	2	21	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 silty clay; 14-21 cmbs, 7.5YR 5/8 silty clay + gravel	gravel
16	3	19	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-19 cmbs, 10YR 5/8 silty clay	
16	4	14	❑	0-3 cmbs, 10YR 3/4 silty clay loam; 3-14 cmbs, 10YR 5/8 clay	
17	1	6	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6 cmbs, root impasse	
17	2	0	Ø		lake, standing water
17	3	32	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-22 cmbs, 10YR 5/8 silty clay loam; 22-32 cmbs, 7.5YR 5/8 compact silty clay	
18	1	9	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-9 cmbs, 10YR 5/8 compact silty clay + gravel	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
18	2	14	❑	0-4 cmbs, 10YR 3/4 silty clay loam; 4-14 cmbs, 10YR 5/8 compact silty clay + gravel	
18	3	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 6/3 + 5/8 mottled clay	
19	1	15	❑	0-12 cmbs, 10YR 4/6 silty clay loam; 12-15 cmbs, 10YR 5/8 compact silty clay + gravel	
19	2	18	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-18 cmbs, 10YR 5/8 silty clay	
20	1	0	Ø		slope to drainage / ditch
21	1	13	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-13 cmbs, 10YR 5/6 silty clay loam; 13 cmbs, root impasse	
21	2	32	❑	0-22 cmbs, 10YR 3/3 silty clay loam; 22-32 cmbs, 10YR 6/3 + 5/8 mottled silty clay	
21	3	22	❑	0-11 cmbs, 10YR 3/3 silty clay loam; 11-22 cmbs, 10YR 6/3 + 5/8 mottled clay	
21	4	14	❑	0-8 cmbs, 10YR 3/3 silty clay loam; 8-14 cmbs, 10YR 5/8 silty clay loam; 14 cmbs, root impasse	
21	5	7	❑	0-7 cmbs, 10YR 3/3 silty clay loam; 7 cmbs, gravel impasse	85% gravel
21	6	19	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-19 cmbs, 10YR 5/6 silty clay	few gravel
21	7	34	❑	0-11 cmbs, 10YR 4/4 silty clay loam; 11-34 cmbs, 10YR 5/6 compact silty clay loam	
21	8	19	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-19 cmbs, 10YR 5/6 silty clay / clay	
21	9	24	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-24 cmbs, 10YR 5/6 silty clay / clay	
21	10	24	❑	0-14 cmbs, 10YR 4/4 silty clay loam; 14-24 cmbs, 10YR 5/8 clay	
21	11	21	❑	0-11 cmbs, 10YR 4/4 silty clay loam; 11-21 cmbs, 10YR 5/8 compact silty clay	
21	12	25	❑	0-12 cmbs, 10YR 4/4 silty clay loam; 12-25 cmbs, 10YR 5/8 silty clay	
21	13	17	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-17 cmbs, 10YR 5/6 compact silty clay	
21	14	24	❑	0-12 cmbs, 10YR 4/4 silty clay loam; 12-24 cmbs, 10YR 5/8 silty clay loam	
21	15	0	Ø		slope
21	16	21	❑	0-8 cmbs, 10YR 3/4 silty clay loam; 8-21 cmbs, 10YR 5/8 silty clay	
21	17	19	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-19 cmbs, 10YR 5/8 compact silty clay loam	
21	18	21	❑	0-8 cmbs, 10YR 4/4 silty clay loam; 8-21 cmbs, 10YR 5/8 compact silty clay loam	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
21	19	0	∅		drainage
21	20	18	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-18 cmbs, 10YR 5/8 silty clay	
21	21	18	❑	0-8 cmbs, 10YR 4/4 silty clay loam; 8-18 cmbs, 10YR 6/3 + 5/8 compact silty clay loam	
22	1	31	❑	0-14 cmbs, 10YR 4/4 silty loam; 14-31 cmbs, 10YR 6/4 silty clay loam	
22	2	38	❑	0-18 cmbs, 10YR 4/4 silty loam; 18-38 cmbs, 10YR 6/6 silty clay loam	
22	3	21	❑	0-9 cmbs, 10YR 4/6 silty clay loam; 9-21 cmbs, 10YR 6/6 silty clay	
22	4	0	∅		tree fall
22	5	15	❑	0-15 cmbs, 10YR 6/6 silty clay	
22	6	20	❑	0-20 cmbs, 10YR 6/6 silty clay	
22	7	21	❑	0-6 cmbs, 10YR 4/6 silty clay loam; 6-21 cmbs, 10YR 6/6 silty clay	
22	8	24	❑	0-10 cmbs, 10YR 4/6 silty clay loam; 10-24 cmbs, 10YR 6/6 silty clay	
22	9	20	❑	0-4 cmbs, 10YR 4/6 silty clay loam; 4-20 cmbs, 10YR 6/6 silty clay	
22	10	16	❑	0-16 cmbs, 10YR 6/6 silty clay	
22	11	21	❑	0-6 cmbs, 10YR 4/6 silty clay loam; 6-21 cmbs, 10YR 6/6 silty clay	
22	12	0	∅		bare ground, good vis, washed out
22	13	30	❑	0-8 cmbs, 10YR 4/6 silty clay loam; 8-30 cmbs, 10YR 6/6 silty clay loam	
22	14	16	❑	0-4 cmbs, 10YR 4/6 silty loam; 4-16 cmbs, 10YR 6/6 silty clay loam; 16 cmbs root impasse	
22	15	0	∅		trail, good vis
22	16	26	❑	0-10 cmbs, 10YR 4/6 silty clay loam; 10-26 cmbs, 10YR 6/6 silty clay	
22	17	30	❑	0-20 cmbs, 10YR 4/4 silty clay loam; 20-30 cmbs, 10YR 6/6 silty clay	
22	18	22	❑	0-12 cmbs, 10YR 4/4 silty clay loam; 12-22 cmbs, 10YR 5/6 silty clay; 22 cmbs, root impasse	
22	19	26	❑	0-16 cmbs, 10YR 4/4 silty loam; 16-26 cmbs, 10YR 6/6 silty clay loam	
22	20	0	∅		large pile of concrete rubble
22	21	29	❑	0-14 cmbs, 10YR 4/4 silty clay loam; 14-29 cmbs, 10YR 6/4 silty clay	
23	1	18	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-18 cmbs, 10YR 5/8 silty clay	
23	2	26	❑	0-16 cmbs, 10YR 5/8 compact silty clay loam; 16-26 cmbs, 10YR 5/6 silty clay	
23	3	0	∅		slope

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
23	4	25	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/6 silty clay loam; 17-25 cmbs, 10YR 6/3 + 5/8 silty clay	
23	5	23	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-15 cmbs, 10YR 5/8 silty clay loam; 15-23 cmbs, 10YR 5/6 silty clay	
23	6	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/8 silty clay	
23	7	29	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-18 cmbs, 10YR 5/8 silty clay loam; 18-29 cmbs, 10YR 5/6 silty clay / clay	
23	8	17	❑	0-6 cmbs, 10YR 5/6 silty clay loam; 6-17 cmbs, 10YR 6/2 + 5/8 mottled silty clay	
23	9	18	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-18 cmbs, 10YR 6/3 + 5/8 compact silty clay loam	
23	10	23	❑	0-12 cmbs, 10YR 5/4 silty clay loam; 12-23 cmbs, 10YR 6/2 + 7.5YR 6/8 compact mottled silty clay loam	
23	11	17	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-17 cmbs, 10YR 5/6 compact silty clay	
23	12	22	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-22 cmbs, 10YR 6/3 + 7.5YR 5/6 mottled silty clay	
23	13	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 silty clay	
23	14	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 6/3 + 5/8 silty clay	
23	15	18	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-18 cmbs, 10YR 5/6 silty clay	
23	16	19	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-19 cmbs, 10YR 5/6 compact silty clay loam	
23	17	6	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6 cmbs, root impasse	
23	18	19	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-19 cmbs, 10YR 5/6 + 6/2 mottled compact silty clay loam	
23	19	18	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-18 cmbs, 10YR 5/6 + 6/3 mottled compact silty clay loam	
23	20	26	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-18 cmbs, 10YR 5/8 silty clay loam; 18-26 cmbs, 10YR 5/6 + 6/3 mottled silty clay	
23	21	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/6 + 6/3 mottled silty clay	
24	1	23	❑	0-11 cmbs, 10YR 5/4 sandy clay loam; 11-23 cmbs, 10YR 6/4 sandy clay	
24	2	16	❑	0-5 cmbs, 10YR 5/6 sandy clay loam; 5-16 cmbs, 10YR 6/6 sandy clay	
24	3	13	❑	0-13 cmbs, 10YR 5/6 + 6/1 mottled clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
24	4	14	❑	0-14 cmbs, 10YR 6/6 sandy clay	
24	5	17	❑	0-17 cmbs, 10YR 6/6 sandy clay	
24	6	20	❑	0-9 cmbs, 10YR 5/6 sandy clay loam; 9-20 cmbs, 10YR 6/6 sandy clay	
24	7	26	❑	0-26 cmbs, 10YR 6/6 sandy clay	
24	8	0	Ø		creek, stream
24	9	19	❑	0-8 cmbs, 10YR 5/6 sandy clay loam; 8-19 cmbs, 10YR 6/6 sandy clay	
24	10	15	❑	0-4 cmbs, 10YR 5/6 sandy clay loam; 4-15 cmbs, 10YR 6/6 sandy clay	
24	11	14	❑	0-14 cmbs, 10YR 5/6 + 6/1 mottled clay	
24	12	0	Ø		pond
24	13	0	Ø		pond
24	14	13	❑	0-13 cmbs, 10YR 5/6 + 6/1 mottled clay	
24	15	16	❑	0-16 cmbs, 10YR 5/6 + 6/1 mottled clay	
24	16	17	❑	0-5 cmbs, 10YR 5/6 sandy clay loam; 5-17 cmbs, 10YR 6/6 sandy clay	
24	17	15	❑	0-3 cmbs, 10YR 5/6 sandy clay loam; 3-15 cmbs, 10YR 6/6 sandy clay	
24	18	16	❑	0-16 cmbs, 10YR 6/6 sandy clay	
24	19	15	❑	0-15 cmbs, 10YR 6/6 sandy clay	
24	20	23	❑	0-12 cmbs, 10YR 5/4 sandy clay loam; 12-23 cmbs, 10YR 5/6 sandy clay	
24	21	14	❑	0-14 cmbs, 10YR 3/1 sandy loam; 14 cmbs, gravel impasse	
24	22	13	❑	0-13 cmbs, 10YR 6/6 clay	
24	23	11	❑	0-11 cmbs, 10YR 5/6 sandy clay	
24	24	13	❑	0-13 cmbs, 10YR 6/6 clay	
25	1	18	❑	0-4 cmbs, 10YR 4/4 silty loam; 4-18 cmbs, 10YR 6/6 silty clay loam	
25	2	14	❑	0-14 cmbs, 10YR 6/6 silty clay	
25	3	20	❑	0-8 cmbs, 10YR 4/4 silty clay loam; 8-20 cmbs, 10YR 6/6 silty clay	
25	4	0	Ø		large pile of concrete rubble
25	5	20	❑	0-20 cmbs, 10YR 5/3 + 5/6 silty clay	
25	6	14	❑	0-14 cmbs, 10YR 6/6 silty clay	
25	7	24	❑	0-8 cmbs, 10YR 4/4 silty clay loam; 8-24 cmbs, 10YR 6/4 silty clay	
25	8	24	❑	0-6 cmbs, 10YR 4/6 silty clay loam; 6-24 cmbs, 10YR 6/4 silty clay	
25	9	21	❑	0-21 cmbs, 10YR 6/8 silty clay	
25	10	28	❑	0-5 cmbs, 10YR 4/4 silty loam; 5-28 cmbs, 10YR 6/6 silty clay loam	
25	11	18	❑	0-18 cmbs, 10YR 6/4 + 5/8 silty clay	next to pond
25	12	16	❑	0-16 cmbs, 10YR 6/6 + 6/2 clay	
25	13	0	Ø		pond berm
25	14	26	❑	0-4 cmbs, 10YR 4/4 silty loam; 4-26 cmbs, 10YR 6/8 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
25	15	28	❑	0-10 cmbs, 10YR 4/4 silty clay loam; 10-28 cmbs, 10YR 6/4 silty clay	creek bank
25	16	0	Ø		creek
25	17	0	Ø		creek
25	18	30	❑	0-30 cmbs, 10YR 6/6 silty clay	
25	19	27	❑	0-27 cmbs, 10YR 6/6 silty clay	
25	20	24	❑	0-24 cmbs, 10YR 6/6 silty clay	
25	21	18	❑	0-18 cmbs, 10YR 6/8 silty clay	
25	22	21	❑	0-21 cmbs, 10YR 6/8 silty clay	
25	23	24	❑	0-24 cmbs, 10YR 6/6 silty clay	
26	1	20	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-20 cmbs, 10YR 6/4 silty clay	
26	2	24	❑	0-5 cmbs, 10YR 4/4 silty clay loam; 5-24 cmbs, 10YR 6/4 silty clay	
26	3	21	❑	0-21 cmbs, 10YR 6/4 silty clay	concrete pile to west
26	4	0	Ø		standing water
26	5	28	❑	0-4 cmbs, 10YR 4/6 silty clay loam; 4-28 cmbs, 10YR 6/4 silty clay	
26	6	10	❑	0-10 cmbs, 10YR 6/4 silty clay loam; 10 cmbs, water	
26	7	16	❑	0-16 cmbs, 10YR 6/4 silty clay; 16 cmbs, water	
26	8	26	❑	0-26 cmbs, 10YR 6/6 silty clay	
26	9	27	❑	0-8 cmbs, 10YR 6/4 silty clay; 8-27 cmbs, 10YR 6/6 silty clay	
26	10	18	❑	0-18 cmbs, 10YR 6/6 silty clay	
26	11	0	Ø		slope
26	12	0	Ø		creek bank
26	13	0	Ø		creek
26	14	20	❑	0-20 cmbs, 10YR 6/6 silty clay	saturated
26	15	0	Ø		slope, eroded gulley
26	16	24	❑	0-24 cmbs, 10YR 6/6 silty clay	saturated
26	17	16	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-16 cmbs, 10YR 6/6 silty clay; 16 cmbs, water	
26	18	20	❑	0-20 cmbs, 10YR 6/6 silty clay loam	saturated
26	19	0	Ø		standing water
26	20	0	Ø		slope
26	21	12	❑	0-12 cmbs, 10YR 6/6 silty clay; 12 cmbs, water	
27	1	18	❑	0-18 cmbs, 10YR 5/8 silty clay	
27	2	11	❑	0-11 cmbs, 10YR 5/8 silty clay loam; 11 cmbs, water	
27	3	12	❑	0-12 cmbs, 10YR 5/8 silty clay	
27	4	13	❑	0-13 cmbs, 10YR 5/8 silty clay	
27	5	0	Ø		large pile of concrete rubble
27	6	0	Ø		slope to asphalt pile
27	7	14	❑	0-14 cmbs, 10YR 5/8 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
27	8	15	❑	0-3 cmbs, 10YR 3/2 silty loam; 3-15 cmbs, 10YR 5/8 silty clay	
27	9	16	❑	0-16 cmbs, 10YR 5/8 silty clay	
27	10	14	❑	0-14 cmbs, 10YR 5/8 silty clay	
27	11	0	Ø		slope
27	12	15	❑	0-15 cmbs, 10YR 5/8 silty clay	
27	13	0	Ø		creek
27	14	13	❑	0-4 cmbs, 10YR 4/4 silty loam; 4-13 cmbs, 10YR 5/8 silty clay	
27	15	19	❑	0-19 cmbs, 10YR 5/8 silty clay	
27	16	17	❑	0-5 cmbs, 10YR 5/2 silty loam; 5-17 cmbs, 10YR 5/8 silty clay	
27	17	17	❑	0-17 cmbs, 10YR 5/8 silty clay	
27	18	15	❑	0-15 cmbs, 10YR 5/8 silty clay	
27	19	0	Ø		road
27	20	14	❑	0-14 cmbs, 10YR 5/8 silty clay	
27	21	12	❑	0-3 cmbs, 10YR 6/1 silty clay loam; 3-12 cmbs, 10YR 5/8 silty clay	
27	22	0	Ø		pond
27	23	0	Ø		pond
27	24	17	❑	0-6 cmbs, 10YR 5/2 silty clay loam; 6-17 cmbs, 10YR 5/8 silty clay	
27	25	18	❑	0-18 cmbs, 10YR 5/8 silty clay	
28	1	18	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-18 cmbs, 10YR 5/6 hydric silty clay	
28	2	16	❑	0-4 cmbs, 10YR 4/4 hydric silty clay loam; 4-16 cmbs, 10YR 5/8 hydric clay	
28	3	24	❑	0-7 cmbs, 10YR 4/4 hydric silty clay; 7-24 cmbs, 10YR 5/8 compact clay	
28	4	25	❑	0-8 cmbs, 10YR 4/3 silty clay; 8-25 cmbs, 10YR 5/8 compact silty clay	
28	5	0	Ø		drainage, pond
28	6	0	Ø		pond
28	7	0	Ø		drainage
28	8	23	❑	0-8 cmbs, 10YR 3/4 silty clay; 8-23 cmbs, 10YR 5/8 clay	
28	9	29	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-29 cmbs, 10YR 5/6 silty clay	
28	10	34	❑	0-18 cmbs, 10YR 4/4 silty clay loam; 18-34 cmbs, 10YR 5/6 silty clay	near drainage
28	11	19	❑	0-8 cmbs, 10YR 4/4 silty clay loam; 8-19 cmbs, 10YR 5/8 silty clay	saturated
28	12	22	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-22 cmbs, 10YR 5/6 clay	saturated
28	13	24	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-24 cmbs, 10YR 5/6 silty clay	hydric
28	14	17	❑	0-3 cmbs, 10YR 3/4 silty clay loam; 3-17 cmbs, 10YR 5/8 + 6/3 mottled silty clay	saturated

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
28	15	24	❑	0-2 cmbs, 10YR 3/4 silty clay loam; 2-12 cmbs, 10YR 5/6 silty clay; 12-24 cmbs, 10YR 5/8 silty clay	saturated, water @ 20 cmbs
28	16	27	❑	0-6 cmbs, 10YR 3/4 silty clay loam; 6-27 cmbs, 10YR 5/8 silty clay	
28	17	0	Ø		drainage
28	18	17	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-17 cmbs, 10YR 5/8 silty clay	
28	19	16	❑	0-2 cmbs, 10YR 5/4 silty clay loam; 2-16 cmbs, 10YR 5/8 silty clay	
28	20	15	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-15 cmbs, 10YR 5/8 silty clay	saturated, water @ 15 cmbs
28	21	17	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-17 cmbs, 10YR 5/8 silty clay	saturated
28	22	16	❑	0-5 cmbs, 10YR 4/4 silty clay loam; 5-16 cmbs, 10YR 5/8 silty clay	saturated
28	23	14	❑	0-2 cmbs, 10YR 4/4 silty clay; 2-14 cmbs, 10YR 5/8 silty clay	
29	1	18	❑	0-18 cmbs, 10YR 5/6 saturated silty clay	
29	2	27	❑	0-17 cmbs, 10YR 5/8 silty clay loam; 17-27 cmbs, 10YR 5/6 silty clay	
29	3	19	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-19 cmbs, 10YR 5/8 compact silty clay loam	
29	4	18	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-18 cmbs, 10YR 5/6 compact silty clay loam + gravel	
29	5	4	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4 cmbs, rock / gravel impasse	
29	6	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 silty clay	
29	7	21	❑	0-11 cmbs, 10YR 4/4 silty clay loam; 11-21 cmbs, 10YR 6/6 silty clay	
29	8	0	Ø		creek
29	9	21	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-21 cmbs, 10YR 5/6 silty clay	
29	10	18	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-18 cmbs, 10YR 6/4 hydric clay	
29	11	14	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-14 cmbs, 10YR 5/6 hydric clay	
29	12	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 hydric clay	
29	13	21	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-12 cmbs, 10YR 5/6 hydric silty clay; 12-21 cmbs, 10YR 6/6 hydric clay	
29	14	14	❑	0-14 cmbs, 10YR 5/6 hydric silty clay	
29	15	18	❑	0-8 cmbs, 10YR 5/6 compact silty clay; 8-18 cmbs, 10YR 6/6 clay	
29	16	15	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-15 cmbs, 10YR 5/6 saturated silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
29	17	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 6/4 hydric silty clay	
29	18	15	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-15 cmbs, 10YR 5/6 saturated silty clay	
29	19	18	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-18 cmbs, 10YR 6/4 saturated silty clay	
29	20	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 6/2 + 6/8 mottled silty clay	
29	21	23	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-14	
29	22	24	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/6 silty clay; 14-24 cmbs, 10YR 6/6 clay	
29	23	22	❑	0-11 cmbs, 10YR 4/4 silty clay loam; 11-22 cmbs, 10YR 5/8 silty clay / clay	
29	24	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 compact silty clay	
30	1	21	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-21 cmbs, 10YR 6/4 silty clay	
30	2	31	❑	0-12 cmbs, 10YR 4/4 silty clay loam; 12-31 cmbs, 10YR 6/4 silty clay	
30	3	30	❑	0-14 cmbs, 10YR 4/4 silty clay loam; 14-30 cmbs, 10YR 6/4 silty clay	
30	4	40	❑	0-40 cmbs, 10YR 4/4 silty clay loam	
30	5	20	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-20 cmbs, 10YR 6/6 silty clay	water @ 20 cmbs
30	6	26	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-26 cmbs, 10YR 6/6 silty clay	
30	7	30	❑	0-10 cmbs, 10YR 6/4 silty clay loam; 10-30 cmbs, 10YR 6/6 silty clay	
30	8	30	❑	0-30 cmbs, 10YR 6/6 silty clay	
30	9	18	❑	0-18 cmbs, 10YR 6/6 silty clay; 18 cmbs, water	water @ 18 cmbs
30	10	19	❑	0-4 cmbs, 10YR 4/6 silty clay loam; 4-19 cmbs, 10YR 6/6 silty clay	
30	11	20	❑	0-4 cmbs, 10YR 4/6 silty clay loam; 4-20 cmbs, 10YR 6/4 clay	
30	12	21	❑	0-21 cmbs, 10YR 6/6 silty clay	
30	13	0	Ø		standing water
30	14	29	❑	0-4 cmbs, 10YR 4/6 silty clay loam; 4-29 cmbs, 10YR 6/6 silty clay	water @ 26 cmbs
30	15	24	❑	0-8 cmbs, 10YR 4/6 silty clay loam; 8-24 cmbs, 10YR 6/6 silty clay	water @ 24 cmbs
30	16	0	Ø		creek
30	17	31	❑	0-12 cmbs, 10YR 4/6 silty clay loam; 12-31 cmbs, 10YR 6/6 silty clay	
30	18	0	Ø		eroded gulley
30	19	30	❑	0-30 cmbs, 10YR 6/8 silty clay	large pile of concrete rubble, modern debris
30	20	8	❑	0-8 cmbs, 10YR 4/4 silty clay loam	hit concrete debris

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
30	21	12	❑	0-12 cmbs, 10YR 4/6 + 6/4 silty clay loam	gravel
30	22	16	❑	0-16 cmbs, 10YR 4/4 silty clay loam; 16 cmbs, water	water @ 16 cmbs
30	23	14	❑	0-14 cmbs, 10YR 4/4 silty clay loam; 14 cmbs, water	water @ 14 cmbs
30	24	18	❑	0-18 cmbs, 10YR 6/8 silty clay	
31	1	18	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-18 cmbs, 10YR 5/8 silty clay	
31	2	20	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-20 cmbs, 10YR 5/8 silty clay	
31	3	21	❑	0-8 cmbs, 10YR 3/4 silty clay loam; 8-21 cmbs, 10YR 5/8 silty clay	
31	4	18	❑	0-7 cmbs, 10YR 3/4 silty clay loam; 7-18 cmbs, 10YR 5/8 silty clay	
31	5	24	❑	0-11 cmbs, 10YR 3/4 silty clay loam; 11-24 cmbs, 10YR 5/8 silty clay	
31	6	0	Ø		drainage
31	7	19	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-19 cmbs, 10YR 5/8 silty clay	
31	8	18	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-18 cmbs, 10YR 5/8 silty clay	
31	9	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/8 silty clay	
31	10	22	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-22 cmbs, 10YR 5/8 silty clay	
31	11	18	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-18 cmbs, 10YR 5/8 silty clay	
31	12	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/8 silty clay	
31	13	23	❑	0-2 cmbs, 10YR 3/4 silty clay loam; 2-23 cmbs, 10YR 5/8 silty clay	
31	14	18	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-18 cmbs, 10YR 5/8 silty clay	
31	15	19	❑	0-3 cmbs, 10YR 3/4 silty clay loam; 3-19 cmbs, 10YR 5/8 silty clay	
31	16	23	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-23 cmbs, 10YR 5/8 silty clay	
31	17	15	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-15 cmbs, 10YR 5/8 clay	
31	18	18	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-18 cmbs, 10YR 5/8 clay	
31	19	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 clay	
31	20	21	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-20 cmbs, 10YR 5/8 silty clay	
31	21	21	❑	0-5 cmbs, 10YR 4/4 silty clay loam; 5-21 cmbs, 10YR 5/8 silty clay	
31	22	0	Ø		drainage
31	23	18	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-18 cmbs, 10YR 5/6 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
32	1	17	❑	0-6 cmbs, 10YR 5/4 silty clay loam; 6-17 cmbs, 10YR 5/8 silty clay	
32	2	16	❑	0-5 cmbs, 10YR 5/4 silty clay loam; 5-16 cmbs, 10YR 5/8 silty clay	
32	3	15	❑	0-4 cmbs, 10YR 5/4 silty clay loam; 4-15 cmbs, 10YR 5/8 silty clay	
32	4	0	∅		trash pile, cement slabs
32	5	0	∅		trash pile, cement slabs
32	6	0	∅		cement slabs, giant pile
32	7	18	❑	0-6 cmbs, 10YR 5/4 silty clay loam; 6-18 cmbs, 10YR 5/8 silty clay	
32	8	17	❑	0-6 cmbs, 10YR 5/4 silty clay loam; 6-17 cmbs, 10YR 5/8 silty clay	
32	9	18	❑	0-7 cmbs, 10YR 5/4 silty clay loam; 7-18 cmbs, 10YR 5/8 silty clay	
32	10	13	❑	0-13 cmbs, 10YR 5/8 silty clay	
32	11	16	❑	0-4 cmbs, 10YR 5/1 silty clay loam; 4-16 cmbs, 10YR 5/8 silty clay	
32	12	16	❑	0-3 cmbs, 10YR 5/4 silty clay loam; 3-16 cmbs, 10YR 5/8 silty clay	
32	13	18	❑	0-6 cmbs, 10YR 5/4 silty clay loam; 6-18 cmbs, 10YR 5/8 silty clay	
32	14	22	❑	0-3 cmbs, 10YR 5/1 silty loam; 3-12 cmbs, 10YR 5/3 silty clay loam; 12-22 cmbs, 10YR 5/8 silty clay	
32	15	12	❑	0-12 cmbs, 10YR 5/8 silty clay	
32	16	14	❑	0-3 cmbs, 10YR 5/3 silty clay loam; 3-14 cmbs, 10YR 5/8 silty clay	
32	17	19	❑	0-4 cmbs, 10YR 5/1 silty loam; 4-8 cmbs, 10YR 5/4 silty clay loam; 8-19 cmbs, 10YR 5/8 silty clay	
32	18	17	❑	0-6 cmbs, 10YR 5/1 silty loam; 6-17 cmbs, 10YR 5/8 silty clay	
32	19	14	❑	0-3 cmbs, 10YR 5/1 silty loam; 3-14 cmbs, 10YR 5/8 silty clay	
32	20	13	❑	0-2 cmbs, 10YR 5/1 silty loam; 2-13 cmbs, 10YR 5/8 silty clay	
32	21	14	❑	0-3 cmbs, 10YR 5/1 silty loam; 3-14 cmbs, 10YR 5/8 silty clay	
32	22	16	❑	0-4 cmbs, 10YR 5/1 silty loam; 4-16 cmbs, 10YR 5/8 silty clay	
32	23	14	❑	0-3 cmbs, 10YR 5/1 silty loam; 3-14 cmbs, 10YR 5/8 clay	
32	24	12	❑	0-12 cmbs, 10YR 6/2 clay	saturated
32	25	16	❑	0-16 cmbs, 10YR 5/8 silty clay	
33	1	20	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-20 cmbs, 10YR 5/6 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
33	2	24	❑	0-11 cmbs, 10YR 4/4 silty clay loam; 11-24 cmbs, 10YR 6/2 + 5/6 mottled silty clay loam	
33	3	18	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-18 cmbs, 10YR 5/6 silty clay	saturated
33	4	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 6/4 + 5/6 silty clay	
33	5	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/6 + 6/4 silty clay	
33	6	0	Ø		creek
33	7	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 silty clay / clay	
33	8	17	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-17 cmbs, 10YR 5/8 compact silty clay	
33	9	16	❑	0-16 cmbs, 10YR 5/6 + 6/4 silty clay	
33	10	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 hydric silty clay	
33	11	18	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-18 cmbs, 10YR 5/8 silty clay	
33	12	14	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-14 cmbs, 10YR 5/6 compact silty clay	
33	13	13	❑	0-13 cmbs, 10YR 5/6 + 6/2 mottled silty clay	saturated
33	14	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
33	15	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/6 hydric silty clay	
33	16	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 hydric silty clay	
33	17	19	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-19 cmbs, 10YR 5/6 hydric silty clay	
33	18	18	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-18 cmbs, 10YR 5/8 saturated silty clay	
33	19	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 compact silty clay	
33	20	18	❑	0-5 cmbs, 10YR 4/4 silty clay loam; 5-18 cmbs, 10YR 5/8 silty clay	
33	21	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/8 silty clay	
33	22	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 clay	
33	23	21	❑	0-9 cmbs, 10YR 5/6 silty clay loam; 9-21 cmbs, 10YR 5/8 + 6/2 mottled compact silty clay loam	
33	24	0	Ø		slope
33	25	0	Ø		slope, forest trail
33	26	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 compact silty clay	
34	1	16	❑	0-16 cmbs, 10YR 6/4 silty clay	possible old track
34	2	0	Ø		standing water

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
34	3	20	❑	0-20 cmbs, 10YR 6/4 + 8/3 silty clay	
34	4	0	Ø		creek
34	5	12	❑	0-12 cmbs, 10YR 6/6 silty clay; 12 cmbs, roots	
34	6	20	❑	0-20 cmbs, 10YR 6/6 silty clay	
34	7	18	❑	0-10 cmbs, 10YR 6/6 silty clay	
34	8	0	Ø		small eroded drainage
34	9	16	❑	0-16 cmbs, 10YR 6/6 silty clay	
34	10	20	❑	0-4 cmbs, 10YR 4/6 silty clay loam; 4-20 cmbs, 10YR 6/6 silty clay	
34	11	21	❑	0-21 cmbs, 10YR 6/6 silty clay	
34	12	0	Ø		eroded wash
34	13	21	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-21 cmbs, 10YR 5/6 silty clay	
34	14	15	❑	0-15 cmbs, 10YR 6/4 silty clay	
34	15	20	❑	0-20 cmbs, 10YR 6/4 silty clay	
34	16	0	Ø		slope
34	17	0	Ø		slope
34	18	0	Ø		slope
34	19	16	❑	0-16 cmbs, 10YR 6/4 silty clay	
34	20	0	Ø		slope
34	21	20	❑	0-20 cmbs, 10YR 6/4 silty clay	
34	22	10	❑	0-10 cmbs, 10YR 5/4 silty clay	
34	23	0	Ø		eroded wash
34	24	0	Ø		slope
35	1	0	Ø		frequently flooded
35	2	0	Ø		standing water
35	3	0	Ø		frequently flooded
35	4	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 6/4 silty clay	
35	5	31	❑	0-31 cmbs, 10YR 6/8 silty clay	
35	6	12	❑	0-5 cmbs, 10YR 4/4 silty clay loam; 5-12 cmbs, 10YR 6/6 silty clay; 12 cmbs, water	
35	7	0	Ø		frequently flooded
35	8	21	❑	0-8 cmbs, 10YR 4/4 silty clay loam; 8-21 cmbs, 10YR 5/6 silty clay	
35	9	18	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-18 cmbs, 10YR 6/4 silty clay	
35	10	18	❑	0-18 cmbs, 10YR 6/8 silty clay	
35	11	0	Ø		slope
35	12	0	Ø		slope
35	13	21	❑	0-2 cmbs, 10YR 4/6 silty clay loam; 2-21 cmbs, 10YR 6/6 silty clay	
35	14	18	❑	0-18 cmbs, 10YR 6/6 silty clay	
35	15	21	❑	0-21 cmbs, 10YR 6/6 silty clay	
35	16	14	❑	0-14 cmbs, 10YR 6/6 silty clay	
35	17	26	❑	0-26 cmbs, 10YR 6/6 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
35	18	24	❑	0-24 cmbs, 10YR 6/6 silty clay	
35	19	19	❑	0-19 cmbs, 10YR 6/6 silty clay	
35	20	21	❑	0-2 cmbs, 10YR 4/6 silty clay loam; 2-21 cmbs, 10YR 6/4 silty clay	
35	21	20	❑	0-20 cmbs, 10YR 6/4 silty clay; 20 cmbs, roots	
35	22	0	Ø		berm
35	23	0	Ø		frequently flooded
35	24	0	Ø		frequently flooded
35	25	26	❑	0-26 cmbs, 10YR 6/6 + 8/2 clay	
36	1	0	Ø		creek
36	2	0	Ø		frequently flooded, old quarry
36	3	0	Ø		slope, edge of quarry
36	4	26	❑	0-18 cmbs, 10YR 6/6 silty clay	
36	5	0	Ø		drainage
36	6	21	❑	0-21 cmbs, 10YR 6/6 silty clay	
36	7	26	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-26 cmbs, 10YR 6/6 + 8/2 silty clay	
36	8	0	Ø		washed out, good vis
36	9	20	❑	0-20 cmbs, 10YR 6/6 silty clay	
36	10	16	❑	0-16 cmbs, 10YR 6/6 silty clay	
36	11	21	❑	0-21 cmbs, 10YR 6/6 silty clay	
36	12	24	❑	0-24 cmbs, 10YR 6/6 silty clay	
36	13	21	❑	0-21 cmbs, 10YR 6/6 silty clay	
36	14	0	Ø		slope
36	15	12	❑	0-12 cmbs, 10YR 6/4 silty clay	wet
36	16	20	❑	0-20 cmbs, 10YR 6/6 silty clay	wet
36	17	15	❑	0-15 cmbs, 10YR 6/4 silty clay	wet
36	18	0	Ø		
36	19	16	❑	0-4 cmbs, 7.5YR 4/4 sandy clay loam; 4-16 cmbs, 5YR 5/8 sandy clay	gravel throughout
37	1	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/3 hydric silty clay	
37	2	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 hydric silty clay / clay	
37	3	18	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-18 cmbs, 10YR 5/6 hydric clay	
37	4	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/8 + 6/3 saturated silty clay	
37	5	17	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-17 cmbs, 10YR 5/8 hydric silty clay	
37	6	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 hydric silty clay	
37	7	18	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-18 cmbs, 10YR 5/6 compact silty clay loam	
37	8	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 + 6/2 mottled silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
37	9	16	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 5/6 clay	
37	10	18	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-18 cmbs, 10YR 5/6 + 6/2 silty clay	
37	11	19	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-19 cmbs, 10YR 5/6 silty clay	
37	12	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 compact silty clay	
37	13	0	Ø		disturbed ATV trail
37	14	0	Ø		slope
37	15	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/6 + 6/2 silty clay	saturated
37	16	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 + 6/3 silty clay	
37	17	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/6 + 6/6 silty clay	
37	18	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 + 6/2 mottled silty clay	
37	19	15	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-15 cmbs, 10YR 5/6 + 6/2 + 6/6 mottled compact silty clay loam	
37	20	15	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-15 cmbs, 10YR 5/8 + 6/1 + 6/6 mottled saturated silty clay	
37	21	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/8 + 6/1 + 6/6 mottled saturated silty clay	
37	22	18	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-18 cmbs, 10YR 5/6 + 6/2 mottled hydric silty clay	
37	23	0	Ø		standing water
37	24	0	Ø		drainage
37	25	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/6 + 6/3 mottled compact silty clay	
37	26	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/6 + 6/2 mottled silty clay	
37	27	0	Ø		slope
38	1	13	❑	0-13 cmbs, 10YR 5/6 silty clay	
38	2	15	❑	0-4 cmbs, 10YR 4/3 silty clay loam; 4-15 cmbs, 10YR 5/6 silty clay	
38	3	17	❑	0-5 cmbs, 10YR 4/3 silty clay loam; 5-17 cmbs, 10YR 5/6 silty clay	
38	4	16	❑	0-16 cmbs, 10YR 5/6 silty clay	
38	5	15	❑	0-15 cmbs, 10YR 5/6 silty clay	
38	6	18	❑	0-6 cmbs, 10YR 5/2 silty clay loam; 6-18 cmbs, 10YR 5/6 silty clay	
38	7	16	❑	0-4 cmbs, 10YR 5/2 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
38	8	17	❑	0-6 cmbs, 10YR 5/2 silty clay loam; 6-17 cmbs, 10YR 5/6 silty clay	
38	9	16	❑	0-4 cmbs, 10YR 5/2 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
38	10	14	❑	0-2 cmbs, 10YR 5/2 silty clay loam; 2-14 cmbs, 10YR 5/6 silty clay	
38	11	17	❑	0-5 cmbs, 10YR 5/2 silty clay loam; 5-17 cmbs, 10YR 5/6 silty clay	
38	12	14	❑	0-3 cmbs, 10YR 5/2 silty clay loam; 3-14 cmbs, 10YR 5/6 silty clay	
38	13	15	❑	0-4 cmbs, 10YR 5/2 silty clay loam; 4-15 cmbs, 10YR 5/6 silty clay	
38	14	0	Ø		slope
38	15	0	Ø		slope
38	16	18	❑	0-18 cmbs, 10YR 5/6 clay	saturated
38	17	16	❑	0-16 cmbs, 10YR 5/6 silty clay	
38	18	15	❑	0-3 cmbs, 10YR 5/2 silty clay loam; 3-15 cmbs, 10YR 5/6 silty clay	
38	19	14	❑	0-14 cmbs, 10YR 5/6 silty clay	
38	20	15	❑	0-3 cmbs, 10YR 5/2 silty clay loam; 3-15 cmbs, 10YR 5/6 silty clay	
38	21	16	❑	0-4 cmbs, 10YR 5/2 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
38	22	18	❑	0-6 cmbs, 10YR 5/4 silty clay loam; 6-18 cmbs, 10YR 5/6 silty clay	
38	23	20	❑	0-9 cmbs, 10YR 5/4 silty clay loam; 9-20 cmbs, 10YR 5/6 silty clay	
38	24	20	❑	0-7 cmbs, 10YR 5/4 silty clay loam; 7-20 cmbs, 10YR 5/8 silty clay	
38	25	18	❑	0-6 cmbs, 10YR 5/4 silty clay loam; 6-18 cmbs, 10YR 5/6 silty clay	
38	26	17	❑	0-5 cmbs, 10YR 5/4 silty clay loam; 5-17 cmbs, 10YR 5/6 silty clay	
38	27	25	❑	0-13 cmbs, 10YR 5/3 silty clay loam; 13-25 cmbs, 10YR 5/6 silty clay	
38	28	17	❑	0-6 cmbs, 10YR 5/4 silty clay loam; 6-17 cmbs, 10YR 5/8 clay	
38	29	0	Ø		slope
39	1	16	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-16 cmbs, 10YR 5/6 silty clay	
39	2	21	❑	0-21 cmbs, 10YR 5/6 silty clay	
39	3	17	❑	0-2 cmbs, 10YR 3/4 silty clay loam; 2-17 cmbs, 10YR 5/6 silty clay	
39	4	18	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-18 cmbs, 10YR 5/6 silty clay	
39	5	19	❑	0-5 cmbs, 10YR 3/4 silty clay loam; 5-19 cmbs, 10YR 5/8 silty clay	
39	6	21	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-21 cmbs, 10YR 5/8 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
39	7	19	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-19 cmbs, 10YR 5/8 silty clay	
39	8	16	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-16 cmbs, 10YR 5/6 silty clay	
39	9	19	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-19 cmbs, 10YR 5/6 silty clay	
39	10	17	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-17 cmbs, 10YR 5/8 silty clay	
39	11	0	Ø		slope
39	12	0	Ø		slope
39	13	18	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-18 cmbs, 10YR 5/8 silty clay	
39	14	0	Ø		drainage
39	15	18	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-18 cmbs, 10YR 5/8 silty clay	
39	16	28	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-28 cmbs, 10YR 5/8 silty clay	
39	17	19	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-19 cmbs, 10YR 5/8 silty clay	
39	18	22	❑	0-6 cmbs, 10YR 3/4 silty clay loam; 6-22 cmbs, 10YR 5/8 silty clay	
39	19	15	❑	0-7 cmbs, 10YR 3/3 silty clay loam; 7-15 cmbs, 10YR 5/8 silty clay; 15 cmbs, compact gravel	70% gravel
39	20	0	Ø		drainage
39	21	0	Ø		drainage, slope
39	22	21	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-21 cmbs, 10YR 5/8 silty clay	
39	23	18	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-18 cmbs, 10YR 5/6 silty clay	
39	24	0	Ø		drainage, slope
39	25	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/8 silty clay	
39	26	0	Ø		slope
40	1	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/6 silty clay	
40	2	13	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-13 cmbs, 10YR 5/8 silty clay	
40	3	13	❑	0-5 cmbs, 10YR 5/6 silty clay; 5-13 cmbs, 10YR 5/2 silty clay; 13 cmbs, water	
40	4	0	Ø		drainage
40	5	0	Ø		slope to creek
40	6	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/8 silty clay / clay	
40	7	0	Ø		slope to drainage
40	8	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/6 silty clay	
40	9	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/8 + 6/6 silty clay	few gravel

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
40	10	18	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-18 cmbs, 10YR 5/6 silty clay / clay	
40	11	19	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-19 cmbs, 10YR 5/8 + 6/6 silty clay / clay	
40	12	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 silty clay	
40	13	18	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-18 cmbs, 10YR 5/8 silty clay	
40	14	0	Ø		field of poison ivy
40	15	0	Ø		creek
40	16	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/8 silty clay	
40	17	16	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 5/6 clay	
40	18	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 compact silty clay	
40	19	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 compact silty clay	
40	20	0	Ø		slope
40	21	19	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-19 cmbs, 10YR 5/8 compact silty clay	
40	22	17	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-17 cmbs, 10YR 5/8 compact silty clay	
40	23	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/6 silty clay	
40	24	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/6 silty clay	
40	25	19	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-19 cmbs, 10YR 5/6 silty clay	
40	26	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/6 compact silty clay	
40	27	16	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 5/6 + 6/4 mottled silty clay	saturated
41	1	19	❑	0-4 cmbs, 10YR 4/4 silty loam; 4-19 cmbs, 10YR 6/4 silty clay	
41	2	0	Ø		eroded wash, frequently flooded
41	3	16	❑	0-16 cmbs, 10YR 6/6 silty clay	
41	4	21	❑	0-21 cmbs, 10YR 6/6 silty clay	
41	5	20	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-20 cmbs, 10YR 6/4 silty clay	
41	6	0	Ø		slope, quarry
41	7	0	Ø		quarry
41	8	0	Ø		slope
41	9	18	❑	0-18 cmbs, 10YR 6/6 silty clay	wet
41	10	0	Ø		gullied
41	11	17	❑	0-17 cmbs, 10YR 6/4 silty clay	
41	12	0	Ø		gully
41	13	14	❑	0-14 cmbs, 10YR 6/6 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
41	14	24	❑	0-24 cmbs, 10YR 6/6 silty clay	
41	15	0	Ø		gullied and eroded
41	16	0	Ø		gullied and eroded
41	17	21	❑	0-6 cmbs, 10YR 4/4 silty clay; 6-21 cmbs, 10YR 6/6 silty clay	
41	18	20	❑	0-20 cmbs, 10YR 6/6 silty clay	
41	19	16	❑	0-16 cmbs, 10YR 6/6 silty clay	
41	20	19	❑	0-19 cmbs, 10YR 6/6 silty clay	
41	21	20	❑	0-20 cmbs, 10YR 6/6 silty clay	
41	22	20	❑	0-20 cmbs, 10YR 6/6 silty clay	
41	23	18	❑	0-18 cmbs, 10YR 6/6 silty clay	
41	24	6	❑	0-6 cmbs, 5YR 6/6 silty clay	gravel, old road
41	25	0	Ø		slope
41	26	0	Ø		frequently flooded, eroded
42	1	14	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-14 cmbs, 10YR 5/6 + 6/2 + 6/6 mottled silty clay	
42	2	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/6 + 6/2 + 6/6 mottled silty clay	
42	3	11	❑	0-3 cmbs, 10YR 4/4 silty clay; 3-11 cmbs, 10YR 5/6 + 6/2 hydric silty clay; 11 cmbs, root impasse	
42	4	13	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-13 cmbs, 10YR 5/6 + 6/2 + 6/6 mottled silty clay	
42	5	0	Ø		slope to drainage
42	6	0	Ø		slope to drainage
42	7	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 + 6/1 saturated silty clay	saturated
42	8	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 + 6/3 mottled silty clay	
42	9	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 + 6/3 mottled silty clay	
42	10	14	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-14 cmbs, 10YR 5/6 + 6/3 silty clay; 14 cmbs, root impasse	
42	11	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 + 6/3 silty clay	
42	12	0	Ø		standing water
42	13	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/6 + 6/3 mottled clay	
42	14	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/6 + 6/3 mottled silty clay	
42	15	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 compact silty clay	
42	16	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/8 compact silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
42	17	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/8 + 6/6 silty clay	few gravel
42	18	18	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-18 cmbs, 10YR 5/8 clay	
42	19	17	❑	0-9 cmbs, 10YR 4/3 silty clay loam; 9-17 cmbs, 10YR 5/6 silty clay; 17 cmbs, root impasse	
42	20	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/6 + 6/3 + 6/6 mottled silty clay	
42	21	16	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 5/8 silty clay	
42	22	19	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-19 cmbs, 10YR 5/8 + 6/3 silty clay / clay	
42	23	0	Ø		drainage
42	24	0	Ø		slope to drainage
42	25	0	Ø		creek, drainage
42	26	0	Ø		slope to creek
42	27	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/4 + 5/8 silty clay	
43	1	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
43	2	13	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-13 cmbs, 10YR 5/8 silty clay	
43	3	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 silty clay	
43	4	16	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-16 cmbs, 10YR 5/8 silty clay	
43	5	0	Ø		slope
43	6	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/8 silty clay	
43	7	13	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-13 cmbs, 10YR 5/6 silty clay	saturated
43	8	0	Ø		drainage
43	9	0	Ø		slope
43	10	12	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-12 cmbs, 10YR 5/8 silty clay	
43	11	0	Ø		slope to drainage
43	12	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/8 silty clay	
43	13	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/8 silty clay	
43	14	15	❑	0-3 cmbs, 10YR 3/4 silty clay loam; 3-15 cmbs, 10YR 5/6 silty clay	
43	15	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 silty clay	
43	16	13	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-13 cmbs, 10YR 5/6 silty clay	
43	17	21	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-21 cmbs, 10YR 5/8 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
43	18	18	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-18 cmbs, 10YR 5/8 silty clay	
43	19	18	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-18 cmbs, 10YR 5/8 silty clay	
43	20	14	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-14 cmbs, 10YR 5/8 silty clay	
43	21	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/6 + 6/3 mottled silty clay	
43	22	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/8 silty clay	
43	23	0	Ø		slope
44	1	15	❑	0-4 cmbs, 10YR 4/2 silty clay loam; 4-15 cmbs, 10YR 5/6 silty clay	
44	2	18	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-18 cmbs, 10YR 5/8 silty clay	
44	3	15	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-15 cmbs, 10YR 5/8 silty clay	
44	4	20	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-20 cmbs, 10YR 5/8 silty clay	
44	5	12	❑	0-12 cmbs, 10YR 5/6 clay	
44	6	16	❑	0-7 cmbs, 10YR 4/2 silty clay loam; 7-16 cmbs, 10YR 5/6 silty clay	
44	7	16	❑	0-5 cmbs, 10YR 4/2 silty clay loam; 5-16 cmbs, 10YR 5/6 silty clay	
44	8	12	❑	0-3 cmbs, 10YR 4/2 silty clay loam; 3-12 cmbs, 10YR 5/6 silty clay	
44	9	16	❑	0-16 cmbs, 10YR 5/6 silty clay	
44	10	16	❑	0-4 cmbs, 10YR 5/1 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
44	11	17	❑	0-6 cmbs, 10YR 5/1 silty clay loam; 6-17 cmbs, 10YR 5/6 silty clay	
44	12	14	❑	0-2 cmbs, 10YR 5/1 silty clay loam; 2-14 cmbs, 10YR 5/6 silty clay	
44	13	13	❑	0-13 cmbs, 10YR 5/6 silty clay	
44	14	14	❑	0-14 cmbs, 10YR 5/6 silty clay	
44	15	0	Ø		wetlands
44	16	0	Ø		wetlands
44	17	0	Ø		drainage
44	18	20	❑	0-8 cmbs, 10YR 5/1 silty clay loam; 8-20 cmbs, 10YR 5/6 silty clay	20% gravel, bank of creek
44	19	16	❑	0-4 cmbs, 10YR 5/1 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	20% gravel, bank of creek
44	20	17	❑	0-6 cmbs, 10YR 5/1 silty clay loam; 6-17 cmbs, 10YR 5/8 clay	
44	21	14	❑	0-3 cmbs, 10YR 5/1 silty clay loam; 3-14 cmbs, 10YR 5/8 clay	
44	22	17	❑	0-17 cmbs, 10YR 5/6 silty clay	
44	23	11	❑	0-11 cmbs, 10YR 6/1 + 5/6 mottled clay	
44	24	17	❑	0-6 cmbs, 10YR 5/4 silty clay loam; 6-17 cmbs, 10YR 5/6 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
44	25	17	❑	0-4 cmbs, 10YR 5/4 silty clay loam; 4-17 cmbs, 10YR 5/6 silty clay	
44	26	16	❑	0-5 cmbs, 10YR 5/4 silty clay loam; 5-16 cmbs, 10YR 5/6 silty clay	
45	1	16	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 5/8 silty clay	
45	2	16	❑	0-3 cmbs, 10YR 3/3 silty clay loam; 3-16 cmbs, 10YR 5/8 silty clay	
45	3	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/8 silty clay	
45	4	21	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-21 cmbs, 10YR 5/6 silty clay	
45	5	0	Ø		slope
45	6	18	❑	0-7 cmbs, 10YR 3/4 silty clay loam; 7-18 cmbs, 10YR 5/8 silty clay	
45	7	17	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-17 cmbs, 10YR 5/6 silty clay	
46	1	15	❑	0-3 cmbs, 10YR 5/2 silty clay loam; 3-15 cmbs, 10YR 5/6 silty clay	
46	2	14	❑	0-2 cmbs, 10YR 5/2 silty clay loam; 2-14 cmbs, 10YR 5/6 silty clay	
46	3	0	Ø		slope
46	4	20	❑	0-9 cmbs, 10YR 5/2 silty clay loam; 9-20 cmbs, 10YR 5/6 silty clay	on creek bank
46	5	16	❑	0-3 cmbs, 10YR 5/2 silty clay loam; 3-16 cmbs, 10YR 5/6 silty clay	
46	6	0	Ø		slope
46	7	22	❑	0-11 cmbs, 10YR 3/2 silty clay loam; 11-22 cmbs, 10YR 5/6 silty clay	
46	8	13	❑	0-13 cmbs, 10YR 5/6 silty clay	
47	1	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/8 compact silty clay	
47	2	18	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-18 cmbs, 10YR 5/8 + 6/3 + 6/6 mottled silty clay	
47	3	20	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-20 cmbs, 10YR 5/8 silty clay	
47	4	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/6 compact silty clay	
47	5	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/6 + 6/3 + 6/6 silty clay	
47	6	0	Ø		slope
47	7	19	❑	0-11 cmbs, 10YR 4/4 silty clay loam; 11-19 cmbs, 10YR 5/4 + 6/3 compact silty clay loam; 19 cmbs, root impasse	
48	1	0	Ø		tram
48	2	0	Ø		eroded, good vis
48	3	0	Ø		dense vegetation
48	4	26	❑	0-4 cmbs, 10YR 4/4 silty loam; 4-26 cmbs, 10YR 6/6 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
48	5	20	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-20 cmbs, 10YR 6/6 silty clay	eroded
48	6	0	Ø		eroded gulley
48	7	0	Ø		slope
49	1	0	Ø		heavily disturbed, treefall
49	2	18	❑	0-7 cmbs, 10YR 4/4 silty clay loam; 7-18 cmbs, 10YR 5/6 silty clay / clay	
49	3	14	❑	0-14 cmbs, 10YR 5/6 hydric silty clay	tram heading 155 degrees
49	4	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/6 hydric silty clay	
49	5	0	Ø		slope to drainage
49	6	14	❑	0-14 cmbs, 10YR 6/2 + 5/8 + 6/6 mottled compact silty clay loam	
49	7	0	Ø		slope
50	1	17	❑	0-6 cmbs, 10YR 5/2 silty clay loam; 6-17 cmbs, 10YR 5/6 silty clay	
50	2	16	❑	0-5 cmbs, 10YR 5/2 silty clay loam; 5-16 cmbs, 10YR 5/6 silty clay	
50	3	18	❑	0-7 cmbs, 10YR 5/1 silty clay loam; 7-18 cmbs, 10YR 5/6 silty clay	
50	4	18	❑	0-4 cmbs, 10YR 5/2 silty clay loam; 4-18 cmbs, 10YR 5/6 silty clay	
50	5	15	❑	0-3 cmbs, 10YR 5/1 silty clay loam; 3-15 cmbs, 10YR 5/6 clay	
50	6	0	Ø		slope
50	7	0	Ø		wetlands
50	8	0	Ø		slope - steep dropoff
51	1	16	❑	0-4 cmbs, 10YR 4/6 silty clay loam; 4-16 cmbs, 10YR 5/8 + 6/3 mottled silty clay	
51	2	18	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-18 cmbs, 10YR 5/8 + 6/3 mottled silty clay	
51	3	0	Ø		wetlands
51	4	0	Ø		slope to drainage
51	5	18	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-18 cmbs, 10YR 5/6 silty clay	
51	6	16	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-16 cmbs, 10YR 5/8 silty clay	
51	7	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
51	8	0	Ø		drainage, water at surface
52	1	14	❑	0-2 cmbs, 10YR 5/2 silty clay loam; 2-14 cmbs, 10YR 5/6 silty clay	
52	2	15	❑	0-3 cmbs, 10YR 5/2 silty clay loam; 3-15 cmbs, 10YR 5/6 silty clay	
52	3	17	❑	0-6 cmbs, 10YR 5/2 silty clay loam; 6-17 cmbs, 10YR 5/6 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
52	4	16	❑	0-4 cmbs, 10YR 5/2 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
52	5	17	❑	0-6 cmbs, 10YR 5/2 silty clay loam; 6-17 cmbs, 10YR 5/6 silty clay	
52	6	0	Ø		wetlands
52	7	17	❑	0-6 cmbs, 10YR 5/2 silty clay loam; 6-17 cmbs, 10YR 5/6 silty clay	
52	8	18	❑	0-7 cmbs, 10YR 5/2 silty clay loam; 7-18 cmbs, 10YR 5/6 silty clay	
53	1	16	❑	0-3 cmbs, 10YR 3/4 silty clay loam; 3-16 cmbs, 10YR 5/8 silty clay	
53	2	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/6 silty clay	
53	3	17	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-17 cmbs, 10YR 5/6 silty clay	
53	4	17	❑	0-2 cmbs, 10YR 3/4 silty clay loam; 2-17 cmbs, 10YR 5/6 silty clay	
53	5	18	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-18 cmbs, 10YR 5/8 silty clay	
53	6	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/6 silty clay	
53	7	13	❑	0-13 cmbs, 10YR 5/8 + 4/3 mottled silty clay	
53	8	15	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-15 cmbs, 10YR 5/8 silty clay	
54	1	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/8 hydric silty clay	
54	2	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 hydric silty clay	
54	3	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
54	4	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/6 compact silty clay	
54	5	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/6 hydric silty clay	
54	6	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/8 + 6/4 mottled silty clay	
54	7	18	❑	0-8 cmbs, 10YR 4/4 silty clay loam; 8-18 cmbs, 10YR 5/6 + 6/3 + 6/8 silty clay	
54	8	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/6 + 6/3 + 6/8 hydric silty clay	
55	1	16	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 5/8 silty clay	
55	2	0	Ø		slope
55	3	0	Ø		wetlands
55	4	19	❑	0-5 cmbs, 10YR 4/4 silty clay loam; 5-19 cmbs, 10YR 5/8 silty clay	
55	5	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/6 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
55	6	18	❑	0-18 cmbs, 10YR 5/6 silty clay	
55	7	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
55	8	0	∅		drainage, water at surface
56	1	15	❑	0-3 cmbs, 10YR 3/2 silty clay loam; 3-15 cmbs, 10YR 5/6 silty clay	
56	2	15	❑	0-3 cmbs, 10YR 3/2 silty clay loam; 3-15 cmbs, 10YR 5/6 silty clay	
56	3	18	❑	0-7 cmbs, 10YR 3/2 silty clay loam; 7-18 cmbs, 10YR 5/6 silty clay	
56	4	16	❑	0-4 cmbs, 10YR 3/2 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
56	5	17	❑	0-3 cmbs, 10YR 3/2 silty clay loam; 3-17 cmbs, 10YR 5/6 silty clay	
56	6	13	❑	0-13 cmbs, 10YR 6/6 clay	
56	7	16	❑	0-5 cmbs, 10YR 3/2 silty clay loam; 5-16 cmbs, 10YR 5/6 silty clay	
56	8	15	❑	0-4 cmbs, 10YR 3/2 silty clay loam; 4-15 cmbs, 10YR 5/6 silty clay	
56	9	14	❑	0-3 cmbs, 10YR 3/2 silty clay loam; 3-14 cmbs, 10YR 5/6 silty clay	
57	1	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/8 hydric silty clay	
57	2	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 + 6/3 mottled silty clay	
57	3	11	❑	0-11 cmbs, 10YR 5/4 silty clay; 11 cmbs, root impasse	
57	4	16	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 5/6 compact silty clay	
57	5	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/8 compact silty clay	
57	6	17	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-17 cmbs, 10YR 5/8 compact silty clay	
57	7	16	❑	0-5 cmbs, 10YR 4/4 silty clay loam; 5-16 cmbs, 10YR 5/8 compact silty clay	
57	8	14	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-14 cmbs, 10YR 5/8 hydric silty clay; 14 cmbs root impasse	
57	9	18	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-18 cmbs, 10YR 5/8 + 6/3 mottled hydric silty clay	
58	1	0	∅		slope
58	2	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/8 silty clay	
58	3	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/8 silty clay	saturated
58	4	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/8 silty clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
58	5	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/6 silty clay	
58	6	17	❑	0-5 cmbs, 10YR 4/4 silty clay loam; 5-17 cmbs, 10YR 6/4 silty clay	
58	7	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
58	8	18	❑	0-18 cmbs, 10YR 5/8 + 6/4 mottled silty clay	
59	1	16	❑	0-3 cmbs, 10YR 3/2 silty clay loam; 3-16 cmbs, 10YR 5/6 silty clay	
59	2	16	❑	0-4 cmbs, 10YR 3/2 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
59	3	15	❑	0-3 cmbs, 10YR 3/2 silty clay loam; 3-15 cmbs, 10YR 5/6 silty clay	
59	4	0	Ø		wetlands
59	5	13	❑	0-13 cmbs, 10YR 5/4 silty clay	saturated
59	6	15	❑	0-3 cmbs, 10YR 3/2 silty clay loam; 3-15 cmbs, 10YR 5/6 silty clay	
59	7	16	❑	0-4 cmbs, 10YR 3/2 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
59	8	17	❑	0-6 cmbs, 10YR 3/2 silty clay loam; 6-17 cmbs, 10YR 5/6 silty clay	
59	9	16	❑	0-5 cmbs, 10YR 3/2 silty clay loam; 5-16 cmbs, 10YR 5/6 silty clay	
59	10	16	❑	0-4 cmbs, 10YR 3/2 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
60	1	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/6 silty clay	
60	2	17	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-17 cmbs, 10YR 5/8 silty clay	
60	3	16	❑	0-1 cmbs, 10YR 4/4 silty clay loam; 1-16 cmbs, 10YR 5/8 silty clay	
60	4	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/8 + 6/3 mottled silty clay	
60	5	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/6 silty clay	
60	6	14	❑	0-1 cmbs, 10YR 4/4 silty clay loam; 1-14 cmbs, 10YR 5/8 silty clay	
60	7	16	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 5/6 silty clay	
60	8	14	❑	0-14 cmbs, 10YR 5/8 silty clay loam	
60	9	17	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-17 cmbs, 10YR 5/8 silty clay	
60	10	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/8 silty clay	
61	1	0	Ø		wetland, standing water
61	2	14	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-14 cmbs, 10YR 5/6 clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
61	3	16	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 5/8 silty clay	
61	4	0	Ø		disturbed, ATV road
61	5	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 + 6/4 silty clay	
61	6	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/6 + 6/3 silty clay	
61	7	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 + 6/3 clay	
61	8	0	Ø		ATV trail
61	9	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 + 6/2 mottled silty clay	
61	10	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 + 6/2 mottled silty clay	
62	1	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/8 silty clay	
62	2	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/8 hydric silty clay	
62	3	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/8 silty clay	
62	4	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/6 compact silty clay	
62	5	12	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-12 cmbs, 10YR 5/8 hydric silty clay; 12 cmbs, root impasse	
62	6	17	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-17 cmbs, 10YR 5/8 silty clay	
62	7	0	Ø		lake, standing water
62	8	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 + 6/2 hydric silty clay	
62	9	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 + 6/2 hydric silty clay	
62	10	0	Ø		disturbed, ATV road
63	1	14	❑	0-2 cmbs, 10YR 3/2 silty clay loam; 2-14 cmbs, 10YR 5/6 silty clay	
63	2	16	❑	0-4 cmbs, 10YR 3/2 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
63	3	17	❑	0-6 cmbs, 10YR 3/2 silty clay loam; 6-17 cmbs, 10YR 5/6 silty clay	
63	4	20	❑	0-8 cmbs, 10YR 5/3 silty clay loam; 8-20 cmbs, 10YR 5/6 silty clay	
63	5	18	❑	0-6 cmbs, 10YR 5/3 silty clay loam; 6-18 cmbs, 10YR 5/6 silty clay	
63	6	15	❑	0-3 cmbs, 10YR 3/2 silty clay loam; 3-15 cmbs, 10YR 5/6 silty clay	
63	7	12	❑	0-12 cmbs, 10YR 5/6 clay	
63	8	18	❑	0-6 cmbs, 10YR 5/1 silty clay loam; 6-18 cmbs, 10YR 5/6 silty clay	
63	9	13	❑	0-13 cmbs, 10YR 5/1 + 5/6 mottled clay	

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
64	1	14	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-14 cmbs, 10YR 5/8 silty clay	
64	2	19	❑	0-19 cmbs, 10YR 5/8 silty clay	
64	3	16	❑	0-4 cmbs, 10YR 3/3 silty clay loam; 4-16 cmbs, 10YR 5/8 silty clay	
64	4	14	❑	0-2 cmbs, 10YR 3/4 silty clay loam; 2-14 cmbs, 10YR 5/8 silty clay	
64	5	14	❑	0-3 cmbs, 10YR 3/4 silty clay loam; 3-14 cmbs, 10YR 5/6 silty clay	
64	6	15	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-15 cmbs, 10YR 5/8 silty clay	
64	7	14	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-14 cmbs, 10YR 5/8 silty clay	
64	8	0	Ø		drainage
64	9	0	Ø		drainage
64	10	0	Ø		drainage
65	1	0	Ø		drainage
65	2	14	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-14 cmbs, 10YR 5/8 silty clay	
65	3	15	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-15 cmbs, 10YR 5/6 silty clay	
65	4	0	Ø		drainage
65	5	0	Ø		drainage
65	6	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/6 silty clay	
65	7	17	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-17 cmbs, 10YR 5/8 silty clay	
65	8	13	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-13 cmbs, 10YR 5/8 silty clay	
65	9	12	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-12 cmbs, 10YR 5/8 silty clay	
65	10	14	❑	0-14 cmbs, 10YR 5/8 silty clay	
66	1	0	Ø		wetlands
66	2	0	Ø		slope to wetlands
66	3	17	❑	0-5 cmbs, 10YR 4/3 silty clay loam; 5-17 cmbs, 10YR 5/4 silty clay	
66	4	14	❑	0-14 cmbs, 10YR 5/6 silty clay	
66	5	18	❑	0-6 cmbs, 10YR 3/2 silty clay loam; 6-18 cmbs, 10YR 5/6 silty clay	
66	6	0	Ø		creek
66	7	16	❑	0-4 cmbs, 10YR 3/2 silty clay loam; 4-16 cmbs, 10YR 5/6 silty clay	
66	8	17	❑	0-3 cmbs, 10YR 3/2 silty clay loam; 3-17 cmbs, 10YR 5/6 silty clay	
66	9	15	❑	0-4 cmbs, 10YR 3/2 silty clay loam; 4-15 cmbs, 10YR 5/6 silty clay	
66	10	18	❑	0-6 cmbs, 10YR 3/2 silty clay loam; 6-18 cmbs, 10YR 5/6 silty clay	
67	1	0	Ø		wetland

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
67	2	0	Ø		slope of tram heading 190 degrees
67	3	16	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-16 cmbs, 10YR 5/8 silty clay	
67	4	16	❑	0-4 cmbs, 10YR 4/4 silty clay loam; 4-16 cmbs, 10YR 5/8 silty clay	
67	5	19	❑	0-2 cmbs, 10YR 4/4 silty clay loam; 2-19 cmbs, 10YR 5/6 compact silty clay loam	
67	6	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 silty clay	
67	7	16	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-16 cmbs, 10YR 5/8 + 6/3 silty clay	
67	8	0	Ø		drainage
67	9	0	Ø		disturbed by large machinery
67	10	14	❑	0-3 cmbs, 10YR 4/4 silty clay loam; 3-14 cmbs, 10YR 5/8 silty clay	
68	1	12	❑	0-12 cmbs, 10YR 5/6 silty clay	
68	2	20	❑	0-8 cmbs, 10YR 3/2 silty clay loam; 8-20 cmbs, 10YR 5/6 silty clay	
68	3	19	❑	0-7 cmbs, 10YR 3/2 silty clay loam; 7-19 cmbs, 10YR 5/6 silty clay	
68	4	17	❑	0-5 cmbs, 10YR 3/2 silty clay loam; 5-17 cmbs, 10YR 5/6 silty clay	near stream
68	5	17	❑	0-6 cmbs, 10YR 3/2 silty clay loam; 6-17 cmbs, 10YR 5/6 silty clay	
68	6	18	❑	0-7 cmbs, 10YR 3/2 silty clay loam; 7-18 cmbs, 10YR 5/6 silty clay	
68	7	13	❑	0-13 cmbs, 10YR 5/6 silty clay	
68	8	15	❑	0-7 cmbs, 10YR 3/2 silty clay loam; 7-15 cmbs, 10YR 5/6 silty clay	
68	9	12	❑	0-12 cmbs, 10YR 5/6 silty clay	
68	10	0	Ø		pond
68	11	0	Ø		pond
FS4	22-16	16	❑	0-4 cmbs, 10YR 3/6 silty clay loam; 4-16 cmbs, 10YR 5/6 + 6/4 mottled silty clay	
FS4	Datum (21-4)	9	❑	0-5 cmbs, 10YR 4/4 silty clay loam; 5-9 cmbs, 10YR 5/6 silty clay loam + compact gravel	
FS4	E10	7	❑	0-6 cmbs, 10YR 3/1 silty loam; 6-7 cmbs, 10YR 5/6 silty clay; 7 cmbs, compact gravel	
FS4	E20	11	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-11 cmbs, 10YR 5/6 silty clay loam; 11 cmbs, compact gravel	80% gravel
FS4	E35	20	❑	0-6 cmbs, 10YR 4/4 silty clay loam; 6-20 cmbs, 10YR 5/6 silty clay / clay	large (plastic?) conduit ~ 17 cmbs
FS4	N10	28	❑	0-13 cmbs, 10YR 4/4 silty clay loam; 13-28 cmbs, 10YR 5/6 silty clay	few gravel

Transect	Shovel test	Max depth (cm)	Status	Soil Description	Comments
FS4	N20	40	❑	0-30 cmbs, 10YR 5/2 silty clay loam; 30-40 cmbs, 10YR 5/6 silty clay	
FS4	N20 E25	36	❑	0-14 cmbs, 10YR 4/4 silty clay loam; 14-36 cmbs, 10YR 5/6 silty clay loam	
FS4	N20 E35	18	■	0-4 cmbs, 10YR 4/4 silty clay loam; 4-18 cmbs, 10YR 5/6 silty clay	
FS4	N20 E45	24	❑	0-7 cmbs, 10YR 4/4 silty clay; 7-24 cmbs, 10YR 5/6 + 6/4 silty clay / clay	
FS4	N20 E55	16	❑	0-5 cmbs, 10YR 4/4 silty clay loam; 5-16 cmbs, 10YR 5/8 silty clay	
FS4	N30 E35	27	■	0-16 cmbs, 10YR 4/4 silty loam; 16-27 cmbs, 10YR 5/6 silty clay	clear bottle glass 0-8 cmbs
FS4	N35 E10	18	❑	0-8 cmbs, 10YR 5/2 silty clay loam; 8-18 cmbs, 10YR 5/6 silty clay	
FS4	N40 E15	15	❑	0-5 cmbs, 10YR 5/2 silty clay loam; 5-15 cmbs, 10YR 5/6 silty clay	
FS4	N40 E25	16	❑	0-6 cmbs, 10YR 5/2 silty clay loam; 6-16 cmbs, 10YR 5/6 silty clay	
FS4	N40 E5	21	❑	0-9 cmbs, 10YR 4/4 silty clay loam; 9-21 cmbs, 10YR 5/8 + 6/4 mottled silty clay	
FS4	N45 E10	16	❑	0-6 cmbs, 10YR 5/2 silty clay loam; 6-16 cmbs, 10YR 5/6 silty clay	
FS4	N50 E35	24	❑	0-12 cmbs, 10YR 4/4 silty clay loam; 12-24 cmbs, 10YR 5/6 + 6/4 silty clay	
FS4	N55 E10	17	❑	0-7 cmbs, 10YR 5/2 silty clay loam; 7-17 cmbs, 10YR 5/6 silty clay	

ATTACHMENT 7

Noise and Noise Compatible Land Use Information

Memphis INTERNATIONAL AIRPORT

Noise Assessment Report

Memphis Shelby County Airport Authority
Holmes Road Land Release

Prepared for:

EnSafe Inc.
308 North Peters Road, Suite #200
Knoxville, TN 37922

Prepared by:

Edwards-Pitman Environmental, Inc.
2700 Cumberland Parkway, Suite 300
Atlanta, GA 30339

February 25, 2021

1.0 Introduction

The affected environment evaluated for noise and noise related impacts in this report is identified as the Proposed Action site and surrounding land uses. The approximately 245-acre Proposed Action site is located approximately 1 mile south of the Memphis Shelby County Airport (MEM) on the southeast corner of East Holmes Road and Swinnea Road and north of the Tennessee/Mississippi State line, in Memphis, Shelby County, Tennessee. A Proposed Site Plan identifies the potential for approximately 1.5 million square feet of facility space at the site with approximately 300,000 square feet of additional space allotted for future growth, if needed (Figure 1 in Attachment 1). The site is predominantly wooded and vacant, and land use along Holmes Road includes four churches, a cemetery, single-family residential, a military base, and Zodiac Park. These land uses are shown on Figure 2 in Attachment 1.

As the principle noise source for this project corridor is vehicular traffic along Holmes Road, the Federal Highway Administration (FHWA) Traffic Noise Model (TNM) Version 2.5 was selected to model changes to the noise environment caused by increased traffic along Holmes Road. While TNM Version 3.0 was released for use last year, the software is still under development (see Attachment 2 for Correspondence). Holmes Road was considered the primary transportation route for projected increased traffic volumes and large trucks. Adjoining and area residential streets were assumed not to be the source of high traffic volumes or large trucks.

This report documents the results of a noise analysis completed to predict the effects that the proposed project would have on surrounding land uses.

2.0 Background

The study area is made up of four churches, a cemetery, single-family residential, a military base, and Zodiac Park.

The principal source of noise in the study area is vehicular traffic, including automobiles and trucks. As an existing transportation corridor, most adjacent land uses are exposed to at least moderate noise levels.

Noise is typically defined as unwanted or undesirable sound. The basic parameters of noise that affect humans are:

(1) intensity or level,

(2) frequency content, and

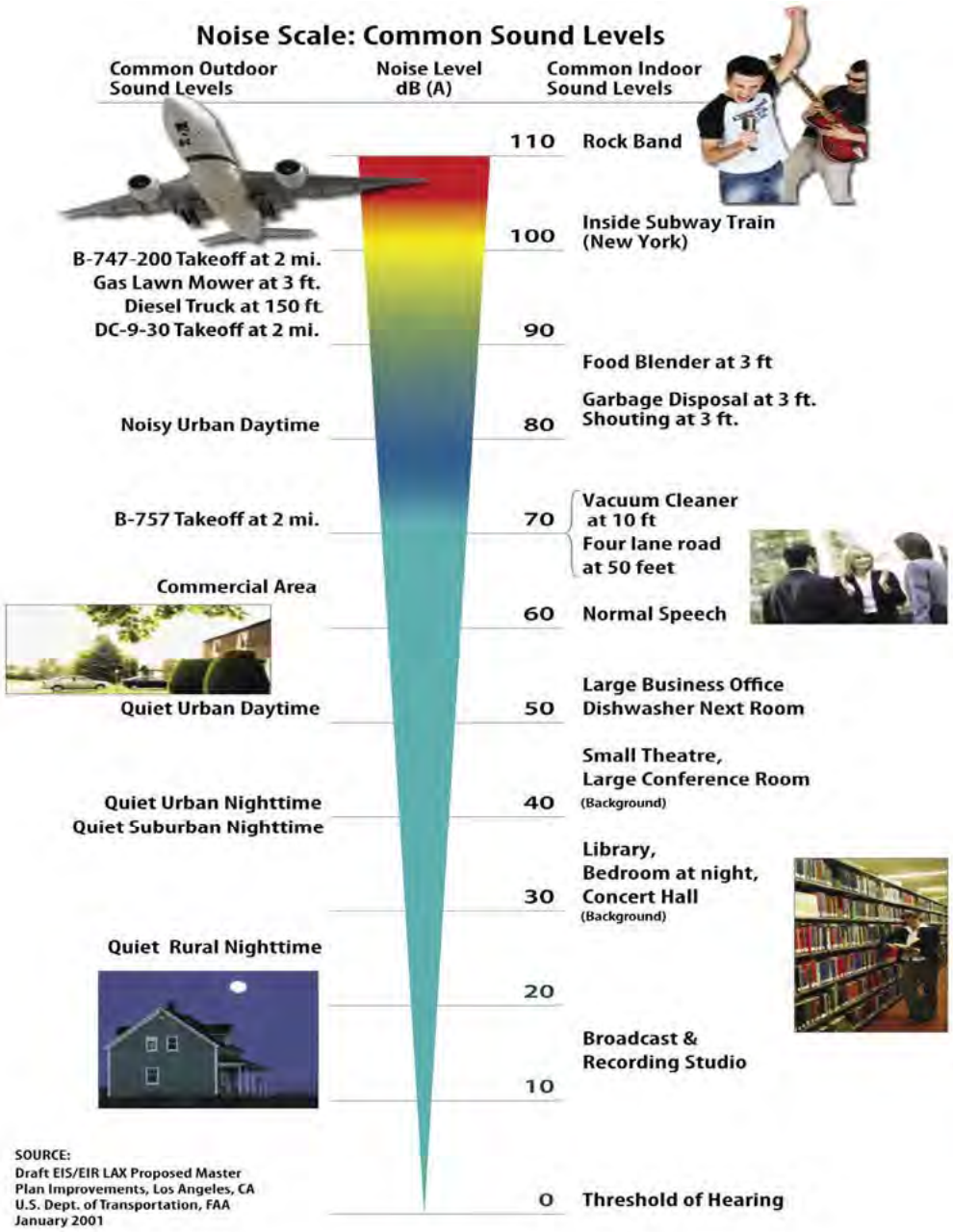
(3) variation with time.

The first parameter is determined by the level of sound, which is expressed in units of decibels (dB). By using this scale, the range of normally encountered sound can be expressed by values between 0 and 120 dB. On a relative basis, a 3-dB change in sound level generally represents a barely perceptible change in a common outdoor setting, to someone with average hearing. A 5-dB positive change presents a “noticeable” change, and a 10-dB positive change is typically perceived as a doubling in the loudness while a 10-dB decrease in noise levels is perceived as a 50 percent reduction in loudness.

The frequency of noise is related to the tone or pitch of the sound and is expressed in terms of cycles per second called hertz (Hz). The human ear can detect a wide range of frequencies from about 20 Hz to 17,000 Hz. However, because the sensitivity of human hearing varies with frequency, the A-weighting system is commonly used. Sound levels measured using this weighting system are called “A-weighted” sound levels

and are expressed in decibel notation as "dBA." The A-weighted sound level is widely accepted as a proper unit for describing environmental noise.

Because environmental noise fluctuates from moment to moment, it is common practice to condense all of this information into a single number called the "equivalent" sound level (Leq). The Leq is a measure of the average sound energy during a specified period of time (typically 1 hour or 24 hours). The Leq is defined as the constant level that, over a given period of time, transmits the same amount of acoustical energy to the receiver as the actual time-varying sound. Studies have shown that Leq is well correlated with human annoyance to sound, and therefore, this descriptor is widely used for environmental noise impact assessment. The Leq measured over a 1-hour period is the hourly Leq (1-hour), which is used to analyze highway noise impacts and abatement.



Many factors affect noise. Traffic noise level at a site depends on both site geometry (distance, land cover, topography, etc.) and traffic characteristics (volume, vehicle type, speed, truck numbers, etc.) of roadways. As an example, for a straight, at-grade roadway with a steady stream of vehicles, the Leq noise level decreases with distance from the roadway. Generally, in areas where the land between the roadway and the receptor site is primarily grass, lawn, or other sound absorptive material, the noise level decreases at a rate of 4.5 dBA per a doubling of the distance. Conversely, in more urban areas with concrete, the noise level drops off at a much slower rate—typically around 3 dBA per a doubling of the distance. These drop-off rates assume vehicle travel speeds remain constant and flat open terrain occurs between the receptor and the roadway. Higher drop off rates will typically occur in areas where there is excess shielding caused by building rows or variations in the terrain.

Assuming similar vehicle mix and travel speeds, a doubling in traffic volume over a given period of time produces a doubling in the sound energy. A doubling in sound energy corresponds to a barely perceptible 3-dBA increase in noise level. At locations where traffic volumes and noise levels are already high, a large change in traffic volume is required to cause a perceptible change in the noise level.

Noise levels from trucks are much greater than noise levels from automobiles. The noise generated by a single heavy truck can be as loud as 10 automobiles. Consequently, at a given constant travel speed, noise level changes are more sensitive to the distance of nearby truck lanes and/or to changes in truck volumes than changes in overall traffic flow. However, travel speeds do play a factor, and on a roadway that is carrying a given volume of traffic, road-traffic noise levels increase by approximately 5 to 6 dBA as the speed increases from 30 to 45 mph, and by another 3 dBA as the speed increases to 55 mph.

3.0 Methodology

Three field measurements were collected on May 29, 2020 from two locations along Holmes Road between 7:15 AM - 8:50 PM. These field measurement sites are depicted on Figure 2 in Attachment 1. The sites were chosen based on close proximity to areas of human use and clear line-of-sight to the traffic noise source. Noise measurement sites included two church properties located along the northern side of Holmes Road. Copies of the field notes are provided in Attachment 3. Field measurements indicate existing noise levels ranged, at the time measurements were taken, between **60.0** and **63.2** dBA.

Land use and terrain were assessed during the time of field measurement collection. The study area includes four churches, a military base located to the northwest, Memorial Park Cemetery located to the west, single-family residential subdivisions located to the east, and Zodiac Park located to the east (see Figure 2 in Attachment 1). Terrain surrounding Holmes Road was considered generally level, and no features that would obscure line-of sight to the traffic noise source or influence the calculation of local sound projections, such as berms, bodies of water, or existing noise barriers, were identified for inclusion in the traffic noise model.

Field measurements were recorded using a laboratory calibrated Bruel & Kjær Model 2238 sound level meter. These measurements were taken for 15 minutes at each location. The locations of field measurements and the observed sound levels are provided in Table 1. Field measurements were compared with TNM-modeled noise levels to confirm the applicability of the model for this analysis. Traffic counts, by vehicle type (cars, medium trucks, and heavy trucks) were taken along Holmes Road during each field measurement. In addition, posted vehicle speeds of 40 mph were observed at all field measurement locations. Total traffic counts were input into the TNM to determine if the model is accurately predicting sound levels along the corridor. The TNM modeled results for the field measurements indicated existing

noise levels between **58.0** and **63.2** dBA, and the comparisons of field measurements to modeled levels are shown in Table 1 below.

A difference of approximately three decibels is generally considered an acceptable range to consider the model for use in predicting future noise levels. Because each of the field measurements were within the accepted three-decibel range of the model, the model is considered applicable for use in analysis of noise levels within the study area.

Table 1: Existing Field Measurements and TNM Results (dBA L_{eq})

Field Receiver #	Time Range	Field Measurement	TNM Calculation	Difference
Field Measurement #1	7:15 AM - 7:30 AM	63.1	63.2	0.1
Field Measurement #2	7:45 AM - 8:00 AM	63.2	62.4	-0.8
Field Measurement #3	8:35 AM – 8:50 AM	60.0	58.0	-2.0

Roadways were digitized in ArcMap version 10.6 from 30-centimeter resolution 2019 ESRI world aerial imagery with elevations obtained from 10-meter resolution National Elevation Dataset (NED) Digital Elevation Models (DEM). Hourly 2017 traffic counts with percentage medium and heavy trucks for Holmes Road (traffic count station number 000291) were provided by the Tennessee Department of Transportation (TDOT) [see Attachment 2]. While AADT (Annual Average Daily Traffic) is available for more recent years, 2017 traffic counts are the most recent hourly counts recorded by TDOT, and 2017 peak hour traffic was used to represent a worst-case scenario for this study. Traffic was distributed evenly across Holmes Road westbound and eastbound thru lanes, and traffic was not modeled on turn lanes. The GIS-derived roadway geometries were imported into TNM, and the number of automobiles, medium trucks, and heavy trucks and the posted travel speed for Holmes Road were input into the model. Noise generated from sources other than traffic is not included in the model.

An Environmental Assessment (EA) was recently prepared for a proposed land release along Ketchum Road, approximately 5 miles north of the Holmes Road site, for the construction of an 819,000 sq. ft. distribution warehouse. As part of this EA, a traffic noise study was completed to model the potential change in the local noise environment attributed to the increase in traffic associated with the proposed development. The study was completed with the assumption that routine operation of the distribution was assumed to include 120 distribution trucks per day, and approximately 100 autos per day for employees accessing the distribution warehouse. Additionally, worst case traffic volumes under the Build condition were calculated with the assumption that 50% of these trucks, assumed all to be heavy trucks (i.e. tractor trailers), and 50% of autos would be added to the No-Build condition hourly traffic volumes along Ketchum Road. The Proposed Site Plan along Holmes Road identifies the potential for approximately 1.5 million sq. ft. of facility space at the site with approximately 300,000 sq. ft. of additional space allotted for future growth if needed (Figure 1 in Attachment 1). As projected traffic data associated with a potential Holmes Road distribution facility is not available, increase in traffic along Holmes Road due to operations of a

distribution facility was assumed to be twice that of the proposed Ketchum Road development, as a Holmes Road distribution facility at the proposed site could be 1,500,000–1,800,000 sq. ft., approximately twice the size of the 819,000 sq. ft. Ketchum Road facility.

Under the No-Build condition, a total of 1108 vehicles including 56 medium and 78 heavy trucks were distributed along the Holmes Road eastbound and westbound lanes to project the No-Build noise levels (see Table 2 below for No-Build inputs). Under the Build condition, routine operation of the distribution warehouse was assumed to include approximately 240 distribution trucks per day, and approximately 200 autos per day for employees accessing the distribution warehouse. Worst case traffic volumes were calculated with the assumption that 50% of these trucks, assumed to all be heavy trucks (i.e. tractor trailers), and 50% of autos would be added to the No-Build condition hourly traffic volumes along Holmes Road. A total of 1328 vehicles including 56 medium and 198 heavy trucks were distributed along the Holmes Road eastbound and westbound lanes to project the hourly traffic noise levels under the Build condition (see Table 3 on page 6 for Build inputs).

To create noise contours with projected noise levels in the Build and No-Build conditions, a 250-foot cell grid was created for the area surrounding Holmes Road with a receiver placed at the center of each cell to capture the local projected sound level (see Figures 3A and 3B in Attachment 1). Sound levels were calculated in TNM for the Build and No-Build traffic projections, and the receiver features were then converted to a 250-foot cell raster from which 5 dBA step contours were generated. Yearly Day-Night Average Sound Levels are the preferred unit of noise level measurement according to Appendix A of 14 CFR part 150, *Airport Noise Compatibility Planning*. However, note that this analysis assumes that 100% of new site generated trips approach the site from the west, via Airways Boulevard and I-55, rather than being distributed to access the site from both the east and the west. With this assumption, the land use assessed for traffic noise effects attributed to operations of the proposed facility was restricted to areas directly north and west of the proposed facility (see Figure 2 in Attachment 1). Land use in this area consists of a military base, church, cemetery, and undeveloped land. The absence of residential development along this traffic corridor precludes application of Day-Night noise penalization, as the Day-Night weighting generally applies to residential land use where increased traffic noise between 11 pm – 7 am could potentially be more impactful than daytime hours. Therefore, this study omitted Day-Night noise weighting and analyzed the potential effect of increased traffic on the local noise environment during peak hour PM traffic conditions. Results are shown in dBA without Day-Night noise penalization, which is also the generally preferred method for traffic noise studies where vehicular traffic is the predominant noise source.

Table 2: Model Inputs No-Build

Road	Direction	Lane Width Input	Total DHV	Cars	Medium Trucks	Heavy Trucks
Holmes Rd EB	EB	12'	554	487	28	39
Holmes Rd EB LT	EB	12'	N/A	N/A	N/A	N/A
Holmes Rd EB RT	EB	12'	N/A	N/A	N/A	N/A
Holmes Rd WB	WB	12'	554	487	28	39
Holmes Rd WB LT	WB	12'	N/A	N/A	N/A	N/A

Road	Direction	Lane Width Input	Total DHV	Cars	Medium Trucks	Heavy Trucks
Holmes Rd WB LT IN	WB	12'	N/A	N/A	N/A	N/A
Holmes Rd WB LT OUT	WB	12'	N/A	N/A	N/A	N/A

Table 3: Model Inputs Build

Road	Direction	Lane Width Input	Total DHV	Cars	Medium Trucks	Heavy Trucks
Holmes Rd EB	EB	12'	664	537	28	99
Holmes Rd EB LT	EB	12'	N/A	N/A	N/A	N/A
Holmes Rd EB RT	EB	12'	N/A	N/A	N/A	N/A
Holmes Rd WB	WB	12'	664	537	28	99
Holmes Rd WB LT	WB	12'	N/A	N/A	N/A	N/A
Holmes Rd WB LT IN	WB	12'	N/A	N/A	N/A	N/A
Holmes Rd WB LT OUT	WB	12'	N/A	N/A	N/A	N/A

4.0 Results

The projected Build and No-Build condition sound contours are shown in Figures 4 and 5 in Attachment 1. Sound contours for the No-Build condition for the study area surrounding Holmes Road ranged from 45 to 60 dBA, and sound contours for the Build condition ranged from 50 to 65 dBA. Station counts taken in 2017 were the most recent data available from TDOT at the time of this study, and peak hour traffic counts were used for the No-Build condition traffic noise model and to provide the base for the Build condition traffic projections. Routine operation of the proposed distribution facility was assumed to include 240 distribution trucks per day and approximately 200 autos per day for employees accessing the distribution warehouse. With the assumption 50% of the proposed development's heavy truck and automobile capacity would be added to the No-Build condition hourly traffic volumes along Holmes Road, the Build condition would result in increased sound levels to surrounding land use.

Prepared By: Andrew Clearer **2/25/2021**
Date

QA/QC: Josh Earhart **2/25/2021**
Date

Attachment 1
Figures

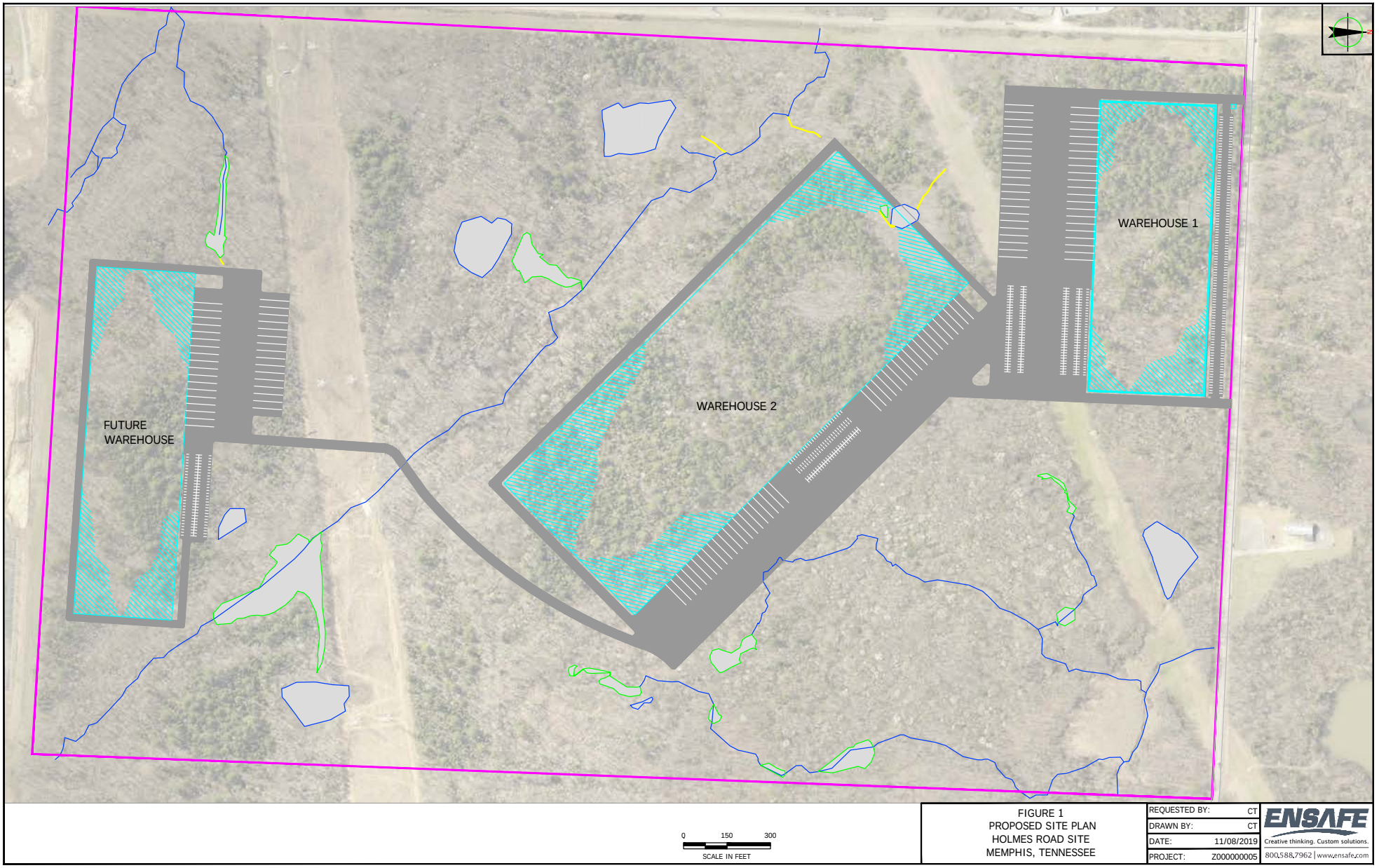


FIGURE 1
PROPOSED SITE PLAN
HOLMES ROAD SITE
MEMPHIS, TENNESSEE

REQUESTED BY:	CT
DRAWN BY:	CT
DATE:	11/08/2019
PROJECT:	Z000000005

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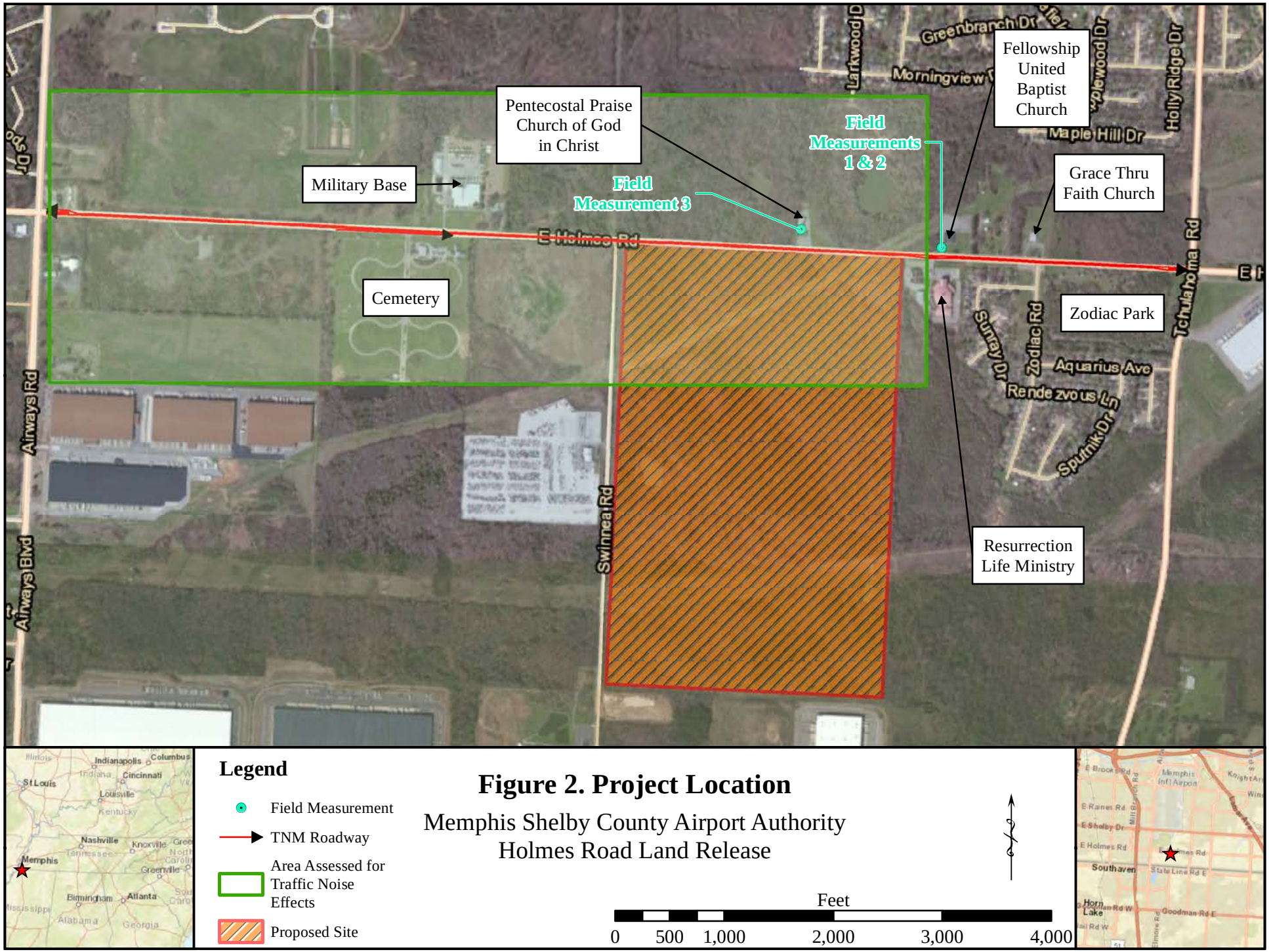
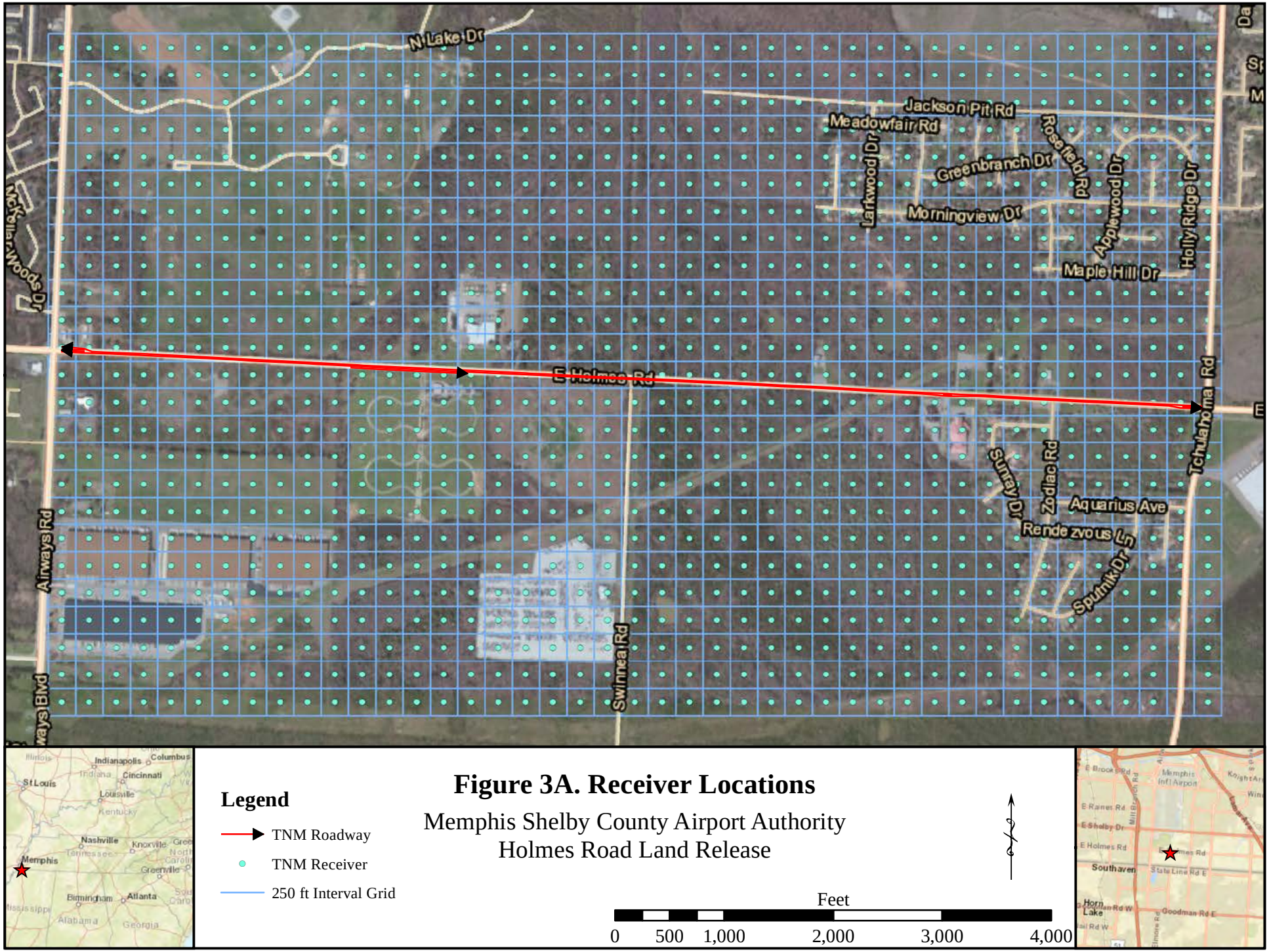


Figure 2. Project Location

Memphis Shelby County Airport Authority
Holmes Road Land Release


N Lake Dr
Jackson Pit Rd
Meadowfair Rd
Larkwood Dr
Greenbranch Dr
Rosefield Rd
Applewood Dr
Holly Ridge Dr
Morningview Dr
Maple Hill Dr
E Holmes Rd
Tchulahoma Rd
Sunray Dr
Zodiac Rd
Aquarius Ave
Rendezvous Ln
Sputnik Dr
Airways Rd
Swinnea Rd
Legend
TNM Roadway
TNM Receiver
250 ft Interval Grid
Figure 3A. Receiver Locations
Memphis Shelby County Airport Authority
Holmes Road Land Release
Feet
0
500
1,000
2,000
3,000
4,000

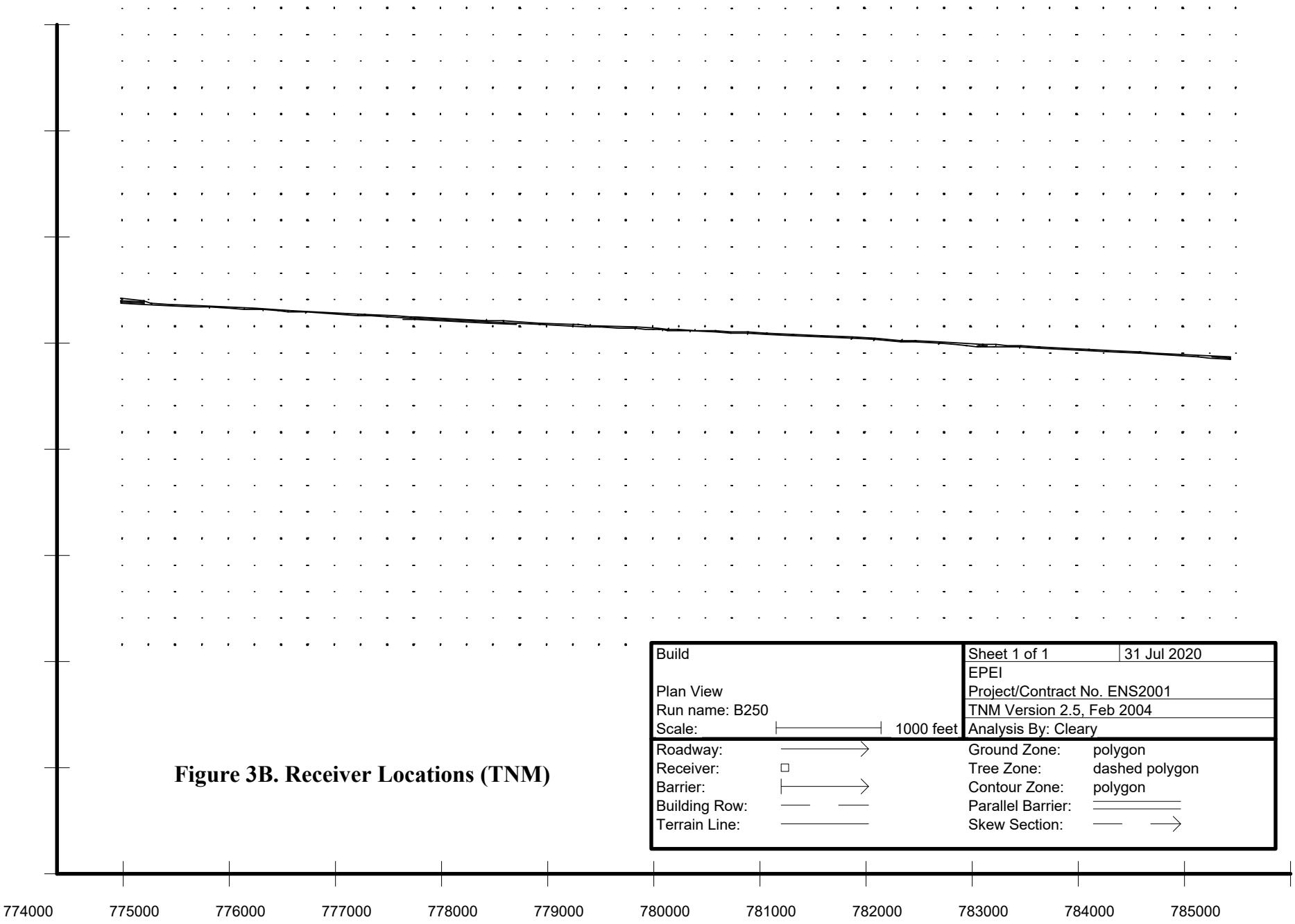
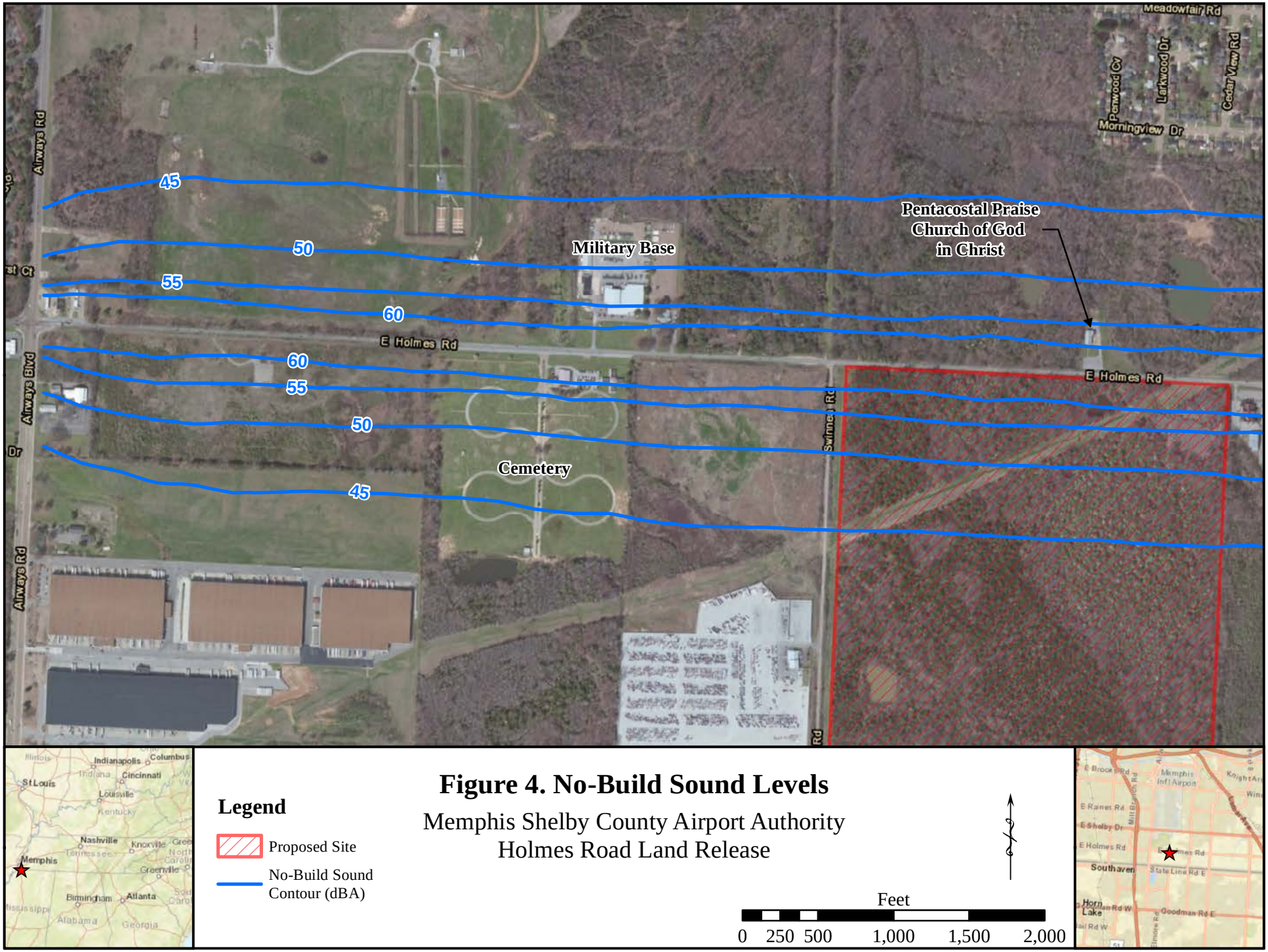
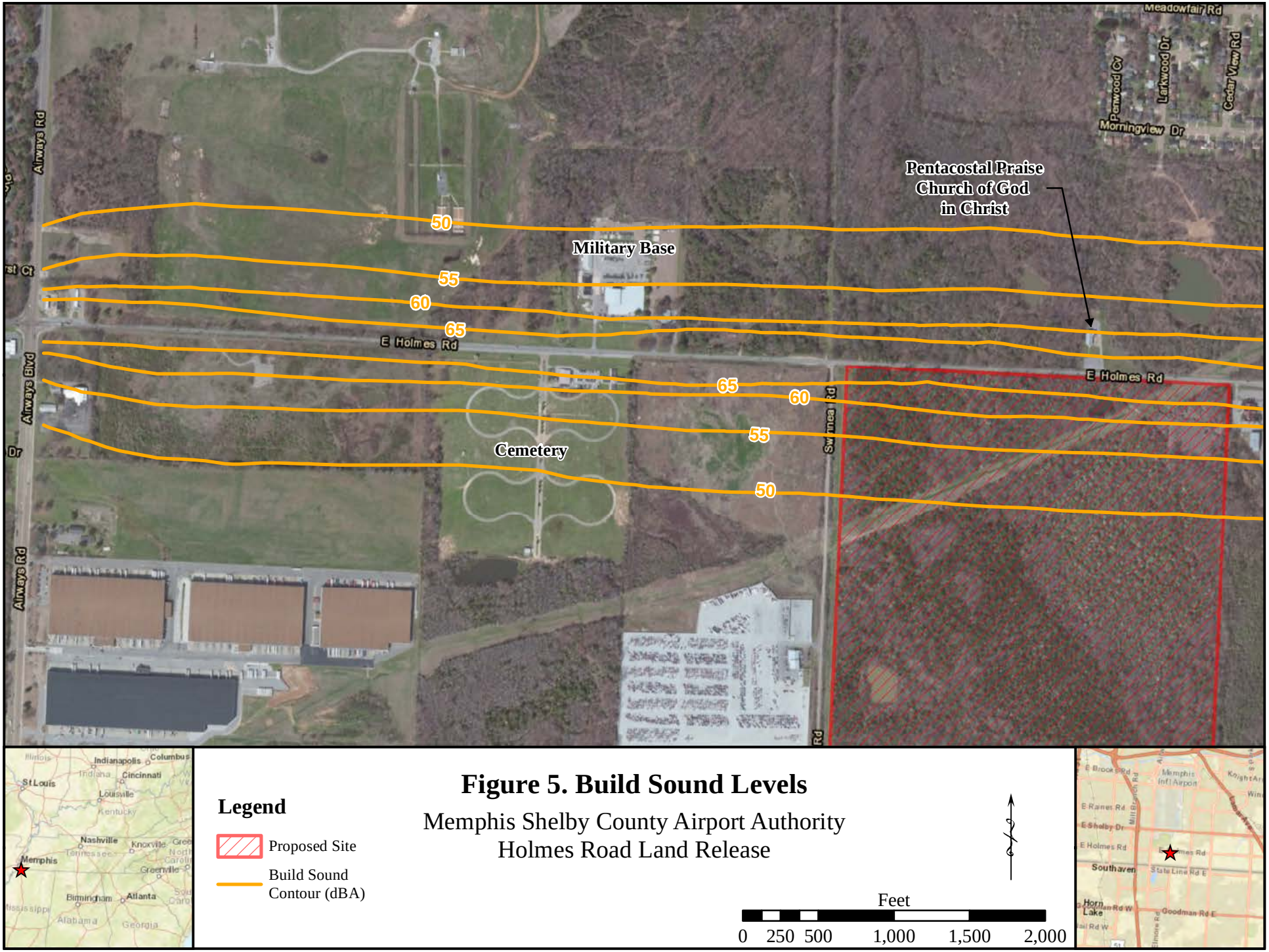


Figure 3B. Receiver Locations (TNM)


Meadowfair Rd
Parkwood Cv
Larkwood Dr
Cedar View Rd
Morningview Dr
Airways Rd
45
50
55
60
Military Base
Pentacostal Praise
Church of God
in Christ
E Holmes Rd
Airways Blvd
Swinnea Rd
Cemetery
Legend
Proposed Site
No-Build Sound
Contour (dBA)
Figure 4. No-Build Sound Levels
Memphis Shelby County Airport Authority
Holmes Road Land Release
Feet
0 250 500 1,000 1,500 2,000


Meadowfair Rd
Penwood Cv
Larkwood Dr
Cedar View Rd
Morningview Dr
Airways Rd
Pentacostal Praise
Church of God
in Christ
50
Military Base
55
60
65
E Holmes Rd
Airways Blvd
65
60
E Holmes Rd
55
Cemetery
50
Airways Rd
Legend
Proposed Site
Build Sound
Contour (dBA)
Figure 5. Build Sound Levels
Memphis Shelby County Airport Authority
Holmes Road Land Release
Feet
0 250 500 1,000 1,500 2,000

Attachment 2
Correspondence

Andrew Cleary

From: William Bowlby <wbowlby@bowlbyassociates.com>
Sent: Monday, June 15, 2020 2:27 PM
To: Andrew Cleary
Cc: Geoff; Darlene Reiter; Rennie Williamson
Subject: RE: 64-bit Windows and TNM 2.5 Contours

Andrew,

Doing well, thanks. You?

You need a Windows XP emulator because the NMPLOT contouring program is indeed a DOS program (and used in the old FAA INM noise prediction model. I'm asking Geoff to share more on that. You could also create your own contours with TNM 2.5 by inputting a grid of receiver points and eyeballing in the lines – or look for a 3rd party program that generates contour lines from a grid file. Your could check Wasmer Consulting, which created the NMPLOT program. Last time I looked, I think they had some plotting options.

TNM 3.0 does color-gradient contours, but doesn't have a legend as to what the colors represent. However, you can roll the cursor over the gradient and see the numeric values.

We've done fairly extensive testing of TNM 3.0 and don't feel it's ready for project use yet – crashes frequently during input, causing you to have to restart from scratch, plus other issues. We've provided lots of comments to the Volpe Center, which is working on a next version. I'd recommend waiting until it comes out, which might be by the end of the year or later (guessing). We're holding off on TNM 3 training courses until that version is released.

Good luck,
Bill

_____ n

William Bowlby, Ph.D., P.E., Principal Engineer
Bowlby & Associates, Inc.
2505 21st Avenue South, Suite 300
Nashville, TN 37212
wbowlby@bowlbyassociates.com
www.bowlbyassociates.com

From: Andrew Cleary
Sent: Monday, June 15, 2020 8:42 AM
To: William Bowlby <wbowlby@bowlbyassociates.com>
Subject: 64-bit Windows and TNM 2.5 Contours

Hi Bill,

Hope you are doing well. This is one of your class of 17' alumni reaching out with a question regarding TNM 2.5 noise contours. All our office computers run Windows 10 (64-bit), and I need to generate noise contours for a project. If I am not mistaken, the contours module is tied to MS DOS, which is not supported by 64-bit Windows. Do you have a suggested work around? For this current project, FAA but the noise source in question is vehicular traffic, I may be able to use 3.0 and GIS to create the contours. However, I have been told

SCDOT will require noise contours on a few projects we have coming up, and I expect their people are not yet trained/comfortable with 3.0. It would be great if we could find a way to create contours while sticking to 2.5.

Any thoughts you might have would be greatly appreciated!

Andrew Cleary | GIS Specialist
Edwards-Pitman
Certified Woman-Owned Small Business (DBE, FBE, SBE, SBA, WBENC, WOSB)
2700 Cumberland Parkway Suite 300 | Atlanta, GA 30339
direct: 678-932-2207 | main: 770.333.9484 | acleary@edwards-pitman.com
www.edwards-pitman.com
Georgia | South Carolina | Florida

Andrew Cleary

From: Christopher Lynch <Christopher.Lynch@tn.gov>
Sent: Monday, June 8, 2020 1:11 PM
To: Andrew Cleary
Cc: Kristin Lehman; David Pearce
Subject: RE: Traffic data request (station number 000291)

Mr. Cleary,
This count was estimated in both 2018 & 2019. Would you like the hourly count for 2017? I'd be happy to send that to you. The truck percentages are:

Passenger Vehicles—88%
Single-Unit Trucks—5%
Multi-Unit Trucks—7%

I look forward to hearing back from you. Have a good afternoon.
Thank you

Chris Lynch | GIS Technician
Long Range Planning Division
Data Management
James K. Polk Building, Suite 1000
505 Deaderick Street,Nashville, TN 37243
Traffic Info. Line: 615-741-0959| O: 615-253-5322
Christopher.Lynch@tn.gov
www.tn.gov/tdot

From: Andrew Cleary <acleary@edwards-pitman.com>
Sent: Monday, June 8, 2020 11:38 AM
To: Christopher Lynch <Christopher.Lynch@tn.gov>
Cc: Kristin Lehman <klehman@Ensafe.com>; David Pearce <dpearce@edwards-pitman.com>
Subject: [EXTERNAL] Traffic data request (station number 000291)

Chris,

Kristin suggested I contact you regarding a traffic data request for Holmes Road. I have attached the station location from the TDOT GIS page. I am looking for the most recent DHV or hourly counts for this location as well as percentages for auto, medium, and heavy trucks. Thanks in advance and please let me know if I can provide any further information.

Andrew Cleary | GIS Specialist
Edwards-Pitman
Certified Woman-Owned Small Business (DBE, FBE, SBE, SBA, WBENC, WOSB)
2700 Cumberland Parkway Suite 300 | Atlanta, GA 30339
direct: 678-932-2207 | main: 770.333.9484 | acleary@edwards-pitman.com
www.edwards-pitman.com
Georgia | **South Carolina** | **Florida**

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number: 000291 **County:** 79 Shelby
Start Date: 08 / 14 / 2017 **End Date:** 08 / 15 / 2017
Start Time: 08 : 00 **End Time:** 08 : 00
Direction: 6 (Coverage)

Time	
08:00 - 09:00	496
09:00 - 10:00	488
10:00 - 11:00	608
11:00 - 12:00	651
12:00 - 13:00	686
13:00 - 14:00	1,069
14:00 - 15:00	1,067
15:00 - 16:00	973
16:00 - 17:00	923
17:00 - 18:00	565
18:00 - 19:00	424
19:00 - 20:00	324
20:00 - 21:00	317
21:00 - 22:00	353
22:00 - 23:00	274
23:00 - 24:00	181
24:00 - 01:00	108
01:00 - 02:00	78
02:00 - 03:00	158
03:00 - 04:00	172
04:00 - 05:00	684
05:00 - 06:00	976
06:00 - 07:00	1,048
07:00 - 08:00	763

Total: 13,386x Variation Factor: 0.96 = 12,851 x Truck Factor: 0.99 = AADT: 12,722.0

Peak AM	**Peak Total**	**Peak Hour Factor**	**Peak PM**	**Peak Total**	**Peak Hour Factor**
05:30 - 06:30	1072	0.93	13:15 - 14:15	1108	0.92

Peak AM %	**Dir Dist AM %**	**Peak PM %**	**Dir Dist PM %**	**Daily Peak %**	**Daily Dir Dist %**
8	64	8	51	8	51

Attachment 3
Field Notes and Validation Input and Output for TNM Runs

Field Measurement 1

Noise Assessment Field Data Sheet

Project Data

Project Name: Holmes Rd Date: 5/29/20

Project No.: ENS2001 County: Shelby

Sampling Data

Measurement No.: 1 15 minute sample period: 7:15 to 7:30 AM LeqA: 63.1

SLM: Bruel & Kjaer 2238 Mediator Factory Calibrated: 21October2011

Field Calibrated: Date/ 5/28/2020 Initials/ aC

Weather Conditions

67°, Cloudy, 96% humidity, 4 mph west

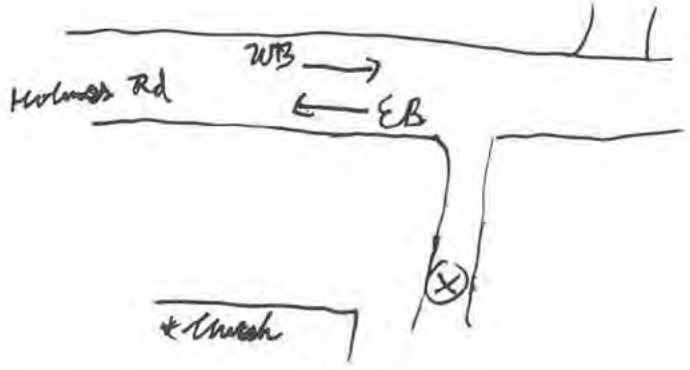
Traffic

Road Name: Holmes Rd. **Posted Speed Limit:** 40

	15 min				Hourly			
	EB (WB) NB SB		(EB) WB NB SB		EB (WB) NB SB		(EB) WB NB SB	
Cars	60		95		240		380	
Med Trucks	0		1		0		4	
Heavy Trucks	6		9		24		36	
Motorcycle								
Bus								

Notes/Site Sketch

* Fellowship United Baptist Church



EPEI 6 August 2020
Cleary TNM 2.5

Roadway geometries are the same for all field validation models

INPUT: ROADWAYS
PROJECT/CONTRACT: ENS2001
RUN: FM1

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Holmes Rd EB	12.0	point54	54	773,960.4	269,378.5	337.20				Average	
		point55	55	774,158.5	269,370.5	346.50				Average	
		point56	56	774,406.4	269,360.4	352.20				Average	
		point57	57	774,651.7	269,349.8	357.80				Average	
		point58	58	774,793.4	269,343.3	359.60				Average	
		point59	59	774,983.8	269,334.2	361.10				Average	
		point60	60	775,127.8	269,327.3	361.30				Average	
		point61	61	775,207.7	269,323.5	363.20				Average	
		point62	62	775,304.3	269,318.3	364.50				Average	
		point63	63	775,446.6	269,310.5	359.40				Average	
		point64	64	775,536.5	269,305.7	355.00				Average	
		point65	65	775,708.3	269,296.5	347.90				Average	
		point66	66	776,192.6	269,270.9	337.60				Average	
		point67	67	776,309.0	269,264.7	335.40				Average	
		point68	68	776,470.9	269,256.2	333.50				Average	
		point69	69	776,688.3	269,244.8	337.00				Average	
		point70	70	776,731.5	269,242.7	337.20				Average	
		point71	71	777,423.3	269,208.6	323.80				Average	
		point72	72	777,907.1	269,185.6	331.80				Average	
		point73	73	778,338.3	269,164.9	344.00				Average	
		point74	74	778,471.6	269,158.7	350.10				Average	
		point75	75	778,656.0	269,150.1	352.60				Average	
		point76	76	778,805.8	269,143.1	347.40				Average	
		point77	77	778,905.5	269,138.4	346.90				Average	
		point78	78	778,981.8	269,134.9	347.80				Average	

		point79	79	779,036.5	269,132.3	347.00				Average	
		point80	80	779,067.9	269,130.9	345.30				Average	
		point81	81	779,112.7	269,128.8	343.40				Average	
		point82	82	779,161.4	269,126.5	342.50				Average	
		point83	83	779,195.2	269,124.9	340.70				Average	
		point84	84	779,330.5	269,118.9	343.10				Average	
		point85	85	779,561.5	269,108.9	352.90				Average	
		point86	86	779,711.6	269,102.8	359.40				Average	
		point87	87	779,868.6	269,095.9	358.90				Average	
		point88	88	780,044.7	269,087.7	354.90				Average	
		point89	89	780,291.9	269,074.9	362.00				Average	
		point90	90	780,565.3	269,061.7	347.80				Average	
		point91	91	780,851.4	269,047.9	346.50				Average	
		point92	92	781,063.4	269,036.0	336.50				Average	
		point93	93	781,318.6	269,021.9	329.50				Average	
		point94	94	781,447.6	269,015.1	333.50				Average	
		point95	95	781,674.7	269,002.1	339.70				Average	
		point96	96	781,825.3	268,994.6	349.40				Average	
		point97	97	781,932.2	268,985.5	355.90				Average	
		point98	98	782,036.8	268,974.2	359.30				Average	
		point99	99	782,110.6	268,970.3	360.70				Average	
		point100	100	782,194.3	268,970.8	361.90				Average	
		point101	101	782,301.1	268,970.8	362.50				Average	
		point102	102	782,343.5	268,970.2	362.70				Average	
		point103	103	782,437.5	268,966.4	367.10				Average	
		point104	104	782,612.7	268,957.2	370.90				Average	
		point105	105	782,832.9	268,945.1	369.90				Average	
		point106	106	783,082.4	268,932.3	368.40				Average	
		point107	107	783,297.2	268,921.5	369.50				Average	
		point108	108	783,560.1	268,909.9	370.20				Average	
		point109	109	784,116.0	268,882.1	377.50				Average	
		point110	110	784,220.7	268,865.9	375.90				Average	
		point111	111	784,418.1	268,856.0	378.80					
Holmes Rd EB LT	12.0	point112	112	784,239.8	268,876.7	375.90				Average	
		point113	113	784,419.0	268,867.7	379.70					
Holmes Rd EB RT	12.0	point114	114	776,613.4	269,232.7	339.30				Average	
		point115	115	776,687.5	269,228.8	339.50				Average	
		point116	116	776,730.7	269,226.7	339.70				Average	
		point117	117	777,422.6	269,192.7	324.40				Average	

		point118	118	777,689.6	269,179.9	326.40					
Holmes Rd WB	12.0	point119	119	784,419.3	268,879.0	379.70				Average	
		point120	120	783,702.5	268,914.8	372.20				Average	
		point121	121	783,567.9	268,921.5	369.80				Average	
		point122	122	783,297.8	268,933.5	369.50				Average	
		point123	123	783,083.0	268,944.3	368.70				Average	
		point124	124	782,833.6	268,957.1	370.30				Average	
		point125	125	782,613.3	268,969.2	370.90				Average	
		point126	126	782,438.1	268,978.4	367.10				Average	
		point127	127	782,315.0	268,983.4	362.50				Average	
		point128	128	782,208.3	268,989.3	362.00				Average	
		point129	129	782,083.6	268,994.4	360.60				Average	
		point130	130	781,891.6	269,003.2	353.40				Average	
		point131	131	781,675.3	269,014.1	339.70				Average	
		point132	132	781,448.2	269,027.1	333.10				Average	
		point133	133	781,319.3	269,033.9	329.50				Average	
		point134	134	781,064.0	269,048.0	336.50				Average	
		point135	135	780,852.0	269,059.9	346.50				Average	
		point136	136	780,565.9	269,073.6	348.30				Average	
		point137	137	780,292.5	269,086.9	362.00				Average	
		point138	138	780,045.3	269,099.7	354.90				Average	
		point139	139	779,869.1	269,107.9	358.90				Average	
		point140	140	779,712.1	269,114.8	359.10				Average	
		point141	141	779,562.0	269,120.9	354.00				Average	
		point142	142	779,368.8	269,129.2	345.00				Average	
		point143	143	779,210.8	269,136.2	340.40				Average	
		point144	144	779,194.3	269,137.0	340.70				Average	
		point145	145	779,115.3	269,140.7	343.40				Average	
		point146	146	779,017.6	269,145.2	347.00				Average	
		point147	147	778,819.0	269,154.5	345.30				Average	
		point148	148	778,378.1	269,175.0	344.40				Average	
		point149	149	778,268.4	269,180.3	341.50				Average	
		point150	150	778,220.7	269,182.6	340.00				Average	
		point151	151	777,902.0	269,197.8	331.70				Average	
		point152	152	777,563.7	269,213.9	324.50				Average	
		point153	153	777,404.0	269,221.6	323.80				Average	
		point154	154	776,729.5	269,254.8	337.20				Average	
		point155	155	776,690.9	269,256.7	337.00				Average	
		point156	156	776,542.1	269,264.5	334.50				Average	

		point157	157	776,257.2	269,279.5	334.90				Average	
		point158	158	775,574.2	269,315.6	353.90				Average	
		point159	159	775,223.9	269,334.7	363.20				Average	
		point160	160	774,710.4	269,359.3	358.10				Average	
		point161	161	774,402.7	269,372.6	356.10				Average	
		point162	162	774,243.6	269,379.0	348.70				Average	
		point163	163	774,171.9	269,406.1	345.70				Average	
		point164	164	773,961.5	269,424.6	338.20					
Holmes Rd WB LT	12.0	point165	165	782,128.8	268,981.4	361.50				Average	
		point166	166	782,082.6	268,983.3	360.40				Average	
		point167	167	782,045.4	268,985.0	359.30					
Holmes Rd WB LT IN	12.0	point168	168	774,176.5	269,381.8	346.50				Average	
		point169	169	773,960.8	269,390.5	337.20					
Holmes Rd WB LT OUT	12.0	point170	170	774,175.6	269,393.8	346.50				Average	
		point171	171	773,961.3	269,402.5	338.20					

EPEI						**6 August 2020**					
Cleary						**TNM 2.5**					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	**ENS2001**										
RUN:	**FM1**										
Receiver											
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**				**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**		**NR**	**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**	**Goal**	**Calc.**
			ft	ft	ft	ft	dBA	dBA	dB	dB	
FM1	1	1	782,169.1	269,066.7	366.13	4.92	63.10	66	15.0	7.0	Y

EPEI				**6 August 2020**								
Cleary				**TNM 2.5**								
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	**ENS2001**											
RUN:	**FM1**											
Roadway	**Points**		**Segment**									
Name	**Name**	**No.**	**Autos**		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**	
			V	**S**	**V**	**S**	**V**	**S**	**V**	**S**	**V**	**S**
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Holmes Rd EB	point54	54	380	40	4	40	36	40	0	0	0	0
	point55	55	380	40	4	40	36	40	0	0	0	0
	point56	56	380	40	4	40	36	40	0	0	0	0
	point57	57	380	40	4	40	36	40	0	0	0	0
	point58	58	380	40	4	40	36	40	0	0	0	0
	point59	59	380	40	4	40	36	40	0	0	0	0
	point60	60	380	40	4	40	36	40	0	0	0	0
	point61	61	380	40	4	40	36	40	0	0	0	0
	point62	62	380	40	4	40	36	40	0	0	0	0
	point63	63	380	40	4	40	36	40	0	0	0	0
	point64	64	380	40	4	40	36	40	0	0	0	0
	point65	65	380	40	4	40	36	40	0	0	0	0
	point66	66	380	40	4	40	36	40	0	0	0	0
	point67	67	380	40	4	40	36	40	0	0	0	0
	point68	68	380	40	4	40	36	40	0	0	0	0
	point69	69	380	40	4	40	36	40	0	0	0	0
	point70	70	380	40	4	40	36	40	0	0	0	0
	point71	71	380	40	4	40	36	40	0	0	0	0
	point72	72	380	40	4	40	36	40	0	0	0	0
	point73	73	380	40	4	40	36	40	0	0	0	0
	point74	74	380	40	4	40	36	40	0	0	0	0
	point75	75	380	40	4	40	36	40	0	0	0	0
	point76	76	380	40	4	40	36	40	0	0	0	0

	point77	77	380	40	4	40	36	40	0	0	0	0
	point78	78	380	40	4	40	36	40	0	0	0	0
	point79	79	380	40	4	40	36	40	0	0	0	0
	point80	80	380	40	4	40	36	40	0	0	0	0
	point81	81	380	40	4	40	36	40	0	0	0	0
	point82	82	380	40	4	40	36	40	0	0	0	0
	point83	83	380	40	4	40	36	40	0	0	0	0
	point84	84	380	40	4	40	36	40	0	0	0	0
	point85	85	380	40	4	40	36	40	0	0	0	0
	point86	86	380	40	4	40	36	40	0	0	0	0
	point87	87	380	40	4	40	36	40	0	0	0	0
	point88	88	380	40	4	40	36	40	0	0	0	0
	point89	89	380	40	4	40	36	40	0	0	0	0
	point90	90	380	40	4	40	36	40	0	0	0	0
	point91	91	380	40	4	40	36	40	0	0	0	0
	point92	92	380	40	4	40	36	40	0	0	0	0
	point93	93	380	40	4	40	36	40	0	0	0	0
	point94	94	380	40	4	40	36	40	0	0	0	0
	point95	95	380	40	4	40	36	40	0	0	0	0
	point96	96	380	40	4	40	36	40	0	0	0	0
	point97	97	380	40	4	40	36	40	0	0	0	0
	point98	98	380	40	4	40	36	40	0	0	0	0
	point99	99	380	40	4	40	36	40	0	0	0	0
	point100	100	380	40	4	40	36	40	0	0	0	0
	point101	101	380	40	4	40	36	40	0	0	0	0
	point102	102	380	40	4	40	36	40	0	0	0	0
	point103	103	380	40	4	40	36	40	0	0	0	0
	point104	104	380	40	4	40	36	40	0	0	0	0
	point105	105	380	40	4	40	36	40	0	0	0	0
	point106	106	380	40	4	40	36	40	0	0	0	0
	point107	107	380	40	4	40	36	40	0	0	0	0
	point108	108	380	40	4	40	36	40	0	0	0	0
	point109	109	380	40	4	40	36	40	0	0	0	0
	point110	110	380	40	4	40	36	40	0	0	0	0
	point111	111										
Holmes Rd EB LT	point112	112	0	0	0	0	0	0	0	0	0	0

	point113	113										
Holmes Rd EB RT	point114	114	0	0	0	0	0	0	0	0	0	0
	point115	115	0	0	0	0	0	0	0	0	0	0
	point116	116	0	0	0	0	0	0	0	0	0	0
	point117	117	0	0	0	0	0	0	0	0	0	0
	point118	118										
Holmes Rd WB	point119	119	240	40	0	0	24	40	0	0	0	0
	point120	120	240	40	0	0	24	40	0	0	0	0
	point121	121	240	40	0	0	24	40	0	0	0	0
	point122	122	240	40	0	0	24	40	0	0	0	0
	point123	123	240	40	0	0	24	40	0	0	0	0
	point124	124	240	40	0	0	24	40	0	0	0	0
	point125	125	240	40	0	0	24	40	0	0	0	0
	point126	126	240	40	0	0	24	40	0	0	0	0
	point127	127	240	40	0	0	24	40	0	0	0	0
	point128	128	240	40	0	0	24	40	0	0	0	0
	point129	129	240	40	0	0	24	40	0	0	0	0
	point130	130	240	40	0	0	24	40	0	0	0	0
	point131	131	240	40	0	0	24	40	0	0	0	0
	point132	132	240	40	0	0	24	40	0	0	0	0
	point133	133	240	40	0	0	24	40	0	0	0	0
	point134	134	240	40	0	0	24	40	0	0	0	0
	point135	135	240	40	0	0	24	40	0	0	0	0
	point136	136	240	40	0	0	24	40	0	0	0	0
	point137	137	240	40	0	0	24	40	0	0	0	0
	point138	138	240	40	0	0	24	40	0	0	0	0
	point139	139	240	40	0	0	24	40	0	0	0	0
	point140	140	240	40	0	0	24	40	0	0	0	0
	point141	141	240	40	0	0	24	40	0	0	0	0
	point142	142	240	40	0	0	24	40	0	0	0	0
	point143	143	240	40	0	0	24	40	0	0	0	0
	point144	144	240	40	0	0	24	40	0	0	0	0
	point145	145	240	40	0	0	24	40	0	0	0	0
	point146	146	240	40	0	0	24	40	0	0	0	0
	point147	147	240	40	0	0	24	40	0	0	0	0
	point148	148	240	40	0	0	24	40	0	0	0	0

	point149	149	240	40	0	0	24	40	0	0	0	0
	point150	150	240	40	0	0	24	40	0	0	0	0
	point151	151	240	40	0	0	24	40	0	0	0	0
	point152	152	240	40	0	0	24	40	0	0	0	0
	point153	153	240	40	0	0	24	40	0	0	0	0
	point154	154	240	40	0	0	24	40	0	0	0	0
	point155	155	240	40	0	0	24	40	0	0	0	0
	point156	156	240	40	0	0	24	40	0	0	0	0
	point157	157	240	40	0	0	24	40	0	0	0	0
	point158	158	240	40	0	0	24	40	0	0	0	0
	point159	159	240	40	0	0	24	40	0	0	0	0
	point160	160	240	40	0	0	24	40	0	0	0	0
	point161	161	240	40	0	0	24	40	0	0	0	0
	point162	162	240	40	0	0	24	40	0	0	0	0
	point163	163	240	40	0	0	24	40	0	0	0	0
	point164	164										
Holmes Rd WB LT	point165	165	0	0	0	0	0	0	0	0	0	0
	point166	166	0	0	0	0	0	0	0	0	0	0
	point167	167										
Holmes Rd WB LT IN	point168	168	0	0	0	0	0	0	0	0	0	0
	point169	169										
Holmes Rd WB LT OUT	point170	170	0	0	0	0	0	0	0	0	0	0
	point171	171										

EPEI
Cleary
6 August 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: ENS2001
RUN: FM1
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
FM1	1	1	63.1	63.2	66	0.1	15	----	63.2	0.0	7	-7.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Field Measurement 2

Noise Assessment Field Data Sheet

Project Data

Project Name: Holmes Rd Date: 5/29/20

Project No.: EM&2001 County: Shelby

Sampling Data

Measurement No.: 2 15 minute sample period: 7:45 to 8:00 AM LeqA: 63.2

SLM: Bruel & Kjaer 2238 Mediator Factory Calibrated: 21October2011

Field Calibrated: Date/ 5/28/2020 Initials/ AC

Weather Conditions

67°, cloudy, 96% humidity, 4 mph NW

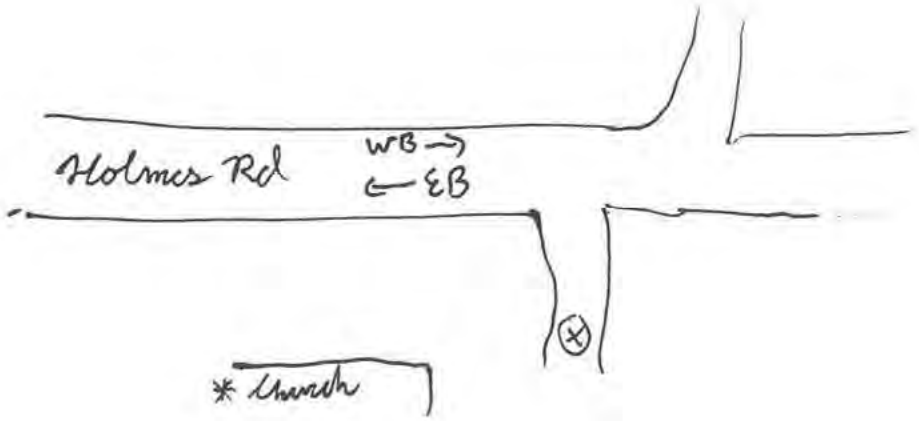
Traffic

Road Name: Holmes Rd. **Posted Speed Limit:** 40

	15 min				Hourly			
	EB (WB) NB SB		EB (WB) NB SB		EB (WB) NB SB		EB (WB) NB SB	
Cars	46		161		184		404	
Med Trucks	0		0		0		0	
Heavy Trucks	14		1		56		4	
Motorcycle								
Bus								

Notes/Site Sketch

*Fellowship United Baptist Church



EPEI 6 August 2020
Cleary TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: ENS2001
RUN: FM2

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
FM2	1	1	782,169.1	269,066.7	366.13	4.92	63.20	66	15.0	7.0	Y

EPEI			**6 August 2020**									
Cleary			**TNM 2.5**									
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	**ENS2001**											
RUN:	**FM2**											
Roadway	**Points**											
Name	**Name**	**No.**	**Segment**									
			Autos		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**	
			V	**S**	**V**	**S**	**V**	**S**	**V**	**S**	**V**	**S**
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Holmes Rd EB	point54	54	404	40	0	0	4	40	0	0	0	0
	point55	55	404	40	0	0	4	40	0	0	0	0
	point56	56	404	40	0	0	4	40	0	0	0	0
	point57	57	404	40	0	0	4	40	0	0	0	0
	point58	58	404	40	0	0	4	40	0	0	0	0
	point59	59	404	40	0	0	4	40	0	0	0	0
	point60	60	404	40	0	0	4	40	0	0	0	0
	point61	61	404	40	0	0	4	40	0	0	0	0
	point62	62	404	40	0	0	4	40	0	0	0	0
	point63	63	404	40	0	0	4	40	0	0	0	0
	point64	64	404	40	0	0	4	40	0	0	0	0
	point65	65	404	40	0	0	4	40	0	0	0	0
	point66	66	404	40	0	0	4	40	0	0	0	0
	point67	67	404	40	0	0	4	40	0	0	0	0
	point68	68	404	40	0	0	4	40	0	0	0	0
	point69	69	404	40	0	0	4	40	0	0	0	0
	point70	70	404	40	0	0	4	40	0	0	0	0
	point71	71	404	40	0	0	4	40	0	0	0	0
	point72	72	404	40	0	0	4	40	0	0	0	0
	point73	73	404	40	0	0	4	40	0	0	0	0
	point74	74	404	40	0	0	4	40	0	0	0	0
	point75	75	404	40	0	0	4	40	0	0	0	0
	point76	76	404	40	0	0	4	40	0	0	0	0

	point77	77	404	40	0	0	4	40	0	0	0	0
	point78	78	404	40	0	0	4	40	0	0	0	0
	point79	79	404	40	0	0	4	40	0	0	0	0
	point80	80	404	40	0	0	4	40	0	0	0	0
	point81	81	404	40	0	0	4	40	0	0	0	0
	point82	82	404	40	0	0	4	40	0	0	0	0
	point83	83	404	40	0	0	4	40	0	0	0	0
	point84	84	404	40	0	0	4	40	0	0	0	0
	point85	85	404	40	0	0	4	40	0	0	0	0
	point86	86	404	40	0	0	4	40	0	0	0	0
	point87	87	404	40	0	0	4	40	0	0	0	0
	point88	88	404	40	0	0	4	40	0	0	0	0
	point89	89	404	40	0	0	4	40	0	0	0	0
	point90	90	404	40	0	0	4	40	0	0	0	0
	point91	91	404	40	0	0	4	40	0	0	0	0
	point92	92	404	40	0	0	4	40	0	0	0	0
	point93	93	404	40	0	0	4	40	0	0	0	0
	point94	94	404	40	0	0	4	40	0	0	0	0
	point95	95	404	40	0	0	4	40	0	0	0	0
	point96	96	404	40	0	0	4	40	0	0	0	0
	point97	97	404	40	0	0	4	40	0	0	0	0
	point98	98	404	40	0	0	4	40	0	0	0	0
	point99	99	404	40	0	0	4	40	0	0	0	0
	point100	100	404	40	0	0	4	40	0	0	0	0
	point101	101	404	40	0	0	4	40	0	0	0	0
	point102	102	404	40	0	0	4	40	0	0	0	0
	point103	103	404	40	0	0	4	40	0	0	0	0
	point104	104	404	40	0	0	4	40	0	0	0	0
	point105	105	404	40	0	0	4	40	0	0	0	0
	point106	106	404	40	0	0	4	40	0	0	0	0
	point107	107	404	40	0	0	4	40	0	0	0	0
	point108	108	404	40	0	0	4	40	0	0	0	0
	point109	109	404	40	0	0	4	40	0	0	0	0
	point110	110	404	40	0	0	4	40	0	0	0	0
	point111	111										
Holmes Rd EB LT	point112	112	0	0	0	0	0	0	0	0	0	0

	point113	113										
Holmes Rd EB RT	point114	114	0	0	0	0	0	0	0	0	0	0
	point115	115	0	0	0	0	0	0	0	0	0	0
	point116	116	0	0	0	0	0	0	0	0	0	0
	point117	117	0	0	0	0	0	0	0	0	0	0
	point118	118										
Holmes Rd WB	point119	119	184	40	0	0	56	40	0	0	0	0
	point120	120	184	40	0	0	56	40	0	0	0	0
	point121	121	184	40	0	0	56	40	0	0	0	0
	point122	122	184	40	0	0	56	40	0	0	0	0
	point123	123	184	40	0	0	56	40	0	0	0	0
	point124	124	184	40	0	0	56	40	0	0	0	0
	point125	125	184	40	0	0	56	40	0	0	0	0
	point126	126	184	40	0	0	56	40	0	0	0	0
	point127	127	184	40	0	0	56	40	0	0	0	0
	point128	128	184	40	0	0	56	40	0	0	0	0
	point129	129	184	40	0	0	56	40	0	0	0	0
	point130	130	184	40	0	0	56	40	0	0	0	0
	point131	131	184	40	0	0	56	40	0	0	0	0
	point132	132	184	40	0	0	56	40	0	0	0	0
	point133	133	184	40	0	0	56	40	0	0	0	0
	point134	134	184	40	0	0	56	40	0	0	0	0
	point135	135	184	40	0	0	56	40	0	0	0	0
	point136	136	184	40	0	0	56	40	0	0	0	0
	point137	137	184	40	0	0	56	40	0	0	0	0
	point138	138	184	40	0	0	56	40	0	0	0	0
	point139	139	184	40	0	0	56	40	0	0	0	0
	point140	140	184	40	0	0	56	40	0	0	0	0
	point141	141	184	40	0	0	56	40	0	0	0	0
	point142	142	184	40	0	0	56	40	0	0	0	0
	point143	143	184	40	0	0	56	40	0	0	0	0
	point144	144	184	40	0	0	56	40	0	0	0	0
	point145	145	184	40	0	0	56	40	0	0	0	0
	point146	146	184	40	0	0	56	40	0	0	0	0
	point147	147	184	40	0	0	56	40	0	0	0	0
	point148	148	184	40	0	0	56	40	0	0	0	0

	point149	149	184	40	0	0	56	40	0	0	0	0
	point150	150	184	40	0	0	56	40	0	0	0	0
	point151	151	184	40	0	0	56	40	0	0	0	0
	point152	152	184	40	0	0	56	40	0	0	0	0
	point153	153	184	40	0	0	56	40	0	0	0	0
	point154	154	184	40	0	0	56	40	0	0	0	0
	point155	155	184	40	0	0	56	40	0	0	0	0
	point156	156	184	40	0	0	56	40	0	0	0	0
	point157	157	184	40	0	0	56	40	0	0	0	0
	point158	158	184	40	0	0	56	40	0	0	0	0
	point159	159	184	40	0	0	56	40	0	0	0	0
	point160	160	184	40	0	0	56	40	0	0	0	0
	point161	161	184	40	0	0	56	40	0	0	0	0
	point162	162	184	40	0	0	56	40	0	0	0	0
	point163	163	184	40	0	0	56	40	0	0	0	0
	point164	164										
Holmes Rd WB LT	point165	165	0	0	0	0	0	0	0	0	0	0
	point166	166	0	0	0	0	0	0	0	0	0	0
	point167	167										
Holmes Rd WB LT IN	point168	168	0	0	0	0	0	0	0	0	0	0
	point169	169										
Holmes Rd WB LT OUT	point170	170	0	0	0	0	0	0	0	0	0	0
	point171	171										

EPEI
Cleary
6 August 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: ENS2001
RUN: FM2
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
FM2	1	1	63.2	62.4	66	-0.8	15	----	62.4	0.0	7	-7.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Field Measurement 3

Noise Assessment Field Data Sheet

Project Data

Project Name: Holmes Rd Date: 5/29/20

Project No.: EM&20011 County: Shelby

Sampling Data

Measurement No.: 3 15 minute sample period: 8:35 to 8:50 LeqA: 60.0

SLM: Bruel & Kjaer 2238 Mediator Factory Calibrated: 21October2011

Field Calibrated: Date/ 5/28/2020 Initials/ AC

Weather Conditions

68°, cloudy, 92% humidity, 6 mph NW

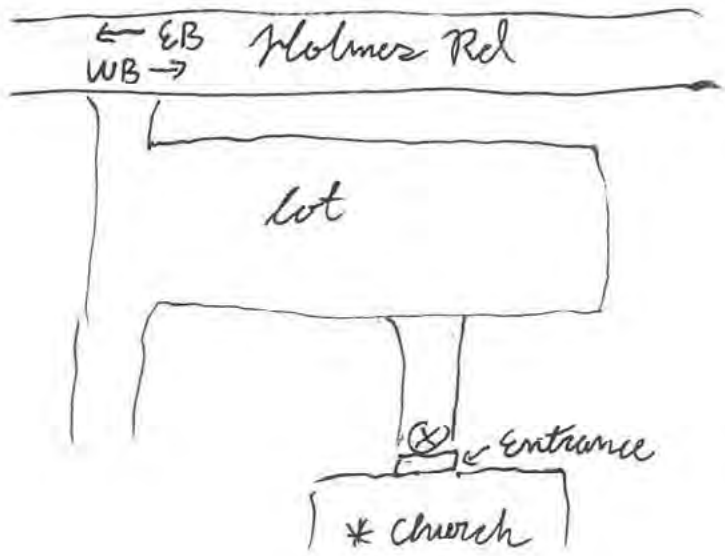
Traffic

Road Name: Holmes Rd. **Posted Speed Limit:** 40

	15 min				Hourly			
	EB (WB) NB SB		EB (WB) NB SB		EB (WB) NB SB		EB (WB) NB SB	
Cars	41		57		164		228	
Med Trucks	2		1		8		4	
Heavy Trucks	10		7		40		28	
Motorcycle								
Bus								

Notes/Site Sketch

*Pentacostal Praise Church of God



EPEI						**6 August 2020**					
Cleary						**TNM 2.5**					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	**ENS2001**										
RUN:	**FM3**										
Receiver											
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**				**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**		**NR**	**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**	**Goal**	**Calc.**
			ft	ft	ft	ft	dBA	dBA	dB	dB	
FM3	1	1	780,877.3	269,230.1	333.92	4.92	60.00	66	15.0	7.0	Y

EPEI			**6 August 2020**									
Cleary			**TNM 2.5**									
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	**ENS2001**											
RUN:	**FM3**											
Roadway	**Points**											
Name	**Name**	**No.**	**Segment**									
			Autos		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**	
			V	**S**	**V**	**S**	**V**	**S**	**V**	**S**	**V**	**S**
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Holmes Rd EB	point54	54	228	40	4	40	28	40	0	0	0	0
	point55	55	228	40	4	40	28	40	0	0	0	0
	point56	56	228	40	4	40	28	40	0	0	0	0
	point57	57	228	40	4	40	28	40	0	0	0	0
	point58	58	228	40	4	40	28	40	0	0	0	0
	point59	59	228	40	4	40	28	40	0	0	0	0
	point60	60	228	40	4	40	28	40	0	0	0	0
	point61	61	228	40	4	40	28	40	0	0	0	0
	point62	62	228	40	4	40	28	40	0	0	0	0
	point63	63	228	40	4	40	28	40	0	0	0	0
	point64	64	228	40	4	40	28	40	0	0	0	0
	point65	65	228	40	4	40	28	40	0	0	0	0
	point66	66	228	40	4	40	28	40	0	0	0	0
	point67	67	228	40	4	40	28	40	0	0	0	0
	point68	68	228	40	4	40	28	40	0	0	0	0
	point69	69	228	40	4	40	28	40	0	0	0	0
	point70	70	228	40	4	40	28	40	0	0	0	0
	point71	71	228	40	4	40	28	40	0	0	0	0
	point72	72	228	40	4	40	28	40	0	0	0	0
	point73	73	228	40	4	40	28	40	0	0	0	0
	point74	74	228	40	4	40	28	40	0	0	0	0
	point75	75	228	40	4	40	28	40	0	0	0	0
	point76	76	228	40	4	40	28	40	0	0	0	0

	point77	77	228	40	4	40	28	40	0	0	0	0
	point78	78	228	40	4	40	28	40	0	0	0	0
	point79	79	228	40	4	40	28	40	0	0	0	0
	point80	80	228	40	4	40	28	40	0	0	0	0
	point81	81	228	40	4	40	28	40	0	0	0	0
	point82	82	228	40	4	40	28	40	0	0	0	0
	point83	83	228	40	4	40	28	40	0	0	0	0
	point84	84	228	40	4	40	28	40	0	0	0	0
	point85	85	228	40	4	40	28	40	0	0	0	0
	point86	86	228	40	4	40	28	40	0	0	0	0
	point87	87	228	40	4	40	28	40	0	0	0	0
	point88	88	228	40	4	40	28	40	0	0	0	0
	point89	89	228	40	4	40	28	40	0	0	0	0
	point90	90	228	40	4	40	28	40	0	0	0	0
	point91	91	228	40	4	40	28	40	0	0	0	0
	point92	92	228	40	4	40	28	40	0	0	0	0
	point93	93	228	40	4	40	28	40	0	0	0	0
	point94	94	228	40	4	40	28	40	0	0	0	0
	point95	95	228	40	4	40	28	40	0	0	0	0
	point96	96	228	40	4	40	28	40	0	0	0	0
	point97	97	228	40	4	40	28	40	0	0	0	0
	point98	98	228	40	4	40	28	40	0	0	0	0
	point99	99	228	40	4	40	28	40	0	0	0	0
	point100	100	228	40	4	40	28	40	0	0	0	0
	point101	101	228	40	4	40	28	40	0	0	0	0
	point102	102	228	40	4	40	28	40	0	0	0	0
	point103	103	228	40	4	40	28	40	0	0	0	0
	point104	104	228	40	4	40	28	40	0	0	0	0
	point105	105	228	40	4	40	28	40	0	0	0	0
	point106	106	228	40	4	40	28	40	0	0	0	0
	point107	107	228	40	4	40	28	40	0	0	0	0
	point108	108	228	40	4	40	28	40	0	0	0	0
	point109	109	228	40	4	40	28	40	0	0	0	0
	point110	110	228	40	4	40	28	40	0	0	0	0
	point111	111										
Holmes Rd EB LT	point112	112	0	0	0	0	0	0	0	0	0	0

	point113	113										
Holmes Rd EB RT	point114	114	0	0	0	0	0	0	0	0	0	0
	point115	115	0	0	0	0	0	0	0	0	0	0
	point116	116	0	0	0	0	0	0	0	0	0	0
	point117	117	0	0	0	0	0	0	0	0	0	0
	point118	118										
Holmes Rd WB	point119	119	164	40	8	40	40	40	0	0	0	0
	point120	120	164	40	8	40	40	40	0	0	0	0
	point121	121	164	40	8	40	40	40	0	0	0	0
	point122	122	164	40	8	40	40	40	0	0	0	0
	point123	123	164	40	8	40	40	40	0	0	0	0
	point124	124	164	40	8	40	40	40	0	0	0	0
	point125	125	164	40	8	40	40	40	0	0	0	0
	point126	126	164	40	8	40	40	40	0	0	0	0
	point127	127	164	40	8	40	40	40	0	0	0	0
	point128	128	164	40	8	40	40	40	0	0	0	0
	point129	129	164	40	8	40	40	40	0	0	0	0
	point130	130	164	40	8	40	40	40	0	0	0	0
	point131	131	164	40	8	40	40	40	0	0	0	0
	point132	132	164	40	8	40	40	40	0	0	0	0
	point133	133	164	40	8	40	40	40	0	0	0	0
	point134	134	164	40	8	40	40	40	0	0	0	0
	point135	135	164	40	8	40	40	40	0	0	0	0
	point136	136	164	40	8	40	40	40	0	0	0	0
	point137	137	164	40	8	40	40	40	0	0	0	0
	point138	138	164	40	8	40	40	40	0	0	0	0
	point139	139	164	40	8	40	40	40	0	0	0	0
	point140	140	164	40	8	40	40	40	0	0	0	0
	point141	141	164	40	8	40	40	40	0	0	0	0
	point142	142	164	40	8	40	40	40	0	0	0	0
	point143	143	164	40	8	40	40	40	0	0	0	0
	point144	144	164	40	8	40	40	40	0	0	0	0
	point145	145	164	40	8	40	40	40	0	0	0	0
	point146	146	164	40	8	40	40	40	0	0	0	0
	point147	147	164	40	8	40	40	40	0	0	0	0
	point148	148	164	40	8	40	40	40	0	0	0	0

	point149	149	164	40	8	40	40	40	0	0	0	0
	point150	150	164	40	8	40	40	40	0	0	0	0
	point151	151	164	40	8	40	40	40	0	0	0	0
	point152	152	164	40	8	40	40	40	0	0	0	0
	point153	153	164	40	8	40	40	40	0	0	0	0
	point154	154	164	40	8	40	40	40	0	0	0	0
	point155	155	164	40	8	40	40	40	0	0	0	0
	point156	156	164	40	8	40	40	40	0	0	0	0
	point157	157	164	40	8	40	40	40	0	0	0	0
	point158	158	164	40	8	40	40	40	0	0	0	0
	point159	159	164	40	8	40	40	40	0	0	0	0
	point160	160	164	40	8	40	40	40	0	0	0	0
	point161	161	164	40	8	40	40	40	0	0	0	0
	point162	162	164	40	8	40	40	40	0	0	0	0
	point163	163	164	40	8	40	40	40	0	0	0	0
	point164	164										
Holmes Rd WB LT	point165	165	0	0	0	0	0	0	0	0	0	0
	point166	166	0	0	0	0	0	0	0	0	0	0
	point167	167										
Holmes Rd WB LT IN	point168	168	0	0	0	0	0	0	0	0	0	0
	point169	169										
Holmes Rd WB LT OUT	point170	170	0	0	0	0	0	0	0	0	0	0
	point171	171										

EPEI 6 August 2020
Cleary TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: ENS2001
RUN: FM3
BARRIER DESIGN: INPUT HEIGHTS
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.
ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existing		Type Impact	With Barrier Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
FM3	1	1	60.0	58.0	66	-2.0	15	----	58.0	0.0	7	-7.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Attachment 4
TNM Files - Receiver Input

EPEI
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6 August 2020
TNM 2.5

Receiver inputs are the same for the No-Build and Build models

INPUT: RECEIVERS
PROJECT/CONTRACT: ENS2001
RUN: NoBuild

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
1	1	1	773,968.4	266,164.6	362.97	4.92	60.00	66	15.0	7.0	Y
2	1734	1	774,218.4	266,164.6	360.46	4.92	0.00	66	15.0	7.0	Y
3	1735	1	774,468.4	266,164.6	355.22	4.92	0.00	66	15.0	7.0	Y
4	1736	1	774,718.4	266,164.6	341.20	4.92	0.00	66	15.0	7.0	Y
5	1737	1	774,968.4	266,164.6	352.26	4.92	0.00	66	15.0	7.0	Y
6	1738	1	775,218.4	266,164.6	341.81	4.92	0.00	66	15.0	7.0	Y
7	1739	1	775,468.4	266,164.6	349.92	4.92	0.00	66	15.0	7.0	Y
8	1740	1	775,718.4	266,164.6	350.47	4.92	0.00	66	15.0	7.0	Y
9	1741	1	775,968.4	266,164.6	342.52	4.92	0.00	66	15.0	7.0	Y
10	1742	1	776,218.4	266,164.6	358.35	4.92	0.00	66	15.0	7.0	Y
11	1743	1	776,468.4	266,164.6	363.52	4.92	0.00	66	15.0	7.0	Y
12	1744	1	776,718.4	266,164.6	364.07	4.92	0.00	66	15.0	7.0	Y
13	1745	1	776,968.4	266,164.6	352.96	4.92	0.00	66	15.0	7.0	Y
14	1746	1	777,218.4	266,164.6	360.38	4.92	0.00	66	15.0	7.0	Y
15	1747	1	777,468.4	266,164.6	346.18	4.92	0.00	66	15.0	7.0	Y
16	1748	1	777,718.4	266,164.6	341.56	4.92	0.00	66	15.0	7.0	Y
17	1749	1	777,968.4	266,164.6	361.15	4.92	0.00	66	15.0	7.0	Y
18	1750	1	778,218.4	266,164.6	367.00	4.92	0.00	66	15.0	7.0	Y
19	1751	1	778,468.4	266,164.6	364.84	4.92	0.00	66	15.0	7.0	Y
20	1752	1	778,718.4	266,164.6	354.75	4.92	0.00	66	15.0	7.0	Y
21	1753	1	778,968.4	266,164.6	369.01	4.92	0.00	66	15.0	7.0	Y
22	1754	1	779,218.4	266,164.6	371.53	4.92	0.00	66	15.0	7.0	Y

23	1755	1	779,468.4	266,164.6	376.81	4.92	0.00	66	15.0	7.0	Y
24	1756	1	779,718.4	266,164.6	379.01	4.92	0.00	66	15.0	7.0	Y
25	1757	1	779,968.4	266,164.6	378.38	4.92	0.00	66	15.0	7.0	Y
26	1758	1	780,218.4	266,164.6	376.96	4.92	0.00	66	15.0	7.0	Y
27	1759	1	780,468.4	266,164.6	370.67	4.92	0.00	66	15.0	7.0	Y
28	1760	1	780,718.4	266,164.6	364.25	4.92	0.00	66	15.0	7.0	Y
29	1761	1	780,968.4	266,164.6	369.71	4.92	0.00	66	15.0	7.0	Y
30	1762	1	781,218.4	266,164.6	375.61	4.92	0.00	66	15.0	7.0	Y
31	1763	1	781,468.4	266,164.6	386.59	4.92	0.00	66	15.0	7.0	Y
32	1764	1	781,718.4	266,164.6	392.66	4.92	0.00	66	15.0	7.0	Y
33	1765	1	781,968.4	266,164.6	390.80	4.92	0.00	66	15.0	7.0	Y
34	1766	1	782,218.4	266,164.6	378.43	4.92	0.00	66	15.0	7.0	Y
35	1767	1	782,468.4	266,164.6	365.54	4.92	0.00	66	15.0	7.0	Y
36	1768	1	782,718.4	266,164.6	373.09	4.92	0.00	66	15.0	7.0	Y
37	1769	1	782,968.4	266,164.6	378.29	4.92	0.00	66	15.0	7.0	Y
38	1770	1	783,218.4	266,164.6	359.74	4.92	0.00	66	15.0	7.0	Y
39	1771	1	783,468.4	266,164.6	368.46	4.92	0.00	66	15.0	7.0	Y
40	1772	1	783,718.4	266,164.6	379.66	4.92	0.00	66	15.0	7.0	Y
41	1773	1	783,968.4	266,164.6	386.66	4.92	0.00	66	15.0	7.0	Y
42	1774	1	784,218.4	266,164.6	386.64	4.92	0.00	66	15.0	7.0	Y
43	1775	1	784,468.4	266,164.6	395.59	4.92	0.00	66	15.0	7.0	Y
44	1776	1	773,968.4	266,414.6	355.33	4.92	0.00	66	15.0	7.0	Y
45	1777	1	774,218.4	266,414.6	352.94	4.92	0.00	66	15.0	7.0	Y
46	1778	1	774,468.4	266,414.6	347.87	4.92	0.00	66	15.0	7.0	Y
47	1779	1	774,718.4	266,414.6	347.65	4.92	0.00	66	15.0	7.0	Y
48	1780	1	774,968.4	266,414.6	356.14	4.92	0.00	66	15.0	7.0	Y
49	1781	1	775,218.4	266,414.6	348.15	4.92	0.00	66	15.0	7.0	Y
50	1782	1	775,468.4	266,414.6	353.59	4.92	0.00	66	15.0	7.0	Y
51	1783	1	775,718.4	266,414.6	356.06	4.92	0.00	66	15.0	7.0	Y
52	1784	1	775,968.4	266,414.6	349.28	4.92	0.00	66	15.0	7.0	Y
53	1785	1	776,218.4	266,414.6	348.10	4.92	0.00	66	15.0	7.0	Y
54	1786	1	776,468.4	266,414.6	356.40	4.92	0.00	66	15.0	7.0	Y
55	1787	1	776,718.4	266,414.6	364.53	4.92	0.00	66	15.0	7.0	Y
56	1788	1	776,968.4	266,414.6	362.44	4.92	0.00	66	15.0	7.0	Y
57	1789	1	777,218.4	266,414.6	351.20	4.92	0.00	66	15.0	7.0	Y
58	1790	1	777,468.4	266,414.6	343.10	4.92	0.00	66	15.0	7.0	Y

59	1791	1	777,718.4	266,414.6	342.97	4.92	0.00	66	15.0	7.0	Y
60	1792	1	777,968.4	266,414.6	343.94	4.92	0.00	66	15.0	7.0	Y
61	1793	1	778,218.4	266,414.6	354.09	4.92	0.00	66	15.0	7.0	Y
62	1794	1	778,468.4	266,414.6	369.28	4.92	0.00	66	15.0	7.0	Y
63	1795	1	778,718.4	266,414.6	371.04	4.92	0.00	66	15.0	7.0	Y
64	1796	1	778,968.4	266,414.6	377.44	4.92	0.00	66	15.0	7.0	Y
65	1797	1	779,218.4	266,414.6	380.01	4.92	0.00	66	15.0	7.0	Y
66	1798	1	779,468.4	266,414.6	379.16	4.92	0.00	66	15.0	7.0	Y
67	1799	1	779,718.4	266,414.6	377.09	4.92	0.00	66	15.0	7.0	Y
68	1800	1	779,968.4	266,414.6	371.87	4.92	0.00	66	15.0	7.0	Y
69	1801	1	780,218.4	266,414.6	373.09	4.92	0.00	66	15.0	7.0	Y
70	1802	1	780,468.4	266,414.6	362.14	4.92	0.00	66	15.0	7.0	Y
71	1803	1	780,718.4	266,414.6	369.45	4.92	0.00	66	15.0	7.0	Y
72	1804	1	780,968.4	266,414.6	380.16	4.92	0.00	66	15.0	7.0	Y
73	1805	1	781,218.4	266,414.6	377.98	4.92	0.00	66	15.0	7.0	Y
74	1806	1	781,468.4	266,414.6	380.75	4.92	0.00	66	15.0	7.0	Y
75	1807	1	781,718.4	266,414.6	387.81	4.92	0.00	66	15.0	7.0	Y
76	1808	1	781,968.4	266,414.6	368.94	4.92	0.00	66	15.0	7.0	Y
77	1809	1	782,218.4	266,414.6	368.34	4.92	0.00	66	15.0	7.0	Y
78	1810	1	782,468.4	266,414.6	356.49	4.92	0.00	66	15.0	7.0	Y
79	1811	1	782,718.4	266,414.6	363.61	4.92	0.00	66	15.0	7.0	Y
80	1812	1	782,968.4	266,414.6	373.47	4.92	0.00	66	15.0	7.0	Y
81	1813	1	783,218.4	266,414.6	357.86	4.92	0.00	66	15.0	7.0	Y
82	1814	1	783,468.4	266,414.6	372.77	4.92	0.00	66	15.0	7.0	Y
83	1815	1	783,718.4	266,414.6	381.25	4.92	0.00	66	15.0	7.0	Y
84	1816	1	783,968.4	266,414.6	388.06	4.92	0.00	66	15.0	7.0	Y
85	1817	1	784,218.4	266,414.6	388.50	4.92	0.00	66	15.0	7.0	Y
86	1818	1	784,468.4	266,414.6	395.25	4.92	0.00	66	15.0	7.0	Y
87	1819	1	773,968.4	266,664.6	352.52	4.92	0.00	66	15.0	7.0	Y
88	1820	1	774,218.4	266,664.6	353.95	4.92	0.00	66	15.0	7.0	Y
89	1821	1	774,468.4	266,664.6	353.79	4.92	0.00	66	15.0	7.0	Y
90	1822	1	774,718.4	266,664.6	353.98	4.92	0.00	66	15.0	7.0	Y
91	1823	1	774,968.4	266,664.6	355.59	4.92	0.00	66	15.0	7.0	Y
92	1824	1	775,218.4	266,664.6	358.61	4.92	0.00	66	15.0	7.0	Y
93	1825	1	775,468.4	266,664.6	362.64	4.92	0.00	66	15.0	7.0	Y
94	1826	1	775,718.4	266,664.6	363.44	4.92	0.00	66	15.0	7.0	Y

95	1827	1	775,968.4	266,664.6	357.74	4.92	0.00	66	15.0	7.0	Y
96	1828	1	776,218.4	266,664.6	352.08	4.92	0.00	66	15.0	7.0	Y
97	1829	1	776,468.4	266,664.6	355.17	4.92	0.00	66	15.0	7.0	Y
98	1830	1	776,718.4	266,664.6	360.51	4.92	0.00	66	15.0	7.0	Y
99	1831	1	776,968.4	266,664.6	364.57	4.92	0.00	66	15.0	7.0	Y
100	1832	1	777,218.4	266,664.6	356.23	4.92	0.00	66	15.0	7.0	Y
101	1833	1	777,468.4	266,664.6	359.64	4.92	0.00	66	15.0	7.0	Y
102	1834	1	777,718.4	266,664.6	355.94	4.92	0.00	66	15.0	7.0	Y
103	1835	1	777,968.4	266,664.6	359.43	4.92	0.00	66	15.0	7.0	Y
104	1836	1	778,218.4	266,664.6	361.08	4.92	0.00	66	15.0	7.0	Y
105	1837	1	778,468.4	266,664.6	365.58	4.92	0.00	66	15.0	7.0	Y
106	1838	1	778,718.4	266,664.6	370.08	4.92	0.00	66	15.0	7.0	Y
107	1839	1	778,968.4	266,664.6	373.83	4.92	0.00	66	15.0	7.0	Y
108	1840	1	779,218.4	266,664.6	373.09	4.92	0.00	66	15.0	7.0	Y
109	1841	1	779,468.4	266,664.6	371.19	4.92	0.00	66	15.0	7.0	Y
110	1842	1	779,718.4	266,664.6	373.34	4.92	0.00	66	15.0	7.0	Y
111	1843	1	779,968.4	266,664.6	359.10	4.92	0.00	66	15.0	7.0	Y
112	1844	1	780,218.4	266,664.6	357.29	4.92	0.00	66	15.0	7.0	Y
113	1845	1	780,468.4	266,664.6	361.59	4.92	0.00	66	15.0	7.0	Y
114	1846	1	780,718.4	266,664.6	376.20	4.92	0.00	66	15.0	7.0	Y
115	1847	1	780,968.4	266,664.6	382.61	4.92	0.00	66	15.0	7.0	Y
116	1848	1	781,218.4	266,664.6	386.15	4.92	0.00	66	15.0	7.0	Y
117	1849	1	781,468.4	266,664.6	375.72	4.92	0.00	66	15.0	7.0	Y
118	1851	1	781,718.4	266,664.6	390.14	4.92	0.00	66	15.0	7.0	Y
119	1852	1	781,968.4	266,664.6	382.31	4.92	0.00	66	15.0	7.0	Y
120	1853	1	782,218.4	266,664.6	368.67	4.92	0.00	66	15.0	7.0	Y
121	1854	1	782,468.4	266,664.6	353.54	4.92	0.00	66	15.0	7.0	Y
122	1855	1	782,718.4	266,664.6	357.62	4.92	0.00	66	15.0	7.0	Y
123	1856	1	782,968.4	266,664.6	368.31	4.92	0.00	66	15.0	7.0	Y
124	1857	1	783,218.4	266,664.6	355.63	4.92	0.00	66	15.0	7.0	Y
125	1858	1	783,468.4	266,664.6	368.60	4.92	0.00	66	15.0	7.0	Y
126	1859	1	783,718.4	266,664.6	377.65	4.92	0.00	66	15.0	7.0	Y
127	1860	1	783,968.4	266,664.6	381.93	4.92	0.00	66	15.0	7.0	Y
128	1861	1	784,218.4	266,664.6	383.00	4.92	0.00	66	15.0	7.0	Y
129	1862	1	784,468.4	266,664.6	393.86	4.92	0.00	66	15.0	7.0	Y
130	1863	1	773,968.4	266,914.6	354.00	4.92	0.00	66	15.0	7.0	Y

131	1864	1	774,218.4	266,914.6	354.89	4.92	0.00	66	15.0	7.0	Y
132	1865	1	774,468.4	266,914.6	354.93	4.92	0.00	66	15.0	7.0	Y
133	1866	1	774,718.4	266,914.6	354.79	4.92	0.00	66	15.0	7.0	Y
134	1867	1	774,968.4	266,914.6	355.77	4.92	0.00	66	15.0	7.0	Y
135	1868	1	775,218.4	266,914.6	358.86	4.92	0.00	66	15.0	7.0	Y
136	1869	1	775,468.4	266,914.6	361.63	4.92	0.00	66	15.0	7.0	Y
137	1870	1	775,718.4	266,914.6	365.58	4.92	0.00	66	15.0	7.0	Y
138	1871	1	775,968.4	266,914.6	362.13	4.92	0.00	66	15.0	7.0	Y
139	1872	1	776,218.4	266,914.6	356.21	4.92	0.00	66	15.0	7.0	Y
140	1873	1	776,468.4	266,914.6	359.82	4.92	0.00	66	15.0	7.0	Y
141	1874	1	776,718.4	266,914.6	354.39	4.92	0.00	66	15.0	7.0	Y
142	1875	1	776,968.4	266,914.6	355.63	4.92	0.00	66	15.0	7.0	Y
143	1876	1	777,218.4	266,914.6	359.31	4.92	0.00	66	15.0	7.0	Y
144	1877	1	777,468.4	266,914.6	362.15	4.92	0.00	66	15.0	7.0	Y
145	1878	1	777,718.4	266,914.6	357.47	4.92	0.00	66	15.0	7.0	Y
146	1879	1	777,968.4	266,914.6	354.35	4.92	0.00	66	15.0	7.0	Y
147	1880	1	778,218.4	266,914.6	356.78	4.92	0.00	66	15.0	7.0	Y
148	1881	1	778,468.4	266,914.6	361.49	4.92	0.00	66	15.0	7.0	Y
149	1882	1	778,718.4	266,914.6	365.75	4.92	0.00	66	15.0	7.0	Y
150	1883	1	778,968.4	266,914.6	370.07	4.92	0.00	66	15.0	7.0	Y
151	1884	1	779,218.4	266,914.6	370.27	4.92	0.00	66	15.0	7.0	Y
152	1885	1	779,468.4	266,914.6	359.80	4.92	0.00	66	15.0	7.0	Y
153	1886	1	779,718.4	266,914.6	364.17	4.92	0.00	66	15.0	7.0	Y
154	1887	1	779,968.4	266,914.6	350.62	4.92	0.00	66	15.0	7.0	Y
155	1888	1	780,218.4	266,914.6	364.85	4.92	0.00	66	15.0	7.0	Y
156	1889	1	780,468.4	266,914.6	371.29	4.92	0.00	66	15.0	7.0	Y
157	1890	1	780,718.4	266,914.6	371.26	4.92	0.00	66	15.0	7.0	Y
158	1891	1	780,968.4	266,914.6	381.92	4.92	0.00	66	15.0	7.0	Y
159	1892	1	781,218.4	266,914.6	370.05	4.92	0.00	66	15.0	7.0	Y
160	1893	1	781,468.4	266,914.6	360.90	4.92	0.00	66	15.0	7.0	Y
161	1894	1	781,718.4	266,914.6	386.02	4.92	0.00	66	15.0	7.0	Y
162	1895	1	781,968.4	266,914.6	382.82	4.92	0.00	66	15.0	7.0	Y
163	1896	1	782,218.4	266,914.6	371.33	4.92	0.00	66	15.0	7.0	Y
164	1897	1	782,468.4	266,914.6	357.45	4.92	0.00	66	15.0	7.0	Y
165	1898	1	782,718.4	266,914.6	353.73	4.92	0.00	66	15.0	7.0	Y
166	1899	1	782,968.4	266,914.6	354.08	4.92	0.00	66	15.0	7.0	Y

167	1900	1	783,218.4	266,914.6	354.32	4.92	0.00	66	15.0	7.0	Y
168	1901	1	783,468.4	266,914.6	357.91	4.92	0.00	66	15.0	7.0	Y
169	1902	1	783,718.4	266,914.6	363.93	4.92	0.00	66	15.0	7.0	Y
170	1903	1	783,968.4	266,914.6	370.30	4.92	0.00	66	15.0	7.0	Y
171	1904	1	784,218.4	266,914.6	377.50	4.92	0.00	66	15.0	7.0	Y
172	1905	1	784,468.4	266,914.6	391.45	4.92	0.00	66	15.0	7.0	Y
173	1906	1	773,968.4	267,164.6	348.10	4.92	0.00	66	15.0	7.0	Y
174	1907	1	774,218.4	267,164.6	353.00	4.92	0.00	66	15.0	7.0	Y
175	1908	1	774,468.4	267,164.6	352.67	4.92	0.00	66	15.0	7.0	Y
176	1909	1	774,718.4	267,164.6	353.38	4.92	0.00	66	15.0	7.0	Y
177	1910	1	774,968.4	267,164.6	353.76	4.92	0.00	66	15.0	7.0	Y
178	1911	1	775,218.4	267,164.6	354.77	4.92	0.00	66	15.0	7.0	Y
179	1912	1	775,468.4	267,164.6	354.90	4.92	0.00	66	15.0	7.0	Y
180	1913	1	775,718.4	267,164.6	356.65	4.92	0.00	66	15.0	7.0	Y
181	1914	1	775,968.4	267,164.6	359.76	4.92	0.00	66	15.0	7.0	Y
182	1915	1	776,218.4	267,164.6	362.51	4.92	0.00	66	15.0	7.0	Y
183	1916	1	776,468.4	267,164.6	362.81	4.92	0.00	66	15.0	7.0	Y
184	1917	1	776,718.4	267,164.6	356.88	4.92	0.00	66	15.0	7.0	Y
185	1918	1	776,968.4	267,164.6	344.42	4.92	0.00	66	15.0	7.0	Y
186	1919	1	777,218.4	267,164.6	347.81	4.92	0.00	66	15.0	7.0	Y
187	1920	1	777,468.4	267,164.6	359.54	4.92	0.00	66	15.0	7.0	Y
188	1921	1	777,718.4	267,164.6	354.96	4.92	0.00	66	15.0	7.0	Y
189	1922	1	777,968.4	267,164.6	348.40	4.92	0.00	66	15.0	7.0	Y
190	1923	1	778,218.4	267,164.6	351.74	4.92	0.00	66	15.0	7.0	Y
191	1924	1	778,468.4	267,164.6	356.71	4.92	0.00	66	15.0	7.0	Y
192	1925	1	778,718.4	267,164.6	362.47	4.92	0.00	66	15.0	7.0	Y
193	1926	1	778,968.4	267,164.6	369.55	4.92	0.00	66	15.0	7.0	Y
194	1927	1	779,218.4	267,164.6	365.78	4.92	0.00	66	15.0	7.0	Y
195	1928	1	779,468.4	267,164.6	359.71	4.92	0.00	66	15.0	7.0	Y
196	1929	1	779,718.4	267,164.6	349.17	4.92	0.00	66	15.0	7.0	Y
197	1930	1	779,968.4	267,164.6	359.58	4.92	0.00	66	15.0	7.0	Y
198	1931	1	780,218.4	267,164.6	360.58	4.92	0.00	66	15.0	7.0	Y
199	1932	1	780,468.4	267,164.6	368.60	4.92	0.00	66	15.0	7.0	Y
200	1933	1	780,718.4	267,164.6	379.82	4.92	0.00	66	15.0	7.0	Y
201	1934	1	780,968.4	267,164.6	380.51	4.92	0.00	66	15.0	7.0	Y
202	1935	1	781,218.4	267,164.6	365.83	4.92	0.00	66	15.0	7.0	Y

203	1936	1	781,468.4	267,164.6	358.74	4.92	0.00	66	15.0	7.0	Y
204	1937	1	781,718.4	267,164.6	360.56	4.92	0.00	66	15.0	7.0	Y
205	1938	1	781,968.4	267,164.6	379.82	4.92	0.00	66	15.0	7.0	Y
206	1939	1	782,218.4	267,164.6	375.73	4.92	0.00	66	15.0	7.0	Y
207	1940	1	782,468.4	267,164.6	362.04	4.92	0.00	66	15.0	7.0	Y
208	1941	1	782,718.4	267,164.6	347.84	4.92	0.00	66	15.0	7.0	Y
209	1942	1	782,968.4	267,164.6	351.69	4.92	0.00	66	15.0	7.0	Y
210	1943	1	783,218.4	267,164.6	355.10	4.92	0.00	66	15.0	7.0	Y
211	1944	1	783,468.4	267,164.6	359.76	4.92	0.00	66	15.0	7.0	Y
212	1945	1	783,718.4	267,164.6	370.13	4.92	0.00	66	15.0	7.0	Y
213	1946	1	783,968.4	267,164.6	373.13	4.92	0.00	66	15.0	7.0	Y
214	1947	1	784,218.4	267,164.6	373.04	4.92	0.00	66	15.0	7.0	Y
215	1948	1	784,468.4	267,164.6	387.35	4.92	0.00	66	15.0	7.0	Y
216	1949	1	773,968.4	267,414.6	344.48	4.92	0.00	66	15.0	7.0	Y
217	1950	1	774,218.4	267,414.6	353.45	4.92	0.00	66	15.0	7.0	Y
218	1951	1	774,468.4	267,414.6	354.14	4.92	0.00	66	15.0	7.0	Y
219	1952	1	774,718.4	267,414.6	353.55	4.92	0.00	66	15.0	7.0	Y
220	1953	1	774,968.4	267,414.6	355.34	4.92	0.00	66	15.0	7.0	Y
221	1954	1	775,218.4	267,414.6	356.04	4.92	0.00	66	15.0	7.0	Y
222	1955	1	775,468.4	267,414.6	355.42	4.92	0.00	66	15.0	7.0	Y
223	1956	1	775,718.4	267,414.6	357.81	4.92	0.00	66	15.0	7.0	Y
224	1957	1	775,968.4	267,414.6	359.81	4.92	0.00	66	15.0	7.0	Y
225	1958	1	776,218.4	267,414.6	362.33	4.92	0.00	66	15.0	7.0	Y
226	1959	1	776,468.4	267,414.6	360.08	4.92	0.00	66	15.0	7.0	Y
227	1960	1	776,718.4	267,414.6	353.53	4.92	0.00	66	15.0	7.0	Y
228	1961	1	776,968.4	267,414.6	354.61	4.92	0.00	66	15.0	7.0	Y
229	1962	1	777,218.4	267,414.6	340.85	4.92	0.00	66	15.0	7.0	Y
230	1963	1	777,468.4	267,414.6	350.73	4.92	0.00	66	15.0	7.0	Y
231	1964	1	777,718.4	267,414.6	345.90	4.92	0.00	66	15.0	7.0	Y
232	1965	1	777,968.4	267,414.6	342.21	4.92	0.00	66	15.0	7.0	Y
233	1966	1	778,218.4	267,414.6	344.70	4.92	0.00	66	15.0	7.0	Y
234	1967	1	778,468.4	267,414.6	355.64	4.92	0.00	66	15.0	7.0	Y
235	1968	1	778,718.4	267,414.6	361.55	4.92	0.00	66	15.0	7.0	Y
236	1969	1	778,968.4	267,414.6	362.52	4.92	0.00	66	15.0	7.0	Y
237	1970	1	779,218.4	267,414.6	357.19	4.92	0.00	66	15.0	7.0	Y
238	1971	1	779,468.4	267,414.6	345.13	4.92	0.00	66	15.0	7.0	Y

239	1972	1	779,718.4	267,414.6	351.62	4.92	0.00	66	15.0	7.0	Y
240	1973	1	779,968.4	267,414.6	366.88	4.92	0.00	66	15.0	7.0	Y
241	1974	1	780,218.4	267,414.6	373.06	4.92	0.00	66	15.0	7.0	Y
242	1975	1	780,468.4	267,414.6	373.23	4.92	0.00	66	15.0	7.0	Y
243	1976	1	780,718.4	267,414.6	375.66	4.92	0.00	66	15.0	7.0	Y
244	1977	1	780,968.4	267,414.6	353.21	4.92	0.00	66	15.0	7.0	Y
245	1978	1	781,218.4	267,414.6	354.38	4.92	0.00	66	15.0	7.0	Y
246	1979	1	781,468.4	267,414.6	360.60	4.92	0.00	66	15.0	7.0	Y
247	1980	1	781,718.4	267,414.6	354.17	4.92	0.00	66	15.0	7.0	Y
248	1981	1	781,968.4	267,414.6	373.62	4.92	0.00	66	15.0	7.0	Y
249	1982	1	782,218.4	267,414.6	363.56	4.92	0.00	66	15.0	7.0	Y
250	1983	1	782,468.4	267,414.6	357.44	4.92	0.00	66	15.0	7.0	Y
251	1984	1	782,718.4	267,414.6	344.99	4.92	0.00	66	15.0	7.0	Y
252	1985	1	782,968.4	267,414.6	353.19	4.92	0.00	66	15.0	7.0	Y
253	1986	1	783,218.4	267,414.6	355.50	4.92	0.00	66	15.0	7.0	Y
254	1987	1	783,468.4	267,414.6	359.26	4.92	0.00	66	15.0	7.0	Y
255	1988	1	783,718.4	267,414.6	369.75	4.92	0.00	66	15.0	7.0	Y
256	1989	1	783,968.4	267,414.6	383.71	4.92	0.00	66	15.0	7.0	Y
257	1990	1	784,218.4	267,414.6	385.03	4.92	0.00	66	15.0	7.0	Y
258	1991	1	784,468.4	267,414.6	385.22	4.92	0.00	66	15.0	7.0	Y
259	1992	1	773,968.4	267,664.6	352.95	4.92	0.00	66	15.0	7.0	Y
260	1993	1	774,218.4	267,664.6	353.33	4.92	0.00	66	15.0	7.0	Y
261	1994	1	774,468.4	267,664.6	353.33	4.92	0.00	66	15.0	7.0	Y
262	1995	1	774,718.4	267,664.6	353.36	4.92	0.00	66	15.0	7.0	Y
263	1996	1	774,968.4	267,664.6	355.18	4.92	0.00	66	15.0	7.0	Y
264	1997	1	775,218.4	267,664.6	355.19	4.92	0.00	66	15.0	7.0	Y
265	1998	1	775,468.4	267,664.6	355.23	4.92	0.00	66	15.0	7.0	Y
266	1999	1	775,718.4	267,664.6	356.27	4.92	0.00	66	15.0	7.0	Y
267	2000	1	775,968.4	267,664.6	360.15	4.92	0.00	66	15.0	7.0	Y
268	2001	1	776,218.4	267,664.6	360.11	4.92	0.00	66	15.0	7.0	Y
269	2002	1	776,468.4	267,664.6	357.76	4.92	0.00	66	15.0	7.0	Y
270	2003	1	776,718.4	267,664.6	346.50	4.92	0.00	66	15.0	7.0	Y
271	2004	1	776,968.4	267,664.6	342.92	4.92	0.00	66	15.0	7.0	Y
272	2005	1	777,218.4	267,664.6	337.70	4.92	0.00	66	15.0	7.0	Y
273	2006	1	777,468.4	267,664.6	347.87	4.92	0.00	66	15.0	7.0	Y
274	2007	1	777,718.4	267,664.6	342.64	4.92	0.00	66	15.0	7.0	Y

275	2008	1	777,968.4	267,664.6	344.48	4.92	0.00	66	15.0	7.0	Y
276	2009	1	778,218.4	267,664.6	337.16	4.92	0.00	66	15.0	7.0	Y
277	2010	1	778,468.4	267,664.6	350.35	4.92	0.00	66	15.0	7.0	Y
278	2011	1	778,718.4	267,664.6	353.41	4.92	0.00	66	15.0	7.0	Y
279	2012	1	778,968.4	267,664.6	340.26	4.92	0.00	66	15.0	7.0	Y
280	2013	1	779,218.4	267,664.6	340.77	4.92	0.00	66	15.0	7.0	Y
281	2014	1	779,468.4	267,664.6	345.73	4.92	0.00	66	15.0	7.0	Y
282	2015	1	779,718.4	267,664.6	360.10	4.92	0.00	66	15.0	7.0	Y
283	2016	1	779,968.4	267,664.6	365.41	4.92	0.00	66	15.0	7.0	Y
284	2017	1	780,218.4	267,664.6	375.59	4.92	0.00	66	15.0	7.0	Y
285	2018	1	780,468.4	267,664.6	374.00	4.92	0.00	66	15.0	7.0	Y
286	2019	1	780,718.4	267,664.6	351.92	4.92	0.00	66	15.0	7.0	Y
287	2020	1	780,968.4	267,664.6	346.18	4.92	0.00	66	15.0	7.0	Y
288	2021	1	781,218.4	267,664.6	352.20	4.92	0.00	66	15.0	7.0	Y
289	2022	1	781,468.4	267,664.6	355.18	4.92	0.00	66	15.0	7.0	Y
290	2023	1	781,718.4	267,664.6	345.94	4.92	0.00	66	15.0	7.0	Y
291	2024	1	781,968.4	267,664.6	367.01	4.92	0.00	66	15.0	7.0	Y
292	2025	1	782,218.4	267,664.6	352.36	4.92	0.00	66	15.0	7.0	Y
293	2026	1	782,468.4	267,664.6	341.87	4.92	0.00	66	15.0	7.0	Y
294	2027	1	782,718.4	267,664.6	349.46	4.92	0.00	66	15.0	7.0	Y
295	2028	1	782,968.4	267,664.6	357.65	4.92	0.00	66	15.0	7.0	Y
296	2029	1	783,218.4	267,664.6	366.02	4.92	0.00	66	15.0	7.0	Y
297	2031	1	783,468.4	267,664.6	368.01	4.92	0.00	66	15.0	7.0	Y
298	2032	1	783,718.4	267,664.6	366.53	4.92	0.00	66	15.0	7.0	Y
299	2033	1	783,968.4	267,664.6	382.08	4.92	0.00	66	15.0	7.0	Y
300	2034	1	784,218.4	267,664.6	390.00	4.92	0.00	66	15.0	7.0	Y
301	2035	1	784,468.4	267,664.6	385.04	4.92	0.00	66	15.0	7.0	Y
302	2036	1	773,968.4	267,914.6	352.32	4.92	0.00	66	15.0	7.0	Y
303	2037	1	774,218.4	267,914.6	345.37	4.92	0.00	66	15.0	7.0	Y
304	2038	1	774,468.4	267,914.6	341.60	4.92	0.00	66	15.0	7.0	Y
305	2039	1	774,718.4	267,914.6	340.99	4.92	0.00	66	15.0	7.0	Y
306	2040	1	774,968.4	267,914.6	344.35	4.92	0.00	66	15.0	7.0	Y
307	2041	1	775,218.4	267,914.6	345.03	4.92	0.00	66	15.0	7.0	Y
308	2042	1	775,468.4	267,914.6	350.58	4.92	0.00	66	15.0	7.0	Y
309	2043	1	775,718.4	267,914.6	356.29	4.92	0.00	66	15.0	7.0	Y
310	2044	1	775,968.4	267,914.6	361.95	4.92	0.00	66	15.0	7.0	Y

311	2045	1	776,218.4	267,914.6	362.52	4.92	0.00	66	15.0	7.0	Y
312	2046	1	776,468.4	267,914.6	360.83	4.92	0.00	66	15.0	7.0	Y
313	2047	1	776,718.4	267,914.6	353.38	4.92	0.00	66	15.0	7.0	Y
314	2048	1	776,968.4	267,914.6	345.93	4.92	0.00	66	15.0	7.0	Y
315	2049	1	777,218.4	267,914.6	340.32	4.92	0.00	66	15.0	7.0	Y
316	2050	1	777,468.4	267,914.6	340.49	4.92	0.00	66	15.0	7.0	Y
317	2051	1	777,718.4	267,914.6	341.02	4.92	0.00	66	15.0	7.0	Y
318	2052	1	777,968.4	267,914.6	339.66	4.92	0.00	66	15.0	7.0	Y
319	2053	1	778,218.4	267,914.6	330.95	4.92	0.00	66	15.0	7.0	Y
320	2054	1	778,468.4	267,914.6	333.78	4.92	0.00	66	15.0	7.0	Y
321	2055	1	778,718.4	267,914.6	340.07	4.92	0.00	66	15.0	7.0	Y
322	2056	1	778,968.4	267,914.6	340.11	4.92	0.00	66	15.0	7.0	Y
323	2057	1	779,218.4	267,914.6	352.26	4.92	0.00	66	15.0	7.0	Y
324	2058	1	779,468.4	267,914.6	360.72	4.92	0.00	66	15.0	7.0	Y
325	2059	1	779,718.4	267,914.6	365.27	4.92	0.00	66	15.0	7.0	Y
326	2060	1	779,968.4	267,914.6	371.09	4.92	0.00	66	15.0	7.0	Y
327	2061	1	780,218.4	267,914.6	377.36	4.92	0.00	66	15.0	7.0	Y
328	2062	1	780,468.4	267,914.6	368.58	4.92	0.00	66	15.0	7.0	Y
329	2063	1	780,718.4	267,914.6	349.99	4.92	0.00	66	15.0	7.0	Y
330	2064	1	780,968.4	267,914.6	343.13	4.92	0.00	66	15.0	7.0	Y
331	2065	1	781,218.4	267,914.6	347.53	4.92	0.00	66	15.0	7.0	Y
332	2066	1	781,468.4	267,914.6	349.64	4.92	0.00	66	15.0	7.0	Y
333	2067	1	781,718.4	267,914.6	346.90	4.92	0.00	66	15.0	7.0	Y
334	2068	1	781,968.4	267,914.6	357.68	4.92	0.00	66	15.0	7.0	Y
335	2069	1	782,218.4	267,914.6	341.85	4.92	0.00	66	15.0	7.0	Y
336	2070	1	782,468.4	267,914.6	345.22	4.92	0.00	66	15.0	7.0	Y
337	2071	1	782,718.4	267,914.6	352.21	4.92	0.00	66	15.0	7.0	Y
338	2072	1	782,968.4	267,914.6	366.25	4.92	0.00	66	15.0	7.0	Y
339	2073	1	783,218.4	267,914.6	372.92	4.92	0.00	66	15.0	7.0	Y
340	2074	1	783,468.4	267,914.6	376.86	4.92	0.00	66	15.0	7.0	Y
341	2075	1	783,718.4	267,914.6	375.20	4.92	0.00	66	15.0	7.0	Y
342	2076	1	783,968.4	267,914.6	378.73	4.92	0.00	66	15.0	7.0	Y
343	2077	1	784,218.4	267,914.6	384.44	4.92	0.00	66	15.0	7.0	Y
344	2078	1	784,468.4	267,914.6	373.44	4.92	0.00	66	15.0	7.0	Y
345	2079	1	773,968.4	268,164.6	342.02	4.92	0.00	66	15.0	7.0	Y
346	2080	1	774,218.4	268,164.6	339.66	4.92	0.00	66	15.0	7.0	Y

347	2081	1	774,468.4	268,164.6	337.90	4.92	0.00	66	15.0	7.0	Y
348	2082	1	774,718.4	268,164.6	340.72	4.92	0.00	66	15.0	7.0	Y
349	2083	1	774,968.4	268,164.6	346.48	4.92	0.00	66	15.0	7.0	Y
350	2084	1	775,218.4	268,164.6	348.84	4.92	0.00	66	15.0	7.0	Y
351	2085	1	775,468.4	268,164.6	353.11	4.92	0.00	66	15.0	7.0	Y
352	2086	1	775,718.4	268,164.6	360.58	4.92	0.00	66	15.0	7.0	Y
353	2087	1	775,968.4	268,164.6	367.25	4.92	0.00	66	15.0	7.0	Y
354	2088	1	776,218.4	268,164.6	370.24	4.92	0.00	66	15.0	7.0	Y
355	2089	1	776,468.4	268,164.6	368.05	4.92	0.00	66	15.0	7.0	Y
356	2090	1	776,718.4	268,164.6	350.21	4.92	0.00	66	15.0	7.0	Y
357	2091	1	776,968.4	268,164.6	343.52	4.92	0.00	66	15.0	7.0	Y
358	2092	1	777,218.4	268,164.6	336.29	4.92	0.00	66	15.0	7.0	Y
359	2093	1	777,468.4	268,164.6	336.21	4.92	0.00	66	15.0	7.0	Y
360	2094	1	777,718.4	268,164.6	336.98	4.92	0.00	66	15.0	7.0	Y
361	2095	1	777,968.4	268,164.6	331.79	4.92	0.00	66	15.0	7.0	Y
362	2096	1	778,218.4	268,164.6	336.16	4.92	0.00	66	15.0	7.0	Y
363	2097	1	778,468.4	268,164.6	347.04	4.92	0.00	66	15.0	7.0	Y
364	2098	1	778,718.4	268,164.6	352.07	4.92	0.00	66	15.0	7.0	Y
365	2099	1	778,968.4	268,164.6	356.76	4.92	0.00	66	15.0	7.0	Y
366	2100	1	779,218.4	268,164.6	356.74	4.92	0.00	66	15.0	7.0	Y
367	2101	1	779,468.4	268,164.6	367.37	4.92	0.00	66	15.0	7.0	Y
368	2102	1	779,718.4	268,164.6	375.18	4.92	0.00	66	15.0	7.0	Y
369	2103	1	779,968.4	268,164.6	378.02	4.92	0.00	66	15.0	7.0	Y
370	2104	1	780,218.4	268,164.6	373.70	4.92	0.00	66	15.0	7.0	Y
371	2105	1	780,468.4	268,164.6	363.53	4.92	0.00	66	15.0	7.0	Y
372	2106	1	780,718.4	268,164.6	347.03	4.92	0.00	66	15.0	7.0	Y
373	2107	1	780,968.4	268,164.6	346.58	4.92	0.00	66	15.0	7.0	Y
374	2108	1	781,218.4	268,164.6	350.74	4.92	0.00	66	15.0	7.0	Y
375	2109	1	781,468.4	268,164.6	342.98	4.92	0.00	66	15.0	7.0	Y
376	2110	1	781,718.4	268,164.6	339.49	4.92	0.00	66	15.0	7.0	Y
377	2111	1	781,968.4	268,164.6	342.48	4.92	0.00	66	15.0	7.0	Y
378	2112	1	782,218.4	268,164.6	337.86	4.92	0.00	66	15.0	7.0	Y
379	2113	1	782,468.4	268,164.6	349.35	4.92	0.00	66	15.0	7.0	Y
380	2114	1	782,718.4	268,164.6	355.51	4.92	0.00	66	15.0	7.0	Y
381	2116	1	782,968.4	268,164.6	368.09	4.92	0.00	66	15.0	7.0	Y
382	2117	1	783,218.4	268,164.6	368.90	4.92	0.00	66	15.0	7.0	Y

383	2118	1	783,468.4	268,164.6	369.38	4.92	0.00	66	15.0	7.0	Y
384	2119	1	783,718.4	268,164.6	372.59	4.92	0.00	66	15.0	7.0	Y
385	2120	1	783,968.4	268,164.6	380.89	4.92	0.00	66	15.0	7.0	Y
386	2121	1	784,218.4	268,164.6	384.35	4.92	0.00	66	15.0	7.0	Y
387	2122	1	784,468.4	268,164.6	373.46	4.92	0.00	66	15.0	7.0	Y
388	2123	1	773,968.4	268,414.6	332.80	4.92	0.00	66	15.0	7.0	Y
389	2124	1	774,218.4	268,414.6	333.03	4.92	0.00	66	15.0	7.0	Y
390	2125	1	774,468.4	268,414.6	339.32	4.92	0.00	66	15.0	7.0	Y
391	2126	1	774,718.4	268,414.6	349.45	4.92	0.00	66	15.0	7.0	Y
392	2127	1	774,968.4	268,414.6	355.83	4.92	0.00	66	15.0	7.0	Y
393	2128	1	775,218.4	268,414.6	357.83	4.92	0.00	66	15.0	7.0	Y
394	2129	1	775,468.4	268,414.6	363.02	4.92	0.00	66	15.0	7.0	Y
395	2130	1	775,718.4	268,414.6	369.29	4.92	0.00	66	15.0	7.0	Y
396	2131	1	775,968.4	268,414.6	364.64	4.92	0.00	66	15.0	7.0	Y
397	2132	1	776,218.4	268,414.6	364.41	4.92	0.00	66	15.0	7.0	Y
398	2133	1	776,468.4	268,414.6	364.90	4.92	0.00	66	15.0	7.0	Y
399	2134	1	776,718.4	268,414.6	349.54	4.92	0.00	66	15.0	7.0	Y
400	2135	1	776,968.4	268,414.6	340.84	4.92	0.00	66	15.0	7.0	Y
401	2136	1	777,218.4	268,414.6	334.39	4.92	0.00	66	15.0	7.0	Y
402	2137	1	777,468.4	268,414.6	333.63	4.92	0.00	66	15.0	7.0	Y
403	2138	1	777,718.4	268,414.6	333.14	4.92	0.00	66	15.0	7.0	Y
404	2139	1	777,968.4	268,414.6	341.03	4.92	0.00	66	15.0	7.0	Y
405	2140	1	778,218.4	268,414.6	344.30	4.92	0.00	66	15.0	7.0	Y
406	2141	1	778,468.4	268,414.6	348.50	4.92	0.00	66	15.0	7.0	Y
407	2142	1	778,718.4	268,414.6	355.82	4.92	0.00	66	15.0	7.0	Y
408	2143	1	778,968.4	268,414.6	362.70	4.92	0.00	66	15.0	7.0	Y
409	2144	1	779,218.4	268,414.6	369.01	4.92	0.00	66	15.0	7.0	Y
410	2145	1	779,468.4	268,414.6	371.59	4.92	0.00	66	15.0	7.0	Y
411	2146	1	779,718.4	268,414.6	374.68	4.92	0.00	66	15.0	7.0	Y
412	2147	1	779,968.4	268,414.6	364.52	4.92	0.00	66	15.0	7.0	Y
413	2148	1	780,218.4	268,414.6	371.76	4.92	0.00	66	15.0	7.0	Y
414	2149	1	780,468.4	268,414.6	360.87	4.92	0.00	66	15.0	7.0	Y
415	2150	1	780,718.4	268,414.6	341.12	4.92	0.00	66	15.0	7.0	Y
416	2151	1	780,968.4	268,414.6	339.69	4.92	0.00	66	15.0	7.0	Y
417	2152	1	781,218.4	268,414.6	334.64	4.92	0.00	66	15.0	7.0	Y
418	2153	1	781,468.4	268,414.6	341.03	4.92	0.00	66	15.0	7.0	Y

419	2154	1	781,718.4	268,414.6	335.27	4.92	0.00	66	15.0	7.0	Y
420	2155	1	781,968.4	268,414.6	333.54	4.92	0.00	66	15.0	7.0	Y
421	2156	1	782,218.4	268,414.6	348.06	4.92	0.00	66	15.0	7.0	Y
422	2157	1	782,468.4	268,414.6	350.87	4.92	0.00	66	15.0	7.0	Y
423	2158	1	782,718.4	268,414.6	352.77	4.92	0.00	66	15.0	7.0	Y
424	2159	1	782,968.4	268,414.6	364.42	4.92	0.00	66	15.0	7.0	Y
425	2160	1	783,218.4	268,414.6	365.56	4.92	0.00	66	15.0	7.0	Y
426	2161	1	783,468.4	268,414.6	370.24	4.92	0.00	66	15.0	7.0	Y
427	2162	1	783,718.4	268,414.6	375.28	4.92	0.00	66	15.0	7.0	Y
428	2163	1	783,968.4	268,414.6	381.90	4.92	0.00	66	15.0	7.0	Y
429	2164	1	784,218.4	268,414.6	383.46	4.92	0.00	66	15.0	7.0	Y
430	2165	1	784,468.4	268,414.6	381.09	4.92	0.00	66	15.0	7.0	Y
431	2166	1	773,968.4	268,664.6	332.11	4.92	0.00	66	15.0	7.0	Y
432	2167	1	774,218.4	268,664.6	337.45	4.92	0.00	66	15.0	7.0	Y
433	2168	1	774,468.4	268,664.6	345.27	4.92	0.00	66	15.0	7.0	Y
434	2169	1	774,718.4	268,664.6	348.10	4.92	0.00	66	15.0	7.0	Y
435	2170	1	774,968.4	268,664.6	357.72	4.92	0.00	66	15.0	7.0	Y
436	2171	1	775,218.4	268,664.6	360.68	4.92	0.00	66	15.0	7.0	Y
437	2172	1	775,468.4	268,664.6	364.06	4.92	0.00	66	15.0	7.0	Y
438	2173	1	775,718.4	268,664.6	369.07	4.92	0.00	66	15.0	7.0	Y
439	2174	1	775,968.4	268,664.6	346.01	4.92	0.00	66	15.0	7.0	Y
440	2175	1	776,218.4	268,664.6	348.00	4.92	0.00	66	15.0	7.0	Y
441	2176	1	776,468.4	268,664.6	352.69	4.92	0.00	66	15.0	7.0	Y
442	2177	1	776,718.4	268,664.6	348.06	4.92	0.00	66	15.0	7.0	Y
443	2178	1	776,968.4	268,664.6	339.12	4.92	0.00	66	15.0	7.0	Y
444	2179	1	777,218.4	268,664.6	331.04	4.92	0.00	66	15.0	7.0	Y
445	2180	1	777,468.4	268,664.6	331.03	4.92	0.00	66	15.0	7.0	Y
446	2181	1	777,718.4	268,664.6	330.64	4.92	0.00	66	15.0	7.0	Y
447	2182	1	777,968.4	268,664.6	343.35	4.92	0.00	66	15.0	7.0	Y
448	2183	1	778,218.4	268,664.6	345.35	4.92	0.00	66	15.0	7.0	Y
449	2184	1	778,468.4	268,664.6	348.15	4.92	0.00	66	15.0	7.0	Y
450	2185	1	778,718.4	268,664.6	355.73	4.92	0.00	66	15.0	7.0	Y
451	2186	1	778,968.4	268,664.6	361.22	4.92	0.00	66	15.0	7.0	Y
452	2187	1	779,218.4	268,664.6	355.74	4.92	0.00	66	15.0	7.0	Y
453	2188	1	779,468.4	268,664.6	367.00	4.92	0.00	66	15.0	7.0	Y
454	2189	1	779,718.4	268,664.6	356.40	4.92	0.00	66	15.0	7.0	Y

455	2190	1	779,968.4	268,664.6	365.03	4.92	0.00	66	15.0	7.0	Y
456	2191	1	780,218.4	268,664.6	369.72	4.92	0.00	66	15.0	7.0	Y
457	2192	1	780,468.4	268,664.6	368.46	4.92	0.00	66	15.0	7.0	Y
458	2193	1	780,718.4	268,664.6	356.37	4.92	0.00	66	15.0	7.0	Y
459	2194	1	780,968.4	268,664.6	347.84	4.92	0.00	66	15.0	7.0	Y
460	2195	1	781,218.4	268,664.6	340.93	4.92	0.00	66	15.0	7.0	Y
461	2196	1	781,468.4	268,664.6	333.86	4.92	0.00	66	15.0	7.0	Y
462	2197	1	781,718.4	268,664.6	327.74	4.92	0.00	66	15.0	7.0	Y
463	2198	1	781,968.4	268,664.6	342.24	4.92	0.00	66	15.0	7.0	Y
464	2199	1	782,218.4	268,664.6	349.24	4.92	0.00	66	15.0	7.0	Y
465	2200	1	782,468.4	268,664.6	358.20	4.92	0.00	66	15.0	7.0	Y
466	2201	1	782,718.4	268,664.6	360.59	4.92	0.00	66	15.0	7.0	Y
467	2202	1	782,968.4	268,664.6	361.71	4.92	0.00	66	15.0	7.0	Y
468	2203	1	783,218.4	268,664.6	366.37	4.92	0.00	66	15.0	7.0	Y
469	2204	1	783,468.4	268,664.6	372.54	4.92	0.00	66	15.0	7.0	Y
470	2205	1	783,718.4	268,664.6	376.62	4.92	0.00	66	15.0	7.0	Y
471	2206	1	783,968.4	268,664.6	379.95	4.92	0.00	66	15.0	7.0	Y
472	2207	1	784,218.4	268,664.6	379.53	4.92	0.00	66	15.0	7.0	Y
473	2208	1	784,468.4	268,664.6	377.32	4.92	0.00	66	15.0	7.0	Y
474	2209	1	773,968.4	268,914.6	340.48	4.92	0.00	66	15.0	7.0	Y
475	2210	1	774,218.4	268,914.6	343.52	4.92	0.00	66	15.0	7.0	Y
476	2211	1	774,468.4	268,914.6	339.59	4.92	0.00	66	15.0	7.0	Y
477	2212	1	774,718.4	268,914.6	350.92	4.92	0.00	66	15.0	7.0	Y
478	2213	1	774,968.4	268,914.6	362.49	4.92	0.00	66	15.0	7.0	Y
479	2214	1	775,218.4	268,914.6	369.09	4.92	0.00	66	15.0	7.0	Y
480	2215	1	775,468.4	268,914.6	363.77	4.92	0.00	66	15.0	7.0	Y
481	2216	1	775,718.4	268,914.6	358.26	4.92	0.00	66	15.0	7.0	Y
482	2217	1	775,968.4	268,914.6	345.91	4.92	0.00	66	15.0	7.0	Y
483	2218	1	776,218.4	268,914.6	339.59	4.92	0.00	66	15.0	7.0	Y
484	2219	1	776,468.4	268,914.6	338.05	4.92	0.00	66	15.0	7.0	Y
485	2220	1	776,718.4	268,914.6	346.31	4.92	0.00	66	15.0	7.0	Y
486	2221	1	776,968.4	268,914.6	340.86	4.92	0.00	66	15.0	7.0	Y
487	2222	1	777,218.4	268,914.6	329.64	4.92	0.00	66	15.0	7.0	Y
488	2223	1	777,468.4	268,914.6	328.96	4.92	0.00	66	15.0	7.0	Y
489	2224	1	777,718.4	268,914.6	328.05	4.92	0.00	66	15.0	7.0	Y
490	2225	1	777,968.4	268,914.6	340.66	4.92	0.00	66	15.0	7.0	Y

491	2226	1	778,218.4	268,914.6	350.72	4.92	0.00	66	15.0	7.0	Y
492	2227	1	778,468.4	268,914.6	351.60	4.92	0.00	66	15.0	7.0	Y
493	2228	1	778,718.4	268,914.6	358.10	4.92	0.00	66	15.0	7.0	Y
494	2229	1	778,968.4	268,914.6	359.65	4.92	0.00	66	15.0	7.0	Y
495	2230	1	779,218.4	268,914.6	344.76	4.92	0.00	66	15.0	7.0	Y
496	2231	1	779,468.4	268,914.6	350.33	4.92	0.00	66	15.0	7.0	Y
497	2232	1	779,718.4	268,914.6	352.90	4.92	0.00	66	15.0	7.0	Y
498	2233	1	779,968.4	268,914.6	363.04	4.92	0.00	66	15.0	7.0	Y
499	2234	1	780,218.4	268,914.6	363.45	4.92	0.00	66	15.0	7.0	Y
500	2235	1	780,468.4	268,914.6	352.97	4.92	0.00	66	15.0	7.0	Y
501	2236	1	780,718.4	268,914.6	360.99	4.92	0.00	66	15.0	7.0	Y
502	2237	1	780,968.4	268,914.6	336.14	4.92	0.00	66	15.0	7.0	Y
503	2238	1	781,218.4	268,914.6	332.20	4.92	0.00	66	15.0	7.0	Y
504	2239	1	781,468.4	268,914.6	332.41	4.92	0.00	66	15.0	7.0	Y
505	2240	1	781,718.4	268,914.6	337.73	4.92	0.00	66	15.0	7.0	Y
506	2241	1	781,968.4	268,914.6	355.03	4.92	0.00	66	15.0	7.0	Y
507	2242	1	782,218.4	268,914.6	358.62	4.92	0.00	66	15.0	7.0	Y
508	2243	1	782,468.4	268,914.6	366.13	4.92	0.00	66	15.0	7.0	Y
509	2244	1	782,718.4	268,914.6	369.77	4.92	0.00	66	15.0	7.0	Y
510	2245	1	782,968.4	268,914.6	369.09	4.92	0.00	66	15.0	7.0	Y
511	2246	1	783,218.4	268,914.6	368.55	4.92	0.00	66	15.0	7.0	Y
514	2249	1	783,968.4	268,914.6	374.84	4.92	0.00	66	15.0	7.0	Y
515	2250	1	784,218.4	268,914.6	376.07	4.92	0.00	66	15.0	7.0	Y
516	2251	1	784,468.4	268,914.6	379.89	4.92	0.00	66	15.0	7.0	Y
517	2252	1	773,968.4	269,164.6	332.53	4.92	0.00	66	15.0	7.0	Y
518	2253	1	774,218.4	269,164.6	336.95	4.92	0.00	66	15.0	7.0	Y
519	2254	1	774,468.4	269,164.6	342.93	4.92	0.00	66	15.0	7.0	Y
520	2255	1	774,718.4	269,164.6	358.46	4.92	0.00	66	15.0	7.0	Y
521	2256	1	774,968.4	269,164.6	364.51	4.92	0.00	66	15.0	7.0	Y
522	2257	1	775,218.4	269,164.6	368.12	4.92	0.00	66	15.0	7.0	Y
523	2258	1	775,468.4	269,164.6	362.55	4.92	0.00	66	15.0	7.0	Y
524	2259	1	775,718.4	269,164.6	348.31	4.92	0.00	66	15.0	7.0	Y
525	2260	1	775,968.4	269,164.6	343.90	4.92	0.00	66	15.0	7.0	Y
526	2261	1	776,218.4	269,164.6	339.41	4.92	0.00	66	15.0	7.0	Y
527	2262	1	776,468.4	269,164.6	333.47	4.92	0.00	66	15.0	7.0	Y
528	2263	1	776,718.4	269,164.6	343.51	4.92	0.00	66	15.0	7.0	Y

529	2264	1	776,968.4	269,164.6	340.21	4.92	0.00	66	15.0	7.0	Y
530	2265	1	777,218.4	269,164.6	328.16	4.92	0.00	66	15.0	7.0	Y
531	2266	1	777,468.4	269,164.6	324.97	4.92	0.00	66	15.0	7.0	Y
532	2267	1	777,718.4	269,164.6	327.45	4.92	0.00	66	15.0	7.0	Y
533	2268	1	777,968.4	269,164.6	334.41	4.92	0.00	66	15.0	7.0	Y
534	2269	1	778,218.4	269,164.6	340.04	4.92	0.00	66	15.0	7.0	Y
537	2272	1	778,968.4	269,164.6	345.31	4.92	0.00	66	15.0	7.0	Y
538	2273	1	779,218.4	269,164.6	339.72	4.92	0.00	66	15.0	7.0	Y
539	2274	1	779,468.4	269,164.6	353.69	4.92	0.00	66	15.0	7.0	Y
540	2275	1	779,718.4	269,164.6	357.81	4.92	0.00	66	15.0	7.0	Y
541	2276	1	779,968.4	269,164.6	347.88	4.92	0.00	66	15.0	7.0	Y
542	2277	1	780,218.4	269,164.6	364.54	4.92	0.00	66	15.0	7.0	Y
543	2278	1	780,468.4	269,164.6	356.98	4.92	0.00	66	15.0	7.0	Y
544	2279	1	780,718.4	269,164.6	340.44	4.92	0.00	66	15.0	7.0	Y
545	2280	1	780,968.4	269,164.6	333.24	4.92	0.00	66	15.0	7.0	Y
546	2281	1	781,218.4	269,164.6	323.76	4.92	0.00	66	15.0	7.0	Y
547	2282	1	781,468.4	269,164.6	333.00	4.92	0.00	66	15.0	7.0	Y
548	2283	1	781,718.4	269,164.6	345.65	4.92	0.00	66	15.0	7.0	Y
549	2284	1	781,968.4	269,164.6	366.01	4.92	0.00	66	15.0	7.0	Y
550	2285	1	782,218.4	269,164.6	367.51	4.92	0.00	66	15.0	7.0	Y
551	2286	1	782,468.4	269,164.6	367.18	4.92	0.00	66	15.0	7.0	Y
552	2287	1	782,718.4	269,164.6	368.25	4.92	0.00	66	15.0	7.0	Y
553	2288	1	782,968.4	269,164.6	358.70	4.92	0.00	66	15.0	7.0	Y
554	2289	1	783,218.4	269,164.6	362.55	4.92	0.00	66	15.0	7.0	Y
555	2290	1	783,468.4	269,164.6	356.16	4.92	0.00	66	15.0	7.0	Y
556	2291	1	783,718.4	269,164.6	361.54	4.92	0.00	66	15.0	7.0	Y
557	2292	1	783,968.4	269,164.6	356.65	4.92	0.00	66	15.0	7.0	Y
558	2293	1	784,218.4	269,164.6	376.20	4.92	0.00	66	15.0	7.0	Y
559	2294	1	784,468.4	269,164.6	381.88	4.92	0.00	66	15.0	7.0	Y
560	2295	1	773,968.4	269,414.6	338.18	4.92	0.00	66	15.0	7.0	Y
561	2296	1	774,218.4	269,414.6	346.52	4.92	0.00	66	15.0	7.0	Y
562	2297	1	774,468.4	269,414.6	357.07	4.92	0.00	66	15.0	7.0	Y
563	2298	1	774,718.4	269,414.6	355.48	4.92	0.00	66	15.0	7.0	Y
564	2299	1	774,968.4	269,414.6	359.12	4.92	0.00	66	15.0	7.0	Y
565	2300	1	775,218.4	269,414.6	361.18	4.92	0.00	66	15.0	7.0	Y
566	2301	1	775,468.4	269,414.6	360.51	4.92	0.00	66	15.0	7.0	Y

567	2302	1	775,718.4	269,414.6	357.85	4.92	0.00	66	15.0	7.0	Y
568	2303	1	775,968.4	269,414.6	346.28	4.92	0.00	66	15.0	7.0	Y
569	2304	1	776,218.4	269,414.6	341.66	4.92	0.00	66	15.0	7.0	Y
570	2305	1	776,468.4	269,414.6	331.60	4.92	0.00	66	15.0	7.0	Y
571	2306	1	776,718.4	269,414.6	329.71	4.92	0.00	66	15.0	7.0	Y
572	2307	1	776,968.4	269,414.6	334.34	4.92	0.00	66	15.0	7.0	Y
573	2308	1	777,218.4	269,414.6	333.46	4.92	0.00	66	15.0	7.0	Y
574	2309	1	777,468.4	269,414.6	317.67	4.92	0.00	66	15.0	7.0	Y
575	2310	1	777,718.4	269,414.6	324.46	4.92	0.00	66	15.0	7.0	Y
576	2311	1	777,968.4	269,414.6	327.51	4.92	0.00	66	15.0	7.0	Y
577	2312	1	778,218.4	269,414.6	342.71	4.92	0.00	66	15.0	7.0	Y
578	2313	1	778,468.4	269,414.6	344.07	4.92	0.00	66	15.0	7.0	Y
579	2314	1	778,718.4	269,414.6	341.55	4.92	0.00	66	15.0	7.0	Y
580	2315	1	778,968.4	269,414.6	339.01	4.92	0.00	66	15.0	7.0	Y
581	2316	1	779,218.4	269,414.6	346.61	4.92	0.00	66	15.0	7.0	Y
582	2317	1	779,468.4	269,414.6	341.96	4.92	0.00	66	15.0	7.0	Y
583	2318	1	779,718.4	269,414.6	337.85	4.92	0.00	66	15.0	7.0	Y
584	2319	1	779,968.4	269,414.6	355.69	4.92	0.00	66	15.0	7.0	Y
585	2320	1	780,218.4	269,414.6	359.98	4.92	0.00	66	15.0	7.0	Y
586	2321	1	780,468.4	269,414.6	345.68	4.92	0.00	66	15.0	7.0	Y
587	2322	1	780,718.4	269,414.6	346.35	4.92	0.00	66	15.0	7.0	Y
588	2323	1	780,968.4	269,414.6	331.39	4.92	0.00	66	15.0	7.0	Y
589	2324	1	781,218.4	269,414.6	323.30	4.92	0.00	66	15.0	7.0	Y
590	2325	1	781,468.4	269,414.6	332.76	4.92	0.00	66	15.0	7.0	Y
591	2326	1	781,718.4	269,414.6	335.35	4.92	0.00	66	15.0	7.0	Y
592	2327	1	781,968.4	269,414.6	361.10	4.92	0.00	66	15.0	7.0	Y
593	2328	1	782,218.4	269,414.6	362.66	4.92	0.00	66	15.0	7.0	Y
594	2329	1	782,468.4	269,414.6	366.85	4.92	0.00	66	15.0	7.0	Y
595	2330	1	782,718.4	269,414.6	363.07	4.92	0.00	66	15.0	7.0	Y
596	2331	1	782,968.4	269,414.6	352.15	4.92	0.00	66	15.0	7.0	Y
597	2332	1	783,218.4	269,414.6	353.51	4.92	0.00	66	15.0	7.0	Y
598	2333	1	783,468.4	269,414.6	346.43	4.92	0.00	66	15.0	7.0	Y
599	2334	1	783,718.4	269,414.6	349.90	4.92	0.00	66	15.0	7.0	Y
600	2335	1	783,968.4	269,414.6	357.08	4.92	0.00	66	15.0	7.0	Y
601	2336	1	784,218.4	269,414.6	367.76	4.92	0.00	66	15.0	7.0	Y
602	2337	1	784,468.4	269,414.6	377.48	4.92	0.00	66	15.0	7.0	Y

603	2338	1	773,968.4	269,664.6	344.00	4.92	0.00	66	15.0	7.0	Y
604	2339	1	774,218.4	269,664.6	354.00	4.92	0.00	66	15.0	7.0	Y
605	2340	1	774,468.4	269,664.6	355.75	4.92	0.00	66	15.0	7.0	Y
606	2341	1	774,718.4	269,664.6	343.85	4.92	0.00	66	15.0	7.0	Y
607	2342	1	774,968.4	269,664.6	352.43	4.92	0.00	66	15.0	7.0	Y
608	2343	1	775,218.4	269,664.6	346.79	4.92	0.00	66	15.0	7.0	Y
609	2344	1	775,468.4	269,664.6	349.21	4.92	0.00	66	15.0	7.0	Y
610	2345	1	775,718.4	269,664.6	354.36	4.92	0.00	66	15.0	7.0	Y
611	2346	1	775,968.4	269,664.6	352.41	4.92	0.00	66	15.0	7.0	Y
612	2347	1	776,218.4	269,664.6	348.82	4.92	0.00	66	15.0	7.0	Y
613	2348	1	776,468.4	269,664.6	328.75	4.92	0.00	66	15.0	7.0	Y
614	2349	1	776,718.4	269,664.6	326.57	4.92	0.00	66	15.0	7.0	Y
615	2350	1	776,968.4	269,664.6	322.21	4.92	0.00	66	15.0	7.0	Y
616	2351	1	777,218.4	269,664.6	318.44	4.92	0.00	66	15.0	7.0	Y
617	2352	1	777,468.4	269,664.6	316.80	4.92	0.00	66	15.0	7.0	Y
618	2353	1	777,718.4	269,664.6	325.04	4.92	0.00	66	15.0	7.0	Y
619	2354	1	777,968.4	269,664.6	325.48	4.92	0.00	66	15.0	7.0	Y
620	2355	1	778,218.4	269,664.6	334.59	4.92	0.00	66	15.0	7.0	Y
621	2356	1	778,468.4	269,664.6	327.25	4.92	0.00	66	15.0	7.0	Y
622	2357	1	778,718.4	269,664.6	326.81	4.92	0.00	66	15.0	7.0	Y
623	2358	1	778,968.4	269,664.6	327.99	4.92	0.00	66	15.0	7.0	Y
624	2359	1	779,218.4	269,664.6	344.56	4.92	0.00	66	15.0	7.0	Y
625	2360	1	779,468.4	269,664.6	331.48	4.92	0.00	66	15.0	7.0	Y
626	2361	1	779,718.4	269,664.6	349.93	4.92	0.00	66	15.0	7.0	Y
627	2362	1	779,968.4	269,664.6	356.98	4.92	0.00	66	15.0	7.0	Y
628	2363	1	780,218.4	269,664.6	341.34	4.92	0.00	66	15.0	7.0	Y
629	2364	1	780,468.4	269,664.6	341.85	4.92	0.00	66	15.0	7.0	Y
630	2365	1	780,718.4	269,664.6	335.00	4.92	0.00	66	15.0	7.0	Y
631	2366	1	780,968.4	269,664.6	323.05	4.92	0.00	66	15.0	7.0	Y
632	2367	1	781,218.4	269,664.6	328.65	4.92	0.00	66	15.0	7.0	Y
633	2368	1	781,468.4	269,664.6	334.17	4.92	0.00	66	15.0	7.0	Y
634	2370	1	781,718.4	269,664.6	331.81	4.92	0.00	66	15.0	7.0	Y
635	2371	1	781,968.4	269,664.6	365.13	4.92	0.00	66	15.0	7.0	Y
636	2372	1	782,218.4	269,664.6	357.22	4.92	0.00	66	15.0	7.0	Y
637	2373	1	782,468.4	269,664.6	364.57	4.92	0.00	66	15.0	7.0	Y
638	2374	1	782,718.4	269,664.6	355.98	4.92	0.00	66	15.0	7.0	Y

639	2375	1	782,968.4	269,664.6	349.89	4.92	0.00	66	15.0	7.0	Y
640	2376	1	783,218.4	269,664.6	345.03	4.92	0.00	66	15.0	7.0	Y
641	2377	1	783,468.4	269,664.6	355.57	4.92	0.00	66	15.0	7.0	Y
642	2378	1	783,718.4	269,664.6	358.59	4.92	0.00	66	15.0	7.0	Y
643	2379	1	783,968.4	269,664.6	369.48	4.92	0.00	66	15.0	7.0	Y
644	2380	1	784,218.4	269,664.6	368.57	4.92	0.00	66	15.0	7.0	Y
645	2381	1	784,468.4	269,664.6	374.25	4.92	0.00	66	15.0	7.0	Y
646	2382	1	773,968.4	269,914.6	344.83	4.92	0.00	66	15.0	7.0	Y
647	2383	1	774,218.4	269,914.6	352.49	4.92	0.00	66	15.0	7.0	Y
648	2384	1	774,468.4	269,914.6	351.80	4.92	0.00	66	15.0	7.0	Y
649	2385	1	774,718.4	269,914.6	338.32	4.92	0.00	66	15.0	7.0	Y
650	2386	1	774,968.4	269,914.6	340.56	4.92	0.00	66	15.0	7.0	Y
651	2387	1	775,218.4	269,914.6	342.91	4.92	0.00	66	15.0	7.0	Y
652	2388	1	775,468.4	269,914.6	350.68	4.92	0.00	66	15.0	7.0	Y
653	2389	1	775,718.4	269,914.6	353.08	4.92	0.00	66	15.0	7.0	Y
654	2390	1	775,968.4	269,914.6	346.67	4.92	0.00	66	15.0	7.0	Y
655	2391	1	776,218.4	269,914.6	341.18	4.92	0.00	66	15.0	7.0	Y
656	2392	1	776,468.4	269,914.6	340.59	4.92	0.00	66	15.0	7.0	Y
657	2393	1	776,718.4	269,914.6	336.60	4.92	0.00	66	15.0	7.0	Y
658	2394	1	776,968.4	269,914.6	328.64	4.92	0.00	66	15.0	7.0	Y
659	2395	1	777,218.4	269,914.6	317.72	4.92	0.00	66	15.0	7.0	Y
660	2396	1	777,468.4	269,914.6	316.21	4.92	0.00	66	15.0	7.0	Y
661	2397	1	777,718.4	269,914.6	322.69	4.92	0.00	66	15.0	7.0	Y
662	2398	1	777,968.4	269,914.6	324.18	4.92	0.00	66	15.0	7.0	Y
663	2399	1	778,218.4	269,914.6	330.12	4.92	0.00	66	15.0	7.0	Y
664	2400	1	778,468.4	269,914.6	320.09	4.92	0.00	66	15.0	7.0	Y
665	2401	1	778,718.4	269,914.6	329.70	4.92	0.00	66	15.0	7.0	Y
666	2402	1	778,968.4	269,914.6	332.94	4.92	0.00	66	15.0	7.0	Y
667	2403	1	779,218.4	269,914.6	329.62	4.92	0.00	66	15.0	7.0	Y
668	2404	1	779,468.4	269,914.6	340.54	4.92	0.00	66	15.0	7.0	Y
669	2405	1	779,718.4	269,914.6	348.66	4.92	0.00	66	15.0	7.0	Y
670	2406	1	779,968.4	269,914.6	351.94	4.92	0.00	66	15.0	7.0	Y
671	2407	1	780,218.4	269,914.6	328.03	4.92	0.00	66	15.0	7.0	Y
672	2408	1	780,468.4	269,914.6	341.04	4.92	0.00	66	15.0	7.0	Y
673	2409	1	780,718.4	269,914.6	321.47	4.92	0.00	66	15.0	7.0	Y
674	2410	1	780,968.4	269,914.6	315.39	4.92	0.00	66	15.0	7.0	Y

675	2411	1	781,218.4	269,914.6	321.19	4.92	0.00	66	15.0	7.0	Y
676	2412	1	781,468.4	269,914.6	350.12	4.92	0.00	66	15.0	7.0	Y
677	2413	1	781,718.4	269,914.6	359.57	4.92	0.00	66	15.0	7.0	Y
678	2414	1	781,968.4	269,914.6	353.00	4.92	0.00	66	15.0	7.0	Y
679	2415	1	782,218.4	269,914.6	356.52	4.92	0.00	66	15.0	7.0	Y
680	2416	1	782,468.4	269,914.6	352.66	4.92	0.00	66	15.0	7.0	Y
681	2417	1	782,718.4	269,914.6	338.78	4.92	0.00	66	15.0	7.0	Y
682	2418	1	782,968.4	269,914.6	337.39	4.92	0.00	66	15.0	7.0	Y
683	2419	1	783,218.4	269,914.6	348.55	4.92	0.00	66	15.0	7.0	Y
684	2420	1	783,468.4	269,914.6	361.95	4.92	0.00	66	15.0	7.0	Y
685	2421	1	783,718.4	269,914.6	365.42	4.92	0.00	66	15.0	7.0	Y
686	2422	1	783,968.4	269,914.6	371.89	4.92	0.00	66	15.0	7.0	Y
687	2423	1	784,218.4	269,914.6	379.55	4.92	0.00	66	15.0	7.0	Y
688	2424	1	784,468.4	269,914.6	380.46	4.92	0.00	66	15.0	7.0	Y
689	2425	1	773,968.4	270,164.6	332.93	4.92	0.00	66	15.0	7.0	Y
690	2426	1	774,218.4	270,164.6	344.96	4.92	0.00	66	15.0	7.0	Y
691	2427	1	774,468.4	270,164.6	341.10	4.92	0.00	66	15.0	7.0	Y
692	2428	1	774,718.4	270,164.6	330.12	4.92	0.00	66	15.0	7.0	Y
693	2429	1	774,968.4	270,164.6	334.70	4.92	0.00	66	15.0	7.0	Y
694	2430	1	775,218.4	270,164.6	352.20	4.92	0.00	66	15.0	7.0	Y
695	2431	1	775,468.4	270,164.6	355.77	4.92	0.00	66	15.0	7.0	Y
696	2432	1	775,718.4	270,164.6	353.79	4.92	0.00	66	15.0	7.0	Y
697	2433	1	775,968.4	270,164.6	344.14	4.92	0.00	66	15.0	7.0	Y
698	2434	1	776,218.4	270,164.6	330.97	4.92	0.00	66	15.0	7.0	Y
699	2435	1	776,468.4	270,164.6	329.76	4.92	0.00	66	15.0	7.0	Y
700	2436	1	776,718.4	270,164.6	327.92	4.92	0.00	66	15.0	7.0	Y
701	2437	1	776,968.4	270,164.6	324.54	4.92	0.00	66	15.0	7.0	Y
702	2438	1	777,218.4	270,164.6	321.82	4.92	0.00	66	15.0	7.0	Y
703	2439	1	777,468.4	270,164.6	315.22	4.92	0.00	66	15.0	7.0	Y
704	2440	1	777,718.4	270,164.6	320.96	4.92	0.00	66	15.0	7.0	Y
705	2441	1	777,968.4	270,164.6	314.67	4.92	0.00	66	15.0	7.0	Y
706	2442	1	778,218.4	270,164.6	315.80	4.92	0.00	66	15.0	7.0	Y
707	2443	1	778,468.4	270,164.6	330.04	4.92	0.00	66	15.0	7.0	Y
708	2444	1	778,718.4	270,164.6	340.09	4.92	0.00	66	15.0	7.0	Y
709	2445	1	778,968.4	270,164.6	339.33	4.92	0.00	66	15.0	7.0	Y
710	2446	1	779,218.4	270,164.6	321.63	4.92	0.00	66	15.0	7.0	Y

711	2447	1	779,468.4	270,164.6	343.16	4.92	0.00	66	15.0	7.0	Y
712	2448	1	779,718.4	270,164.6	325.85	4.92	0.00	66	15.0	7.0	Y
713	2449	1	779,968.4	270,164.6	341.70	4.92	0.00	66	15.0	7.0	Y
714	2450	1	780,218.4	270,164.6	323.32	4.92	0.00	66	15.0	7.0	Y
715	2451	1	780,468.4	270,164.6	316.62	4.92	0.00	66	15.0	7.0	Y
716	2452	1	780,718.4	270,164.6	321.19	4.92	0.00	66	15.0	7.0	Y
717	2453	1	780,968.4	270,164.6	317.45	4.92	0.00	66	15.0	7.0	Y
718	2454	1	781,218.4	270,164.6	319.10	4.92	0.00	66	15.0	7.0	Y
719	2455	1	781,468.4	270,164.6	350.06	4.92	0.00	66	15.0	7.0	Y
720	2456	1	781,718.4	270,164.6	344.77	4.92	0.00	66	15.0	7.0	Y
721	2457	1	781,968.4	270,164.6	350.98	4.92	0.00	66	15.0	7.0	Y
722	2458	1	782,218.4	270,164.6	349.79	4.92	0.00	66	15.0	7.0	Y
723	2459	1	782,468.4	270,164.6	332.47	4.92	0.00	66	15.0	7.0	Y
724	2460	1	782,718.4	270,164.6	337.18	4.92	0.00	66	15.0	7.0	Y
725	2461	1	782,968.4	270,164.6	343.64	4.92	0.00	66	15.0	7.0	Y
726	2462	1	783,218.4	270,164.6	348.19	4.92	0.00	66	15.0	7.0	Y
727	2463	1	783,468.4	270,164.6	350.83	4.92	0.00	66	15.0	7.0	Y
728	2464	1	783,718.4	270,164.6	363.57	4.92	0.00	66	15.0	7.0	Y
729	2465	1	783,968.4	270,164.6	372.79	4.92	0.00	66	15.0	7.0	Y
730	2466	1	784,218.4	270,164.6	380.55	4.92	0.00	66	15.0	7.0	Y
731	2467	1	784,468.4	270,164.6	384.46	4.92	0.00	66	15.0	7.0	Y
732	2468	1	773,968.4	270,414.6	325.23	4.92	0.00	66	15.0	7.0	Y
733	2469	1	774,218.4	270,414.6	326.28	4.92	0.00	66	15.0	7.0	Y
734	2470	1	774,468.4	270,414.6	324.20	4.92	0.00	66	15.0	7.0	Y
735	2471	1	774,718.4	270,414.6	332.75	4.92	0.00	66	15.0	7.0	Y
736	2472	1	774,968.4	270,414.6	332.56	4.92	0.00	66	15.0	7.0	Y
737	2473	1	775,218.4	270,414.6	347.45	4.92	0.00	66	15.0	7.0	Y
738	2474	1	775,468.4	270,414.6	338.40	4.92	0.00	66	15.0	7.0	Y
739	2475	1	775,718.4	270,414.6	338.82	4.92	0.00	66	15.0	7.0	Y
740	2476	1	775,968.4	270,414.6	336.32	4.92	0.00	66	15.0	7.0	Y
741	2477	1	776,218.4	270,414.6	327.34	4.92	0.00	66	15.0	7.0	Y
742	2478	1	776,468.4	270,414.6	327.43	4.92	0.00	66	15.0	7.0	Y
743	2479	1	776,718.4	270,414.6	324.37	4.92	0.00	66	15.0	7.0	Y
744	2480	1	776,968.4	270,414.6	323.90	4.92	0.00	66	15.0	7.0	Y
745	2481	1	777,218.4	270,414.6	327.68	4.92	0.00	66	15.0	7.0	Y
746	2482	1	777,468.4	270,414.6	314.62	4.92	0.00	66	15.0	7.0	Y

747	2483	1	777,718.4	270,414.6	310.78	4.92	0.00	66	15.0	7.0	Y
748	2484	1	777,968.4	270,414.6	312.73	4.92	0.00	66	15.0	7.0	Y
749	2485	1	778,218.4	270,414.6	314.07	4.92	0.00	66	15.0	7.0	Y
750	2486	1	778,468.4	270,414.6	329.66	4.92	0.00	66	15.0	7.0	Y
751	2487	1	778,718.4	270,414.6	340.41	4.92	0.00	66	15.0	7.0	Y
752	2488	1	778,968.4	270,414.6	338.73	4.92	0.00	66	15.0	7.0	Y
753	2489	1	779,218.4	270,414.6	317.91	4.92	0.00	66	15.0	7.0	Y
754	2490	1	779,468.4	270,414.6	341.68	4.92	0.00	66	15.0	7.0	Y
755	2491	1	779,718.4	270,414.6	327.20	4.92	0.00	66	15.0	7.0	Y
756	2498	1	779,968.4	270,414.6	313.11	4.92	0.00	66	15.0	7.0	Y
757	2501	1	780,218.4	270,414.6	312.88	4.92	0.00	66	15.0	7.0	Y
758	2502	1	780,468.4	270,414.6	312.22	4.92	0.00	66	15.0	7.0	Y
759	2503	1	780,718.4	270,414.6	312.24	4.92	0.00	66	15.0	7.0	Y
760	2504	1	780,968.4	270,414.6	316.18	4.92	0.00	66	15.0	7.0	Y
761	2505	1	781,218.4	270,414.6	323.84	4.92	0.00	66	15.0	7.0	Y
762	2506	1	781,468.4	270,414.6	340.62	4.92	0.00	66	15.0	7.0	Y
763	2507	1	781,718.4	270,414.6	334.81	4.92	0.00	66	15.0	7.0	Y
764	2508	1	781,968.4	270,414.6	337.76	4.92	0.00	66	15.0	7.0	Y
765	2509	1	782,218.4	270,414.6	331.82	4.92	0.00	66	15.0	7.0	Y
766	2510	1	782,468.4	270,414.6	338.88	4.92	0.00	66	15.0	7.0	Y
767	2511	1	782,718.4	270,414.6	348.27	4.92	0.00	66	15.0	7.0	Y
768	2512	1	782,968.4	270,414.6	353.75	4.92	0.00	66	15.0	7.0	Y
769	2513	1	783,218.4	270,414.6	361.90	4.92	0.00	66	15.0	7.0	Y
770	2514	1	783,468.4	270,414.6	354.90	4.92	0.00	66	15.0	7.0	Y
771	2515	1	783,718.4	270,414.6	354.03	4.92	0.00	66	15.0	7.0	Y
772	2516	1	783,968.4	270,414.6	364.71	4.92	0.00	66	15.0	7.0	Y
773	2517	1	784,218.4	270,414.6	373.64	4.92	0.00	66	15.0	7.0	Y
774	2518	1	784,468.4	270,414.6	374.11	4.92	0.00	66	15.0	7.0	Y
775	2519	1	773,968.4	270,664.6	323.57	4.92	0.00	66	15.0	7.0	Y
776	2520	1	774,218.4	270,664.6	325.82	4.92	0.00	66	15.0	7.0	Y
777	2521	1	774,468.4	270,664.6	331.55	4.92	0.00	66	15.0	7.0	Y
778	2522	1	774,718.4	270,664.6	334.71	4.92	0.00	66	15.0	7.0	Y
779	2523	1	774,968.4	270,664.6	335.39	4.92	0.00	66	15.0	7.0	Y
780	2524	1	775,218.4	270,664.6	341.88	4.92	0.00	66	15.0	7.0	Y
781	2525	1	775,468.4	270,664.6	357.24	4.92	0.00	66	15.0	7.0	Y
782	2526	1	775,718.4	270,664.6	360.68	4.92	0.00	66	15.0	7.0	Y

783	2527	1	775,968.4	270,664.6	357.33	4.92	0.00	66	15.0	7.0	Y
784	2528	1	776,218.4	270,664.6	328.84	4.92	0.00	66	15.0	7.0	Y
785	2529	1	776,468.4	270,664.6	327.15	4.92	0.00	66	15.0	7.0	Y
786	2530	1	776,718.4	270,664.6	325.15	4.92	0.00	66	15.0	7.0	Y
787	2531	1	776,968.4	270,664.6	324.23	4.92	0.00	66	15.0	7.0	Y
788	2532	1	777,218.4	270,664.6	322.64	4.92	0.00	66	15.0	7.0	Y
789	2533	1	777,468.4	270,664.6	329.55	4.92	0.00	66	15.0	7.0	Y
790	2534	1	777,718.4	270,664.6	318.23	4.92	0.00	66	15.0	7.0	Y
791	2535	1	777,968.4	270,664.6	307.45	4.92	0.00	66	15.0	7.0	Y
792	2536	1	778,218.4	270,664.6	310.84	4.92	0.00	66	15.0	7.0	Y
793	2537	1	778,468.4	270,664.6	310.34	4.92	0.00	66	15.0	7.0	Y
794	2538	1	778,718.4	270,664.6	328.26	4.92	0.00	66	15.0	7.0	Y
795	2539	1	778,968.4	270,664.6	336.48	4.92	0.00	66	15.0	7.0	Y
796	2540	1	779,218.4	270,664.6	316.41	4.92	0.00	66	15.0	7.0	Y
797	2541	1	779,468.4	270,664.6	325.89	4.92	0.00	66	15.0	7.0	Y
798	2542	1	779,718.4	270,664.6	309.53	4.92	0.00	66	15.0	7.0	Y
799	2543	1	779,968.4	270,664.6	307.45	4.92	0.00	66	15.0	7.0	Y
800	2544	1	780,218.4	270,664.6	308.16	4.92	0.00	66	15.0	7.0	Y
801	2545	1	780,468.4	270,664.6	311.91	4.92	0.00	66	15.0	7.0	Y
802	2546	1	780,718.4	270,664.6	314.90	4.92	0.00	66	15.0	7.0	Y
803	2547	1	780,968.4	270,664.6	318.64	4.92	0.00	66	15.0	7.0	Y
804	2548	1	781,218.4	270,664.6	320.28	4.92	0.00	66	15.0	7.0	Y
805	2549	1	781,468.4	270,664.6	321.25	4.92	0.00	66	15.0	7.0	Y
806	2550	1	781,718.4	270,664.6	322.87	4.92	0.00	66	15.0	7.0	Y
807	2551	1	781,968.4	270,664.6	326.50	4.92	0.00	66	15.0	7.0	Y
808	2552	1	782,218.4	270,664.6	336.57	4.92	0.00	66	15.0	7.0	Y
809	2553	1	782,468.4	270,664.6	346.84	4.92	0.00	66	15.0	7.0	Y
810	2554	1	782,718.4	270,664.6	354.26	4.92	0.00	66	15.0	7.0	Y
811	2555	1	782,968.4	270,664.6	357.32	4.92	0.00	66	15.0	7.0	Y
812	2556	1	783,218.4	270,664.6	363.61	4.92	0.00	66	15.0	7.0	Y
813	2557	1	783,468.4	270,664.6	365.20	4.92	0.00	66	15.0	7.0	Y
814	2558	1	783,718.4	270,664.6	356.64	4.92	0.00	66	15.0	7.0	Y
815	2559	1	783,968.4	270,664.6	360.84	4.92	0.00	66	15.0	7.0	Y
816	2560	1	784,218.4	270,664.6	363.91	4.92	0.00	66	15.0	7.0	Y
817	2561	1	784,468.4	270,664.6	369.11	4.92	0.00	66	15.0	7.0	Y
818	2562	1	773,968.4	270,914.6	331.53	4.92	0.00	66	15.0	7.0	Y

819	2563	1	774,218.4	270,914.6	337.53	4.92	0.00	66	15.0	7.0	Y
820	2564	1	774,468.4	270,914.6	344.85	4.92	0.00	66	15.0	7.0	Y
821	2565	1	774,718.4	270,914.6	341.65	4.92	0.00	66	15.0	7.0	Y
822	2566	1	774,968.4	270,914.6	347.72	4.92	0.00	66	15.0	7.0	Y
823	2567	1	775,218.4	270,914.6	353.90	4.92	0.00	66	15.0	7.0	Y
824	2568	1	775,468.4	270,914.6	360.78	4.92	0.00	66	15.0	7.0	Y
825	2569	1	775,718.4	270,914.6	364.25	4.92	0.00	66	15.0	7.0	Y
826	2570	1	775,968.4	270,914.6	360.87	4.92	0.00	66	15.0	7.0	Y
827	2571	1	776,218.4	270,914.6	342.20	4.92	0.00	66	15.0	7.0	Y
828	2572	1	776,468.4	270,914.6	332.90	4.92	0.00	66	15.0	7.0	Y
829	2573	1	776,718.4	270,914.6	335.15	4.92	0.00	66	15.0	7.0	Y
830	2574	1	776,968.4	270,914.6	335.53	4.92	0.00	66	15.0	7.0	Y
831	2575	1	777,218.4	270,914.6	334.89	4.92	0.00	66	15.0	7.0	Y
832	2576	1	777,468.4	270,914.6	336.59	4.92	0.00	66	15.0	7.0	Y
833	2577	1	777,718.4	270,914.6	322.66	4.92	0.00	66	15.0	7.0	Y
834	2578	1	777,968.4	270,914.6	312.86	4.92	0.00	66	15.0	7.0	Y
835	2579	1	778,218.4	270,914.6	307.81	4.92	0.00	66	15.0	7.0	Y
836	2580	1	778,468.4	270,914.6	307.06	4.92	0.00	66	15.0	7.0	Y
837	2581	1	778,718.4	270,914.6	311.22	4.92	0.00	66	15.0	7.0	Y
838	2582	1	778,968.4	270,914.6	332.74	4.92	0.00	66	15.0	7.0	Y
839	2583	1	779,218.4	270,914.6	319.82	4.92	0.00	66	15.0	7.0	Y
840	2584	1	779,468.4	270,914.6	308.53	4.92	0.00	66	15.0	7.0	Y
841	2585	1	779,718.4	270,914.6	306.62	4.92	0.00	66	15.0	7.0	Y
842	2586	1	779,968.4	270,914.6	311.52	4.92	0.00	66	15.0	7.0	Y
843	2587	1	780,218.4	270,914.6	324.30	4.92	0.00	66	15.0	7.0	Y
844	2588	1	780,468.4	270,914.6	320.83	4.92	0.00	66	15.0	7.0	Y
845	2589	1	780,718.4	270,914.6	329.92	4.92	0.00	66	15.0	7.0	Y
846	2590	1	780,968.4	270,914.6	331.38	4.92	0.00	66	15.0	7.0	Y
847	2591	1	781,218.4	270,914.6	328.46	4.92	0.00	66	15.0	7.0	Y
848	2592	1	781,468.4	270,914.6	327.01	4.92	0.00	66	15.0	7.0	Y
849	2593	1	781,718.4	270,914.6	328.38	4.92	0.00	66	15.0	7.0	Y
850	2594	1	781,968.4	270,914.6	333.86	4.92	0.00	66	15.0	7.0	Y
851	2595	1	782,218.4	270,914.6	342.43	4.92	0.00	66	15.0	7.0	Y
852	2596	1	782,468.4	270,914.6	350.96	4.92	0.00	66	15.0	7.0	Y
853	2597	1	782,718.4	270,914.6	354.09	4.92	0.00	66	15.0	7.0	Y
854	2598	1	782,968.4	270,914.6	356.26	4.92	0.00	66	15.0	7.0	Y

855	2599	1	783,218.4	270,914.6	366.35	4.92	0.00	66	15.0	7.0	Y
856	2600	1	783,468.4	270,914.6	369.09	4.92	0.00	66	15.0	7.0	Y
857	2601	1	783,718.4	270,914.6	364.45	4.92	0.00	66	15.0	7.0	Y
858	2602	1	783,968.4	270,914.6	361.37	4.92	0.00	66	15.0	7.0	Y
859	2603	1	784,218.4	270,914.6	372.39	4.92	0.00	66	15.0	7.0	Y
860	2604	1	784,468.4	270,914.6	374.63	4.92	0.00	66	15.0	7.0	Y
861	2605	1	773,968.4	271,164.6	338.87	4.92	0.00	66	15.0	7.0	Y
862	2606	1	774,218.4	271,164.6	342.87	4.92	0.00	66	15.0	7.0	Y
863	2607	1	774,468.4	271,164.6	348.21	4.92	0.00	66	15.0	7.0	Y
864	2609	1	774,718.4	271,164.6	352.36	4.92	0.00	66	15.0	7.0	Y
865	2610	1	774,968.4	271,164.6	354.00	4.92	0.00	66	15.0	7.0	Y
866	2611	1	775,218.4	271,164.6	356.25	4.92	0.00	66	15.0	7.0	Y
867	2612	1	775,468.4	271,164.6	360.39	4.92	0.00	66	15.0	7.0	Y
868	2613	1	775,718.4	271,164.6	365.64	4.92	0.00	66	15.0	7.0	Y
869	2614	1	775,968.4	271,164.6	364.06	4.92	0.00	66	15.0	7.0	Y
870	2615	1	776,218.4	271,164.6	354.95	4.92	0.00	66	15.0	7.0	Y
871	2616	1	776,468.4	271,164.6	348.29	4.92	0.00	66	15.0	7.0	Y
872	2617	1	776,718.4	271,164.6	347.08	4.92	0.00	66	15.0	7.0	Y
873	2618	1	776,968.4	271,164.6	327.57	4.92	0.00	66	15.0	7.0	Y
874	2619	1	777,218.4	271,164.6	339.67	4.92	0.00	66	15.0	7.0	Y
875	2620	1	777,468.4	271,164.6	344.85	4.92	0.00	66	15.0	7.0	Y
876	2621	1	777,718.4	271,164.6	330.73	4.92	0.00	66	15.0	7.0	Y
877	2622	1	777,968.4	271,164.6	321.38	4.92	0.00	66	15.0	7.0	Y
878	2623	1	778,218.4	271,164.6	309.56	4.92	0.00	66	15.0	7.0	Y
879	2624	1	778,468.4	271,164.6	306.53	4.92	0.00	66	15.0	7.0	Y
880	2625	1	778,718.4	271,164.6	306.24	4.92	0.00	66	15.0	7.0	Y
881	2626	1	778,968.4	271,164.6	308.49	4.92	0.00	66	15.0	7.0	Y
882	2627	1	779,218.4	271,164.6	312.72	4.92	0.00	66	15.0	7.0	Y
883	2628	1	779,468.4	271,164.6	307.87	4.92	0.00	66	15.0	7.0	Y
884	2629	1	779,718.4	271,164.6	307.02	4.92	0.00	66	15.0	7.0	Y
885	2630	1	779,968.4	271,164.6	312.26	4.92	0.00	66	15.0	7.0	Y
886	2631	1	780,218.4	271,164.6	319.82	4.92	0.00	66	15.0	7.0	Y
887	2632	1	780,468.4	271,164.6	335.28	4.92	0.00	66	15.0	7.0	Y
888	2633	1	780,718.4	271,164.6	338.03	4.92	0.00	66	15.0	7.0	Y
889	2634	1	780,968.4	271,164.6	345.01	4.92	0.00	66	15.0	7.0	Y
890	2635	1	781,218.4	271,164.6	345.96	4.92	0.00	66	15.0	7.0	Y

891	2636	1	781,468.4	271,164.6	337.59	4.92	0.00	66	15.0	7.0	Y
892	2637	1	781,718.4	271,164.6	337.49	4.92	0.00	66	15.0	7.0	Y
893	2638	1	781,968.4	271,164.6	336.94	4.92	0.00	66	15.0	7.0	Y
894	2639	1	782,218.4	271,164.6	338.40	4.92	0.00	66	15.0	7.0	Y
895	2640	1	782,468.4	271,164.6	338.69	4.92	0.00	66	15.0	7.0	Y
896	2641	1	782,718.4	271,164.6	344.26	4.92	0.00	66	15.0	7.0	Y
897	2642	1	782,968.4	271,164.6	349.85	4.92	0.00	66	15.0	7.0	Y
898	2643	1	783,218.4	271,164.6	356.97	4.92	0.00	66	15.0	7.0	Y
899	2644	1	783,468.4	271,164.6	369.62	4.92	0.00	66	15.0	7.0	Y
900	2645	1	783,718.4	271,164.6	372.54	4.92	0.00	66	15.0	7.0	Y
901	2646	1	783,968.4	271,164.6	372.81	4.92	0.00	66	15.0	7.0	Y
902	2647	1	784,218.4	271,164.6	380.18	4.92	0.00	66	15.0	7.0	Y
903	2649	1	784,468.4	271,164.6	383.95	4.92	0.00	66	15.0	7.0	Y
904	2650	1	773,968.4	271,414.6	337.42	4.92	0.00	66	15.0	7.0	Y
905	2651	1	774,218.4	271,414.6	349.87	4.92	0.00	66	15.0	7.0	Y
906	2652	1	774,468.4	271,414.6	350.48	4.92	0.00	66	15.0	7.0	Y
907	2653	1	774,718.4	271,414.6	351.01	4.92	0.00	66	15.0	7.0	Y
908	2654	1	774,968.4	271,414.6	357.10	4.92	0.00	66	15.0	7.0	Y
909	2655	1	775,218.4	271,414.6	359.38	4.92	0.00	66	15.0	7.0	Y
910	2656	1	775,468.4	271,414.6	357.41	4.92	0.00	66	15.0	7.0	Y
911	2657	1	775,718.4	271,414.6	361.04	4.92	0.00	66	15.0	7.0	Y
912	2658	1	775,968.4	271,414.6	364.13	4.92	0.00	66	15.0	7.0	Y
913	2659	1	776,218.4	271,414.6	351.26	4.92	0.00	66	15.0	7.0	Y
914	2660	1	776,468.4	271,414.6	343.69	4.92	0.00	66	15.0	7.0	Y
915	2661	1	776,718.4	271,414.6	334.32	4.92	0.00	66	15.0	7.0	Y
916	2662	1	776,968.4	271,414.6	336.23	4.92	0.00	66	15.0	7.0	Y
917	2663	1	777,218.4	271,414.6	344.10	4.92	0.00	66	15.0	7.0	Y
918	2664	1	777,468.4	271,414.6	345.41	4.92	0.00	66	15.0	7.0	Y
919	2665	1	777,718.4	271,414.6	326.51	4.92	0.00	66	15.0	7.0	Y
920	2666	1	777,968.4	271,414.6	318.63	4.92	0.00	66	15.0	7.0	Y
921	2667	1	778,218.4	271,414.6	311.75	4.92	0.00	66	15.0	7.0	Y
922	2668	1	778,468.4	271,414.6	308.24	4.92	0.00	66	15.0	7.0	Y
923	2669	1	778,718.4	271,414.6	304.34	4.92	0.00	66	15.0	7.0	Y
924	2670	1	778,968.4	271,414.6	306.34	4.92	0.00	66	15.0	7.0	Y
925	2671	1	779,218.4	271,414.6	310.67	4.92	0.00	66	15.0	7.0	Y
926	2672	1	779,468.4	271,414.6	306.68	4.92	0.00	66	15.0	7.0	Y

927	2673	1	779,718.4	271,414.6	306.53	4.92	0.00	66	15.0	7.0	Y
928	2674	1	779,968.4	271,414.6	312.20	4.92	0.00	66	15.0	7.0	Y
929	2675	1	780,218.4	271,414.6	322.15	4.92	0.00	66	15.0	7.0	Y
930	2676	1	780,468.4	271,414.6	336.77	4.92	0.00	66	15.0	7.0	Y
931	2677	1	780,718.4	271,414.6	347.85	4.92	0.00	66	15.0	7.0	Y
932	2678	1	780,968.4	271,414.6	354.55	4.92	0.00	66	15.0	7.0	Y
933	2679	1	781,218.4	271,414.6	353.22	4.92	0.00	66	15.0	7.0	Y
934	2680	1	781,468.4	271,414.6	349.82	4.92	0.00	66	15.0	7.0	Y
935	2681	1	781,718.4	271,414.6	346.47	4.92	0.00	66	15.0	7.0	Y
936	2682	1	781,968.4	271,414.6	342.71	4.92	0.00	66	15.0	7.0	Y
937	2683	1	782,218.4	271,414.6	349.18	4.92	0.00	66	15.0	7.0	Y
938	2684	1	782,468.4	271,414.6	344.62	4.92	0.00	66	15.0	7.0	Y
939	2685	1	782,718.4	271,414.6	354.94	4.92	0.00	66	15.0	7.0	Y
940	2686	1	782,968.4	271,414.6	363.00	4.92	0.00	66	15.0	7.0	Y
941	2688	1	783,218.4	271,414.6	358.83	4.92	0.00	66	15.0	7.0	Y
942	2689	1	783,468.4	271,414.6	362.70	4.92	0.00	66	15.0	7.0	Y
943	2690	1	783,718.4	271,414.6	371.58	4.92	0.00	66	15.0	7.0	Y
944	2691	1	783,968.4	271,414.6	376.16	4.92	0.00	66	15.0	7.0	Y
945	2692	1	784,218.4	271,414.6	382.43	4.92	0.00	66	15.0	7.0	Y
946	2693	1	784,468.4	271,414.6	389.49	4.92	0.00	66	15.0	7.0	Y
947	2694	1	773,968.4	271,664.6	333.01	4.92	0.00	66	15.0	7.0	Y
948	2695	1	774,218.4	271,664.6	342.88	4.92	0.00	66	15.0	7.0	Y
949	2696	1	774,468.4	271,664.6	340.14	4.92	0.00	66	15.0	7.0	Y
950	2697	1	774,718.4	271,664.6	338.19	4.92	0.00	66	15.0	7.0	Y
951	2698	1	774,968.4	271,664.6	347.45	4.92	0.00	66	15.0	7.0	Y
952	2699	1	775,218.4	271,664.6	347.11	4.92	0.00	66	15.0	7.0	Y
953	2700	1	775,468.4	271,664.6	344.04	4.92	0.00	66	15.0	7.0	Y
954	2701	1	775,718.4	271,664.6	345.46	4.92	0.00	66	15.0	7.0	Y
955	2702	1	775,968.4	271,664.6	359.19	4.92	0.00	66	15.0	7.0	Y
956	2703	1	776,218.4	271,664.6	362.70	4.92	0.00	66	15.0	7.0	Y
957	2704	1	776,468.4	271,664.6	347.48	4.92	0.00	66	15.0	7.0	Y
958	2705	1	776,718.4	271,664.6	346.25	4.92	0.00	66	15.0	7.0	Y
959	2706	1	776,968.4	271,664.6	337.21	4.92	0.00	66	15.0	7.0	Y
960	2707	1	777,218.4	271,664.6	349.63	4.92	0.00	66	15.0	7.0	Y
961	2708	1	777,468.4	271,664.6	347.05	4.92	0.00	66	15.0	7.0	Y
962	2709	1	777,718.4	271,664.6	331.12	4.92	0.00	66	15.0	7.0	Y

963	2710	1	777,968.4	271,664.6	324.13	4.92	0.00	66	15.0	7.0	Y
964	2711	1	778,218.4	271,664.6	322.19	4.92	0.00	66	15.0	7.0	Y
965	2712	1	778,468.4	271,664.6	309.49	4.92	0.00	66	15.0	7.0	Y
966	2713	1	778,718.4	271,664.6	303.84	4.92	0.00	66	15.0	7.0	Y
967	2714	1	778,968.4	271,664.6	304.75	4.92	0.00	66	15.0	7.0	Y
968	2715	1	779,218.4	271,664.6	304.62	4.92	0.00	66	15.0	7.0	Y
969	2716	1	779,468.4	271,664.6	304.49	4.92	0.00	66	15.0	7.0	Y
970	2717	1	779,718.4	271,664.6	313.15	4.92	0.00	66	15.0	7.0	Y
971	2718	1	779,968.4	271,664.6	330.98	4.92	0.00	66	15.0	7.0	Y
972	2719	1	780,218.4	271,664.6	322.94	4.92	0.00	66	15.0	7.0	Y
973	2720	1	780,468.4	271,664.6	328.51	4.92	0.00	66	15.0	7.0	Y
974	2721	1	780,718.4	271,664.6	332.76	4.92	0.00	66	15.0	7.0	Y
975	2722	1	780,968.4	271,664.6	341.18	4.92	0.00	66	15.0	7.0	Y
976	2723	1	781,218.4	271,664.6	346.14	4.92	0.00	66	15.0	7.0	Y
977	2724	1	781,468.4	271,664.6	360.36	4.92	0.00	66	15.0	7.0	Y
978	2725	1	781,718.4	271,664.6	357.22	4.92	0.00	66	15.0	7.0	Y
979	2726	1	781,968.4	271,664.6	352.93	4.92	0.00	66	15.0	7.0	Y
980	2727	1	782,218.4	271,664.6	357.07	4.92	0.00	66	15.0	7.0	Y
981	2728	1	782,468.4	271,664.6	352.08	4.92	0.00	66	15.0	7.0	Y
982	2729	1	782,718.4	271,664.6	354.48	4.92	0.00	66	15.0	7.0	Y
983	2730	1	782,968.4	271,664.6	360.27	4.92	0.00	66	15.0	7.0	Y
984	2731	1	783,218.4	271,664.6	364.82	4.92	0.00	66	15.0	7.0	Y
985	2732	1	783,468.4	271,664.6	367.71	4.92	0.00	66	15.0	7.0	Y
986	2733	1	783,718.4	271,664.6	369.99	4.92	0.00	66	15.0	7.0	Y
987	2734	1	783,968.4	271,664.6	364.20	4.92	0.00	66	15.0	7.0	Y
988	2735	1	784,218.4	271,664.6	374.51	4.92	0.00	66	15.0	7.0	Y
989	2736	1	784,468.4	271,664.6	383.51	4.92	0.00	66	15.0	7.0	Y
990	2737	1	773,968.4	271,914.6	330.63	4.92	0.00	66	15.0	7.0	Y
991	2738	1	774,218.4	271,914.6	335.45	4.92	0.00	66	15.0	7.0	Y
992	2739	1	774,468.4	271,914.6	327.29	4.92	0.00	66	15.0	7.0	Y
993	2740	1	774,718.4	271,914.6	340.81	4.92	0.00	66	15.0	7.0	Y
994	2741	1	774,968.4	271,914.6	343.10	4.92	0.00	66	15.0	7.0	Y
995	2742	1	775,218.4	271,914.6	340.74	4.92	0.00	66	15.0	7.0	Y
996	2743	1	775,468.4	271,914.6	338.77	4.92	0.00	66	15.0	7.0	Y
997	2744	1	775,718.4	271,914.6	349.78	4.92	0.00	66	15.0	7.0	Y
998	2745	1	775,968.4	271,914.6	360.19	4.92	0.00	66	15.0	7.0	Y

999	2746	1	776,218.4	271,914.6	364.09	4.92	0.00	66	15.0	7.0	Y
1000	2747	1	776,468.4	271,914.6	349.45	4.92	0.00	66	15.0	7.0	Y
1001	2748	1	776,718.4	271,914.6	352.65	4.92	0.00	66	15.0	7.0	Y
1002	2749	1	776,968.4	271,914.6	352.47	4.92	0.00	66	15.0	7.0	Y
1003	2750	1	777,218.4	271,914.6	353.15	4.92	0.00	66	15.0	7.0	Y
1004	2751	1	777,468.4	271,914.6	347.29	4.92	0.00	66	15.0	7.0	Y
1005	2752	1	777,718.4	271,914.6	343.70	4.92	0.00	66	15.0	7.0	Y
1006	2753	1	777,968.4	271,914.6	338.27	4.92	0.00	66	15.0	7.0	Y
1007	2754	1	778,218.4	271,914.6	328.85	4.92	0.00	66	15.0	7.0	Y
1008	2755	1	778,468.4	271,914.6	313.20	4.92	0.00	66	15.0	7.0	Y
1009	2756	1	778,718.4	271,914.6	302.99	4.92	0.00	66	15.0	7.0	Y
1010	2757	1	778,968.4	271,914.6	301.67	4.92	0.00	66	15.0	7.0	Y
1011	2758	1	779,218.4	271,914.6	302.26	4.92	0.00	66	15.0	7.0	Y
1012	2759	1	779,468.4	271,914.6	302.54	4.92	0.00	66	15.0	7.0	Y
1013	2760	1	779,718.4	271,914.6	308.37	4.92	0.00	66	15.0	7.0	Y
1014	2761	1	779,968.4	271,914.6	336.97	4.92	0.00	66	15.0	7.0	Y
1015	2762	1	780,218.4	271,914.6	330.72	4.92	0.00	66	15.0	7.0	Y
1016	2763	1	780,468.4	271,914.6	320.31	4.92	0.00	66	15.0	7.0	Y
1017	2764	1	780,718.4	271,914.6	325.51	4.92	0.00	66	15.0	7.0	Y
1018	2765	1	780,968.4	271,914.6	329.08	4.92	0.00	66	15.0	7.0	Y
1019	2766	1	781,218.4	271,914.6	339.36	4.92	0.00	66	15.0	7.0	Y
1020	2767	1	781,468.4	271,914.6	352.76	4.92	0.00	66	15.0	7.0	Y
1021	2768	1	781,718.4	271,914.6	362.52	4.92	0.00	66	15.0	7.0	Y
1022	2769	1	781,968.4	271,914.6	359.82	4.92	0.00	66	15.0	7.0	Y
1023	2771	1	782,218.4	271,914.6	357.29	4.92	0.00	66	15.0	7.0	Y
1024	2772	1	782,468.4	271,914.6	358.32	4.92	0.00	66	15.0	7.0	Y
1025	2773	1	782,718.4	271,914.6	358.06	4.92	0.00	66	15.0	7.0	Y
1026	2774	1	782,968.4	271,914.6	360.25	4.92	0.00	66	15.0	7.0	Y
1027	2775	1	783,218.4	271,914.6	365.08	4.92	0.00	66	15.0	7.0	Y
1028	2776	1	783,468.4	271,914.6	366.88	4.92	0.00	66	15.0	7.0	Y
1029	2777	1	783,718.4	271,914.6	367.11	4.92	0.00	66	15.0	7.0	Y
1030	2778	1	783,968.4	271,914.6	370.06	4.92	0.00	66	15.0	7.0	Y
1031	2779	1	784,218.4	271,914.6	366.12	4.92	0.00	66	15.0	7.0	Y
1032	2780	1	784,468.4	271,914.6	374.58	4.92	0.00	66	15.0	7.0	Y
1033	2781	1	773,968.4	272,164.6	330.22	4.92	0.00	66	15.0	7.0	Y
1034	2782	1	774,218.4	272,164.6	321.02	4.92	0.00	66	15.0	7.0	Y

1035	2783	1	774,468.4	272,164.6	337.33	4.92	0.00	66	15.0	7.0	Y
1036	2784	1	774,718.4	272,164.6	337.60	4.92	0.00	66	15.0	7.0	Y
1037	2785	1	774,968.4	272,164.6	330.47	4.92	0.00	66	15.0	7.0	Y
1038	2786	1	775,218.4	272,164.6	341.70	4.92	0.00	66	15.0	7.0	Y
1039	2787	1	775,468.4	272,164.6	348.55	4.92	0.00	66	15.0	7.0	Y
1040	2788	1	775,718.4	272,164.6	353.81	4.92	0.00	66	15.0	7.0	Y
1041	2789	1	775,968.4	272,164.6	356.49	4.92	0.00	66	15.0	7.0	Y
1042	2790	1	776,218.4	272,164.6	361.29	4.92	0.00	66	15.0	7.0	Y
1043	2791	1	776,468.4	272,164.6	360.79	4.92	0.00	66	15.0	7.0	Y
1044	2792	1	776,718.4	272,164.6	359.07	4.92	0.00	66	15.0	7.0	Y
1045	2793	1	776,968.4	272,164.6	357.74	4.92	0.00	66	15.0	7.0	Y
1046	2794	1	777,218.4	272,164.6	355.43	4.92	0.00	66	15.0	7.0	Y
1047	2795	1	777,468.4	272,164.6	351.43	4.92	0.00	66	15.0	7.0	Y
1048	2796	1	777,718.4	272,164.6	345.40	4.92	0.00	66	15.0	7.0	Y
1049	2797	1	777,968.4	272,164.6	328.76	4.92	0.00	66	15.0	7.0	Y
1050	2798	1	778,218.4	272,164.6	316.80	4.92	0.00	66	15.0	7.0	Y
1051	2799	1	778,468.4	272,164.6	310.52	4.92	0.00	66	15.0	7.0	Y
1052	2800	1	778,718.4	272,164.6	302.06	4.92	0.00	66	15.0	7.0	Y
1053	2801	1	778,968.4	272,164.6	301.72	4.92	0.00	66	15.0	7.0	Y
1054	2802	1	779,218.4	272,164.6	301.24	4.92	0.00	66	15.0	7.0	Y
1055	2803	1	779,468.4	272,164.6	301.44	4.92	0.00	66	15.0	7.0	Y
1056	2804	1	779,718.4	272,164.6	300.81	4.92	0.00	66	15.0	7.0	Y
1057	2805	1	779,968.4	272,164.6	317.34	4.92	0.00	66	15.0	7.0	Y
1058	2806	1	780,218.4	272,164.6	317.08	4.92	0.00	66	15.0	7.0	Y
1059	2807	1	780,468.4	272,164.6	331.78	4.92	0.00	66	15.0	7.0	Y
1060	2808	1	780,718.4	272,164.6	344.07	4.92	0.00	66	15.0	7.0	Y
1061	2809	1	780,968.4	272,164.6	349.20	4.92	0.00	66	15.0	7.0	Y
1062	2810	1	781,218.4	272,164.6	356.20	4.92	0.00	66	15.0	7.0	Y
1063	2811	1	781,468.4	272,164.6	356.31	4.92	0.00	66	15.0	7.0	Y
1064	2812	1	781,718.4	272,164.6	348.63	4.92	0.00	66	15.0	7.0	Y
1065	2813	1	781,968.4	272,164.6	354.99	4.92	0.00	66	15.0	7.0	Y
1066	2814	1	782,218.4	272,164.6	353.14	4.92	0.00	66	15.0	7.0	Y
1067	2815	1	782,468.4	272,164.6	354.47	4.92	0.00	66	15.0	7.0	Y
1068	2816	1	782,718.4	272,164.6	359.23	4.92	0.00	66	15.0	7.0	Y
1069	2817	1	782,968.4	272,164.6	358.58	4.92	0.00	66	15.0	7.0	Y
1070	2818	1	783,218.4	272,164.6	362.94	4.92	0.00	66	15.0	7.0	Y

1071	2819	1	783,468.4	272,164.6	364.81	4.92	0.00	66	15.0	7.0	Y
1072	2820	1	783,718.4	272,164.6	362.07	4.92	0.00	66	15.0	7.0	Y
1073	2821	1	783,968.4	272,164.6	363.14	4.92	0.00	66	15.0	7.0	Y
1074	2822	1	784,218.4	272,164.6	373.64	4.92	0.00	66	15.0	7.0	Y
1075	2823	1	784,468.4	272,164.6	373.81	4.92	0.00	66	15.0	7.0	Y

Attachment 5
TNM Files - Roadways

EPEI 6 August 2020

Cleary TNM 2.5

Roadway geometries are the same for the No-Build and Build models

INPUT: ROADWAYS

PROJECT/CONTRACT: ENS2001

RUN: NoBuild

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement)			Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
				X	Y	Z					
	ft			ft	ft	ft		mph	%		
Holmes Rd EB	12.0	point54	54	773,960.4	269,378.5	337.20				Average	
		point55	55	774,158.5	269,370.5	346.50				Average	
		point56	56	774,406.4	269,360.4	352.20				Average	
		point57	57	774,651.7	269,349.8	357.80				Average	
		point58	58	774,793.4	269,343.3	359.60				Average	
		point59	59	774,983.8	269,334.2	361.10				Average	
		point60	60	775,127.8	269,327.3	361.30				Average	
		point61	61	775,207.7	269,323.5	363.20				Average	
		point62	62	775,304.3	269,318.3	364.50				Average	
		point63	63	775,446.6	269,310.5	359.40				Average	
		point64	64	775,536.5	269,305.7	355.00				Average	
		point65	65	775,708.3	269,296.5	347.90				Average	
		point66	66	776,192.6	269,270.9	337.60				Average	
		point67	67	776,309.0	269,264.7	335.40				Average	
		point68	68	776,470.9	269,256.2	333.50				Average	
		point69	69	776,688.3	269,244.8	337.00				Average	
		point70	70	776,731.5	269,242.7	337.20				Average	
		point71	71	777,423.3	269,208.6	323.80				Average	
		point72	72	777,907.1	269,185.6	331.80				Average	
		point73	73	778,338.3	269,164.9	344.00				Average	
		point74	74	778,471.6	269,158.7	350.10				Average	
		point75	75	778,656.0	269,150.1	352.60				Average	
		point76	76	778,805.8	269,143.1	347.40				Average	
		point77	77	778,905.5	269,138.4	346.90				Average	
		point78	78	778,981.8	269,134.9	347.80				Average	

		point79	79	779,036.5	269,132.3	347.00				Average	
		point80	80	779,067.9	269,130.9	345.30				Average	
		point81	81	779,112.7	269,128.8	343.40				Average	
		point82	82	779,161.4	269,126.5	342.50				Average	
		point83	83	779,195.2	269,124.9	340.70				Average	
		point84	84	779,330.5	269,118.9	343.10				Average	
		point85	85	779,561.5	269,108.9	352.90				Average	
		point86	86	779,711.6	269,102.8	359.40				Average	
		point87	87	779,868.6	269,095.9	358.90				Average	
		point88	88	780,044.7	269,087.7	354.90				Average	
		point89	89	780,291.9	269,074.9	362.00				Average	
		point90	90	780,565.3	269,061.7	347.80				Average	
		point91	91	780,851.4	269,047.9	346.50				Average	
		point92	92	781,063.4	269,036.0	336.50				Average	
		point93	93	781,318.6	269,021.9	329.50				Average	
		point94	94	781,447.6	269,015.1	333.50				Average	
		point95	95	781,674.7	269,002.1	339.70				Average	
		point96	96	781,825.3	268,994.6	349.40				Average	
		point97	97	781,932.2	268,985.5	355.90				Average	
		point98	98	782,036.8	268,974.2	359.30				Average	
		point99	99	782,110.6	268,970.3	360.70				Average	
		point100	100	782,194.3	268,970.8	361.90				Average	
		point101	101	782,301.1	268,970.8	362.50				Average	
		point102	102	782,343.5	268,970.2	362.70				Average	
		point103	103	782,437.5	268,966.4	367.10				Average	
		point104	104	782,612.7	268,957.2	370.90				Average	
		point105	105	782,832.9	268,945.1	369.90				Average	
		point106	106	783,082.4	268,932.3	368.40				Average	
		point107	107	783,297.2	268,921.5	369.50				Average	
		point108	108	783,560.1	268,909.9	370.20				Average	
		point109	109	784,116.0	268,882.1	377.50				Average	
		point110	110	784,220.7	268,865.9	375.90				Average	
		point111	111	784,418.1	268,856.0	378.80					
Holmes Rd EB LT	12.0	point112	112	784,239.8	268,876.7	375.90				Average	
		point113	113	784,419.0	268,867.7	379.70					
Holmes Rd EB RT	12.0	point114	114	776,613.4	269,232.7	339.30				Average	
		point115	115	776,687.5	269,228.8	339.50				Average	
		point116	116	776,730.7	269,226.7	339.70				Average	
		point117	117	777,422.6	269,192.7	324.40				Average	

		point118	118	777,689.6	269,179.9	326.40					
Holmes Rd WB	12.0	point119	119	784,419.3	268,879.0	379.70				Average	
		point120	120	783,702.5	268,914.8	372.20				Average	
		point121	121	783,567.9	268,921.5	369.80				Average	
		point122	122	783,297.8	268,933.5	369.50				Average	
		point123	123	783,083.0	268,944.3	368.70				Average	
		point124	124	782,833.6	268,957.1	370.30				Average	
		point125	125	782,613.3	268,969.2	370.90				Average	
		point126	126	782,438.1	268,978.4	367.10				Average	
		point127	127	782,315.0	268,983.4	362.50				Average	
		point128	128	782,208.3	268,989.3	362.00				Average	
		point129	129	782,083.6	268,994.4	360.60				Average	
		point130	130	781,891.6	269,003.2	353.40				Average	
		point131	131	781,675.3	269,014.1	339.70				Average	
		point132	132	781,448.2	269,027.1	333.10				Average	
		point133	133	781,319.3	269,033.9	329.50				Average	
		point134	134	781,064.0	269,048.0	336.50				Average	
		point135	135	780,852.0	269,059.9	346.50				Average	
		point136	136	780,565.9	269,073.6	348.30				Average	
		point137	137	780,292.5	269,086.9	362.00				Average	
		point138	138	780,045.3	269,099.7	354.90				Average	
		point139	139	779,869.1	269,107.9	358.90				Average	
		point140	140	779,712.1	269,114.8	359.10				Average	
		point141	141	779,562.0	269,120.9	354.00				Average	
		point142	142	779,368.8	269,129.2	345.00				Average	
		point143	143	779,210.8	269,136.2	340.40				Average	
		point144	144	779,194.3	269,137.0	340.70				Average	
		point145	145	779,115.3	269,140.7	343.40				Average	
		point146	146	779,017.6	269,145.2	347.00				Average	
		point147	147	778,819.0	269,154.5	345.30				Average	
		point148	148	778,378.1	269,175.0	344.40				Average	
		point149	149	778,268.4	269,180.3	341.50				Average	
		point150	150	778,220.7	269,182.6	340.00				Average	
		point151	151	777,902.0	269,197.8	331.70				Average	
		point152	152	777,563.7	269,213.9	324.50				Average	
		point153	153	777,404.0	269,221.6	323.80				Average	
		point154	154	776,729.5	269,254.8	337.20				Average	
		point155	155	776,690.9	269,256.7	337.00				Average	
		point156	156	776,542.1	269,264.5	334.50				Average	

		point157	157	776,257.2	269,279.5	334.90				Average	
		point158	158	775,574.2	269,315.6	353.90				Average	
		point159	159	775,223.9	269,334.7	363.20				Average	
		point160	160	774,710.4	269,359.3	358.10				Average	
		point161	161	774,402.7	269,372.6	356.10				Average	
		point162	162	774,243.6	269,379.0	348.70				Average	
		point163	163	774,171.9	269,406.1	345.70				Average	
		point164	164	773,961.5	269,424.6	338.20					
Holmes Rd WB LT	12.0	point165	165	782,128.8	268,981.4	361.50				Average	
		point166	166	782,082.6	268,983.3	360.40				Average	
		point167	167	782,045.4	268,985.0	359.30					
Holmes Rd WB LT IN	12.0	point168	168	774,176.5	269,381.8	346.50				Average	
		point169	169	773,960.8	269,390.5	337.20					
Holmes Rd WB LT OUT	12.0	point170	170	774,175.6	269,393.8	346.50				Average	
		point171	171	773,961.3	269,402.5	338.20					

Attachment 6
TNM Files - Traffic

EPEI 6 August 2020
Cleary TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: ENS2001
RUN: NoBuild

Roadway Name	Points Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Holmes Rd EB	point54	54	487	40	28	40	39	40	0	0	0	0
	point55	55	487	40	28	40	39	40	0	0	0	0
	point56	56	487	40	28	40	39	40	0	0	0	0
	point57	57	487	40	28	40	39	40	0	0	0	0
	point58	58	487	40	28	40	39	40	0	0	0	0
	point59	59	487	40	28	40	39	40	0	0	0	0
	point60	60	487	40	28	40	39	40	0	0	0	0
	point61	61	487	40	28	40	39	40	0	0	0	0
	point62	62	487	40	28	40	39	40	0	0	0	0
	point63	63	487	40	28	40	39	40	0	0	0	0
	point64	64	487	40	28	40	39	40	0	0	0	0
	point65	65	487	40	28	40	39	40	0	0	0	0
	point66	66	487	40	28	40	39	40	0	0	0	0
	point67	67	487	40	28	40	39	40	0	0	0	0
	point68	68	487	40	28	40	39	40	0	0	0	0
	point69	69	487	40	28	40	39	40	0	0	0	0
	point70	70	487	40	28	40	39	40	0	0	0	0
	point71	71	487	40	28	40	39	40	0	0	0	0
	point72	72	487	40	28	40	39	40	0	0	0	0
	point73	73	487	40	28	40	39	40	0	0	0	0
	point74	74	487	40	28	40	39	40	0	0	0	0
	point75	75	487	40	28	40	39	40	0	0	0	0
	point76	76	487	40	28	40	39	40	0	0	0	0

	point77	77	487	40	28	40	39	40	0	0	0	0
	point78	78	487	40	28	40	39	40	0	0	0	0
	point79	79	487	40	28	40	39	40	0	0	0	0
	point80	80	487	40	28	40	39	40	0	0	0	0
	point81	81	487	40	28	40	39	40	0	0	0	0
	point82	82	487	40	28	40	39	40	0	0	0	0
	point83	83	487	40	28	40	39	40	0	0	0	0
	point84	84	487	40	28	40	39	40	0	0	0	0
	point85	85	487	40	28	40	39	40	0	0	0	0
	point86	86	487	40	28	40	39	40	0	0	0	0
	point87	87	487	40	28	40	39	40	0	0	0	0
	point88	88	487	40	28	40	39	40	0	0	0	0
	point89	89	487	40	28	40	39	40	0	0	0	0
	point90	90	487	40	28	40	39	40	0	0	0	0
	point91	91	487	40	28	40	39	40	0	0	0	0
	point92	92	487	40	28	40	39	40	0	0	0	0
	point93	93	487	40	28	40	39	40	0	0	0	0
	point94	94	487	40	28	40	39	40	0	0	0	0
	point95	95	487	40	28	40	39	40	0	0	0	0
	point96	96	487	40	28	40	39	40	0	0	0	0
	point97	97	487	40	28	40	39	40	0	0	0	0
	point98	98	487	40	28	40	39	40	0	0	0	0
	point99	99	487	40	28	40	39	40	0	0	0	0
	point100	100	487	40	28	40	39	40	0	0	0	0
	point101	101	487	40	28	40	39	40	0	0	0	0
	point102	102	487	40	28	40	39	40	0	0	0	0
	point103	103	487	40	28	40	39	40	0	0	0	0
	point104	104	487	40	28	40	39	40	0	0	0	0
	point105	105	487	40	28	40	39	40	0	0	0	0
	point106	106	487	40	28	40	39	40	0	0	0	0
	point107	107	487	40	28	40	39	40	0	0	0	0
	point108	108	487	40	28	40	39	40	0	0	0	0
	point109	109	487	40	28	40	39	40	0	0	0	0
	point110	110	487	40	28	40	39	40	0	0	0	0
	point111	111										
Holmes Rd EB LT	point112	112	0	0	0	0	0	0	0	0	0	0

	point113	113										
Holmes Rd EB RT	point114	114	0	0	0	0	0	0	0	0	0	0
	point115	115	0	0	0	0	0	0	0	0	0	0
	point116	116	0	0	0	0	0	0	0	0	0	0
	point117	117	0	0	0	0	0	0	0	0	0	0
	point118	118										
Holmes Rd WB	point119	119	487	40	28	40	39	40	0	0	0	0
	point120	120	487	40	28	40	39	40	0	0	0	0
	point121	121	487	40	28	40	39	40	0	0	0	0
	point122	122	487	40	28	40	39	40	0	0	0	0
	point123	123	487	40	28	40	39	40	0	0	0	0
	point124	124	487	40	28	40	39	40	0	0	0	0
	point125	125	487	40	28	40	39	40	0	0	0	0
	point126	126	487	40	28	40	39	40	0	0	0	0
	point127	127	487	40	28	40	39	40	0	0	0	0
	point128	128	487	40	28	40	39	40	0	0	0	0
	point129	129	487	40	28	40	39	40	0	0	0	0
	point130	130	487	40	28	40	39	40	0	0	0	0
	point131	131	487	40	28	40	39	40	0	0	0	0
	point132	132	487	40	28	40	39	40	0	0	0	0
	point133	133	487	40	28	40	39	40	0	0	0	0
	point134	134	487	40	28	40	39	40	0	0	0	0
	point135	135	487	40	28	40	39	40	0	0	0	0
	point136	136	487	40	28	40	39	40	0	0	0	0
	point137	137	487	40	28	40	39	40	0	0	0	0
	point138	138	487	40	28	40	39	40	0	0	0	0
	point139	139	487	40	28	40	39	40	0	0	0	0
	point140	140	487	40	28	40	39	40	0	0	0	0
	point141	141	487	40	28	40	39	40	0	0	0	0
	point142	142	487	40	28	40	39	40	0	0	0	0
	point143	143	487	40	28	40	39	40	0	0	0	0
	point144	144	487	40	28	40	39	40	0	0	0	0
	point145	145	487	40	28	40	39	40	0	0	0	0
	point146	146	487	40	28	40	39	40	0	0	0	0
	point147	147	487	40	28	40	39	40	0	0	0	0
	point148	148	487	40	28	40	39	40	0	0	0	0

	point149	149	487	40	28	40	39	40	0	0	0	0
	point150	150	487	40	28	40	39	40	0	0	0	0
	point151	151	487	40	28	40	39	40	0	0	0	0
	point152	152	487	40	28	40	39	40	0	0	0	0
	point153	153	487	40	28	40	39	40	0	0	0	0
	point154	154	487	40	28	40	39	40	0	0	0	0
	point155	155	487	40	28	40	39	40	0	0	0	0
	point156	156	487	40	28	40	39	40	0	0	0	0
	point157	157	487	40	28	40	39	40	0	0	0	0
	point158	158	487	40	28	40	39	40	0	0	0	0
	point159	159	487	40	28	40	39	40	0	0	0	0
	point160	160	487	40	28	40	39	40	0	0	0	0
	point161	161	487	40	28	40	39	40	0	0	0	0
	point162	162	487	40	28	40	39	40	0	0	0	0
	point163	163	487	40	28	40	39	40	0	0	0	0
	point164	164										
Holmes Rd WB LT	point165	165	0	0	0	0	0	0	0	0	0	0
	point166	166	0	0	0	0	0	0	0	0	0	0
	point167	167										
Holmes Rd WB LT IN	point168	168	0	0	0	0	0	0	0	0	0	0
	point169	169										
Holmes Rd WB LT OUT	point170	170	0	0	0	0	0	0	0	0	0	0
	point171	171										

EPEI **6 August 2020**
Cleary **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **ENS2001**
RUN: **Build**

Roadway Name	Points Name	No.	Segment Autos V veh/hr	Autos S mph	MTrucks V veh/hr	MTrucks S mph	HTrucks V veh/hr	HTrucks S mph	Buses V veh/hr	Buses S mph	Motorcycles V veh/hr	Motorcycles S mph
Holmes Rd EB	point54	54	537	40	28	40	99	40	0	0	0	0
	point55	55	537	40	28	40	99	40	0	0	0	0
	point56	56	537	40	28	40	99	40	0	0	0	0
	point57	57	537	40	28	40	99	40	0	0	0	0
	point58	58	537	40	28	40	99	40	0	0	0	0
	point59	59	537	40	28	40	99	40	0	0	0	0
	point60	60	537	40	28	40	99	40	0	0	0	0
	point61	61	537	40	28	40	99	40	0	0	0	0
	point62	62	537	40	28	40	99	40	0	0	0	0
	point63	63	537	40	28	40	99	40	0	0	0	0
	point64	64	537	40	28	40	99	40	0	0	0	0
	point65	65	537	40	28	40	99	40	0	0	0	0
	point66	66	537	40	28	40	99	40	0	0	0	0
	point67	67	537	40	28	40	99	40	0	0	0	0
	point68	68	537	40	28	40	99	40	0	0	0	0
	point69	69	537	40	28	40	99	40	0	0	0	0
	point70	70	537	40	28	40	99	40	0	0	0	0
	point71	71	537	40	28	40	99	40	0	0	0	0
	point72	72	537	40	28	40	99	40	0	0	0	0
	point73	73	537	40	28	40	99	40	0	0	0	0
	point74	74	537	40	28	40	99	40	0	0	0	0
	point75	75	537	40	28	40	99	40	0	0	0	0
	point76	76	537	40	28	40	99	40	0	0	0	0

	point77	77	537	40	28	40	99	40	0	0	0	0
	point78	78	537	40	28	40	99	40	0	0	0	0
	point79	79	537	40	28	40	99	40	0	0	0	0
	point80	80	537	40	28	40	99	40	0	0	0	0
	point81	81	537	40	28	40	99	40	0	0	0	0
	point82	82	537	40	28	40	99	40	0	0	0	0
	point83	83	537	40	28	40	99	40	0	0	0	0
	point84	84	537	40	28	40	99	40	0	0	0	0
	point85	85	537	40	28	40	99	40	0	0	0	0
	point86	86	537	40	28	40	99	40	0	0	0	0
	point87	87	537	40	28	40	99	40	0	0	0	0
	point88	88	537	40	28	40	99	40	0	0	0	0
	point89	89	537	40	28	40	99	40	0	0	0	0
	point90	90	537	40	28	40	99	40	0	0	0	0
	point91	91	537	40	28	40	99	40	0	0	0	0
	point92	92	537	40	28	40	99	40	0	0	0	0
	point93	93	537	40	28	40	99	40	0	0	0	0
	point94	94	537	40	28	40	99	40	0	0	0	0
	point95	95	537	40	28	40	99	40	0	0	0	0
	point96	96	537	40	28	40	99	40	0	0	0	0
	point97	97	537	40	28	40	99	40	0	0	0	0
	point98	98	537	40	28	40	99	40	0	0	0	0
	point99	99	537	40	28	40	99	40	0	0	0	0
	point100	100	537	40	28	40	99	40	0	0	0	0
	point101	101	537	40	28	40	99	40	0	0	0	0
	point102	102	537	40	28	40	99	40	0	0	0	0
	point103	103	537	40	28	40	99	40	0	0	0	0
	point104	104	537	40	28	40	99	40	0	0	0	0
	point105	105	537	40	28	40	99	40	0	0	0	0
	point106	106	537	40	28	40	99	40	0	0	0	0
	point107	107	537	40	28	40	99	40	0	0	0	0
	point108	108	537	40	28	40	99	40	0	0	0	0
	point109	109	537	40	28	40	99	40	0	0	0	0
	point110	110	537	40	28	40	99	40	0	0	0	0
	point111	111										
Holmes Rd EB LT	point112	112	0	0	0	0	0	0	0	0	0	0

	point113	113										
Holmes Rd EB RT	point114	114	0	0	0	0	0	0	0	0	0	0
	point115	115	0	0	0	0	0	0	0	0	0	0
	point116	116	0	0	0	0	0	0	0	0	0	0
	point117	117	0	0	0	0	0	0	0	0	0	0
	point118	118										
Holmes Rd WB	point119	119	537	40	28	40	99	40	0	0	0	0
	point120	120	537	40	28	40	99	40	0	0	0	0
	point121	121	537	40	28	40	99	40	0	0	0	0
	point122	122	537	40	28	40	99	40	0	0	0	0
	point123	123	537	40	28	40	99	40	0	0	0	0
	point124	124	537	40	28	40	99	40	0	0	0	0
	point125	125	537	40	28	40	99	40	0	0	0	0
	point126	126	537	40	28	40	99	40	0	0	0	0
	point127	127	537	40	28	40	99	40	0	0	0	0
	point128	128	537	40	28	40	99	40	0	0	0	0
	point129	129	537	40	28	40	99	40	0	0	0	0
	point130	130	537	40	28	40	99	40	0	0	0	0
	point131	131	537	40	28	40	99	40	0	0	0	0
	point132	132	537	40	28	40	99	40	0	0	0	0
	point133	133	537	40	28	40	99	40	0	0	0	0
	point134	134	537	40	28	40	99	40	0	0	0	0
	point135	135	537	40	28	40	99	40	0	0	0	0
	point136	136	537	40	28	40	99	40	0	0	0	0
	point137	137	537	40	28	40	99	40	0	0	0	0
	point138	138	537	40	28	40	99	40	0	0	0	0
	point139	139	537	40	28	40	99	40	0	0	0	0
	point140	140	537	40	28	40	99	40	0	0	0	0
	point141	141	537	40	28	40	99	40	0	0	0	0
	point142	142	537	40	28	40	99	40	0	0	0	0
	point143	143	537	40	28	40	99	40	0	0	0	0
	point144	144	537	40	28	40	99	40	0	0	0	0
	point145	145	537	40	28	40	99	40	0	0	0	0
	point146	146	537	40	28	40	99	40	0	0	0	0
	point147	147	537	40	28	40	99	40	0	0	0	0
	point148	148	537	40	28	40	99	40	0	0	0	0

	point149	149	537	40	28	40	99	40	0	0	0	0
	point150	150	537	40	28	40	99	40	0	0	0	0
	point151	151	537	40	28	40	99	40	0	0	0	0
	point152	152	537	40	28	40	99	40	0	0	0	0
	point153	153	537	40	28	40	99	40	0	0	0	0
	point154	154	537	40	28	40	99	40	0	0	0	0
	point155	155	537	40	28	40	99	40	0	0	0	0
	point156	156	537	40	28	40	99	40	0	0	0	0
	point157	157	537	40	28	40	99	40	0	0	0	0
	point158	158	537	40	28	40	99	40	0	0	0	0
	point159	159	537	40	28	40	99	40	0	0	0	0
	point160	160	537	40	28	40	99	40	0	0	0	0
	point161	161	537	40	28	40	99	40	0	0	0	0
	point162	162	537	40	28	40	99	40	0	0	0	0
	point163	163	537	40	28	40	99	40	0	0	0	0
	point164	164										
Holmes Rd WB LT	point165	165	0	0	0	0	0	0	0	0	0	0
	point166	166	0	0	0	0	0	0	0	0	0	0
	point167	167										
Holmes Rd WB LT IN	point168	168	0	0	0	0	0	0	0	0	0	0
	point169	169										
Holmes Rd WB LT OUT	point170	170	0	0	0	0	0	0	0	0	0	0
	point171	171										

Attachment 7
TNM Files -
Sound Level Results

EPEI
Cleary
6 August 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: ENS2001
RUN: NoBuild
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1	1	1	60.0	35.5	66	-24.5	15	----	35.5	0.0	7	-7.0
2	1734	1	0.0	35.9	66	35.9	15	----	35.9	0.0	7	-7.0
3	1735	1	0.0	36.1	66	36.1	15	----	36.1	0.0	7	-7.0
4	1736	1	0.0	36.4	66	36.4	15	----	36.4	0.0	7	-7.0
5	1737	1	0.0	36.7	66	36.7	15	----	36.7	0.0	7	-7.0
6	1738	1	0.0	36.8	66	36.8	15	----	36.8	0.0	7	-7.0
7	1739	1	0.0	37.1	66	37.1	15	----	37.1	0.0	7	-7.0
8	1740	1	0.0	37.4	66	37.4	15	----	37.4	0.0	7	-7.0
9	1741	1	0.0	37.3	66	37.3	15	----	37.3	0.0	7	-7.0
10	1742	1	0.0	37.3	66	37.3	15	----	37.3	0.0	7	-7.0
11	1743	1	0.0	37.4	66	37.4	15	----	37.4	0.0	7	-7.0
12	1744	1	0.0	37.4	66	37.4	15	----	37.4	0.0	7	-7.0
13	1745	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
14	1746	1	0.0	37.7	66	37.7	15	----	37.7	0.0	7	-7.0
15	1747	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
16	1748	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
17	1749	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
18	1750	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
19	1751	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
20	1752	1	0.0	38.3	66	38.3	15	----	38.3	0.0	7	-7.0
21	1753	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
22	1754	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
23	1755	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
24	1756	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0

25	1757	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
26	1758	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
27	1759	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
28	1760	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
29	1761	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
30	1762	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
31	1763	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
32	1764	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
33	1765	1	0.0	37.7	66	37.7	15	----	37.7	0.0	7	-7.0
34	1766	1	0.0	37.6	66	37.6	15	----	37.6	0.0	7	-7.0
35	1767	1	0.0	37.7	66	37.7	15	----	37.7	0.0	7	-7.0
36	1768	1	0.0	37.5	66	37.5	15	----	37.5	0.0	7	-7.0
37	1769	1	0.0	37.2	66	37.2	15	----	37.2	0.0	7	-7.0
38	1770	1	0.0	37.3	66	37.3	15	----	37.3	0.0	7	-7.0
39	1771	1	0.0	37.2	66	37.2	15	----	37.2	0.0	7	-7.0
40	1772	1	0.0	36.8	66	36.8	15	----	36.8	0.0	7	-7.0
41	1773	1	0.0	36.6	66	36.6	15	----	36.6	0.0	7	-7.0
42	1774	1	0.0	36.3	66	36.3	15	----	36.3	0.0	7	-7.0
43	1775	1	0.0	36.0	66	36.0	15	----	36.0	0.0	7	-7.0
44	1776	1	0.0	36.2	66	36.2	15	----	36.2	0.0	7	-7.0
45	1777	1	0.0	36.7	66	36.7	15	----	36.7	0.0	7	-7.0
46	1778	1	0.0	36.8	66	36.8	15	----	36.8	0.0	7	-7.0
47	1779	1	0.0	36.9	66	36.9	15	----	36.9	0.0	7	-7.0
48	1780	1	0.0	37.2	66	37.2	15	----	37.2	0.0	7	-7.0
49	1781	1	0.0	37.3	66	37.3	15	----	37.3	0.0	7	-7.0
50	1782	1	0.0	37.5	66	37.5	15	----	37.5	0.0	7	-7.0
51	1783	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
52	1784	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
53	1785	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
54	1786	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
55	1787	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
56	1788	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
57	1789	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
58	1790	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
59	1791	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
60	1792	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
61	1793	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
62	1794	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
63	1795	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
64	1796	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
65	1797	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0

66	1798	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
67	1799	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
68	1800	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
69	1801	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
70	1802	1	0.0	38.7	66	38.7	15	----	38.7	0.0	7	-7.0
71	1803	1	0.0	38.7	66	38.7	15	----	38.7	0.0	7	-7.0
72	1804	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
73	1805	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
74	1806	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
75	1807	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
76	1808	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
77	1809	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0
78	1810	1	0.0	38.3	66	38.3	15	----	38.3	0.0	7	-7.0
79	1811	1	0.0	38.2	66	38.2	15	----	38.2	0.0	7	-7.0
80	1812	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
81	1813	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
82	1814	1	0.0	37.6	66	37.6	15	----	37.6	0.0	7	-7.0
83	1815	1	0.0	37.2	66	37.2	15	----	37.2	0.0	7	-7.0
84	1816	1	0.0	37.2	66	37.2	15	----	37.2	0.0	7	-7.0
85	1817	1	0.0	36.8	66	36.8	15	----	36.8	0.0	7	-7.0
86	1818	1	0.0	36.3	66	36.3	15	----	36.3	0.0	7	-7.0
87	1819	1	0.0	36.9	66	36.9	15	----	36.9	0.0	7	-7.0
88	1820	1	0.0	37.2	66	37.2	15	----	37.2	0.0	7	-7.0
89	1821	1	0.0	37.4	66	37.4	15	----	37.4	0.0	7	-7.0
90	1822	1	0.0	37.5	66	37.5	15	----	37.5	0.0	7	-7.0
91	1823	1	0.0	37.7	66	37.7	15	----	37.7	0.0	7	-7.0
92	1824	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
93	1825	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
94	1826	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
95	1827	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0
96	1828	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
97	1829	1	0.0	38.7	66	38.7	15	----	38.7	0.0	7	-7.0
98	1830	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
99	1831	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
100	1832	1	0.0	38.9	66	38.9	15	----	38.9	0.0	7	-7.0
101	1833	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
102	1834	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
103	1835	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
104	1836	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
105	1837	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
106	1838	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0

107	1839	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
108	1840	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
109	1841	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
110	1842	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
111	1843	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
112	1844	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
113	1845	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
114	1846	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
115	1847	1	0.0	39.3	66	39.3	15	----	39.3	0.0	7	-7.0
116	1848	1	0.0	39.3	66	39.3	15	----	39.3	0.0	7	-7.0
117	1849	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
118	1851	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
119	1852	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
120	1853	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
121	1854	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
122	1855	1	0.0	38.8	66	38.8	15	----	38.8	0.0	7	-7.0
123	1856	1	0.0	38.8	66	38.8	15	----	38.8	0.0	7	-7.0
124	1857	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
125	1858	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0
126	1859	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
127	1860	1	0.0	37.6	66	37.6	15	----	37.6	0.0	7	-7.0
128	1861	1	0.0	37.3	66	37.3	15	----	37.3	0.0	7	-7.0
129	1862	1	0.0	37.1	66	37.1	15	----	37.1	0.0	7	-7.0
130	1863	1	0.0	37.3	66	37.3	15	----	37.3	0.0	7	-7.0
131	1864	1	0.0	37.5	66	37.5	15	----	37.5	0.0	7	-7.0
132	1865	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
133	1866	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
134	1867	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
135	1868	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
136	1869	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
137	1870	1	0.0	38.8	66	38.8	15	----	38.8	0.0	7	-7.0
138	1871	1	0.0	38.8	66	38.8	15	----	38.8	0.0	7	-7.0
139	1872	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
140	1873	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
141	1874	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
142	1875	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
143	1876	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
144	1877	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
145	1878	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
146	1879	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
147	1880	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0

148	1881	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
149	1882	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
150	1883	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
151	1884	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
152	1885	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
153	1886	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
154	1887	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
155	1888	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
156	1889	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
157	1890	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
158	1891	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
159	1892	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
160	1893	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
161	1894	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
162	1895	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
163	1896	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
164	1897	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
165	1898	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
166	1899	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
167	1900	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
168	1901	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
169	1902	1	0.0	38.8	66	38.8	15	----	38.8	0.0	7	-7.0
170	1903	1	0.0	38.7	66	38.7	15	----	38.7	0.0	7	-7.0
171	1904	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0
172	1905	1	0.0	37.5	66	37.5	15	----	37.5	0.0	7	-7.0
173	1906	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
174	1907	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
175	1908	1	0.0	38.7	66	38.7	15	----	38.7	0.0	7	-7.0
176	1909	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
177	1910	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
178	1911	1	0.0	39.3	66	39.3	15	----	39.3	0.0	7	-7.0
179	1912	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
180	1913	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
181	1914	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
182	1915	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
183	1916	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
184	1917	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
185	1918	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
186	1919	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
187	1920	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
188	1921	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0

189	1922	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
190	1923	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
191	1924	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
192	1925	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
193	1926	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
194	1927	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
195	1928	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
196	1929	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
197	1930	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
198	1931	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
199	1932	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
200	1933	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
201	1934	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
202	1935	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
203	1936	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
204	1937	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
205	1938	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
206	1939	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
207	1940	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
208	1941	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
209	1942	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
210	1943	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
211	1944	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
212	1945	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
213	1946	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
214	1947	1	0.0	38.9	66	38.9	15	----	38.9	0.0	7	-7.0
215	1948	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
216	1949	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
217	1950	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
218	1951	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
219	1952	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
220	1953	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
221	1954	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
222	1955	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
223	1956	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
224	1957	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
225	1958	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
226	1959	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
227	1960	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
228	1961	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
229	1962	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0

230	1963	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
231	1964	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
232	1965	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
233	1966	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
234	1967	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
235	1968	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
236	1969	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
237	1970	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
238	1971	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
239	1972	1	0.0	42.0	66	42.0	15	----	42.0	0.0	7	-7.0
240	1973	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
241	1974	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
242	1975	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
243	1976	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
244	1977	1	0.0	42.0	66	42.0	15	----	42.0	0.0	7	-7.0
245	1978	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
246	1979	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
247	1980	1	0.0	42.0	66	42.0	15	----	42.0	0.0	7	-7.0
248	1981	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
249	1982	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
250	1983	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
251	1984	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
252	1985	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
253	1986	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
254	1987	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
255	1988	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
256	1989	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
257	1990	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
258	1991	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
259	1992	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
260	1993	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
261	1994	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
262	1995	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
263	1996	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
264	1997	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
265	1998	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
266	1999	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
267	2000	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
268	2001	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
269	2002	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
270	2003	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0

271	2004	1	0.0	42.0	66	42.0	15	----	42.0	0.0	7	-7.0
272	2005	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
273	2006	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
274	2007	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
275	2008	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
276	2009	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
277	2010	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
278	2011	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
279	2012	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
280	2013	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
281	2014	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
282	2015	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
283	2016	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
284	2017	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
285	2018	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
286	2019	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
287	2020	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
288	2021	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
289	2022	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
290	2023	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
291	2024	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
292	2025	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
293	2026	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
294	2027	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
295	2028	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
296	2029	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
297	2031	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
298	2032	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
299	2033	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
300	2034	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
301	2035	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
302	2036	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
303	2037	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
304	2038	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
305	2039	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
306	2040	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
307	2041	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
308	2042	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
309	2043	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
310	2044	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
311	2045	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0

312	2046	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
313	2047	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
314	2048	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
315	2049	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
316	2050	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
317	2051	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
318	2052	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
319	2053	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
320	2054	1	0.0	44.2	66	44.2	15	----	44.2	0.0	7	-7.0
321	2055	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
322	2056	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
323	2057	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
324	2058	1	0.0	44.2	66	44.2	15	----	44.2	0.0	7	-7.0
325	2059	1	0.0	44.2	66	44.2	15	----	44.2	0.0	7	-7.0
326	2060	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
327	2061	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
328	2062	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
329	2063	1	0.0	44.6	66	44.6	15	----	44.6	0.0	7	-7.0
330	2064	1	0.0	44.6	66	44.6	15	----	44.6	0.0	7	-7.0
331	2065	1	0.0	44.8	66	44.8	15	----	44.8	0.0	7	-7.0
332	2066	1	0.0	44.9	66	44.9	15	----	44.9	0.0	7	-7.0
333	2067	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
334	2068	1	0.0	44.9	66	44.9	15	----	44.9	0.0	7	-7.0
335	2069	1	0.0	45.2	66	45.2	15	----	45.2	0.0	7	-7.0
336	2070	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
337	2071	1	0.0	44.8	66	44.8	15	----	44.8	0.0	7	-7.0
338	2072	1	0.0	44.6	66	44.6	15	----	44.6	0.0	7	-7.0
339	2073	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
340	2074	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
341	2075	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
342	2076	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
343	2077	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
344	2078	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
345	2079	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
346	2080	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
347	2081	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
348	2082	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
349	2083	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
350	2084	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
351	2085	1	0.0	44.2	66	44.2	15	----	44.2	0.0	7	-7.0
352	2086	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0

353	2087	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
354	2088	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
355	2089	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
356	2090	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
357	2091	1	0.0	44.6	66	44.6	15	----	44.6	0.0	7	-7.0
358	2092	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
359	2093	1	0.0	45.2	66	45.2	15	----	45.2	0.0	7	-7.0
360	2094	1	0.0	45.2	66	45.2	15	----	45.2	0.0	7	-7.0
361	2095	1	0.0	45.6	66	45.6	15	----	45.6	0.0	7	-7.0
362	2096	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0
363	2097	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0
364	2098	1	0.0	45.9	66	45.9	15	----	45.9	0.0	7	-7.0
365	2099	1	0.0	45.8	66	45.8	15	----	45.8	0.0	7	-7.0
366	2100	1	0.0	45.9	66	45.9	15	----	45.9	0.0	7	-7.0
367	2101	1	0.0	46.1	66	46.1	15	----	46.1	0.0	7	-7.0
368	2102	1	0.0	46.1	66	46.1	15	----	46.1	0.0	7	-7.0
369	2103	1	0.0	46.3	66	46.3	15	----	46.3	0.0	7	-7.0
370	2104	1	0.0	46.4	66	46.4	15	----	46.4	0.0	7	-7.0
371	2105	1	0.0	46.6	66	46.6	15	----	46.6	0.0	7	-7.0
372	2106	1	0.0	46.8	66	46.8	15	----	46.8	0.0	7	-7.0
373	2107	1	0.0	46.9	66	46.9	15	----	46.9	0.0	7	-7.0
374	2108	1	0.0	47.1	66	47.1	15	----	47.1	0.0	7	-7.0
375	2109	1	0.0	47.0	66	47.0	15	----	47.0	0.0	7	-7.0
376	2110	1	0.0	47.2	66	47.2	15	----	47.2	0.0	7	-7.0
377	2111	1	0.0	47.4	66	47.4	15	----	47.4	0.0	7	-7.0
378	2112	1	0.0	47.5	66	47.5	15	----	47.5	0.0	7	-7.0
379	2113	1	0.0	47.3	66	47.3	15	----	47.3	0.0	7	-7.0
380	2114	1	0.0	47.2	66	47.2	15	----	47.2	0.0	7	-7.0
381	2116	1	0.0	47.1	66	47.1	15	----	47.1	0.0	7	-7.0
382	2117	1	0.0	46.9	66	46.9	15	----	46.9	0.0	7	-7.0
383	2118	1	0.0	47.2	66	47.2	15	----	47.2	0.0	7	-7.0
384	2119	1	0.0	46.7	66	46.7	15	----	46.7	0.0	7	-7.0
385	2120	1	0.0	46.2	66	46.2	15	----	46.2	0.0	7	-7.0
386	2121	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
387	2122	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
388	2123	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
389	2124	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
390	2125	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
391	2126	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0
392	2127	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0
393	2128	1	0.0	46.3	66	46.3	15	----	46.3	0.0	7	-7.0

394	2129	1	0.0	46.0	66	46.0	15	----	46.0	0.0	7	-7.0
395	2130	1	0.0	46.1	66	46.1	15	----	46.1	0.0	7	-7.0
396	2131	1	0.0	46.2	66	46.2	15	----	46.2	0.0	7	-7.0
397	2132	1	0.0	46.3	66	46.3	15	----	46.3	0.0	7	-7.0
398	2133	1	0.0	46.3	66	46.3	15	----	46.3	0.0	7	-7.0
399	2134	1	0.0	46.4	66	46.4	15	----	46.4	0.0	7	-7.0
400	2135	1	0.0	46.5	66	46.5	15	----	46.5	0.0	7	-7.0
401	2136	1	0.0	46.8	66	46.8	15	----	46.8	0.0	7	-7.0
402	2137	1	0.0	47.3	66	47.3	15	----	47.3	0.0	7	-7.0
403	2138	1	0.0	47.6	66	47.6	15	----	47.6	0.0	7	-7.0
404	2139	1	0.0	47.7	66	47.7	15	----	47.7	0.0	7	-7.0
405	2140	1	0.0	47.8	66	47.8	15	----	47.8	0.0	7	-7.0
406	2141	1	0.0	48.0	66	48.0	15	----	48.0	0.0	7	-7.0
407	2142	1	0.0	48.0	66	48.0	15	----	48.0	0.0	7	-7.0
408	2143	1	0.0	48.1	66	48.1	15	----	48.1	0.0	7	-7.0
409	2144	1	0.0	48.3	66	48.3	15	----	48.3	0.0	7	-7.0
410	2145	1	0.0	48.5	66	48.5	15	----	48.5	0.0	7	-7.0
411	2146	1	0.0	48.8	66	48.8	15	----	48.8	0.0	7	-7.0
412	2147	1	0.0	49.1	66	49.1	15	----	49.1	0.0	7	-7.0
413	2148	1	0.0	49.3	66	49.3	15	----	49.3	0.0	7	-7.0
414	2149	1	0.0	49.4	66	49.4	15	----	49.4	0.0	7	-7.0
415	2150	1	0.0	49.6	66	49.6	15	----	49.6	0.0	7	-7.0
416	2151	1	0.0	49.7	66	49.7	15	----	49.7	0.0	7	-7.0
417	2152	1	0.0	49.8	66	49.8	15	----	49.8	0.0	7	-7.0
418	2153	1	0.0	50.0	66	50.0	15	----	50.0	0.0	7	-7.0
419	2154	1	0.0	50.2	66	50.2	15	----	50.2	0.0	7	-7.0
420	2155	1	0.0	50.7	66	50.7	15	----	50.7	0.0	7	-7.0
421	2156	1	0.0	50.6	66	50.6	15	----	50.6	0.0	7	-7.0
422	2157	1	0.0	50.6	66	50.6	15	----	50.6	0.0	7	-7.0
423	2158	1	0.0	50.7	66	50.7	15	----	50.7	0.0	7	-7.0
424	2159	1	0.0	50.6	66	50.6	15	----	50.6	0.0	7	-7.0
425	2160	1	0.0	50.6	66	50.6	15	----	50.6	0.0	7	-7.0
426	2161	1	0.0	50.5	66	50.5	15	----	50.5	0.0	7	-7.0
427	2162	1	0.0	50.7	66	50.7	15	----	50.7	0.0	7	-7.0
428	2163	1	0.0	50.2	66	50.2	15	----	50.2	0.0	7	-7.0
429	2164	1	0.0	49.4	66	49.4	15	----	49.4	0.0	7	-7.0
430	2165	1	0.0	47.8	66	47.8	15	----	47.8	0.0	7	-7.0
431	2166	1	0.0	45.8	66	45.8	15	----	45.8	0.0	7	-7.0
432	2167	1	0.0	47.1	66	47.1	15	----	47.1	0.0	7	-7.0
433	2168	1	0.0	48.0	66	48.0	15	----	48.0	0.0	7	-7.0
434	2169	1	0.0	48.6	66	48.6	15	----	48.6	0.0	7	-7.0

435	2170	1	0.0	49.1	66	49.1	15	----	49.1	0.0	7	-7.0
436	2171	1	0.0	48.8	66	48.8	15	----	48.8	0.0	7	-7.0
437	2172	1	0.0	49.0	66	49.0	15	----	49.0	0.0	7	-7.0
438	2173	1	0.0	49.0	66	49.0	15	----	49.0	0.0	7	-7.0
439	2174	1	0.0	49.3	66	49.3	15	----	49.3	0.0	7	-7.0
440	2175	1	0.0	49.2	66	49.2	15	----	49.2	0.0	7	-7.0
441	2176	1	0.0	49.2	66	49.2	15	----	49.2	0.0	7	-7.0
442	2177	1	0.0	49.2	66	49.2	15	----	49.2	0.0	7	-7.0
443	2178	1	0.0	49.5	66	49.5	15	----	49.5	0.0	7	-7.0
444	2179	1	0.0	50.0	66	50.0	15	----	50.0	0.0	7	-7.0
445	2180	1	0.0	50.3	66	50.3	15	----	50.3	0.0	7	-7.0
446	2181	1	0.0	50.6	66	50.6	15	----	50.6	0.0	7	-7.0
447	2182	1	0.0	51.0	66	51.0	15	----	51.0	0.0	7	-7.0
448	2183	1	0.0	51.3	66	51.3	15	----	51.3	0.0	7	-7.0
449	2184	1	0.0	51.3	66	51.3	15	----	51.3	0.0	7	-7.0
450	2185	1	0.0	51.4	66	51.4	15	----	51.4	0.0	7	-7.0
451	2186	1	0.0	51.6	66	51.6	15	----	51.6	0.0	7	-7.0
452	2187	1	0.0	51.9	66	51.9	15	----	51.9	0.0	7	-7.0
453	2188	1	0.0	52.1	66	52.1	15	----	52.1	0.0	7	-7.0
454	2189	1	0.0	52.6	66	52.6	15	----	52.6	0.0	7	-7.0
455	2190	1	0.0	53.0	66	53.0	15	----	53.0	0.0	7	-7.0
456	2191	1	0.0	53.3	66	53.3	15	----	53.3	0.0	7	-7.0
457	2192	1	0.0	53.5	66	53.5	15	----	53.5	0.0	7	-7.0
458	2193	1	0.0	53.6	66	53.6	15	----	53.6	0.0	7	-7.0
459	2194	1	0.0	53.8	66	53.8	15	----	53.8	0.0	7	-7.0
460	2195	1	0.0	54.1	66	54.1	15	----	54.1	0.0	7	-7.0
461	2196	1	0.0	54.4	66	54.4	15	----	54.4	0.0	7	-7.0
462	2197	1	0.0	54.8	66	54.8	15	----	54.8	0.0	7	-7.0
463	2198	1	0.0	54.7	66	54.7	15	----	54.7	0.0	7	-7.0
464	2199	1	0.0	54.9	66	54.9	15	----	54.9	0.0	7	-7.0
465	2200	1	0.0	55.4	66	55.4	15	----	55.4	0.0	7	-7.0
466	2201	1	0.0	55.7	66	55.7	15	----	55.7	0.0	7	-7.0
467	2202	1	0.0	55.9	66	55.9	15	----	55.9	0.0	7	-7.0
468	2203	1	0.0	55.8	66	55.8	15	----	55.8	0.0	7	-7.0
469	2204	1	0.0	55.8	66	55.8	15	----	55.8	0.0	7	-7.0
470	2205	1	0.0	56.2	66	56.2	15	----	56.2	0.0	7	-7.0
471	2206	1	0.0	56.5	66	56.5	15	----	56.5	0.0	7	-7.0
472	2207	1	0.0	56.5	66	56.5	15	----	56.5	0.0	7	-7.0
473	2208	1	0.0	54.0	66	54.0	15	----	54.0	0.0	7	-7.0
474	2209	1	0.0	49.6	66	49.6	15	----	49.6	0.0	7	-7.0
475	2210	1	0.0	51.1	66	51.1	15	----	51.1	0.0	7	-7.0

476	2211	1	0.0	51.8	66	51.8	15	----	51.8	0.0	7	-7.0
477	2212	1	0.0	52.5	66	52.5	15	----	52.5	0.0	7	-7.0
478	2213	1	0.0	52.7	66	52.7	15	----	52.7	0.0	7	-7.0
479	2214	1	0.0	52.8	66	52.8	15	----	52.8	0.0	7	-7.0
480	2215	1	0.0	52.9	66	52.9	15	----	52.9	0.0	7	-7.0
481	2216	1	0.0	53.3	66	53.3	15	----	53.3	0.0	7	-7.0
482	2217	1	0.0	53.3	66	53.3	15	----	53.3	0.0	7	-7.0
483	2218	1	0.0	53.4	66	53.4	15	----	53.4	0.0	7	-7.0
484	2219	1	0.0	53.5	66	53.5	15	----	53.5	0.0	7	-7.0
485	2220	1	0.0	53.4	66	53.4	15	----	53.4	0.0	7	-7.0
486	2221	1	0.0	53.7	66	53.7	15	----	53.7	0.0	7	-7.0
487	2222	1	0.0	54.6	66	54.6	15	----	54.6	0.0	7	-7.0
488	2223	1	0.0	55.6	66	55.6	15	----	55.6	0.0	7	-7.0
489	2224	1	0.0	55.5	66	55.5	15	----	55.5	0.0	7	-7.0
490	2225	1	0.0	56.0	66	56.0	15	----	56.0	0.0	7	-7.0
491	2226	1	0.0	56.4	66	56.4	15	----	56.4	0.0	7	-7.0
492	2227	1	0.0	56.2	66	56.2	15	----	56.2	0.0	7	-7.0
493	2228	1	0.0	56.5	66	56.5	15	----	56.5	0.0	7	-7.0
494	2229	1	0.0	57.1	66	57.1	15	----	57.1	0.0	7	-7.0
495	2230	1	0.0	57.7	66	57.7	15	----	57.7	0.0	7	-7.0
496	2231	1	0.0	58.3	66	58.3	15	----	58.3	0.0	7	-7.0
497	2232	1	0.0	59.1	66	59.1	15	----	59.1	0.0	7	-7.0
498	2233	1	0.0	60.1	66	60.1	15	----	60.1	0.0	7	-7.0
499	2234	1	0.0	61.0	66	61.0	15	----	61.0	0.0	7	-7.0
500	2235	1	0.0	60.6	66	60.6	15	----	60.6	0.0	7	-7.0
501	2236	1	0.0	61.2	66	61.2	15	----	61.2	0.0	7	-7.0
502	2237	1	0.0	62.7	66	62.7	15	----	62.7	0.0	7	-7.0
503	2238	1	0.0	63.6	66	63.6	15	----	63.6	0.0	7	-7.0
504	2239	1	0.0	64.1	66	64.1	15	----	64.1	0.0	7	-7.0
505	2240	1	0.0	64.1	66	64.1	15	----	64.1	0.0	7	-7.0
506	2241	1	0.0	65.8	66	65.8	15	----	65.8	0.0	7	-7.0
507	2242	1	0.0	67.2	66	67.2	15	Snd Lvl	67.2	0.0	7	-7.0
508	2243	1	0.0	68.6	66	68.6	15	Snd Lvl	68.6	0.0	7	-7.0
509	2244	1	0.0	70.1	66	70.1	15	Snd Lvl	70.1	0.0	7	-7.0
510	2245	1	0.0	72.1	66	72.1	15	Snd Lvl	72.1	0.0	7	-7.0
511	2246	1	0.0	74.0	66	74.0	15	Snd Lvl	74.0	0.0	7	-7.0
514	2249	1	0.0	73.3	66	73.3	15	Snd Lvl	73.3	0.0	7	-7.0
515	2250	1	0.0	70.4	66	70.4	15	Snd Lvl	70.4	0.0	7	-7.0
516	2251	1	0.0	62.2	66	62.2	15	----	62.2	0.0	7	-7.0
517	2252	1	0.0	54.8	66	54.8	15	----	54.8	0.0	7	-7.0
518	2253	1	0.0	57.0	66	57.0	15	----	57.0	0.0	7	-7.0

519	2254	1	0.0	58.7	66	58.7	15	----	58.7	0.0	7	-7.0
520	2255	1	0.0	59.9	66	59.9	15	----	59.9	0.0	7	-7.0
521	2256	1	0.0	59.6	66	59.6	15	----	59.6	0.0	7	-7.0
522	2257	1	0.0	59.6	66	59.6	15	----	59.6	0.0	7	-7.0
523	2258	1	0.0	60.1	66	60.1	15	----	60.1	0.0	7	-7.0
524	2259	1	0.0	60.8	66	60.8	15	----	60.8	0.0	7	-7.0
525	2260	1	0.0	61.9	66	61.9	15	----	61.9	0.0	7	-7.0
526	2261	1	0.0	62.5	66	62.5	15	----	62.5	0.0	7	-7.0
527	2262	1	0.0	63.7	66	63.7	15	----	63.7	0.0	7	-7.0
528	2263	1	0.0	64.0	66	64.0	15	----	64.0	0.0	7	-7.0
529	2264	1	0.0	66.1	66	66.1	15	Snd Lvl	66.1	0.0	7	-7.0
530	2265	1	0.0	67.3	66	67.3	15	Snd Lvl	67.3	0.0	7	-7.0
531	2266	1	0.0	68.8	66	68.8	15	Snd Lvl	68.8	0.0	7	-7.0
532	2267	1	0.0	70.3	66	70.3	15	Snd Lvl	70.3	0.0	7	-7.0
533	2268	1	0.0	73.0	66	73.0	15	Snd Lvl	73.0	0.0	7	-7.0
534	2269	1	0.0	76.6	66	76.6	15	Snd Lvl	76.6	0.0	7	-7.0
537	2272	1	0.0	73.2	66	73.2	15	Snd Lvl	73.2	0.0	7	-7.0
538	2273	1	0.0	70.6	66	70.6	15	Snd Lvl	70.6	0.0	7	-7.0
539	2274	1	0.0	69.6	66	69.6	15	Snd Lvl	69.6	0.0	7	-7.0
540	2275	1	0.0	68.4	66	68.4	15	Snd Lvl	68.4	0.0	7	-7.0
541	2276	1	0.0	64.8	66	64.8	15	----	64.8	0.0	7	-7.0
542	2277	1	0.0	66.6	66	66.6	15	Snd Lvl	66.6	0.0	7	-7.0
543	2278	1	0.0	64.6	66	64.6	15	----	64.6	0.0	7	-7.0
544	2279	1	0.0	62.9	66	62.9	15	----	62.9	0.0	7	-7.0
545	2280	1	0.0	62.3	66	62.3	15	----	62.3	0.0	7	-7.0
546	2281	1	0.0	61.5	66	61.5	15	----	61.5	0.0	7	-7.0
547	2282	1	0.0	62.2	66	62.2	15	----	62.2	0.0	7	-7.0
548	2283	1	0.0	61.0	66	61.0	15	----	61.0	0.0	7	-7.0
549	2284	1	0.0	60.5	66	60.5	15	----	60.5	0.0	7	-7.0
550	2285	1	0.0	60.0	66	60.0	15	----	60.0	0.0	7	-7.0
551	2286	1	0.0	59.6	66	59.6	15	----	59.6	0.0	7	-7.0
552	2287	1	0.0	59.2	66	59.2	15	----	59.2	0.0	7	-7.0
553	2288	1	0.0	57.4	66	57.4	15	----	57.4	0.0	7	-7.0
554	2289	1	0.0	56.7	66	56.7	15	----	56.7	0.0	7	-7.0
555	2290	1	0.0	55.6	66	55.6	15	----	55.6	0.0	7	-7.0
556	2291	1	0.0	55.5	66	55.5	15	----	55.5	0.0	7	-7.0
557	2292	1	0.0	54.7	66	54.7	15	----	54.7	0.0	7	-7.0
558	2293	1	0.0	53.9	66	53.9	15	----	53.9	0.0	7	-7.0
559	2294	1	0.0	51.1	66	51.1	15	----	51.1	0.0	7	-7.0
560	2295	1	0.0	72.1	66	72.1	15	Snd Lvl	72.1	0.0	7	-7.0
561	2296	1	0.0	70.9	66	70.9	15	Snd Lvl	70.9	0.0	7	-7.0

562	2297	1	0.0	68.1	66	68.1	15	Snd Lvl	68.1	0.0	7	-7.0
563	15 3	1	0.0	68.0	66	68.0	15	Snd Lvl	68.0	0.0	7	-7.0
564	2299	1	0.0	66.6	66	66.6	15	Snd Lvl	66.6	0.0	7	-7.0
565	2300	1	0.0	64.9	66	64.9	15	----	64.9	0.0	7	-7.0
566	2301	1	0.0	63.9	66	63.9	15	----	63.9	0.0	7	-7.0
567	2302	1	0.0	62.5	66	62.5	15	----	62.5	0.0	7	-7.0
568	2303	1	0.0	61.7	66	61.7	15	----	61.7	0.0	7	-7.0
569	2304	1	0.0	61.4	66	61.4	15	----	61.4	0.0	7	-7.0
570	2305	1	0.0	60.8	66	60.8	15	----	60.8	0.0	7	-7.0
571	2306	1	0.0	59.8	66	59.8	15	----	59.8	0.0	7	-7.0
572	2307	1	0.0	59.5	66	59.5	15	----	59.5	0.0	7	-7.0
573	2308	1	0.0	58.9	66	58.9	15	----	58.9	0.0	7	-7.0
574	2309	1	0.0	57.9	66	57.9	15	----	57.9	0.0	7	-7.0
575	2310	1	0.0	57.1	66	57.1	15	----	57.1	0.0	7	-7.0
576	2311	1	0.0	57.2	66	57.2	15	----	57.2	0.0	7	-7.0
577	2312	1	0.0	57.2	66	57.2	15	----	57.2	0.0	7	-7.0
578	2313	1	0.0	56.8	66	56.8	15	----	56.8	0.0	7	-7.0
579	2314	1	0.0	56.4	66	56.4	15	----	56.4	0.0	7	-7.0
580	2315	1	0.0	56.0	66	56.0	15	----	56.0	0.0	7	-7.0
581	2316	1	0.0	55.6	66	55.6	15	----	55.6	0.0	7	-7.0
582	2317	1	0.0	55.2	66	55.2	15	----	55.2	0.0	7	-7.0
583	2318	1	0.0	55.1	66	55.1	15	----	55.1	0.0	7	-7.0
584	2319	1	0.0	55.4	66	55.4	15	----	55.4	0.0	7	-7.0
585	2320	1	0.0	55.3	66	55.3	15	----	55.3	0.0	7	-7.0
586	2321	1	0.0	54.8	66	54.8	15	----	54.8	0.0	7	-7.0
587	2322	1	0.0	54.4	66	54.4	15	----	54.4	0.0	7	-7.0
588	2323	1	0.0	54.1	66	54.1	15	----	54.1	0.0	7	-7.0
589	2324	1	0.0	53.9	66	53.9	15	----	53.9	0.0	7	-7.0
590	2325	1	0.0	53.6	66	53.6	15	----	53.6	0.0	7	-7.0
591	2326	1	0.0	53.2	66	53.2	15	----	53.2	0.0	7	-7.0
592	2327	1	0.0	53.1	66	53.1	15	----	53.1	0.0	7	-7.0
593	2328	1	0.0	53.0	66	53.0	15	----	53.0	0.0	7	-7.0
594	2329	1	0.0	52.8	66	52.8	15	----	52.8	0.0	7	-7.0
595	2330	1	0.0	52.6	66	52.6	15	----	52.6	0.0	7	-7.0
596	2331	1	0.0	51.8	66	51.8	15	----	51.8	0.0	7	-7.0
597	2332	1	0.0	51.0	66	51.0	15	----	51.0	0.0	7	-7.0
598	2333	1	0.0	50.5	66	50.5	15	----	50.5	0.0	7	-7.0
599	2334	1	0.0	50.0	66	50.0	15	----	50.0	0.0	7	-7.0
600	2335	1	0.0	49.5	66	49.5	15	----	49.5	0.0	7	-7.0
601	2336	1	0.0	48.5	66	48.5	15	----	48.5	0.0	7	-7.0
602	2337	1	0.0	46.7	66	46.7	15	----	46.7	0.0	7	-7.0

603	2338	1	0.0	53.5	66	53.5	15	----	53.5	0.0	7	-7.0
604	2339	1	0.0	55.1	66	55.1	15	----	55.1	0.0	7	-7.0
605	2340	1	0.0	55.3	66	55.3	15	----	55.3	0.0	7	-7.0
606	2341	1	0.0	54.9	66	54.9	15	----	54.9	0.0	7	-7.0
607	2342	1	0.0	55.1	66	55.1	15	----	55.1	0.0	7	-7.0
608	2343	1	0.0	54.3	66	54.3	15	----	54.3	0.0	7	-7.0
609	2344	1	0.0	53.9	66	53.9	15	----	53.9	0.0	7	-7.0
610	2345	1	0.0	53.6	66	53.6	15	----	53.6	0.0	7	-7.0
611	2346	1	0.0	53.2	66	53.2	15	----	53.2	0.0	7	-7.0
612	2347	1	0.0	52.9	66	52.9	15	----	52.9	0.0	7	-7.0
613	2348	1	0.0	52.5	66	52.5	15	----	52.5	0.0	7	-7.0
614	2349	1	0.0	52.2	66	52.2	15	----	52.2	0.0	7	-7.0
615	2350	1	0.0	51.9	66	51.9	15	----	51.9	0.0	7	-7.0
616	2351	1	0.0	51.6	66	51.6	15	----	51.6	0.0	7	-7.0
617	2352	1	0.0	51.4	66	51.4	15	----	51.4	0.0	7	-7.0
618	2353	1	0.0	51.3	66	51.3	15	----	51.3	0.0	7	-7.0
619	2354	1	0.0	51.4	66	51.4	15	----	51.4	0.0	7	-7.0
620	2355	1	0.0	51.4	66	51.4	15	----	51.4	0.0	7	-7.0
621	2356	1	0.0	51.3	66	51.3	15	----	51.3	0.0	7	-7.0
622	2357	1	0.0	51.2	66	51.2	15	----	51.2	0.0	7	-7.0
623	2358	1	0.0	51.1	66	51.1	15	----	51.1	0.0	7	-7.0
624	2359	1	0.0	51.0	66	51.0	15	----	51.0	0.0	7	-7.0
625	2360	1	0.0	50.6	66	50.6	15	----	50.6	0.0	7	-7.0
626	2361	1	0.0	50.8	66	50.8	15	----	50.8	0.0	7	-7.0
627	2362	1	0.0	50.8	66	50.8	15	----	50.8	0.0	7	-7.0
628	2363	1	0.0	50.8	66	50.8	15	----	50.8	0.0	7	-7.0
629	2364	1	0.0	50.5	66	50.5	15	----	50.5	0.0	7	-7.0
630	2365	1	0.0	50.2	66	50.2	15	----	50.2	0.0	7	-7.0
631	2366	1	0.0	50.1	66	50.1	15	----	50.1	0.0	7	-7.0
632	2367	1	0.0	49.8	66	49.8	15	----	49.8	0.0	7	-7.0
633	2368	1	0.0	49.5	66	49.5	15	----	49.5	0.0	7	-7.0
634	2370	1	0.0	49.2	66	49.2	15	----	49.2	0.0	7	-7.0
635	2371	1	0.0	49.3	66	49.3	15	----	49.3	0.0	7	-7.0
636	2372	1	0.0	49.1	66	49.1	15	----	49.1	0.0	7	-7.0
637	2373	1	0.0	49.2	66	49.2	15	----	49.2	0.0	7	-7.0
638	2374	1	0.0	48.6	66	48.6	15	----	48.6	0.0	7	-7.0
639	2375	1	0.0	48.2	66	48.2	15	----	48.2	0.0	7	-7.0
640	2376	1	0.0	47.5	66	47.5	15	----	47.5	0.0	7	-7.0
641	2377	1	0.0	47.3	66	47.3	15	----	47.3	0.0	7	-7.0
642	2378	1	0.0	46.9	66	46.9	15	----	46.9	0.0	7	-7.0
643	2379	1	0.0	45.9	66	45.9	15	----	45.9	0.0	7	-7.0

644	2380	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
645	2381	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
646	2382	1	0.0	48.5	66	48.5	15	----	48.5	0.0	7	-7.0
647	2383	1	0.0	49.6	66	49.6	15	----	49.6	0.0	7	-7.0
648	2384	1	0.0	50.3	66	50.3	15	----	50.3	0.0	7	-7.0
649	2385	1	0.0	50.2	66	50.2	15	----	50.2	0.0	7	-7.0
650	2386	1	0.0	50.1	66	50.1	15	----	50.1	0.0	7	-7.0
651	2387	1	0.0	49.9	66	49.9	15	----	49.9	0.0	7	-7.0
652	2388	1	0.0	49.6	66	49.6	15	----	49.6	0.0	7	-7.0
653	2389	1	0.0	49.4	66	49.4	15	----	49.4	0.0	7	-7.0
654	2390	1	0.0	49.3	66	49.3	15	----	49.3	0.0	7	-7.0
655	2391	1	0.0	49.2	66	49.2	15	----	49.2	0.0	7	-7.0
656	2392	1	0.0	48.7	66	48.7	15	----	48.7	0.0	7	-7.0
657	2393	1	0.0	48.3	66	48.3	15	----	48.3	0.0	7	-7.0
658	2394	1	0.0	48.1	66	48.1	15	----	48.1	0.0	7	-7.0
659	2395	1	0.0	47.9	66	47.9	15	----	47.9	0.0	7	-7.0
660	2396	1	0.0	47.8	66	47.8	15	----	47.8	0.0	7	-7.0
661	2397	1	0.0	47.8	66	47.8	15	----	47.8	0.0	7	-7.0
662	2398	1	0.0	47.8	66	47.8	15	----	47.8	0.0	7	-7.0
663	2399	1	0.0	47.9	66	47.9	15	----	47.9	0.0	7	-7.0
664	2400	1	0.0	47.8	66	47.8	15	----	47.8	0.0	7	-7.0
665	2401	1	0.0	47.8	66	47.8	15	----	47.8	0.0	7	-7.0
666	2402	1	0.0	47.8	66	47.8	15	----	47.8	0.0	7	-7.0
667	2403	1	0.0	47.6	66	47.6	15	----	47.6	0.0	7	-7.0
668	2404	1	0.0	47.6	66	47.6	15	----	47.6	0.0	7	-7.0
669	2405	1	0.0	47.6	66	47.6	15	----	47.6	0.0	7	-7.0
670	2406	1	0.0	47.6	66	47.6	15	----	47.6	0.0	7	-7.0
671	2407	1	0.0	47.7	66	47.7	15	----	47.7	0.0	7	-7.0
672	2408	1	0.0	47.6	66	47.6	15	----	47.6	0.0	7	-7.0
673	2409	1	0.0	47.2	66	47.2	15	----	47.2	0.0	7	-7.0
674	2410	1	0.0	47.2	66	47.2	15	----	47.2	0.0	7	-7.0
675	2411	1	0.0	46.8	66	46.8	15	----	46.8	0.0	7	-7.0
676	2412	1	0.0	46.8	66	46.8	15	----	46.8	0.0	7	-7.0
677	2413	1	0.0	46.6	66	46.6	15	----	46.6	0.0	7	-7.0
678	2414	1	0.0	46.5	66	46.5	15	----	46.5	0.0	7	-7.0
679	2415	1	0.0	46.4	66	46.4	15	----	46.4	0.0	7	-7.0
680	2416	1	0.0	46.2	66	46.2	15	----	46.2	0.0	7	-7.0
681	2417	1	0.0	45.9	66	45.9	15	----	45.9	0.0	7	-7.0
682	2418	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
683	2419	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
684	2420	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0

685	2421	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
686	2422	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
687	2423	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
688	2424	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
689	2425	1	0.0	44.9	66	44.9	15	----	44.9	0.0	7	-7.0
690	2426	1	0.0	45.9	66	45.9	15	----	45.9	0.0	7	-7.0
691	2427	1	0.0	46.3	66	46.3	15	----	46.3	0.0	7	-7.0
692	2428	1	0.0	46.6	66	46.6	15	----	46.6	0.0	7	-7.0
693	2429	1	0.0	46.8	66	46.8	15	----	46.8	0.0	7	-7.0
694	2430	1	0.0	46.6	66	46.6	15	----	46.6	0.0	7	-7.0
695	2431	1	0.0	46.5	66	46.5	15	----	46.5	0.0	7	-7.0
696	2432	1	0.0	46.4	66	46.4	15	----	46.4	0.0	7	-7.0
697	2433	1	0.0	46.2	66	46.2	15	----	46.2	0.0	7	-7.0
698	2434	1	0.0	46.0	66	46.0	15	----	46.0	0.0	7	-7.0
699	2435	1	0.0	45.8	66	45.8	15	----	45.8	0.0	7	-7.0
700	2436	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0
701	2437	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
702	2438	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
703	2439	1	0.0	45.3	66	45.3	15	----	45.3	0.0	7	-7.0
704	2440	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
705	2441	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
706	2442	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
707	2443	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
708	2444	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
709	2445	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
710	2446	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
711	2447	1	0.0	45.3	66	45.3	15	----	45.3	0.0	7	-7.0
712	2448	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
713	2449	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
714	2450	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
715	2451	1	0.0	45.2	66	45.2	15	----	45.2	0.0	7	-7.0
716	2452	1	0.0	45.1	66	45.1	15	----	45.1	0.0	7	-7.0
717	2453	1	0.0	44.8	66	44.8	15	----	44.8	0.0	7	-7.0
718	2454	1	0.0	44.7	66	44.7	15	----	44.7	0.0	7	-7.0
719	2455	1	0.0	44.8	66	44.8	15	----	44.8	0.0	7	-7.0
720	2456	1	0.0	44.6	66	44.6	15	----	44.6	0.0	7	-7.0
721	2457	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
722	2458	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
723	2459	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
724	2460	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
725	2461	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0

726	2462	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
727	2463	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
728	2464	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
729	2465	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
730	2466	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
731	2467	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
732	2468	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
733	2469	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
734	2470	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
735	2471	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
736	2472	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
737	2473	1	0.0	44.2	66	44.2	15	----	44.2	0.0	7	-7.0
738	2474	1	0.0	44.2	66	44.2	15	----	44.2	0.0	7	-7.0
739	2475	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
740	2476	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
741	2477	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
742	2478	1	0.0	43.9	66	43.9	15	----	43.9	0.0	7	-7.0
743	2479	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
744	2480	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
745	2481	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
746	2482	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
747	2483	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
748	2484	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
749	2485	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
750	2486	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
751	2487	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
752	2488	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
753	2489	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
754	2490	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
755	2491	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
756	2498	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
757	2501	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
758	2502	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
759	2503	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
760	2504	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
761	2505	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
762	2506	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
763	2507	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
764	2508	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
765	2509	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
766	2510	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0

767	2511	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
768	2512	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
769	2513	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
770	2514	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
771	2515	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
772	2516	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
773	2517	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
774	2518	1	0.0	39.3	66	39.3	15	----	39.3	0.0	7	-7.0
775	2519	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
776	2520	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
777	2521	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
778	2522	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
779	2523	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
780	2524	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
781	2525	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
782	2526	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
783	2527	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
784	2528	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
785	2529	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
786	2530	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
787	2531	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
788	2532	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
789	2533	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
790	2534	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
791	2535	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
792	2536	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
793	2537	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
794	2538	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
795	2539	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
796	2540	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
797	2541	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
798	2542	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
799	2543	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
800	2544	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
801	2545	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
802	2546	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
803	2547	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
804	2548	1	0.0	42.0	66	42.0	15	----	42.0	0.0	7	-7.0
805	2549	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
806	2550	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
807	2551	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0

808	2552	1	0.0	41.6	15	41.6	15	----	41.6	0.0	7	-7.0
809	2553	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
810	2554	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
811	2555	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
812	2556	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
813	2557	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
814	2558	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
815	2559	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
816	2560	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
817	2561	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
818	2562	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
819	2563	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
820	2564	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
821	2565	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
822	2566	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
823	2567	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
824	2568	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
825	2569	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
826	2570	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
827	2571	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
828	2572	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
829	2573	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
830	2574	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
831	2575	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
832	2576	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
833	2577	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
834	2578	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
835	2579	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
836	2580	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
837	2581	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
838	2582	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
839	2583	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
840	2584	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
841	2585	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
842	2586	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
843	2587	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
844	2588	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
845	2589	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
846	2590	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
847	2591	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
848	2592	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0

849	2593	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
850	2594	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
851	2595	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
852	2596	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
853	2597	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
854	2598	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
855	2599	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
856	2600	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
857	2601	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
858	2602	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
859	2603	1	0.0	38.2	66	38.2	15	----	38.2	0.0	7	-7.0
860	2604	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
861	2605	1	0.0	38.7	66	38.7	15	----	38.7	0.0	7	-7.0
862	2606	1	0.0	39.3	66	39.3	15	----	39.3	0.0	7	-7.0
863	2607	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
864	2609	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
865	2610	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
866	2611	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
867	2612	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
868	2613	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
869	2614	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
870	2615	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
871	2616	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
872	2617	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
873	2618	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
874	2619	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
875	2620	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
876	2621	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
877	2622	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
878	2623	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
879	2624	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
880	2625	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
881	2626	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
882	2627	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
883	2628	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
884	2629	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
885	2630	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
886	2631	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
887	2632	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
888	2633	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
889	2634	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0

890	2635	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
891	2636	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
892	2637	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
893	2638	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
894	2639	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
895	2640	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
896	2641	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
897	2642	1	0.0	39.3	66	39.3	15	----	39.3	0.0	7	-7.0
898	2643	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
899	2644	1	0.0	38.8	66	38.8	15	----	38.8	0.0	7	-7.0
900	2645	1	0.0	38.3	66	38.3	15	----	38.3	0.0	7	-7.0
901	2646	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
902	2647	1	0.0	37.7	66	37.7	15	----	37.7	0.0	7	-7.0
903	2649	1	0.0	37.1	66	37.1	15	----	37.1	0.0	7	-7.0
904	2650	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
905	2651	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
906	2652	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
907	2653	1	0.0	38.9	66	38.9	15	----	38.9	0.0	7	-7.0
908	2654	1	0.0	38.9	66	38.9	15	----	38.9	0.0	7	-7.0
909	2655	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
910	2656	1	0.0	39.3	66	39.3	15	----	39.3	0.0	7	-7.0
911	2657	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
912	2658	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
913	2659	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
914	2660	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
915	2661	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
916	2662	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
917	2663	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
918	2664	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
919	2665	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
920	2666	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
921	2667	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
922	2668	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
923	2669	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
924	2670	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
925	2671	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
926	2672	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
927	2673	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
928	2674	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
929	2675	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
930	2676	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0

931	2677	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
932	2678	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
933	2679	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
934	2680	1	0.0	39.3	66	39.3	15	----	39.3	0.0	7	-7.0
935	2681	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
936	2682	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
937	2683	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
938	2684	1	0.0	38.8	66	38.8	15	----	38.8	0.0	7	-7.0
939	2685	1	0.0	38.7	66	38.7	15	----	38.7	0.0	7	-7.0
940	2686	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
941	2688	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
942	2689	1	0.0	38.3	66	38.3	15	----	38.3	0.0	7	-7.0
943	2690	1	0.0	37.6	66	37.6	15	----	37.6	0.0	7	-7.0
944	2691	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
945	2692	1	0.0	37.0	66	37.0	15	----	37.0	0.0	7	-7.0
946	2693	1	0.0	36.6	66	36.6	15	----	36.6	0.0	7	-7.0
947	2694	1	0.0	37.1	66	37.1	15	----	37.1	0.0	7	-7.0
948	2695	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
949	2696	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
950	2697	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
951	2698	1	0.0	38.2	66	38.2	15	----	38.2	0.0	7	-7.0
952	2699	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0
953	2700	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
954	2701	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
955	2702	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
956	2703	1	0.0	38.7	66	38.7	15	----	38.7	0.0	7	-7.0
957	2704	1	0.0	38.8	66	38.8	15	----	38.8	0.0	7	-7.0
958	2705	1	0.0	38.9	66	38.9	15	----	38.9	0.0	7	-7.0
959	2706	1	0.0	38.9	66	38.9	15	----	38.9	0.0	7	-7.0
960	2707	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
961	2708	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
962	2709	1	0.0	38.9	66	38.9	15	----	38.9	0.0	7	-7.0
963	2710	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
964	2711	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
965	2712	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
966	2713	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
967	2714	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
968	2715	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
969	2716	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
970	2717	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
971	2718	1	0.0	38.9	66	38.9	15	----	38.9	0.0	7	-7.0

972	2719	1	0.0	38.9	66	38.9	15	----	38.9	0.0	7	-7.0
973	2720	1	0.0	38.8	66	38.8	15	----	38.8	0.0	7	-7.0
974	2721	1	0.0	38.8	66	38.8	15	----	38.8	0.0	7	-7.0
975	2722	1	0.0	38.8	66	38.8	15	----	38.8	0.0	7	-7.0
976	2723	1	0.0	38.7	66	38.7	15	----	38.7	0.0	7	-7.0
977	2724	1	0.0	38.7	66	38.7	15	----	38.7	0.0	1	-7.0
978	2725	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
979	2726	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
980	2727	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0
981	2728	1	0.0	38.2	66	38.2	15	----	38.2	0.0	7	-7.0
982	2729	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
983	2730	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
984	2731	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
985	2732	1	0.0	37.3	66	37.3	15	----	37.3	0.0	7	-7.0
986	2733	1	0.0	37.2	66	37.2	15	----	37.2	0.0	7	-7.0
987	2734	1	0.0	37.2	66	37.2	15	----	37.2	0.0	7	-7.0
988	2735	1	0.0	36.5	66	36.5	15	----	36.5	0.0	7	-7.0
989	2736	1	0.0	36.2	66	36.2	15	----	36.2	0.0	7	-7.0
990	2737	1	0.0	36.5	66	36.5	15	----	36.5	0.0	7	-7.0
991	2738	1	0.0	36.8	66	36.8	15	----	36.8	0.0	7	-7.0
992	2739	1	0.0	37.2	66	37.2	15	----	37.2	0.0	7	-7.0
993	2740	1	0.0	37.3	66	37.3	15	----	37.3	0.0	7	-7.0
994	2741	1	0.0	37.5	66	37.5	15	----	37.5	0.0	7	-7.0
995	2742	1	0.0	37.7	66	37.7	15	----	37.7	0.0	7	-7.0
996	2743	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
997	2744	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
998	2745	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
999	2746	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
1000	2747	1	0.0	38.2	66	38.2	15	----	38.2	0.0	7	-7.0
1001	2748	1	0.0	38.2	66	38.2	15	----	38.2	0.0	7	-7.0
1002	2749	1	0.0	38.2	66	38.2	15	----	38.2	0.0	7	-7.0
1003	2750	1	0.0	38.3	66	38.3	15	----	38.3	0.0	7	-7.0
1004	2751	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0
1005	2752	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
1006	2753	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0
1007	2754	1	0.0	38.5	66	38.5	15	----	38.5	0.0	7	-7.0
1008	2755	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0
1009	2756	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0
1010	2757	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0
1011	2758	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0
1012	2759	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0

1013	2760	1	0.0	38.3	66	38.3	15	----	38.3	0.0	7	-7.0
1014	2761	1	0.0	38.3	66	38.3	15	----	38.3	0.0	7	-7.0
1015	2762	1	0.0	38.3	66	38.3	15	----	38.3	0.0	7	-7.0
1016	2763	1	0.0	38.2	66	38.2	15	----	38.2	0.0	7	-7.0
1017	2764	1	0.0	38.2	66	38.2	15	----	38.2	0.0	7	-7.0
1018	2765	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
1019	2766	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
1020	2767	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
1021	2768	1	0.0	38.1	66	38.1	15	----	38.1	0.0	7	-7.0
1022	2769	1	0.0	38.0	66	38.0	15	----	38.0	0.0	7	-7.0
1023	2771	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
1024	2772	1	0.0	37.7	66	37.7	15	----	37.7	0.0	7	-7.0
1025	2773	1	0.0	37.5	66	37.5	15	----	37.5	0.0	7	-7.0
1026	2774	1	0.0	37.3	66	37.3	15	----	37.3	0.0	7	-7.0
1027	2775	1	0.0	37.0	66	37.0	15	----	37.0	0.0	7	-7.0
1028	2776	1	0.0	37.1	66	37.1	15	----	37.1	0.0	7	-7.0
1029	2777	1	0.0	36.7	66	36.7	15	----	36.7	0.0	7	-7.0
1030	2778	1	0.0	36.5	66	36.5	15	----	36.5	0.0	7	-7.0
1031	2779	1	0.0	36.1	66	36.1	15	----	36.1	0.0	7	-7.0
1032	2780	1	0.0	35.8	66	35.8	15	----	35.8	0.0	7	-7.0
1033	2781	1	0.0	36.0	66	36.0	15	----	36.0	0.0	7	-7.0
1034	2782	1	0.0	36.4	66	36.4	15	----	36.4	0.0	7	-7.0
1035	2783	1	0.0	36.5	66	36.5	15	----	36.5	0.0	7	-7.0
1036	2784	1	0.0	36.9	66	36.9	15	----	36.9	0.0	7	-7.0
1037	2785	1	0.0	37.0	66	37.0	15	----	37.0	0.0	7	-7.0
1038	2786	1	0.0	37.1	66	37.1	15	----	37.1	0.0	7	-7.0
1039	2787	1	0.0	37.3	66	37.3	15	----	37.3	0.0	7	-7.0
1040	2788	1	0.0	37.4	66	37.4	15	----	37.4	0.0	7	-7.0
1041	2789	1	0.0	37.4	66	37.4	15	----	37.4	0.0	7	-7.0
1042	2790	1	0.0	37.5	66	37.5	15	----	37.5	0.0	7	-7.0
1043	2791	1	0.0	37.6	66	37.6	15	----	37.6	0.0	7	-7.0
1044	2792	1	0.0	37.6	66	37.6	15	----	37.6	0.0	7	-7.0
1045	2793	1	0.0	37.7	66	37.7	15	----	37.7	0.0	7	-7.0
1046	2794	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
1047	2795	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
1048	2796	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
1049	2797	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
1050	2798	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
1051	2799	1	0.0	37.9	66	37.9	15	----	37.9	0.0	7	-7.0
1052	2800	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
1053	2801	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0

1054	2802	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
1055	2803	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
1056	2804	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
1057	2805	1	0.0	37.8	66	37.8	15	----	37.8	0.0	7	-7.0
1058	2806	1	0.0	37.7	66	37.7	15	----	37.7	0.0	7	-7.0
1059	2807	1	0.0	37.7	66	37.7	15	----	37.7	0.0	7	-7.0
1060	2808	1	0.0	37.7	66	37.7	15	----	37.7	0.0	7	-7.0
1061	2809	1	0.0	37.7	66	37.7	15	----	37.7	0.0	7	-7.0
1062	2810	1	0.0	37.6	66	37.6	15	----	37.6	0.0	7	-7.0
1063	2811	1	0.0	37.6	66	37.6	15	----	37.6	0.0	7	-7.0
1064	2812	1	0.0	37.4	66	37.4	15	----	37.4	0.0	7	-7.0
1065	2813	1	0.0	37.4	66	37.4	15	----	37.4	0.0	7	-7.0
1066	2814	1	0.0	37.2	66	37.2	15	----	37.2	0.0	7	-7.0
1067	2815	1	0.0	37.0	66	37.0	15	----	37.0	0.0	7	-7.0
1068	2816	1	0.0	36.9	66	36.9	15	----	36.9	0.0	7	-7.0
1069	2817	1	0.0	36.8	66	36.8	15	----	36.8	0.0	7	-7.0
1070	2818	1	0.0	36.6	66	36.6	15	----	36.6	0.0	7	-7.0
1071	2819	1	0.0	36.5	66	36.5	15	----	36.5	0.0	7	-7.0
1072	2820	1	0.0	36.1	66	36.1	15	----	36.1	0.0	7	-7.0
1073	2821	1	0.0	36.0	66	36.0	15	----	36.0	0.0	7	-7.0
1074	2822	1	0.0	35.6	66	35.6	15	----	35.6	0.0	7	-7.0
1075	2823	1	0.0	35.4	66	35.4	15	----	35.4	0.0	7	-7.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	1071	0.0	0.0	0.0
All Impacted	23	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

EPEI 6 August 2020
Cleary TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: ENS2001
RUN: Build
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1	1	1	60.0	38.6	66	-21.4	15	----	38.6	0.0	7	-7.0
2	1734	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
3	1735	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
4	1736	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
5	1737	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
6	1738	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
7	1739	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
8	1740	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
9	1741	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
10	1742	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
11	1743	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
12	1744	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
13	1745	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
14	1746	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
15	1747	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
16	1748	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
17	1749	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
18	1750	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
19	1751	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
20	1752	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
21	1753	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
22	1754	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
23	1755	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
24	1756	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0

25	1757	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
26	1758	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
27	1759	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
28	1760	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
29	1761	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
30	1762	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
31	1763	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
32	1764	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
33	1765	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
34	1766	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
35	1767	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
36	1768	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
37	1769	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
38	1770	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
39	1771	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
40	1772	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
41	1773	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
42	1774	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
43	1775	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
44	1776	1	0.0	39.3	66	39.3	15	----	39.3	0.0	7	-7.0
45	1777	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
46	1778	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
47	1779	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
48	1780	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
49	1781	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
50	1782	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
51	1783	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
52	1784	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
53	1785	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
54	1786	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
55	1787	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
56	1788	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
57	1789	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
58	1790	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
59	1791	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
60	1792	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
61	1793	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
62	1794	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
63	1795	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
64	1796	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
65	1797	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0

66	1798	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
67	1799	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
68	1800	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
69	1801	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
70	1802	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
71	1803	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
72	1804	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
73	1805	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
74	1806	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
75	1807	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
76	1808	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
77	1809	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
78	1810	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
79	1811	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
80	1812	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
81	1813	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
82	1814	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
83	1815	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
84	1816	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
85	1817	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
86	1818	1	0.0	39.4	66	39.4	15	----	39.4	0.0	7	-7.0
87	1819	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
88	1820	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
89	1821	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
90	1822	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
91	1823	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
92	1824	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
93	1825	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
94	1826	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
95	1827	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
96	1828	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
97	1829	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
98	1830	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
99	1831	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
100	1832	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
101	1833	1	0.0	42.0	66	42.0	15	----	42.0	0.0	7	-7.0
102	1834	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
103	1835	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
104	1836	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
105	1837	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
106	1838	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0

107	1839	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
108	1840	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
109	1841	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
110	1842	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
111	1843	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
112	1844	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
113	1845	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
114	1846	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
115	1847	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
116	1848	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
117	1849	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
118	1851	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
119	1852	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
120	1853	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
121	1854	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
122	1855	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
123	1856	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
124	1857	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
125	1858	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
126	1859	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
127	1860	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
128	1861	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
129	1862	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
130	1863	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
131	1864	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
132	1865	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
133	1866	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
134	1867	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
135	1868	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
136	1869	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
137	1870	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
138	1871	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
139	1872	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
140	1873	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
141	1874	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
142	1875	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
143	1876	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
144	1877	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
145	1878	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
146	1879	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
147	1880	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0

148	1881	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
149	1882	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
150	1883	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
151	1884	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
152	1885	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
153	1886	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
154	1887	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
155	1888	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
156	1889	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
157	1890	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
158	1891	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
159	1892	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
160	1893	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
161	1894	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
162	1895	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
163	1896	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
164	1897	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
165	1898	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
166	1899	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
167	1900	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
168	1901	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
169	1902	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
170	1903	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
171	1904	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
172	1905	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
173	1906	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
174	1907	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
175	1908	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
176	1909	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
177	1910	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
178	1911	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
179	1912	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
180	1913	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
181	1914	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
182	1915	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
183	1916	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
184	1917	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
185	1918	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
186	1919	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
187	1920	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
188	1921	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0

189	1922	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
190	1923	1	0.0	43.9	66	43.9	15	----	43.9	0.0	7	-7.0
191	1924	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
192	1925	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
193	1926	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
194	1927	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
195	1928	1	0.0	43.9	66	43.9	15	----	43.9	0.0	7	-7.0
196	1929	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
197	1930	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
198	1931	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
199	1932	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
200	1933	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
201	1934	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
202	1935	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
203	1936	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
204	1937	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
205	1938	1	0.0	43.9	66	43.9	15	----	43.9	0.0	7	-7.0
206	1939	1	0.0	43.9	66	43.9	15	----	43.9	0.0	7	-7.0
207	1940	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
208	1941	1	0.0	43.8	66	43.8	15	----	43.8	0.0	7	-7.0
209	1942	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
210	1943	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
211	1944	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
212	1945	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
213	1946	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
214	1947	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
215	1948	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
216	1949	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
217	1950	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
218	1951	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
219	1952	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
220	1953	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
221	1954	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
222	1955	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
223	1956	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
224	1957	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
225	1958	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
226	1959	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
227	1960	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
228	1961	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
229	1962	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0

230	1963	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
231	1964	1	0.0	44.6	66	44.6	15	----	44.6	0.0	7	-7.0
232	1965	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
233	1966	1	0.0	44.6	66	44.6	15	----	44.6	0.0	7	-7.0
234	1967	1	0.0	44.7	66	44.7	15	----	44.7	0.0	7	-7.0
235	1968	1	0.0	44.6	66	44.6	15	----	44.6	0.0	7	-7.0
236	1969	1	0.0	44.7	66	44.7	15	----	44.7	0.0	7	-7.0
237	1970	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
238	1971	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
239	1972	1	0.0	45.1	66	45.1	15	----	45.1	0.0	7	-7.0
240	1973	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
241	1974	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
242	1975	1	0.0	44.9	66	44.9	15	----	44.9	0.0	7	-7.0
243	1976	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
244	1977	1	0.0	45.1	66	45.1	15	----	45.1	0.0	7	-7.0
245	1978	1	0.0	45.1	66	45.1	15	----	45.1	0.0	7	-7.0
246	1979	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
247	1980	1	0.0	45.1	66	45.1	15	----	45.1	0.0	7	-7.0
248	1981	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
249	1982	1	0.0	44.9	66	44.9	15	----	44.9	0.0	7	-7.0
250	1983	1	0.0	44.8	66	44.8	15	----	44.8	0.0	7	-7.0
251	1984	1	0.0	44.8	66	44.8	15	----	44.8	0.0	7	-7.0
252	1985	1	0.0	44.6	66	44.6	15	----	44.6	0.0	7	-7.0
253	1986	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
254	1987	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
255	1988	1	0.0	43.9	66	43.9	15	----	43.9	0.0	7	-7.0
256	1989	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
257	1990	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
258	1991	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
259	1992	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
260	1993	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
261	1994	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
262	1995	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
263	1996	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
264	1997	1	0.0	44.2	66	44.2	15	----	44.2	0.0	7	-7.0
265	1998	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
266	1999	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
267	2000	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
268	2001	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
269	2002	1	0.0	44.8	66	44.8	15	----	44.8	0.0	7	-7.0
270	2003	1	0.0	44.9	66	44.9	15	----	44.9	0.0	7	-7.0

271	2004	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
272	2005	1	0.0	45.1	66	45.1	15	----	45.1	0.0	7	-7.0
273	2006	1	0.0	45.3	66	45.3	15	----	45.3	0.0	7	-7.0
274	2007	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
275	2008	1	0.0	45.6	66	45.6	15	----	45.6	0.0	7	-7.0
276	2009	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0
277	2010	1	0.0	45.8	66	45.8	15	----	45.8	0.0	7	-7.0
278	2011	1	0.0	45.8	66	45.8	15	----	45.8	0.0	7	-7.0
279	2012	1	0.0	46.0	66	46.0	15	----	46.0	0.0	7	-7.0
280	2013	1	0.0	46.1	66	46.1	15	----	46.1	0.0	7	-7.0
281	2014	1	0.0	46.1	66	46.1	15	----	46.1	0.0	7	-7.0
282	2015	1	0.0	46.0	66	46.0	15	----	46.0	0.0	7	-7.0
283	2016	1	0.0	46.1	66	46.1	15	----	46.1	0.0	7	-7.0
284	2017	1	0.0	46.1	66	46.1	15	----	46.1	0.0	7	-7.0
285	2018	1	0.0	46.2	66	46.2	15	----	46.2	0.0	7	-7.0
286	2019	1	0.0	46.3	66	46.3	15	----	46.3	0.0	7	-7.0
287	2020	1	0.0	46.4	66	46.4	15	----	46.4	0.0	7	-7.0
288	2021	1	0.0	46.3	66	46.3	15	----	46.3	0.0	7	-7.0
289	2022	1	0.0	46.5	66	46.5	15	----	46.5	0.0	7	-7.0
290	2023	1	0.0	46.4	66	46.4	15	----	46.4	0.0	7	-7.0
291	2024	1	0.0	46.4	66	46.4	15	----	46.4	0.0	7	-7.0
292	2025	1	0.0	46.4	66	46.4	15	----	46.4	0.0	7	-7.0
293	2026	1	0.0	46.3	66	46.3	15	----	46.3	0.0	7	-7.0
294	2027	1	0.0	46.1	66	46.1	15	----	46.1	0.0	7	-7.0
295	2028	1	0.0	45.9	66	45.9	15	----	45.9	0.0	7	-7.0
296	2029	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0
297	2031	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
298	2032	1	0.0	45.6	66	45.6	15	----	45.6	0.0	7	-7.0
299	2033	1	0.0	45.1	66	45.1	15	----	45.1	0.0	7	-7.0
300	2034	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
301	2035	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
302	2036	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
303	2037	1	0.0	44.2	66	44.2	15	----	44.2	0.0	7	-7.0
304	2038	1	0.0	44.7	66	44.7	15	----	44.7	0.0	7	-7.0
305	2039	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
306	2040	1	0.0	45.3	66	45.3	15	----	45.3	0.0	7	-7.0
307	2041	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
308	2042	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0
309	2043	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0
310	2044	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0
311	2045	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0

312	2046	1	0.0	45.8	66	45.8	15	----	45.8	0.0	7	-7.0
313	2047	1	0.0	46.0	66	46.0	15	----	46.0	0.0	7	-7.0
314	2048	1	0.0	46.1	66	46.1	15	----	46.1	0.0	7	-7.0
315	2049	1	0.0	46.3	66	46.3	15	----	46.3	0.0	7	-7.0
316	2050	1	0.0	46.5	66	46.5	15	----	46.5	0.0	7	-7.0
317	2051	1	0.0	46.5	66	46.5	15	----	46.5	0.0	7	-7.0
318	2052	1	0.0	46.8	66	46.8	15	----	46.8	0.0	7	-7.0
319	2053	1	0.0	47.2	66	47.2	15	----	47.2	0.0	7	-7.0
320	2054	1	0.0	47.3	66	47.3	15	----	47.3	0.0	7	-7.0
321	2055	1	0.0	47.1	66	47.1	15	----	47.1	0.0	7	-7.0
322	2056	1	0.0	47.4	66	47.4	15	----	47.4	0.0	7	-7.0
323	2057	1	0.0	47.5	66	47.5	15	----	47.5	0.0	7	-7.0
324	2058	1	0.0	47.4	66	47.4	15	----	47.4	0.0	7	-7.0
325	2059	1	0.0	47.4	66	47.4	15	----	47.4	0.0	7	-7.0
326	2060	1	0.0	47.5	66	47.5	15	----	47.5	0.0	7	-7.0
327	2061	1	0.0	47.6	66	47.6	15	----	47.6	0.0	7	-7.0
328	2062	1	0.0	47.7	66	47.7	15	----	47.7	0.0	7	-7.0
329	2063	1	0.0	47.8	66	47.8	15	----	47.8	0.0	7	-7.0
330	2064	1	0.0	47.9	66	47.9	15	----	47.9	0.0	7	-7.0
331	2065	1	0.0	48.0	66	48.0	15	----	48.0	0.0	7	-7.0
332	2066	1	0.0	48.1	66	48.1	15	----	48.1	0.0	7	-7.0
333	2067	1	0.0	48.2	66	48.2	15	----	48.2	0.0	7	-7.0
334	2068	1	0.0	48.1	66	48.1	15	----	48.1	0.0	7	-7.0
335	2069	1	0.0	48.3	66	48.3	15	----	48.3	0.0	7	-7.0
336	2070	1	0.0	48.1	66	48.1	15	----	48.1	0.0	7	-7.0
337	2071	1	0.0	47.9	66	47.9	15	----	47.9	0.0	7	-7.0
338	2072	1	0.0	47.8	66	47.8	15	----	47.8	0.0	7	-7.0
339	2073	1	0.0	47.6	66	47.6	15	----	47.6	0.0	7	-7.0
340	2074	1	0.0	47.5	66	47.5	15	----	47.5	0.0	7	-7.0
341	2075	1	0.0	47.3	66	47.3	15	----	47.3	0.0	7	-7.0
342	2076	1	0.0	46.7	66	46.7	15	----	46.7	0.0	7	-7.0
343	2077	1	0.0	46.1	66	46.1	15	----	46.1	0.0	7	-7.0
344	2078	1	0.0	45.3	66	45.3	15	----	45.3	0.0	7	-7.0
345	2079	1	0.0	44.9	66	44.9	15	----	44.9	0.0	7	-7.0
346	2080	1	0.0	45.6	66	45.6	15	----	45.6	0.0	7	-7.0
347	2081	1	0.0	46.2	66	46.2	15	----	46.2	0.0	7	-7.0
348	2082	1	0.0	46.6	66	46.6	15	----	46.6	0.0	7	-7.0
349	2083	1	0.0	47.0	66	47.0	15	----	47.0	0.0	7	-7.0
350	2084	1	0.0	47.1	66	47.1	15	----	47.1	0.0	7	-7.0
351	2085	1	0.0	47.4	66	47.4	15	----	47.4	0.0	7	-7.0
352	2086	1	0.0	47.2	66	47.2	15	----	47.2	0.0	7	-7.0

353	2087	1	0.0	47.3	66	47.3	15	----	47.3	0.0	7	-7.0
354	2088	1	0.0	47.3	66	47.3	15	----	47.3	0.0	7	-7.0
355	2089	1	0.0	47.4	66	47.4	15	----	47.4	0.0	7	-7.0
356	2090	1	0.0	47.5	66	47.5	15	----	47.5	0.0	7	-7.0
357	2091	1	0.0	47.6	66	47.6	15	----	47.6	0.0	7	-7.0
358	2092	1	0.0	48.0	66	48.0	15	----	48.0	0.0	7	-7.0
359	2093	1	0.0	48.2	66	48.2	15	----	48.2	0.0	7	-7.0
360	2094	1	0.0	48.3	66	48.3	15	----	48.3	0.0	7	-7.0
361	2095	1	0.0	48.7	66	48.7	15	----	48.7	0.0	7	-7.0
362	2096	1	0.0	48.8	66	48.8	15	----	48.8	0.0	7	-7.0
363	2097	1	0.0	48.9	66	48.9	15	----	48.9	0.0	7	-7.0
364	2098	1	0.0	49.0	66	49.0	15	----	49.0	0.0	7	-7.0
365	2099	1	0.0	49.0	66	49.0	15	----	49.0	0.0	7	-7.0
366	2100	1	0.0	49.1	66	49.1	15	----	49.1	0.0	7	-7.0
367	2101	1	0.0	49.3	66	49.3	15	----	49.3	0.0	7	-7.0
368	2102	1	0.0	49.4	66	49.4	15	----	49.4	0.0	7	-7.0
369	2103	1	0.0	49.6	66	49.6	15	----	49.6	0.0	7	-7.0
370	2104	1	0.0	49.8	66	49.8	15	----	49.8	0.0	7	-7.0
371	2105	1	0.0	49.9	66	49.9	15	----	49.9	0.0	7	-7.0
372	2106	1	0.0	50.1	66	50.1	15	----	50.1	0.0	7	-7.0
373	2107	1	0.0	50.2	66	50.2	15	----	50.2	0.0	7	-7.0
374	2108	1	0.0	50.3	66	50.3	15	----	50.3	0.0	7	-7.0
375	2109	1	0.0	50.3	66	50.3	15	----	50.3	0.0	7	-7.0
376	2110	1	0.0	50.5	66	50.5	15	----	50.5	0.0	7	-7.0
377	2111	1	0.0	50.6	66	50.6	15	----	50.6	0.0	7	-7.0
378	2112	1	0.0	50.7	66	50.7	15	----	50.7	0.0	7	-7.0
379	2113	1	0.0	50.6	66	50.6	15	----	50.6	0.0	7	-7.0
380	2114	1	0.0	50.4	66	50.4	15	----	50.4	0.0	7	-7.0
381	2116	1	0.0	50.3	66	50.3	15	----	50.3	0.0	7	-7.0
382	2117	1	0.0	50.1	66	50.1	15	----	50.1	0.0	7	-7.0
383	2118	1	0.0	50.3	66	50.3	15	----	50.3	0.0	7	-7.0
384	2119	1	0.0	49.8	66	49.8	15	----	49.8	0.0	7	-7.0
385	2120	1	0.0	49.4	66	49.4	15	----	49.4	0.0	7	-7.0
386	2121	1	0.0	48.7	66	48.7	15	----	48.7	0.0	7	-7.0
387	2122	1	0.0	47.6	66	47.6	15	----	47.6	0.0	7	-7.0
388	2123	1	0.0	46.7	66	46.7	15	----	46.7	0.0	7	-7.0
389	2124	1	0.0	47.6	66	47.6	15	----	47.6	0.0	7	-7.0
390	2125	1	0.0	48.3	66	48.3	15	----	48.3	0.0	7	-7.0
391	2126	1	0.0	48.9	66	48.9	15	----	48.9	0.0	7	-7.0
392	2127	1	0.0	49.0	66	49.0	15	----	49.0	0.0	7	-7.0
393	2128	1	0.0	49.5	66	49.5	15	----	49.5	0.0	7	-7.0

394	2129	1	0.0	49.3	66	49.3	15	----	49.3	0.0	7	-7.0
395	2130	1	0.0	49.4	66	49.4	15	----	49.4	0.0	7	-7.0
396	2131	1	0.0	49.5	66	49.5	15	----	49.5	0.0	7	-7.0
397	2132	1	0.0	49.5	66	49.5	15	----	49.5	0.0	7	-7.0
398	2133	1	0.0	49.5	66	49.5	15	----	49.5	0.0	7	-7.0
399	2134	1	0.0	49.5	66	49.5	15	----	49.5	0.0	7	-7.0
400	2135	1	0.0	49.7	66	49.7	15	----	49.7	0.0	7	-7.0
401	2136	1	0.0	49.9	66	49.9	15	----	49.9	0.0	7	-7.0
402	2137	1	0.0	50.4	66	50.4	15	----	50.4	0.0	7	-7.0
403	2138	1	0.0	50.7	66	50.7	15	----	50.7	0.0	7	-7.0
404	2139	1	0.0	50.9	66	50.9	15	----	50.9	0.0	7	-7.0
405	2140	1	0.0	51.1	66	51.1	15	----	51.1	0.0	7	-7.0
406	2141	1	0.0	51.3	66	51.3	15	----	51.3	0.0	7	-7.0
407	2142	1	0.0	51.3	66	51.3	15	----	51.3	0.0	7	-7.0
408	2143	1	0.0	51.4	66	51.4	15	----	51.4	0.0	7	-7.0
409	2144	1	0.0	51.6	66	51.6	15	----	51.6	0.0	7	-7.0
410	2145	1	0.0	51.9	66	51.9	15	----	51.9	0.0	7	-7.0
411	2146	1	0.0	52.2	66	52.2	15	----	52.2	0.0	7	-7.0
412	2147	1	0.0	52.5	66	52.5	15	----	52.5	0.0	7	-7.0
413	2148	1	0.0	52.7	66	52.7	15	----	52.7	0.0	7	-7.0
414	2149	1	0.0	52.8	66	52.8	15	----	52.8	0.0	7	-7.0
415	2150	1	0.0	53.0	66	53.0	15	----	53.0	0.0	7	-7.0
416	2151	1	0.0	53.1	66	53.1	15	----	53.1	0.0	7	-7.0
417	2152	1	0.0	53.2	66	53.2	15	----	53.2	0.0	7	-7.0
418	2153	1	0.0	53.4	66	53.4	15	----	53.4	0.0	7	-7.0
419	2154	1	0.0	53.5	66	53.5	15	----	53.5	0.0	7	-7.0
420	2155	1	0.0	54.0	66	54.0	15	----	54.0	0.0	7	-7.0
421	2156	1	0.0	53.9	66	53.9	15	----	53.9	0.0	7	-7.0
422	2157	1	0.0	53.9	66	53.9	15	----	53.9	0.0	7	-7.0
423	2158	1	0.0	54.0	66	54.0	15	----	54.0	0.0	7	-7.0
424	2159	1	0.0	53.9	66	53.9	15	----	53.9	0.0	7	-7.0
425	2160	1	0.0	53.8	66	53.8	15	----	53.8	0.0	7	-7.0
426	2161	1	0.0	53.6	66	53.6	15	----	53.6	0.0	7	-7.0
427	2162	1	0.0	53.8	66	53.8	15	----	53.8	0.0	7	-7.0
428	2163	1	0.0	53.3	66	53.3	15	----	53.3	0.0	7	-7.0
429	2164	1	0.0	52.6	66	52.6	15	----	52.6	0.0	7	-7.0
430	2165	1	0.0	50.9	66	50.9	15	----	50.9	0.0	7	-7.0
431	2166	1	0.0	49.2	66	49.2	15	----	49.2	0.0	7	-7.0
432	2167	1	0.0	50.4	66	50.4	15	----	50.4	0.0	7	-7.0
433	2168	1	0.0	51.4	66	51.4	15	----	51.4	0.0	7	-7.0
434	2169	1	0.0	52.0	66	52.0	15	----	52.0	0.0	7	-7.0

435	2170	1	0.0	52.4	66	52.4	15	----	52.4	0.0	7	-7.0
436	2171	1	0.0	52.2	66	52.2	15	----	52.2	0.0	7	-7.0
437	2172	1	0.0	52.4	66	52.4	15	----	52.4	0.0	7	-7.0
438	2173	1	0.0	52.4	66	52.4	15	----	52.4	0.0	7	-7.0
439	2174	1	0.0	52.6	66	52.6	15	----	52.6	0.0	7	-7.0
440	2175	1	0.0	52.5	66	52.5	15	----	52.5	0.0	7	-7.0
441	2176	1	0.0	52.5	66	52.5	15	----	52.5	0.0	7	-7.0
442	2177	1	0.0	52.5	66	52.5	15	----	52.5	0.0	7	-7.0
443	2178	1	0.0	52.7	66	52.7	15	----	52.7	0.0	7	-7.0
444	2179	1	0.0	53.1	66	53.1	15	----	53.1	0.0	7	-7.0
445	2180	1	0.0	53.4	66	53.4	15	----	53.4	0.0	7	-7.0
446	2181	1	0.0	53.8	66	53.8	15	----	53.8	0.0	7	-7.0
447	2182	1	0.0	54.2	66	54.2	15	----	54.2	0.0	7	-7.0
448	2183	1	0.0	54.6	66	54.6	15	----	54.6	0.0	7	-7.0
449	2184	1	0.0	54.7	66	54.7	15	----	54.7	0.0	7	-7.0
450	2185	1	0.0	54.8	66	54.8	15	----	54.8	0.0	7	-7.0
451	2186	1	0.0	55.0	66	55.0	15	----	55.0	0.0	7	-7.0
452	2187	1	0.0	55.2	66	55.2	15	----	55.2	0.0	7	-7.0
453	2188	1	0.0	55.5	66	55.5	15	----	55.5	0.0	7	-7.0
454	2189	1	0.0	56.0	66	56.0	15	----	56.0	0.0	7	-7.0
455	2190	1	0.0	56.4	66	56.4	15	----	56.4	0.0	7	-7.0
456	2191	1	0.0	56.7	66	56.7	15	----	56.7	0.0	7	-7.0
457	2192	1	0.0	56.9	66	56.9	15	----	56.9	0.0	7	-7.0
458	2193	1	0.0	57.0	66	57.0	15	----	57.0	0.0	7	-7.0
459	2194	1	0.0	57.1	66	57.1	15	----	57.1	0.0	7	-7.0
460	2195	1	0.0	57.4	66	57.4	15	----	57.4	0.0	7	-7.0
461	2196	1	0.0	57.7	66	57.7	15	----	57.7	0.0	7	-7.0
462	2197	1	0.0	58.0	66	58.0	15	----	58.0	0.0	7	-7.0
463	2198	1	0.0	58.0	66	58.0	15	----	58.0	0.0	7	-7.0
464	2199	1	0.0	58.2	66	58.2	15	----	58.2	0.0	7	-7.0
465	2200	1	0.0	58.6	66	58.6	15	----	58.6	0.0	7	-7.0
466	2201	1	0.0	58.9	66	58.9	15	----	58.9	0.0	7	-7.0
467	2202	1	0.0	59.0	66	59.0	15	----	59.0	0.0	7	-7.0
468	2203	1	0.0	58.8	66	58.8	15	----	58.8	0.0	7	-7.0
469	2204	1	0.0	58.8	66	58.8	15	----	58.8	0.0	7	-7.0
470	2205	1	0.0	59.1	66	59.1	15	----	59.1	0.0	7	-7.0
471	2206	1	0.0	59.4	66	59.4	15	----	59.4	0.0	7	-7.0
472	2207	1	0.0	59.4	66	59.4	15	----	59.4	0.0	7	-7.0
473	2208	1	0.0	56.8	66	56.8	15	----	56.8	0.0	7	-7.0
474	2209	1	0.0	52.9	66	52.9	15	----	52.9	0.0	7	-7.0
475	2210	1	0.0	54.4	66	54.4	15	----	54.4	0.0	7	-7.0

476	2211	1	0.0	55.2	66	55.2	15	----	55.2	0.0	7	-7.0
477	2212	1	0.0	55.9	66	55.9	15	----	55.9	0.0	7	-7.0
478	2213	1	0.0	56.1	66	56.1	15	----	56.1	0.0	7	-7.0
479	2214	1	0.0	56.2	66	56.2	15	----	56.2	0.0	7	-7.0
480	2215	1	0.0	56.3	66	56.3	15	----	56.3	0.0	7	-7.0
481	2216	1	0.0	56.6	66	56.6	15	----	56.6	0.0	7	-7.0
482	2217	1	0.0	56.6	66	56.6	15	----	56.6	0.0	7	-7.0
483	2218	1	0.0	56.6	66	56.6	15	----	56.6	0.0	7	-7.0
484	2219	1	0.0	56.6	66	56.6	15	----	56.6	0.0	7	-7.0
485	2220	1	0.0	56.6	66	56.6	15	----	56.6	0.0	7	-7.0
486	2221	1	0.0	56.9	66	56.9	15	----	56.9	0.0	7	-7.0
487	2222	1	0.0	57.6	66	57.6	15	----	57.6	0.0	7	-7.0
488	2223	1	0.0	58.4	66	58.4	15	----	58.4	0.0	7	-7.0
489	2224	1	0.0	58.5	66	58.5	15	----	58.5	0.0	7	-7.0
490	2225	1	0.0	59.1	66	59.1	15	----	59.1	0.0	7	-7.0
491	2226	1	0.0	59.6	66	59.6	15	----	59.6	0.0	7	-7.0
492	2227	1	0.0	59.6	66	59.6	15	----	59.6	0.0	7	-7.0
493	2228	1	0.0	59.9	66	59.9	15	----	59.9	0.0	7	-7.0
494	2229	1	0.0	60.3	66	60.3	15	----	60.3	0.0	7	-7.0
495	2230	1	0.0	60.8	66	60.8	15	----	60.8	0.0	7	-7.0
496	2231	1	0.0	61.4	66	61.4	15	----	61.4	0.0	7	-7.0
497	2232	1	0.0	62.2	66	62.2	15	----	62.2	0.0	7	-7.0
498	2233	1	0.0	63.2	66	63.2	15	----	63.2	0.0	7	-7.0
499	2234	1	0.0	64.1	66	64.1	15	----	64.1	0.0	7	-7.0
500	2235	1	0.0	63.8	66	63.8	15	----	63.8	0.0	7	-7.0
501	2236	1	0.0	64.2	66	64.2	15	----	64.2	0.0	7	-7.0
502	2237	1	0.0	65.5	66	65.5	15	----	65.5	0.0	7	-7.0
503	2238	1	0.0	66.4	66	66.4	15	Snd Lvl	66.4	0.0	7	-7.0
504	2239	1	0.0	66.9	66	66.9	15	Snd Lvl	66.9	0.0	7	-7.0
505	2240	1	0.0	67.0	66	67.0	15	Snd Lvl	67.0	0.0	7	-7.0
506	2241	1	0.0	68.6	66	68.6	15	Snd Lvl	68.6	0.0	7	-7.0
507	2242	1	0.0	69.9	66	69.9	15	Snd Lvl	69.9	0.0	7	-7.0
508	2243	1	0.0	71.3	66	71.3	15	Snd Lvl	71.3	0.0	7	-7.0
509	2244	1	0.0	72.8	66	72.8	15	Snd Lvl	72.8	0.0	7	-7.0
510	2245	1	0.0	74.8	66	74.8	15	Snd Lvl	74.8	0.0	7	-7.0
511	2246	1	0.0	76.3	66	76.3	15	Snd Lvl	76.3	0.0	7	-7.0
514	2249	1	0.0	75.6	66	75.6	15	Snd Lvl	75.6	0.0	7	-7.0
515	2250	1	0.0	72.7	66	72.7	15	Snd Lvl	72.7	0.0	7	-7.0
516	2251	1	0.0	64.5	66	64.5	15	----	64.5	0.0	7	-7.0
517	2252	1	0.0	58.0	66	58.0	15	----	58.0	0.0	7	-7.0
518	2253	1	0.0	60.3	66	60.3	15	----	60.3	0.0	7	-7.0

519	2254	1	0.0	61.8	66	61.8	15	----	61.8	0.0	7	-7.0
520	2255	1	0.0	63.0	66	63.0	15	----	63.0	0.0	7	-7.0
521	2256	1	0.0	62.8	66	62.8	15	----	62.8	0.0	7	-7.0
522	2257	1	0.0	62.7	66	62.7	15	----	62.7	0.0	7	-7.0
523	2258	1	0.0	63.2	66	63.2	15	----	63.2	0.0	7	-7.0
524	2259	1	0.0	63.8	66	63.8	15	----	63.8	0.0	7	-7.0
525	2260	1	0.0	64.8	66	64.8	15	----	64.8	0.0	7	-7.0
526	2261	1	0.0	65.3	66	65.3	15	----	65.3	0.0	7	-7.0
527	2262	1	0.0	66.2	66	66.2	15	Snd Lvl	66.2	0.0	7	-7.0
528	2263	1	0.0	66.5	66	66.5	15	Snd Lvl	66.5	0.0	7	-7.0
529	2264	1	0.0	68.5	66	68.5	15	Snd Lvl	68.5	0.0	7	-7.0
530	2265	1	0.0	69.6	15	69.6	15	Snd Lvl	69.6	0.0	7	-7.0
531	2266	1	0.0	71.2	66	71.2	15	Snd Lvl	71.2	0.0	7	-7.0
532	2267	1	0.0	72.7	66	72.7	15	Snd Lvl	72.7	0.0	7	-7.0
533	2268	1	0.0	75.7	66	75.7	15	Snd Lvl	75.7	0.0	7	-7.0
534	2269	1	0.0	79.3	66	79.3	15	Snd Lvl	79.3	0.0	7	-7.0
537	2272	1	0.0	75.9	66	75.9	15	Snd Lvl	75.9	0.0	7	-7.0
538	2273	1	0.0	73.1	66	73.1	15	Snd Lvl	73.1	0.0	7	-7.0
539	2274	1	0.0	72.1	66	72.1	15	Snd Lvl	72.1	0.0	7	-7.0
540	2275	1	0.0	71.0	66	71.0	15	Snd Lvl	71.0	0.0	7	-7.0
541	2276	1	0.0	67.8	66	67.8	15	Snd Lvl	67.8	0.0	7	-7.0
542	2277	1	0.0	69.5	66	69.5	15	Snd Lvl	69.5	0.0	7	-7.0
543	2278	1	0.0	67.6	66	67.6	15	Snd Lvl	67.6	0.0	7	-7.0
544	2279	1	0.0	65.9	66	65.9	15	----	65.9	0.0	7	-7.0
545	2280	1	0.0	65.2	66	65.2	15	----	65.2	0.0	7	-7.0
546	2281	1	0.0	64.5	66	64.5	15	----	64.5	0.0	7	-7.0
547	2282	1	0.0	65.1	66	65.1	15	----	65.1	0.0	7	-7.0
548	2283	1	0.0	64.0	66	64.0	15	----	64.0	0.0	7	-7.0
549	2284	1	0.0	63.4	66	63.4	15	----	63.4	0.0	7	-7.0
550	2285	1	0.0	63.0	66	63.0	15	----	63.0	0.0	7	-7.0
551	2286	1	0.0	62.7	66	62.7	15	----	62.7	0.0	7	-7.0
552	2287	1	0.0	62.2	66	62.2	15	----	62.2	0.0	7	-7.0
553	2288	1	0.0	60.5	66	60.5	15	----	60.5	0.0	7	-7.0
554	2289	1	0.0	59.7	66	59.7	15	----	59.7	0.0	7	-7.0
555	2290	1	0.0	58.7	66	58.7	15	----	58.7	0.0	7	-7.0
556	2291	1	0.0	58.5	66	58.5	15	----	58.5	0.0	7	-7.0
557	2292	1	0.0	57.8	66	57.8	15	----	57.8	0.0	7	-7.0
558	2293	1	0.0	56.9	66	56.9	15	----	56.9	0.0	7	-7.0
559	2294	1	0.0	54.1	66	54.1	15	----	54.1	0.0	7	-7.0
560	2295	1	0.0	74.6	66	74.6	15	Snd Lvl	74.6	0.0	7	-7.0
561	2296	1	0.0	73.4	66	73.4	15	Snd Lvl	73.4	0.0	7	-7.0

562	2297	1	0.0	70.7	66	70.7	15	Snd Lvl	70.7	0.0	7	-7.0
563	2298	1	0.0	70.8	66	70.8	15	Snd Lvl	70.8	0.0	7	-7.0
564	2299	1	0.0	69.4	66	69.4	15	Snd Lvl	69.4	0.0	7	-7.0
565	2300	1	0.0	67.8	66	67.8	15	Snd Lvl	67.8	0.0	7	-7.0
566	2301	1	0.0	66.7	66	66.7	15	Snd Lvl	66.7	0.0	7	-7.0
567	2302	1	0.0	65.5	66	65.5	15	----	65.5	0.0	7	-7.0
568	2303	1	0.0	64.6	66	64.6	15	----	64.6	0.0	7	-7.0
569	2304	1	0.0	64.2	66	64.2	15	----	64.2	0.0	7	-7.0
570	2305	1	0.0	63.4	66	63.4	15	----	63.4	0.0	7	-7.0
571	2306	1	0.0	62.5	66	62.5	15	----	62.5	0.0	7	-7.0
572	2307	1	0.0	62.2	66	62.2	15	----	62.2	0.0	7	-7.0
573	2308	1	0.0	61.7	66	61.7	15	----	61.7	0.0	7	-7.0
574	2309	1	0.0	60.8	66	60.8	15	----	60.8	0.0	7	-7.0
575	2310	1	0.0	60.1	66	60.1	15	----	60.1	0.0	7	-7.0
576	2311	1	0.0	60.3	66	60.3	15	----	60.3	0.0	7	-7.0
577	2312	1	0.0	60.3	66	60.3	15	----	60.3	0.0	7	-7.0
578	2313	1	0.0	60.0	66	60.0	15	----	60.0	0.0	7	-7.0
579	2314	1	0.0	59.6	66	59.6	15	----	59.6	0.0	7	-7.0
580	2315	1	0.0	59.2	66	59.2	15	----	59.2	0.0	7	-7.0
581	2316	1	0.0	58.9	66	58.9	15	----	58.9	0.0	7	-7.0
582	2317	1	0.0	58.5	66	58.5	15	----	58.5	0.0	7	-7.0
583	2318	1	0.0	58.4	66	58.4	15	----	58.4	0.0	7	-7.0
584	2319	1	0.0	58.7	66	58.7	15	----	58.7	0.0	7	-7.0
585	2320	1	0.0	58.7	66	58.7	15	----	58.7	0.0	7	-7.0
586	2321	1	0.0	58.2	66	58.2	15	----	58.2	0.0	7	-7.0
587	2322	1	0.0	57.8	66	57.8	15	----	57.8	0.0	7	-7.0
588	2323	1	0.0	57.4	66	57.4	15	----	57.4	0.0	7	-7.0
589	2324	1	0.0	57.2	66	57.2	15	----	57.2	0.0	7	-7.0
590	2325	1	0.0	56.9	66	56.9	15	----	56.9	0.0	7	-7.0
591	2326	1	0.0	56.5	66	56.5	15	----	56.5	0.0	7	-7.0
592	2327	1	0.0	56.4	66	56.4	15	----	56.4	0.0	7	-7.0
593	2328	1	0.0	56.3	66	56.3	15	----	56.3	0.0	7	-7.0
594	2329	1	0.0	56.0	66	56.0	15	----	56.0	0.0	7	-7.0
595	2330	1	0.0	55.8	66	55.8	15	----	55.8	0.0	7	-7.0
596	2331	1	0.0	55.0	66	55.0	15	----	55.0	0.0	7	-7.0
597	2332	1	0.0	54.3	66	54.3	15	----	54.3	0.0	7	-7.0
598	2333	1	0.0	53.7	66	53.7	15	----	53.7	0.0	7	-7.0
599	2334	1	0.0	53.2	66	53.2	15	----	53.2	0.0	7	-7.0
600	2335	1	0.0	52.7	66	52.7	15	----	52.7	0.0	7	-7.0
601	2336	1	0.0	51.6	66	51.6	15	----	51.6	0.0	7	-7.0
602	2337	1	0.0	49.9	66	49.9	15	----	49.9	0.0	7	-7.0

603	2338	1	0.0	56.7	66	56.7	15	----	56.7	0.0	7	-7.0
604	2339	1	0.0	58.3	66	58.3	15	----	58.3	0.0	7	-7.0
605	2340	1	0.0	58.6	66	58.6	15	----	58.6	0.0	7	-7.0
606	2341	1	0.0	58.3	66	58.3	15	----	58.3	0.0	7	-7.0
607	2342	1	0.0	58.4	66	58.4	15	----	58.4	0.0	7	-7.0
608	2343	1	0.0	57.7	66	57.7	15	----	57.7	0.0	7	-7.0
609	2344	1	0.0	57.3	66	57.3	15	----	57.3	0.0	7	-7.0
610	2345	1	0.0	57.0	66	57.0	15	----	57.0	0.0	7	-7.0
611	2346	1	0.0	56.6	66	56.6	15	----	56.6	0.0	7	-7.0
612	2347	1	0.0	56.2	66	56.2	15	----	56.2	0.0	7	-7.0
613	2348	1	0.0	55.7	66	55.7	15	----	55.7	0.0	7	-7.0
614	2349	1	0.0	55.3	66	55.3	15	----	55.3	0.0	7	-7.0
615	2350	1	0.0	55.0	66	55.0	15	----	55.0	0.0	7	-7.0
616	2351	1	0.0	54.8	66	54.8	15	----	54.8	0.0	7	-7.0
617	2352	1	0.0	54.6	66	54.6	15	----	54.6	0.0	7	-7.0
618	15 4	1	0.0	54.6	66	54.6	15	----	54.6	0.0	7	-7.0
619	2354	1	0.0	54.7	66	54.7	15	----	54.7	0.0	7	-7.0
620	2355	1	0.0	54.7	66	54.7	15	----	54.7	0.0	7	-7.0
621	2356	1	0.0	54.7	66	54.7	15	----	54.7	0.0	7	-7.0
622	2357	1	0.0	54.5	66	54.5	15	----	54.5	0.0	7	-7.0
623	2358	1	0.0	54.4	66	54.4	15	----	54.4	0.0	7	-7.0
624	2359	1	0.0	54.3	66	54.3	15	----	54.3	0.0	7	-7.0
625	2360	1	0.0	54.0	66	54.0	15	----	54.0	0.0	7	-7.0
626	2361	1	0.0	54.1	66	54.1	15	----	54.1	0.0	7	-7.0
627	2362	1	0.0	54.2	66	54.2	15	----	54.2	0.0	7	-7.0
628	2363	1	0.0	54.2	66	54.2	15	----	54.2	0.0	7	-7.0
629	2364	1	0.0	53.9	66	53.9	15	----	53.9	0.0	7	-7.0
630	2365	1	0.0	53.6	66	53.6	15	----	53.6	0.0	7	-7.0
631	2366	1	0.0	53.4	66	53.4	15	----	53.4	0.0	7	-7.0
632	2367	1	0.0	53.1	66	53.1	15	----	53.1	0.0	7	-7.0
633	2368	1	0.0	52.8	66	52.8	15	----	52.8	0.0	7	-7.0
634	2370	1	0.0	52.6	66	52.6	15	----	52.6	0.0	7	-7.0
635	2371	1	0.0	52.6	66	52.6	15	----	52.6	0.0	7	-7.0
636	2372	1	0.0	52.4	66	52.4	15	----	52.4	0.0	7	-7.0
637	2373	1	0.0	52.4	66	52.4	15	----	52.4	0.0	7	-7.0
638	2374	1	0.0	51.8	66	51.8	15	----	51.8	0.0	7	-7.0
639	2375	1	0.0	51.5	66	51.5	15	----	51.5	0.0	7	-7.0
640	2376	1	0.0	50.7	66	50.7	15	----	50.7	0.0	7	-7.0
641	2377	1	0.0	50.4	66	50.4	15	----	50.4	0.0	7	-7.0
642	2378	1	0.0	50.0	66	50.0	15	----	50.0	0.0	7	-7.0
643	2379	1	0.0	49.0	66	49.0	15	----	49.0	0.0	7	-7.0

644	2380	1	0.0	48.1	66	48.1	15	----	48.1	0.0	7	-7.0
645	2381	1	0.0	46.9	66	46.9	15	----	46.9	0.0	7	-7.0
646	2382	1	0.0	51.8	66	51.8	15	----	51.8	0.0	7	-7.0
647	2383	1	0.0	53.0	66	53.0	15	----	53.0	0.0	7	-7.0
648	2384	1	0.0	53.7	66	53.7	15	----	53.7	0.0	7	-7.0
649	2385	1	0.0	53.6	66	53.6	15	----	53.6	0.0	7	-7.0
650	2386	1	0.0	53.6	66	53.6	15	----	53.6	0.0	7	-7.0
651	2387	1	0.0	53.4	66	53.4	15	----	53.4	0.0	7	-7.0
652	2388	1	0.0	53.1	66	53.1	15	----	53.1	0.0	7	-7.0
653	2389	1	0.0	52.8	66	52.8	15	----	52.8	0.0	7	-7.0
654	2390	1	0.0	52.7	66	52.7	15	----	52.7	0.0	7	-7.0
655	2391	1	0.0	52.4	66	52.4	15	----	52.4	0.0	7	-7.0
656	2392	1	0.0	51.9	66	51.9	15	----	51.9	0.0	7	-7.0
657	2393	1	0.0	51.5	66	51.5	15	----	51.5	0.0	7	-7.0
658	2394	1	0.0	51.3	66	51.3	15	----	51.3	0.0	7	-7.0
659	2395	1	0.0	51.1	66	51.1	15	----	51.1	0.0	7	-7.0
660	2396	1	0.0	51.0	66	51.0	15	----	51.0	0.0	7	-7.0
661	2397	1	0.0	51.0	66	51.0	15	----	51.0	0.0	7	-7.0
662	2398	1	0.0	51.1	66	51.1	15	----	51.1	0.0	7	-7.0
663	2399	1	0.0	51.2	66	51.2	15	----	51.2	0.0	7	-7.0
664	2400	1	0.0	51.1	66	51.1	15	----	51.1	0.0	7	-7.0
665	2401	1	0.0	51.2	66	51.2	15	----	51.2	0.0	7	-7.0
666	2402	1	0.0	51.1	66	51.1	15	----	51.1	0.0	7	-7.0
667	2403	1	0.0	50.9	66	50.9	15	----	50.9	0.0	7	-7.0
668	2404	1	0.0	50.9	66	50.9	15	----	50.9	0.0	7	-7.0
669	2405	1	0.0	50.9	66	50.9	15	----	50.9	0.0	7	-7.0
670	2406	1	0.0	50.9	66	50.9	15	----	50.9	0.0	7	-7.0
671	2407	1	0.0	51.0	66	51.0	15	----	51.0	0.0	7	-7.0
672	2408	1	0.0	50.9	66	50.9	15	----	50.9	0.0	7	-7.0
673	2409	1	0.0	50.5	66	50.5	15	----	50.5	0.0	7	-7.0
674	2410	1	0.0	50.4	66	50.4	15	----	50.4	0.0	7	-7.0
675	2411	1	0.0	50.1	66	50.1	15	----	50.1	0.0	7	-7.0
676	2412	1	0.0	50.1	66	50.1	15	----	50.1	0.0	7	-7.0
677	2413	1	0.0	49.9	66	49.9	15	----	49.9	0.0	7	-7.0
678	2414	1	0.0	49.7	66	49.7	15	----	49.7	0.0	7	-7.0
679	2415	1	0.0	49.6	66	49.6	15	----	49.6	0.0	7	-7.0
680	2416	1	0.0	49.4	66	49.4	15	----	49.4	0.0	7	-7.0
681	2417	1	0.0	49.1	66	49.1	15	----	49.1	0.0	7	-7.0
682	2418	1	0.0	48.7	66	48.7	15	----	48.7	0.0	7	-7.0
683	2419	1	0.0	48.5	66	48.5	15	----	48.5	0.0	7	-7.0
684	2420	1	0.0	48.0	66	48.0	15	----	48.0	0.0	7	-7.0

685	2421	1	0.0	47.5	66	47.5	15	----	47.5	0.0	7	-7.0
686	2422	1	0.0	46.5	66	46.5	15	----	46.5	0.0	7	-7.0
687	2423	1	0.0	45.8	66	45.8	15	----	45.8	0.0	7	-7.0
688	2424	1	0.0	44.9	66	44.9	15	----	44.9	0.0	7	-7.0
689	2425	1	0.0	48.2	66	48.2	15	----	48.2	0.0	7	-7.0
690	2426	1	0.0	49.3	66	49.3	15	----	49.3	0.0	7	-7.0
691	2427	1	0.0	49.7	66	49.7	15	----	49.7	0.0	7	-7.0
692	2428	1	0.0	50.0	66	50.0	15	----	50.0	0.0	7	-7.0
693	2429	1	0.0	50.2	66	50.2	15	----	50.2	0.0	7	-7.0
694	2430	1	0.0	50.0	66	50.0	15	----	50.0	0.0	7	-7.0
695	2431	1	0.0	49.9	66	49.9	15	----	49.9	0.0	7	-7.0
696	2432	1	0.0	49.7	66	49.7	15	----	49.7	0.0	7	-7.0
697	2433	1	0.0	49.4	66	49.4	15	----	49.4	0.0	7	-7.0
698	2434	1	0.0	49.2	66	49.2	15	----	49.2	0.0	7	-7.0
699	2435	1	0.0	49.0	66	49.0	15	----	49.0	0.0	7	-7.0
700	2436	1	0.0	48.8	66	48.8	15	----	48.8	0.0	7	-7.0
701	2437	1	0.0	48.6	66	48.6	15	----	48.6	0.0	7	-7.0
702	2438	1	0.0	48.5	66	48.5	15	----	48.5	0.0	7	-7.0
703	2439	1	0.0	48.5	66	48.5	15	----	48.5	0.0	7	-7.0
704	2440	1	0.0	48.5	66	48.5	15	----	48.5	0.0	7	-7.0
705	2441	1	0.0	48.6	66	48.6	15	----	48.6	0.0	7	-7.0
706	2442	1	0.0	48.6	66	48.6	15	----	48.6	0.0	7	-7.0
707	2443	1	0.0	48.7	66	48.7	15	----	48.7	0.0	7	-7.0
708	2444	1	0.0	48.7	66	48.7	15	----	48.7	0.0	7	-7.0
709	2445	1	0.0	48.7	66	48.7	15	----	48.7	0.0	7	-7.0
710	2446	1	0.0	48.6	66	48.6	15	----	48.6	0.0	7	-7.0
711	2447	1	0.0	48.6	66	48.6	15	----	48.6	0.0	7	-7.0
712	2448	1	0.0	48.7	66	48.7	15	----	48.7	0.0	7	-7.0
713	2449	1	0.0	48.6	66	48.6	15	----	48.6	0.0	7	-7.0
714	2450	1	0.0	48.7	66	48.7	15	----	48.7	0.0	7	-7.0
715	2451	1	0.0	48.4	66	48.4	15	----	48.4	0.0	7	-7.0
716	2452	1	0.0	48.3	66	48.3	15	----	48.3	0.0	7	-7.0
717	2453	1	0.0	48.1	66	48.1	15	----	48.1	0.0	7	-7.0
718	2454	1	0.0	47.9	66	47.9	15	----	47.9	0.0	7	-7.0
719	2455	1	0.0	48.0	66	48.0	15	----	48.0	0.0	7	-7.0
720	2456	1	0.0	47.7	66	47.7	15	----	47.7	0.0	7	-7.0
721	2457	1	0.0	47.7	66	47.7	15	----	47.7	0.0	7	-7.0
722	2458	1	0.0	47.5	66	47.5	15	----	47.5	0.0	7	-7.0
723	2459	1	0.0	47.4	66	47.4	15	----	47.4	0.0	7	-7.0
724	2460	1	0.0	47.2	66	47.2	15	----	47.2	0.0	7	-7.0
725	2461	1	0.0	46.8	66	46.8	15	----	46.8	0.0	7	-7.0

726	2462	1	0.0	46.5	66	46.5	15	----	46.5	0.0	7	-7.0
727	2463	1	0.0	46.2	66	46.2	15	----	46.2	0.0	7	-7.0
728	2464	1	0.0	45.8	66	45.8	15	----	45.8	0.0	7	-7.0
729	2465	1	0.0	44.7	66	44.7	15	----	44.7	0.0	7	-7.0
730	2466	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
731	2467	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
732	2468	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0
733	2469	1	0.0	46.7	66	46.7	15	----	46.7	0.0	7	-7.0
734	2470	1	0.0	47.1	66	47.1	15	----	47.1	0.0	7	-7.0
735	2471	1	0.0	47.5	66	47.5	15	----	47.5	0.0	7	-7.0
736	2472	1	0.0	47.7	66	47.7	15	----	47.7	0.0	7	-7.0
737	2473	1	0.0	47.5	66	47.5	15	----	47.5	0.0	7	-7.0
738	2474	1	0.0	47.5	66	47.5	15	----	47.5	0.0	7	-7.0
739	2475	1	0.0	47.4	66	47.4	15	----	47.4	0.0	7	-7.0
740	2476	1	0.0	47.4	66	47.4	15	----	47.4	0.0	7	-7.0
741	2477	1	0.0	47.2	66	47.2	15	----	47.2	0.0	7	-7.0
742	2478	1	0.0	47.0	66	47.0	15	----	47.0	0.0	7	-7.0
743	2479	1	0.0	46.9	66	46.9	15	----	46.9	0.0	7	-7.0
744	2480	1	0.0	46.8	66	46.8	15	----	46.8	0.0	7	-7.0
745	2481	1	0.0	46.7	66	46.7	15	----	46.7	0.0	7	-7.0
746	2482	1	0.0	46.7	66	46.7	15	----	46.7	0.0	7	-7.0
747	2483	1	0.0	46.7	66	46.7	15	----	46.7	0.0	7	-7.0
748	2484	1	0.0	46.8	66	46.8	15	----	46.8	0.0	7	-7.0
749	2485	1	0.0	46.8	66	46.8	15	----	46.8	0.0	7	-7.0
750	2486	1	0.0	46.9	66	46.9	15	----	46.9	0.0	7	-7.0
751	2487	1	0.0	46.9	66	46.9	15	----	46.9	0.0	7	-7.0
752	2488	1	0.0	46.9	66	46.9	15	----	46.9	0.0	7	-7.0
753	2489	1	0.0	46.9	66	46.9	15	----	46.9	0.0	7	-7.0
754	2490	1	0.0	46.9	66	46.9	15	----	46.9	0.0	7	-7.0
755	2491	1	0.0	46.9	66	46.9	15	----	46.9	0.0	7	-7.0
756	2498	1	0.0	46.9	66	46.9	15	----	46.9	0.0	7	-7.0
757	2501	1	0.0	46.8	66	46.8	15	----	46.8	0.0	7	-7.0
758	2502	1	0.0	46.7	66	46.7	15	----	46.7	0.0	7	-7.0
759	2503	1	0.0	46.7	66	46.7	15	----	46.7	0.0	7	-7.0
760	2504	1	0.0	46.4	66	46.4	15	----	46.4	0.0	7	-7.0
761	2505	1	0.0	46.3	66	46.3	15	----	46.3	0.0	7	-7.0
762	2506	1	0.0	46.3	66	46.3	15	----	46.3	0.0	7	-7.0
763	2507	1	0.0	46.2	66	46.2	15	----	46.2	0.0	7	-7.0
764	2508	1	0.0	46.1	66	46.1	15	----	46.1	0.0	7	-7.0
765	2509	1	0.0	46.0	66	46.0	15	----	46.0	0.0	7	-7.0
766	2510	1	0.0	45.8	66	45.8	15	----	45.8	0.0	7	-7.0

767	2511	1	0.0	45.6	66	45.6	15	----	45.6	0.0	7	-7.0
768	2512	1	0.0	45.3	66	45.3	15	----	45.3	0.0	7	-7.0
769	2513	1	0.0	45.2	66	45.2	15	----	45.2	0.0	7	-7.0
770	2514	1	0.0	44.7	66	44.7	15	----	44.7	0.0	7	-7.0
771	2515	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
772	2516	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
773	2517	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
774	2518	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
775	2519	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
776	2520	1	0.0	44.8	66	44.8	15	----	44.8	0.0	7	-7.0
777	2521	1	0.0	45.3	66	45.3	15	----	45.3	0.0	7	-7.0
778	2522	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
779	2523	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
780	2524	1	0.0	45.8	66	45.8	15	----	45.8	0.0	7	-7.0
781	2525	1	0.0	45.6	66	45.6	15	----	45.6	0.0	7	-7.0
782	2526	1	0.0	45.6	66	45.6	15	----	45.6	0.0	7	-7.0
783	2527	1	0.0	45.6	66	45.6	15	----	45.6	0.0	7	-7.0
784	2528	1	0.0	45.6	66	45.6	15	----	45.6	0.0	7	-7.0
785	2529	1	0.0	45.6	66	45.6	15	----	45.6	0.0	7	-7.0
786	2530	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
787	2531	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
788	2532	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
789	2533	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
790	2534	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
791	2535	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
792	2536	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
793	2537	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
794	2538	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
795	2539	1	0.0	45.6	66	45.6	15	----	45.6	0.0	7	-7.0
796	2540	1	0.0	45.6	66	45.6	15	----	45.6	0.0	7	-7.0
797	2541	1	0.0	45.7	66	45.7	15	----	45.7	0.0	7	-7.0
798	2542	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
799	2543	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
800	2544	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
801	2545	1	0.0	45.5	66	45.5	15	----	45.5	0.0	7	-7.0
802	2546	1	0.0	45.4	66	45.4	15	----	45.4	0.0	7	-7.0
803	2547	1	0.0	45.2	66	45.2	15	----	45.2	0.0	7	-7.0
804	2548	1	0.0	45.1	66	45.1	15	----	45.1	0.0	7	-7.0
805	2549	1	0.0	45.0	66	45.0	15	----	45.0	0.0	7	-7.0
806	2550	1	0.0	44.9	66	44.9	15	----	44.9	0.0	7	-7.0
807	2551	1	0.0	44.8	66	44.8	15	----	44.8	0.0	7	-7.0

808	2552	1	0.0	44.7	66	44.7	15	----	44.7	0.0	7	-7.0
809	2553	1	0.0	44.6	66	44.6	15	----	44.6	0.0	7	-7.0
810	2554	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
811	2555	1	0.0	44.1	66	44.1	15	----	44.1	0.0	7	-7.0
812	2556	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
813	2557	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
814	2558	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
815	2559	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
816	2560	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
817	2561	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
818	2562	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
819	2563	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
820	2564	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
821	2565	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0
822	2566	1	0.0	44.2	66	44.2	15	----	44.2	0.0	7	-7.0
823	2567	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
824	2568	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
825	2569	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
826	2570	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
827	2571	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
828	2572	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
829	2573	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
830	2574	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
831	2575	1	0.0	44.3	66	44.3	15	----	44.3	0.0	7	-7.0
832	2576	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
833	2577	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
834	2578	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
835	2579	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
836	2580	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
837	2581	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
838	2582	1	0.0	44.6	66	44.6	15	----	44.6	0.0	7	-7.0
839	2583	1	0.0	44.6	66	44.6	15	----	44.6	0.0	7	-7.0
840	2584	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
841	2585	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
842	2586	1	0.0	44.5	66	44.5	15	----	44.5	0.0	7	-7.0
843	2587	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
844	2588	1	0.0	44.4	66	44.4	15	----	44.4	0.0	7	-7.0
845	2589	1	0.0	44.2	66	44.2	15	----	44.2	0.0	7	-7.0
846	2590	1	0.0	44.2	66	44.2	15	----	44.2	0.0	7	-7.0
847	2591	1	0.0	44.2	66	44.2	15	----	44.2	0.0	7	-7.0
848	2592	1	0.0	44.0	66	44.0	15	----	44.0	0.0	7	-7.0

849	2593	1	0.0	43.9	66	43.9	15	----	43.9	0.0	7	-7.0
850	2594	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
851	2595	1	0.0	43.7	66	43.7	15	----	43.7	0.0	7	-7.0
852	2596	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
853	2597	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
854	2598	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
855	2599	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
856	2600	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
857	2601	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
858	2602	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
859	2603	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
860	2604	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
861	2605	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
862	2606	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
863	2607	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
864	2609	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
865	2610	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
866	2611	1	0.0	43.2	66	43.2	15	----	43.2	0.0	7	-7.0
867	2612	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
868	2613	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
869	2614	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
870	2615	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
871	2616	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
872	2617	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
873	2618	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
874	2619	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
875	2620	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
876	2621	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
877	2622	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
878	2623	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
879	2624	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
880	2625	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
881	2626	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
882	2627	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
883	2628	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
884	2629	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
885	2630	1	0.0	43.6	66	43.6	15	----	43.6	0.0	7	-7.0
886	2631	1	0.0	43.5	66	43.5	15	----	43.5	0.0	7	-7.0
887	2632	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
888	2633	1	0.0	43.4	66	43.4	15	----	43.4	0.0	7	-7.0
889	2634	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0

890	2635	1	0.0	43.3	66	43.3	15	----	43.3	0.0	7	-7.0
891	2636	1	0.0	43.1	66	43.1	15	----	43.1	0.0	7	-7.0
892	2637	1	0.0	43.0	66	43.0	15	----	43.0	0.0	7	-7.0
893	2638	1	0.0	42.9	66	42.9	15	----	42.9	0.0	7	-7.0
894	2639	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
895	2640	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
896	2641	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
897	2642	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
898	2643	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
899	2644	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
900	2645	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
901	2646	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
902	2647	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
903	2649	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
904	2650	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
905	2651	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
906	2652	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
907	2653	1	0.0	42.0	66	42.0	15	----	42.0	0.0	7	-7.0
908	2654	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
909	2655	1	0.0	42.2	66	42.2	15	----	42.2	0.0	7	-7.0
910	2656	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
911	2657	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
912	2658	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
913	2659	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
914	2660	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
915	2661	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
916	2662	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
917	2663	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
918	2664	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
919	2665	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
920	2666	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
921	2667	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
922	2668	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
923	2669	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
924	2670	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
925	2671	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
926	2672	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
927	2673	1	0.0	42.8	66	42.8	15	----	42.8	0.0	7	-7.0
928	2674	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
929	2675	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
930	2676	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0

931	2677	1	0.0	42.7	66	42.7	15	----	42.7	0.0	7	-7.0
932	2678	1	0.0	42.6	66	42.6	15	----	42.6	0.0	7	-7.0
933	2679	1	0.0	42.5	66	42.5	15	----	42.5	0.0	7	-7.0
934	2680	1	0.0	42.4	66	42.4	15	----	42.4	0.0	7	-7.0
935	2681	1	0.0	42.3	66	42.3	15	----	42.3	0.0	7	-7.0
936	2682	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
937	2683	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
938	2684	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
939	2685	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
940	2686	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
941	2688	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
942	2689	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
943	2690	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
944	2691	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
945	2692	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
946	2693	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
947	2694	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
948	2695	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
949	2696	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
950	2697	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
951	2698	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
952	2699	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
953	2700	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
954	2701	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
955	2702	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
956	2703	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
957	2704	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
958	2705	1	0.0	42.0	66	42.0	15	----	42.0	0.0	7	-7.0
959	2706	1	0.0	42.0	66	42.0	15	----	42.0	0.0	7	-7.0
960	2707	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
961	2708	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
962	2709	1	0.0	42.0	66	42.0	15	----	42.0	0.0	7	-7.0
963	2710	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
964	2711	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
965	2712	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
966	2713	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
967	2714	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
968	2715	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
969	2716	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
970	2717	1	0.0	42.1	66	42.1	15	----	42.1	0.0	7	-7.0
971	2718	1	0.0	42.0	66	42.0	15	----	42.0	0.0	7	-7.0

972	2719	1	0.0	42.0	66	42.0	15	----	42.0	0.0	7	-7.0
973	2720	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
974	2721	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
975	2722	1	0.0	41.9	66	41.9	15	----	41.9	0.0	7	-7.0
976	2723	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
977	2724	1	0.0	41.8	66	41.8	15	----	41.8	0.0	7	-7.0
978	2725	1	0.0	41.7	66	41.7	15	----	41.7	0.0	7	-7.0
979	2726	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
980	2727	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
981	2728	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
982	2729	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
983	2730	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
984	2731	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
985	2732	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
986	2733	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
987	2734	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
988	2735	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
989	2736	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
990	2737	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
991	2738	1	0.0	39.9	66	39.9	15	----	39.9	0.0	7	-7.0
992	2739	1	0.0	40.3	66	40.3	15	----	40.3	0.0	7	-7.0
993	2740	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
994	2741	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
995	2742	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
996	2743	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
997	2744	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
998	2745	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
999	2746	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
1000	2747	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
1001	2748	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
1002	2749	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
1003	2750	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
1004	2751	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
1005	2752	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
1006	2753	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
1007	2754	1	0.0	41.6	66	41.6	15	----	41.6	0.0	7	-7.0
1008	2755	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
1009	2756	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
1010	2757	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
1011	2758	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0
1012	2759	1	0.0	41.5	66	41.5	15	----	41.5	0.0	7	-7.0

1013	2760	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
1014	2761	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
1015	2762	1	0.0	41.4	66	41.4	15	----	41.4	0.0	7	-7.0
1016	2763	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
1017	2764	1	0.0	41.3	66	41.3	15	----	41.3	0.0	7	-7.0
1018	2765	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
1019	2766	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
1020	2767	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
1021	2768	1	0.0	41.2	66	41.2	15	----	41.2	0.0	7	-7.0
1022	2769	1	0.0	41.1	66	41.1	15	----	41.1	0.0	7	-7.0
1023	2771	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
1024	2772	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
1025	2773	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
1026	2774	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
1027	2775	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
1028	2776	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
1029	2777	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
1030	2778	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
1031	2779	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
1032	2780	1	0.0	38.8	66	38.8	15	----	38.8	0.0	7	-7.0
1033	2781	1	0.0	39.1	66	39.1	15	----	39.1	0.0	7	-7.0
1034	2782	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
1035	2783	1	0.0	39.6	66	39.6	15	----	39.6	0.0	7	-7.0
1036	2784	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
1037	2785	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
1038	2786	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
1039	2787	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
1040	2788	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
1041	2789	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
1042	2790	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
1043	2791	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
1044	2792	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
1045	2793	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
1046	2794	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
1047	2795	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
1048	2796	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
1049	2797	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
1050	2798	1	0.0	41.0	66	41.0	15	----	41.0	0.0	7	-7.0
1051	2799	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
1052	2800	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
1053	2801	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0

1054	2802	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
1055	2803	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
1056	2804	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
1057	2805	1	0.0	40.9	66	40.9	15	----	40.9	0.0	7	-7.0
1058	2806	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
1059	2807	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
1060	2808	1	0.0	40.8	66	40.8	15	----	40.8	0.0	7	-7.0
1061	2809	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
1062	2810	1	0.0	40.7	66	40.7	15	----	40.7	0.0	7	-7.0
1063	2811	1	0.0	40.6	66	40.6	15	----	40.6	0.0	7	-7.0
1064	2812	1	0.0	40.5	66	40.5	15	----	40.5	0.0	7	-7.0
1065	2813	1	0.0	40.4	66	40.4	15	----	40.4	0.0	7	-7.0
1066	2814	1	0.0	40.2	66	40.2	15	----	40.2	0.0	7	-7.0
1067	2815	1	0.0	40.1	66	40.1	15	----	40.1	0.0	7	-7.0
1068	2816	1	0.0	40.0	66	40.0	15	----	40.0	0.0	7	-7.0
1069	2817	1	0.0	39.8	66	39.8	15	----	39.8	0.0	7	-7.0
1070	2818	1	0.0	39.7	66	39.7	15	----	39.7	0.0	7	-7.0
1071	2819	1	0.0	39.5	66	39.5	15	----	39.5	0.0	7	-7.0
1072	2820	1	0.0	39.2	66	39.2	15	----	39.2	0.0	7	-7.0
1073	2821	1	0.0	39.0	66	39.0	15	----	39.0	0.0	7	-7.0
1074	2822	1	0.0	38.6	66	38.6	15	----	38.6	0.0	7	-7.0
1075	2823	1	0.0	38.4	66	38.4	15	----	38.4	0.0	7	-7.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	1071	0.0	0.0	0.0
All Impacted	33	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ATTACHMENT 8
EJSCREEN Report

EJSCREEN Report (Version 2019)

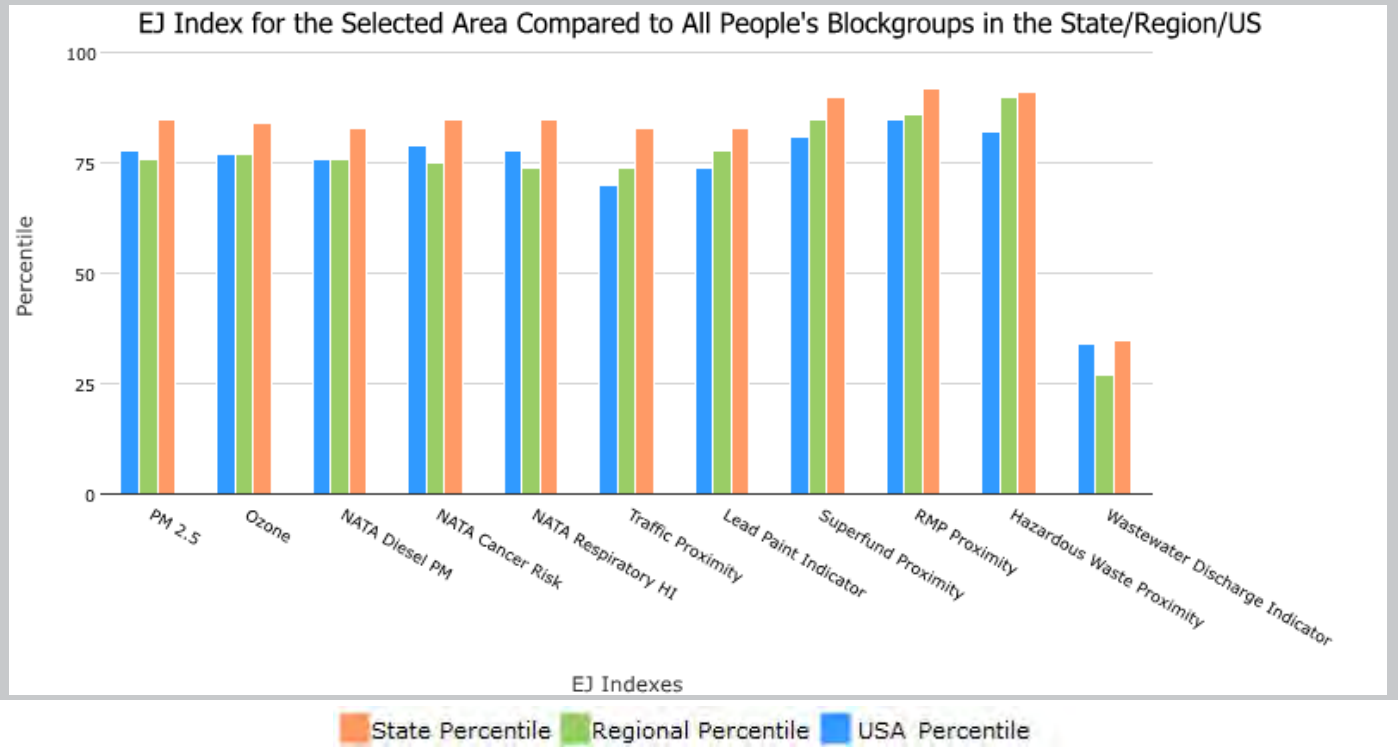
1.0 miles Ring around the Area, TENNESSEE, EPA Region 4

Approximate Population: 5,466

Input Area (sq. miles): 5.96

Proposed Action Site

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	85	76	78
EJ Index for Ozone	84	77	77
EJ Index for NATA* Diesel PM	83	76	76
EJ Index for NATA* Air Toxics Cancer Risk	85	75	79
EJ Index for NATA* Respiratory Hazard Index	85	74	78
EJ Index for Traffic Proximity and Volume	83	74	70
EJ Index for Lead Paint Indicator	83	78	74
EJ Index for Superfund Proximity	90	85	81
EJ Index for RMP Proximity	92	86	85
EJ Index for Hazardous Waste Proximity	91	90	82
EJ Index for Wastewater Discharge Indicator	35	27	34



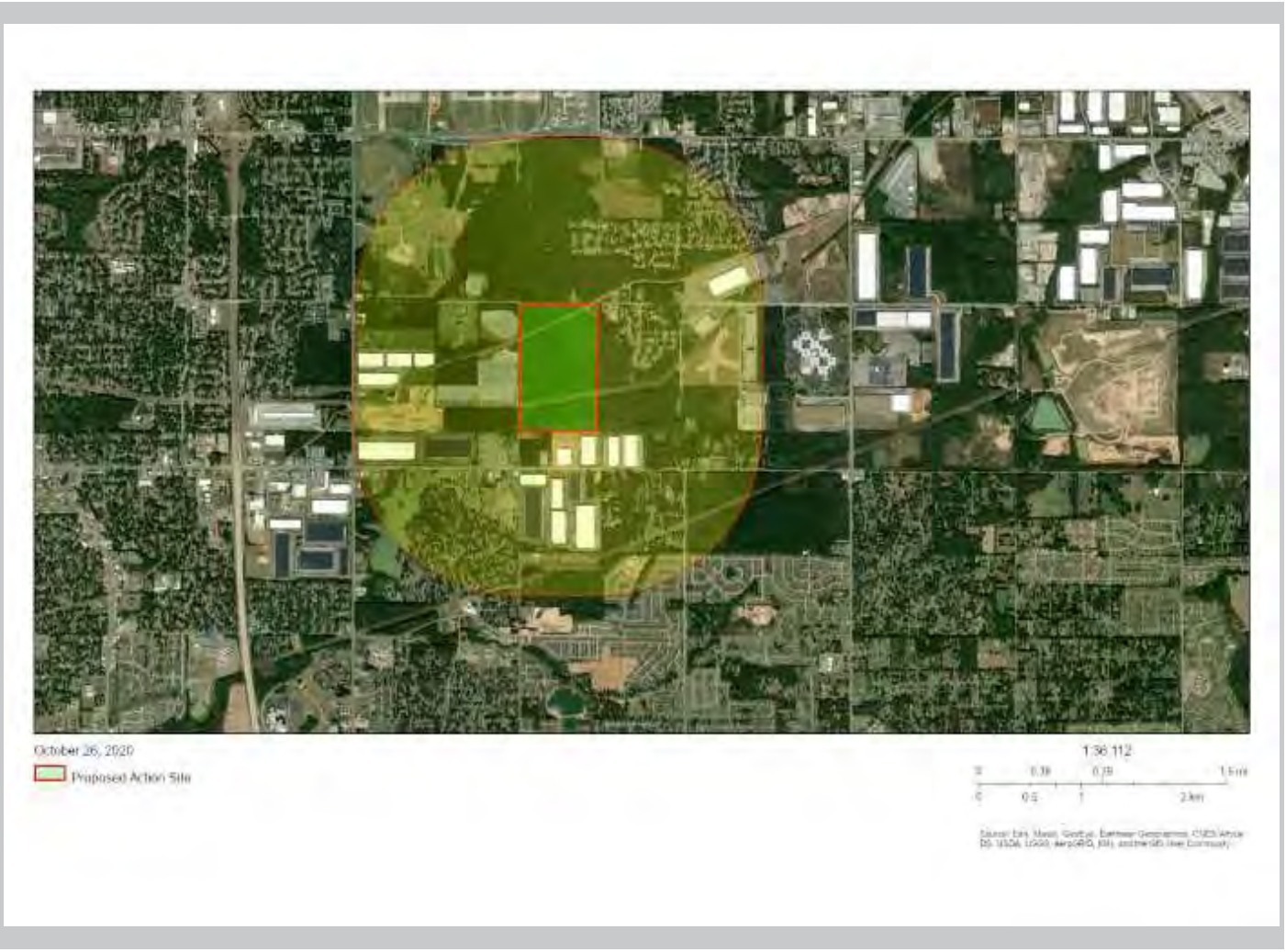
This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

1.0 miles Ring around the Area, TENNESSEE, EPA Region 4

Approximate Population: 5,466

Input Area (sq. miles): 5.96

Proposed Action Site



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJSCREEN Report (Version 2019)

1.0 miles Ring around the Area, TENNESSEE, EPA Region 4

Approximate Population: 5,466

Input Area (sq. miles): 5.96

Proposed Action Site

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m^3)	9.16	9.04	57	8.59	66	8.3	74
Ozone (ppb)	43.9	44.4	38	40	68	43	51
NATA* Diesel PM (µg/m^3)	0.459	0.396	67	0.417	60-70th	0.479	50-60th
NATA* Cancer Risk (lifetime risk per million)	38	35	76	36	60-70th	32	70-80th
NATA* Respiratory Hazard Index	0.53	0.48	74	0.52	50-60th	0.44	70-80th
Traffic Proximity and Volume (daily traffic count/distance to road)	150	260	64	350	55	750	42
Lead Paint Indicator (% Pre-1960 Housing)	0.064	0.2	32	0.15	45	0.28	31
Superfund Proximity (site count/km distance)	0.09	0.071	83	0.083	76	0.13	63
RMP Proximity (facility count/km distance)	0.8	0.53	80	0.6	76	0.74	71
Hazardous Waste Proximity (facility count/km distance)	0.95	0.61	81	0.52	84	4	63
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	2.7E-06	0.018	45	0.45	50	14	43
Demographic Indicators							
Demographic Index	53%	32%	85	38%	75	36%	76
Minority Population	63%	26%	87	38%	77	39%	75
Low Income Population	43%	37%	62	37%	63	33%	70
Linguistically Isolated Population	0%	2%	66	3%	51	4%	45
Population With Less Than High School Education	12%	13%	50	13%	53	13%	60
Population Under 5 years of age	5%	6%	42	6%	44	6%	41
Population over 64 years of age	7%	15%	13	16%	13	15%	17

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 1.0-miles radius
Description: Holmes Road

Summary of ACS Estimates	2013 - 2017
Population	5,761
Population Density (per sq. mile)	888
Minority Population	3,581
% Minority	62%
Households	1,788
Housing Units	1,962
Housing Units Built Before 1950	33
Per Capita Income	20,079
Land Area (sq. miles) (Source: SF1)	6.49
% Land Area	99%
Water Area (sq. miles) (Source: SF1)	0.08
% Water Area	1%

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	5,761	100%	727
Population Reporting One Race	5,705	99%	1,422
White	2,205	38%	594
Black	3,323	58%	542
American Indian	0	0%	18
Asian	29	1%	95
Pacific Islander	0	0%	18
Some Other Race	148	3%	155
Population Reporting Two or More Races	56	1%	173
Total Hispanic Population	140	2%	183
Total Non-Hispanic Population	5,621		
White Alone	2,180	38%	564
Black Alone	3,323	58%	542
American Indian Alone	0	0%	18
Non-Hispanic Asian Alone	29	1%	95
Pacific Islander Alone	0	0%	18
Other Race Alone	40	1%	61
Two or More Races Alone	49	1%	145
Population by Sex			
Male	2,948	51%	533
Female	2,813	49%	410
Population by Age			
Age 0-4	282	5%	211
Age 0-17	1,792	31%	411
Age 18+	3,969	69%	596
Age 65+	423	7%	174

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2013 - 2017 .

EJSCREEN ACS Summary Report

Location: User-specified polygonal location
Ring (buffer): 1.0-miles radius
Description: Holmes Road

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	3,525	100%	442
Less than 9th Grade	99	3%	167
9th - 12th Grade, No Diploma	340	10%	144
High School Graduate	1,181	33%	245
Some College, No Degree	1,275	36%	302
Associate Degree	254	7%	164
Bachelor's Degree or more	630	18%	313
Population Age 5+ Years by Ability to Speak English			
Total	5,479	100%	624
Speak only English	5,258	96%	609
Non-English at Home[1+2+3+4]	221	4%	196
[1]Speak English "very well"	169	3%	149
[2]Speak English "well"	48	1%	77
[3]Speak English "not well"	3	0%	38
[4]Speak English "not at all"	1	0%	25
[3+4]Speak English "less than well"	4	0%	42
[2+3+4]Speak English "less than very well"	52	1%	86
Linguistically Isolated Households*			
Total	1	100%	26
Speak Spanish	1	100%	19
Speak Other Indo-European Languages	0	0%	18
Speak Asian-Pacific Island Languages	0	0%	18
Speak Other Languages	0	0%	18
Households by Household Income			
Household Income Base	1,788	100%	182
< $15,000	164	9%	70
$15,000 - $25,000	218	12%	84
$25,000 - $50,000	550	31%	158
$50,000 - $75,000	402	22%	170
$75,000 +	454	25%	274
Occupied Housing Units by Tenure			
Total	1,788	100%	182
Owner Occupied	1,369	77%	187
Renter Occupied	419	23%	159
Employed Population Age 16+ Years			
Total	4,213	100%	514
In Labor Force	3,065	73%	484
Civilian Unemployed in Labor Force	285	7%	79
Not In Labor Force	1,148	27%	272

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

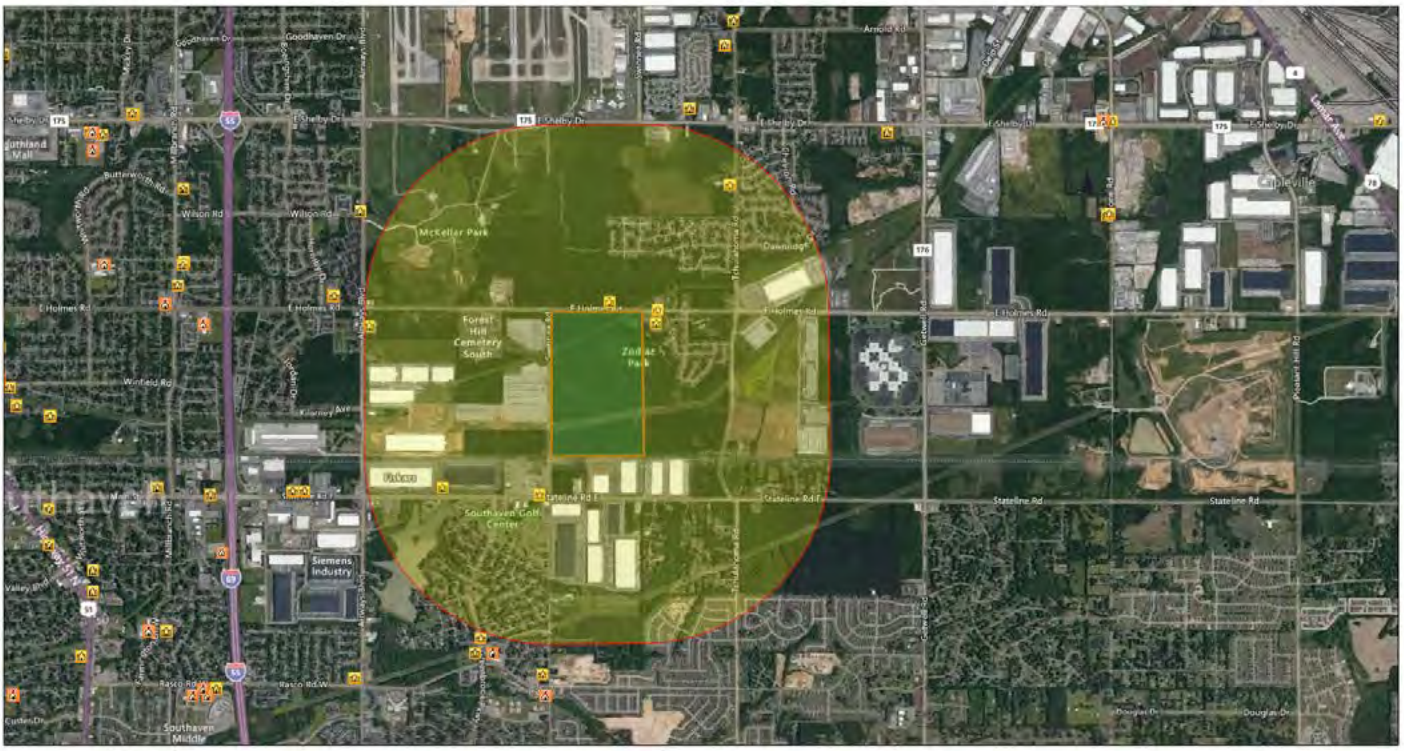
Location: User-specified polygonal location
Ring (buffer): 1.0-miles radius
Description: Holmes Road

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	3,852	100%	464
English	3,494	91%	463
Spanish	327	8%	190
French	4	0%	25
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	6	0%	17
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	8	0%	25
Chinese	0	0%	17
Japanese	N/A	N/A	N/A
Korean	0	0%	17
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	12	0%	32
Other Asian	0	0%	17
Tagalog	0	0%	17
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	0	0%	17
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	0	0%	17
Total Non-English	357	9%	655

Data Note: Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A meansnot available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2013 - 2017.
*Population by Language Spoken at Home is available at the census tract summary level and up.

NEPAssist Report

Proposed Action Site



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Project Area	0.38 sq mi
Within 1 mile of an Ozone 8-hr (1997 standard) Non-Attainment/Maintenance Area?	yes
Within 1 mile of an Ozone 8-hr (2008 standard) Non-Attainment/Maintenance Area?	yes
Within 1 mile of a Lead (2008 standard) Non-Attainment/Maintenance Area?	no
Within 1 mile of a SO2 1-hr (2010 standard) Non-Attainment/Maintenance Area?	no
Within 1 mile of a PM2.5 24hr (2006 standard) Non-Attainment/Maintenance Area?	no
Within 1 mile of a PM2.5 Annual (1997 standard) Non-Attainment/Maintenance Area?	no
Within 1 mile of a PM2.5 Annual (2012 standard) Non-Attainment/Maintenance Area?	no
Within 1 mile of a PM10 (1987 standard) Non-Attainment/Maintenance Area?	no
Within 1 mile of a Federal Land?	no
Within 1 mile of an impaired stream?	yes
Within 1 mile of an impaired waterbody?	no
Within 1 mile of a waterbody?	yes
Within 1 mile of a stream?	yes
Within 1 mile of an NWI wetland?	Available Online
Within 1 mile of a Brownfields site?	no
Within 1 mile of a Superfund site?	no
Within 1 mile of a Toxic Release Inventory (TRI) site?	yes
Within 1 mile of a water discharger (NPDES)?	yes
Within 1 mile of a hazardous waste (RCRA) facility?	yes

Within 1 mile of an air emission facility?	yes
Within 1 mile of a school?	no
Within 1 mile of an airport?	no
Within 1 mile of a hospital?	no
Within 1 mile of a designated sole source aquifer?	no
Within 1 mile of a historic property on the National Register of Historic Places?	no
Within 1 mile of a Toxic Substances Control Act (TSCA) site?	yes
Within 1 mile of a Land Cession Boundary?	yes
Within 1 mile of a tribal area (lower 48 states)?	no

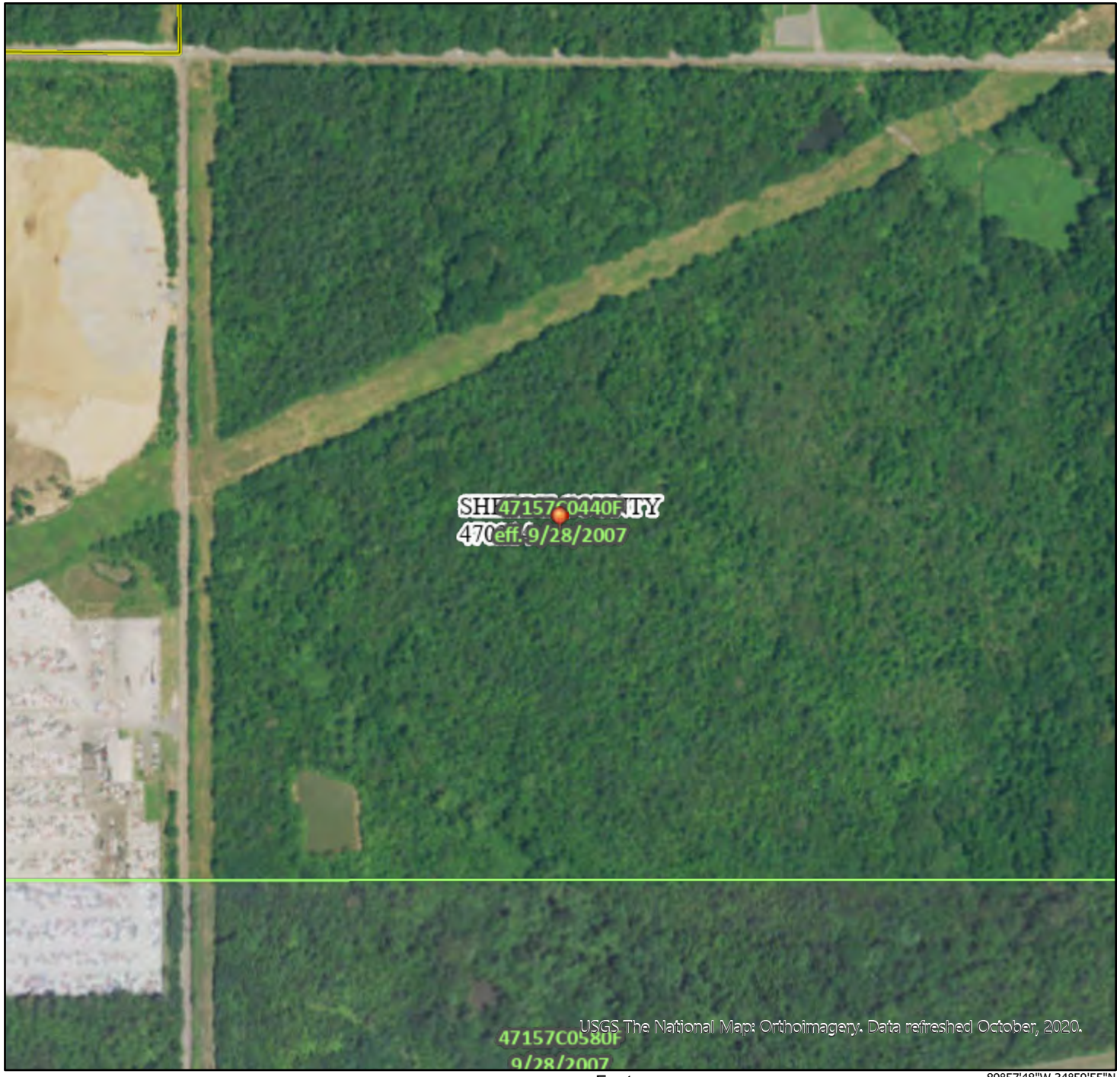
Created on: 12/15/2020 9:46:34 AM

ATTACHMENT 9

Water Resources Information

National Flood Hazard Layer FIRMette

89°58'26"W 35°0'24"N



89°57'48"W 34°59'55"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/17/2020 at 12:00 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

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- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
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- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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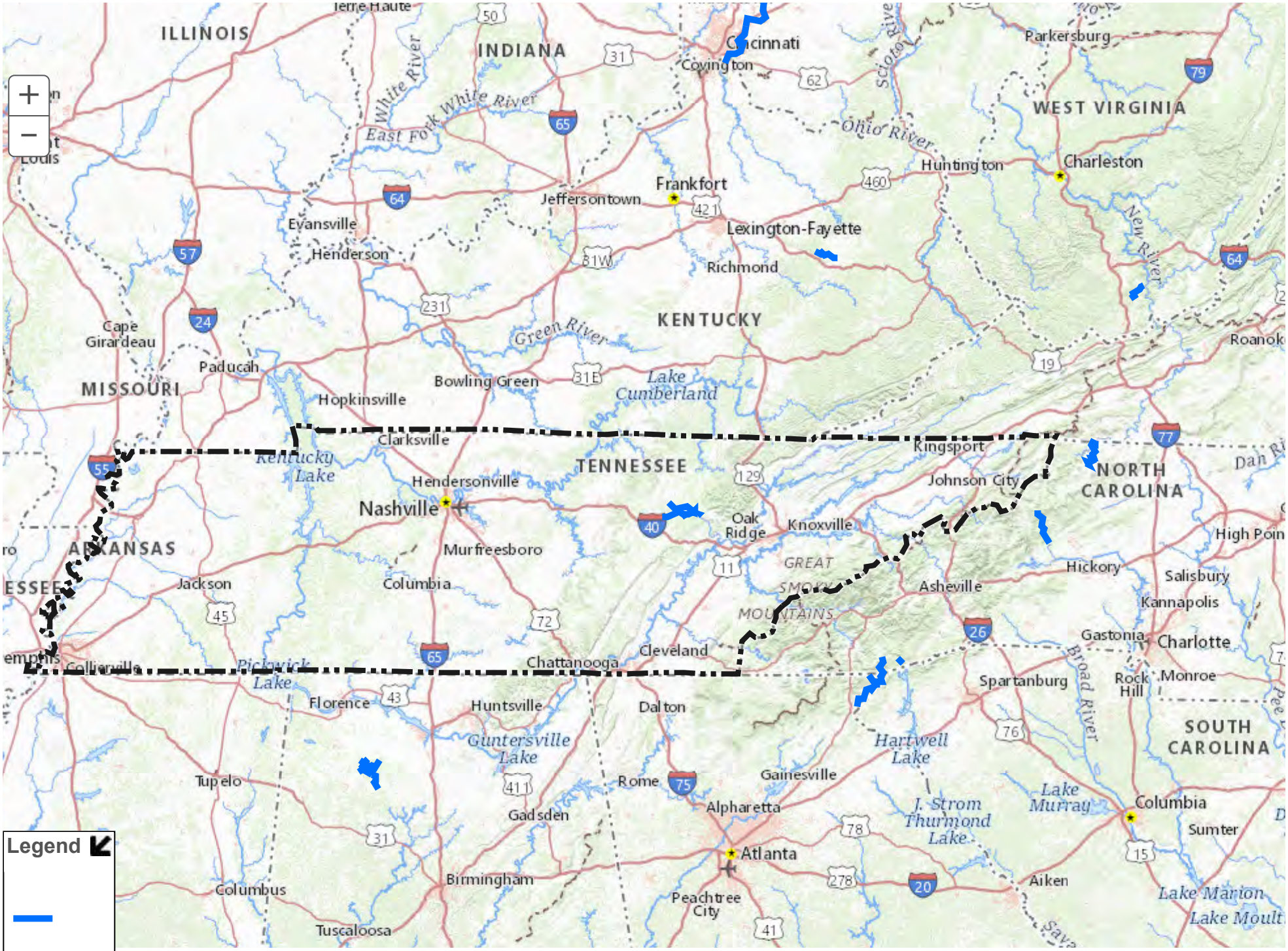
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.


ILLINOIS
INDIANA
KENTUCKY
TENNESSEE
MISSOURI
ARKANSAS
WEST VIRGINIA
NORTH CAROLINA
SOUTH CAROLINA
Cincinnati
Covington
Parkersburg
Huntington
Charleston
Frankfort
Jeffersontown
Lexington-Fayette
Richmond
Evansville
Henderson
Bowling Green
Hopkinsville
Paducah
Cape Girardeau
Clarksville
Nashville
Hendersonville
Murfreesboro
Jackson
Columbia
Oak Ridge
Knoxville
Kingsport
Johnson City
Asheville
Hickory
Salisbury
Kannapolis
Gastonia
Charlotte
Rock Hill
Monroe
Spartanburg
Cleveland
Chattanooga
Dalton
Huntsville
Florence
Tupelo
Gadsden
Rome
Alpharetta
Atlanta
Gainesville
Columbus
Birmingham
Tuscaloosa
Peachtree City
Aiken
Columbia
Sumter
Lake Marion
Lake Moultrie
Lake Murray
Hartwell Lake
J. Strom Thurmond Lake
Guntersville Lake
Pickwick Lake
Kentucky Lake
Lake Cumberland
Green River
White River
East Fork White River
Ohio River
Scioto River
New River
Broad River
GREAT SMOKY MOUNTAINS
Legend

AQUATIC RESOURCE ASSESSMENT REPORT

250-ACRE TRACT AT EAST HOLMES ROAD AND SWINNEA ROAD
SHELBY COUNTY, TENNESSEE

EnSafe Project Number:
0888821806

Prepared for:

Memphis-Shelby County Airport Authority
4225 Airways Boulevard
Memphis, Tennessee 38116

June 2020

5724 Summer Trees Drive
Memphis, Tennessee 38134
901-372-7962 | 800-588-7962
www.ensafe.com

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TABLE OF CONTENTS

TABLES

ATTACHMENTS

1.0 INTRODUCTION

EnSafe Inc. and Tioga Environmental Consultants Inc. conducted an aquatic assessment reconnaissance site visit on July 18, 2019, to assess for jurisdictional waters, including wetlands, streams, wet weather conveyances (WWCs), and other waters of the United States, on an approximately 250-acre tract southeast of the intersection of East Holmes Road and Swinnea Road in Memphis, Shelby County, Tennessee (Site). EnSafe conducted a formal delineation of aquatic resources at the Site on April 15 and 16, 2020, to verify the initial reconnaissance findings from 2019 and collect requisite data related to potentially jurisdictional aquatic resources for the purpose of obtaining formal concurrence from Tennessee Department of Environment and Conservation (TDEC).

Memphis-Shelby County Airport Authority (MSCAA) is proposing development within the Site, and these proposed impacts may require future permitting under the Clean Water Act (Sections 404 and 401) by the United States Army Corps of Engineers (USACE) and TDEC. The objective of this report is to support Section 404/401 permit applications that will allow for the development of the Site; additional details (e.g., preliminary design plans) will be provided as appropriate during the permitting process. As such, USACE and TDEC concurrences with a Preliminary Jurisdictional Determination and a Hydrologic Determination, respectively, would be used to avoid and/or minimize impacts to jurisdictional aquatic resources at the Site during a future permitting process.

Wetland delineation was conducted according to the USACE *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region Version 2.0* (Environmental Laboratory 2010) for wetlands. TDEC *Guidance for Making Hydrologic Determinations* (Version 1.5, April 2020) was used for stream determinations. Figures of the Site and surrounding area, including the Assessment findings, are included as Attachment A. Field data forms are documented as Attachment B, and Attachment C includes the photo log of features and conditions as observed during the Site visit.

2.0 SITE OVERVIEW

The Site is mostly within the Lower Nonconnah Creek watershed (Hydrologic Unit Code 080102110103); a portion of the Site, in the southwest quadrant, is within the Horn Lake Creek (Hydrologic Unit Code 080102110301) watershed. According to the Natural Resources Conservation Service, the soil types within the Site include: Collins silt loam, 0 to 2% slopes, occasionally flooded, brief duration; Falaya silt loam; Grenada complex, 5 to 12% slopes, severely eroded; Gullied land, silty(udorthent, silty); Loring silt loam, 2 to 5% slopes; Loring silt loam, 5 to 8% slopes, eroded; Loring silt loam, 8 to 12% slopes, east; Loring silt loam, 8 to 12% slopes, eroded; Loring silt loam, 5 to 12% slopes, severely eroded; Memphis silt loam, 2 to 5% slopes, eroded, north. Falaya silt loam

includes a minor hydric component (Waverly, 9%). The Site is identified on the National Wetland Inventory as potentially including freshwater ponds, linear freshwater forested/shrub wetlands, and riverine features.

2.1 Clean Water Act Section 404 and 401 Potentially Jurisdictional Resources

The Assessment identified 10 wetlands, six streams, and seven open water ponds that may be considered other waters, all of which may be TDEC-jurisdictional features based on hydrological connectivity to other aquatic resources and pursuant to Section 401 of the Clean Water Act (Tables 1, 2, and 3). Six upland data points were collected at locations in close proximity to wetlands, for reference purposes. Several of the linear aquatic features extended beyond the subject property, and assessment beyond the property boundary was not necessary due to the geographic scope of the proposed project.

Wetland 1 is comprised mostly of 60%/40% wetland/upland mosaic; there is an offshoot drainageway from Pond 5 into Wetland 1 that is excluded from the mosaic. Wetland 1 measures approximately 1.61 acres in size (including 1.14 acres of mosaic wetland). Wetland 1 receives drainage from Stream 1 that dissipates into overland surface water flow as it drains northward and eventually reconvenes into a stream at the downgradient terminus of Wetland 1 and continuing in a northwesterly direction as Stream 1. Wetland 1 vegetation is dominated by red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), east woodland sedge (*Carex blanda*), and leathery rush (*Juncus coriaceus*).

Wetland 2 exhibits drainage patterns indicative of periods of overland sheet flow though most of its area, except for an upland "island" area present within Wetland 2. Wetland 2 measures approximately 0.35 acre in size. Hydrology is fed by seepage through the Pond 3 containment berm upgradient of Wetland 2. The perched water table observed is likely from shallow surface water surrounding the data collection point filling the soil pit. Wetland 2 vegetation is dominated by red maple, Chinese privet (*Ligustrum sinense*), American elm (*Ulmus americana*), and Virginia creeper (*Parthenocissus quinquefolia*).

Wetland 3 is a low-lying, mostly flat area just south of the toe of a slope that rises up to the gas pipeline easement cleared area; the wetland drains eastward into WWC 6. Wetland 3 measures approximately 0.13 acre in size. Wetland 3 vegetation is dominated by persimmon (*Diospyros virginiana*), water oak (*Quercus nigra*), silver maple (*Acer saccharinum*), Callery pear (*Pyrus calleryana*), Chinese privet, horsebrier (*Smilax rotundifolia*), and American elm.

Wetland 4 is a 60%/40% wetland/upland mosaic immediately upgradient of and adjacent to the inception of Stream 2. Wetland 4 measures approximately 0.19 acre in size and drains into

Stream 2. Surface water was observed in less than 50% of the wetland, and drainage patterns indicate times of overland sheet flow. Wetland 4 vegetation is dominated by American elm, Chinese privet, water oak, and American snowbell (*Styrax americanus*).

Wetland 5 is a winding drainageway, very narrow at some portions of its length, that drains into Stream 3. Wetland 5 measures approximately 0.25 acre in size. There is a shallow-ponded depressional area where the data was collected. Wetland 5 vegetation is dominated by American elm, sweetgum, Chinese privet, trumpet creeper (*Campsis radicans*), and Japanese honeysuckle (*Lonicera japonica*).

Wetlands 6 and 7 exhibit numerous puddles of shallow (approximately 1-2 inches deep) surface water and mucky surface soil within a drainageway where Stream 3 completely loses its morphology throughout these wetland areas. Wetlands 6 and 7 measure approximately 0.04 acre and 0.17 acre in size, respectively. Though not adjacent to each other, these wetlands are connected to each other and Wetland 5 through a drainageway (Stream 3). Dominant vegetation in common among these wetlands includes sweetgum, Chinese privet, American elm, and pignut hickory (*Carya glabra*).

Wetland 8 is an isolated depressional wetland at the toe of a slope and is not connected to any streams or WWCs. Wetland 8 measures approximately 0.01 acre in size. Wetland 8 vegetation is dominated by sweetgum, Chinese privet, and poison ivy (*Toxicodendron radicans*). Due to logistical constraints in the field, no USACE wetland determination data form was filled out for this feature.

Wetland 9 is a depressional feature that contained ponded surface water at the time of observation. Wetland 9 drains at the west end into WWC 9 and eventually into Wetland 10. Wetland 9 measures approximately 0.03 acre in size. Wetland 9 vegetation is dominated by sweetgum, cottonwood (*Populus deltoides*), water oak, American elm, privet, Indian wood-oats (*Chasmanthium latifolium*), and poison ivy.

Wetland 10 is a depressional area that receives hydrologic input at its east end from WWC 9, traversing through a low-elevation or breached point in a berm, and extending westward beyond the berm as a narrow drainageway that connects to Stream 5. Wetland 10 measures approximately 0.15 acre in size. Wetland 10 vegetation is dominated by cottonwood, sycamore (*Platanus occidentalis*), water oak, American elm, Chinese privet, Japanese stilt grass (*Microstegium vimineum*), and Virginia creeper. UPL 6 was taken as an upland reference point at the top of the berm that nearly bisects Wetland 10.

Table 1 provides approximate acreages and locations for onsite wetlands and ponds.

Table 1
Wetland and Other Water Acreage and Location

Aquatic Resource	Approximate Acreage	Approximate Location
Wetland 1	1.61	34.997631°, -89.965395°
Wetland 2	0.35	34.999768°, -89.969078°
Wetland 3	0.13	35.004463°, -89.966759°
Wetland 4	0.19	35.001613°, -89.964715°
Wetland 5	0.25	35.001480°, -89.964156°
Wetland 6	0.04	35.002069°, -89.963553°
Wetland 7	0.17	35.003052°, -89.963711°
Wetland 8	0.01	35.004933°, -89.969684°
Wetland 9	0.03	34.996997°, -89.968801°
Wetland 10	0.15	34.996614°, -89.969313°
Pond 1	0.13	35.003108°, -89.969937°
Pond 2	0.82	35.000556°, -89.970864°
Pond 3	0.67	34.999141°, -89.969426°
Pond 4	0.14	34.996871°, -89.966122°
Pond 5	0.59	34.997747°, -89.964092°
Pond 6	0.02	35.000841°, -89.964221°
Pond 7	0.59	35.005780°, -89.966152°

In several wetlands where surface water was observed, soil pits dug for data collection within or adjacent to these areas collected water via the lateral migration of soil saturation or overland surface water flow into the pit. The appearance of water in these pits should not be confused with a groundwater seep or connection, unless the saturation within the soil itself is considered to be perched groundwater.

Multiple ponds seem to have been constructed in the past by berming the contour of the pond so that it holds water. In several instances, containment failures were observed that have resulted in pond surface water drainage either via seepage through the berm's base or breaches in the berm's profile. These failures are sources of several onsite wetlands that, in some cases, drain into onsite streams.

Table 2 provides onsite stream lengths and locations of upgradient onsite origins and downgradient onsite termini.

Table 2
Stream Length and Termini

Aquatic Resource	Approximate Linear Feet	Onsite Upgradient Origin	Onsite Downgradient Terminus
Stream 1	3395	34.995279°, -89.963291°	35.002212°, -89.971942°
Stream 2	1961	35.001832°, -89.965059°	35.005591°, -89.964569°
Stream 3	1521	35.001489°, -89.964020°	35.005405°, -89.963765°
Stream 4	699	35.005361°, -89.963375°	35.006217°, -89.965119°
Stream 5	675	34.996650°, -89.969974°	34.996083°, -89.972008°
Stream 6	1210	34.995170°, -89.969619°	34.996083°, -89.972008°

Stream 1 flows in a northwesterly direction across much of the site and is located within the Lower Nonconnah Creek watershed. WWCs 1, 2, 3, 4, 5, 7, and 8 drain into Stream 1. Stream 1 is a blue line stream (Hurricane Creek) on the USGS topographical map, but field observation showed that Stream 1 completely loses its morphology as it drains through Wetland 1. The onsite portion of Stream 1 measures approximately 3395 linear feet, including approximately 200 feet of buried reach that flows through a culvert underneath the southern power line easement. Stream 1 becomes Hurricane Creek at the approximate location where Wetland 2 drains into Stream 1. Hurricane Creek flows offsite to the northwest and eventually drains into Nonconnah Creek.

Streams 2 and 3 both flow roughly parallel in a northerly direction in the northeast quadrant of the Site within the Lower Nonconnah Creek watershed. Both streams drain into Stream 4, which flows in a northwesterly direction. Wetland 4 and WWC 6 drain into Stream 2. Wetland 5 drains into Stream 3, which completely loses its morphology where it drains through Wetlands 6 and 7. All three streams are blue line streams on the USGS topographical map. Streams 2 and 3 measure approximately 1961 and 1521 linear feet, respectively, while the onsite portion of Stream 4 measures approximately 699 linear feet.

Streams 5 and 6 both flow in a generally westerly direction and meet at a confluence near the Site's west property boundary. Stream 5 receives hydrologic input from Wetland 10. Stream 6 is a blue line stream on the USGS topographical map. Streams 5 and 6 are within the Horn Lake Creek watershed, and measure 675 and 1210 linear feet, respectively.

2.2 Non-jurisdictional Features

None of the non-jurisdictional features received a score greater than 19 points using the TDEC Hydrologic Determination (HD) methodology and no groundwater connections or seeps were observed other than surface water seepage through artificial pond berms or soil saturation within wetlands (as previously noted). Table 3 provides onsite WWC lengths and locations of upgradient onsite origins and downgradient onsite termini.

Table 3
Wet Weather Conveyances Length and Termini

Aquatic Resource	Approximate Linear Feet	Onsite Upgradient Origin	Onsite Downgradient Terminus
WWC 1	173	35.003487°, -89.970504°	35.003232°, -89.970026°
WWC 2	107	35.002983°, -89.969892° 35.002871°, -89.970095°	35.00215°, -89.970845°
WWC 3	107	35.002288°, -89.970818°	35.002027°, -89.970936°
WWC 4	447	35.001167°, -89.970770°	35.001401°, -89.970594°
WWC 5	101	35.000789°, -89.970637°	35.001310°, -89.9705207
WWC 6	200	35.004703°, -89.96651°	35.004646°, -89.965310°
WWC 7	500	34.999400°, -89.969556°	34.999475°, -89.969554°
WWC 8	27	34.999307°, -89.968201°	34.999674°, -89.968162°
WWC 9	184	34.996992°, -89.968841°	34.996677°, -89.969229°

As noted previously, multiple constructed ponds have undergone berm failures that have resulted in surface water draining from the pond either via seepage through the berm's base or breaches in the berm's profile. These failures are sources of several onsite WWCs that, in some cases, drain into onsite streams. However, the surface water seepage through the artificial berms should not be confused with a groundwater seep, even though in the HD data forms the term "subsurface discharge" was sometimes borrowed to communicate the surface water seepage through the berm.

The topographic map shows a blue line stream leaving the Site in the northwest corner, but the stream feature is no longer present. Earliest available historical aerial imagery shows that the power line easement that runs parallel to, and just west of, the east boundary of the Site has been present since 1997 or earlier. Site history was not further reviewed for this report with respect to disappearance of this feature and the installment of the power line easement.

Attachment A
Site Figures

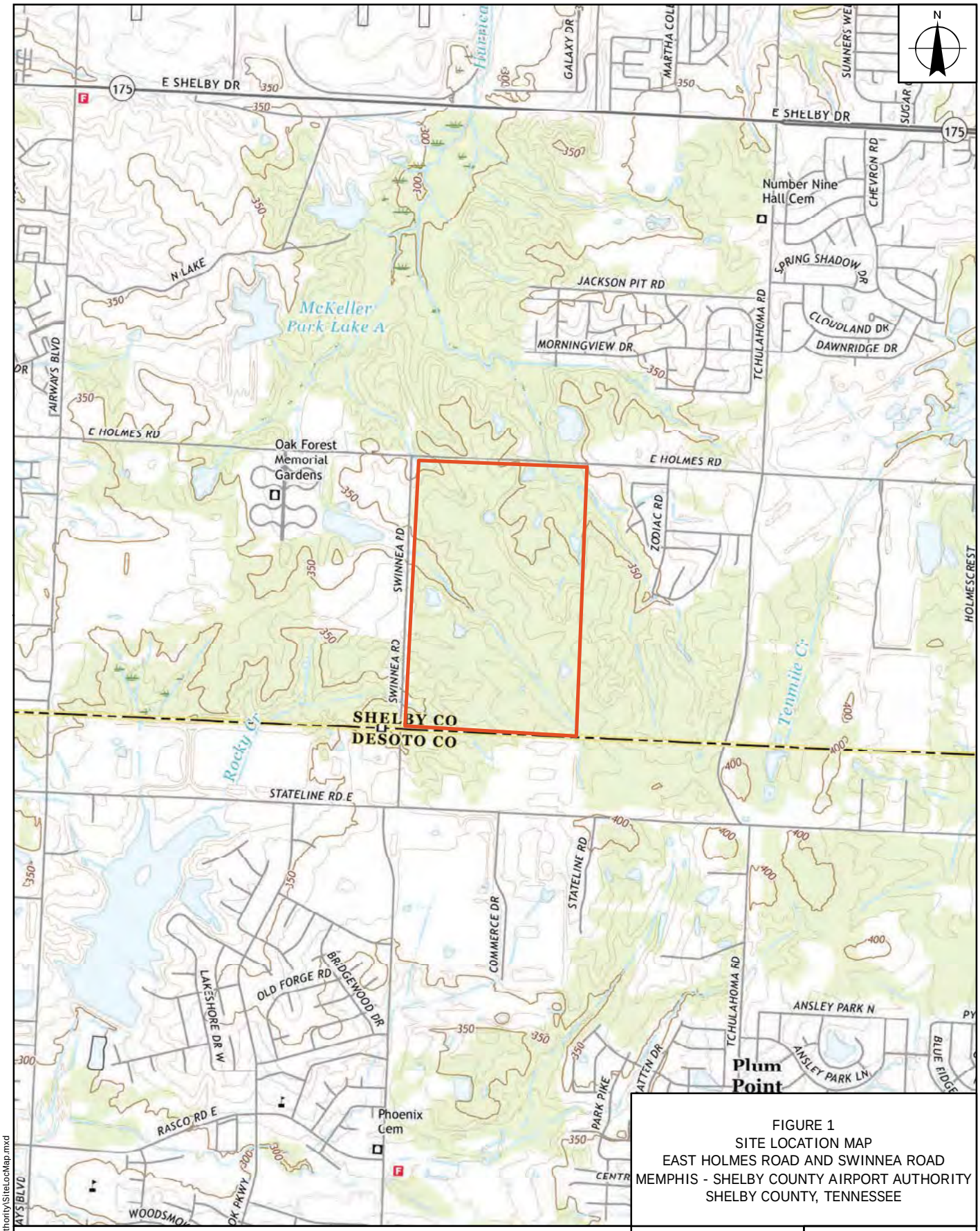

FIGURE 1
SITE LOCATION MAP
EAST HOLMES ROAD AND SWINNEA ROAD
MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY
SHELBY COUNTY, TENNESSEE

LEGEND

APPROXIMATE SUBJECT PROPERTY BOUNDARY

NAD 1983 STATE PLANE
TENNESSEE FEET

0 1,000 2,000

SCALE IN FEET

REQUESTED BY:	AC
DRAWN BY:	MS
DATE:	4/21/2020
PROJECT:	0888821806

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X:\ShelbyCoAirportAuthority\SiteLocMap.mxd

Source: U.S. Geological Survey. Pleasant Hill Quadrangle, Tennessee [Map]. Photorevised 2018. 1:24,000. 7.5 Minute Series.Southeast Memphis Quadrangle, Tennessee [Map]. Photorevised 2019. 1:24,000. 7.5 Minute Series.

FIGURE 2
SITE VICINITY MAP
EAST HOLMES ROAD AND SWINNEA ROAD
MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY
SHELBY COUNTY, TENNESSEE

LEGEND

APPROXIMATE SUBJECT PROPERTY BOUNDARY

NAD 1983 STATE PLANE
TENNESSEE FEET

0 300 600

SCALE IN FEET

REQUESTED BY:	AC
DRAWN BY:	MS
DATE:	4/21/2020
PROJECT:	0888821806

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Source: Google Earth Pro Imagery - 03/14/2018

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LEGEND

CO	COLLINS SILT LOAM, 0 TO 2 PERCENT SLOPES, OCCASIONALLY FLOODED, BRIEF DURATION	
FM	FALAYA SILT LOAM	
GGD3	GRENADA COMPLEX, 5 TO 12 PERCENT SLOPES, SEVERELY ERODED	
GS	GULLIED LAND, SILTY (UDORTHENT, SILTY)	
LOB	LORING SILT LOAM, 2 TO 5 PERCENT SLOPES	
LOC2	LORING SILT LOAM, 5 TO 8 PERCENT SLOPES, ERODED	
LOD	LORING SILT LOAM, 8 TO 12 PERCENT SLOPES, EAST	
LOD2	LORING SILT LOAM, 8 TO 12 PERCENT SLOPES, ERODED	
LOD3	LORING SILT LOAM, 5 TO 12 PERCENT SLOPES, SEVERELY ERODED	
MEB2	MEMPHIS SILT LOAM, 2 TO 5 PERCENT SLOPES, MODERATELY ERODED, NORTHERN PHASE	
W	WATER	
	APPROXIMATE SUBJECT PROPERTY BOUNDARY	

NAD 1983 STATE PLANE TENNESSEE FEET

0 300 600

SCALE IN FEET

FIGURE 3
SOIL SURVEY MAP
EAST HOLMES ROAD AND SWINNEA ROAD
MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY
SHELBY COUNTY, TENNESSEE

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Sources: Google Earth Pro Imagery - 03/14/2018https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

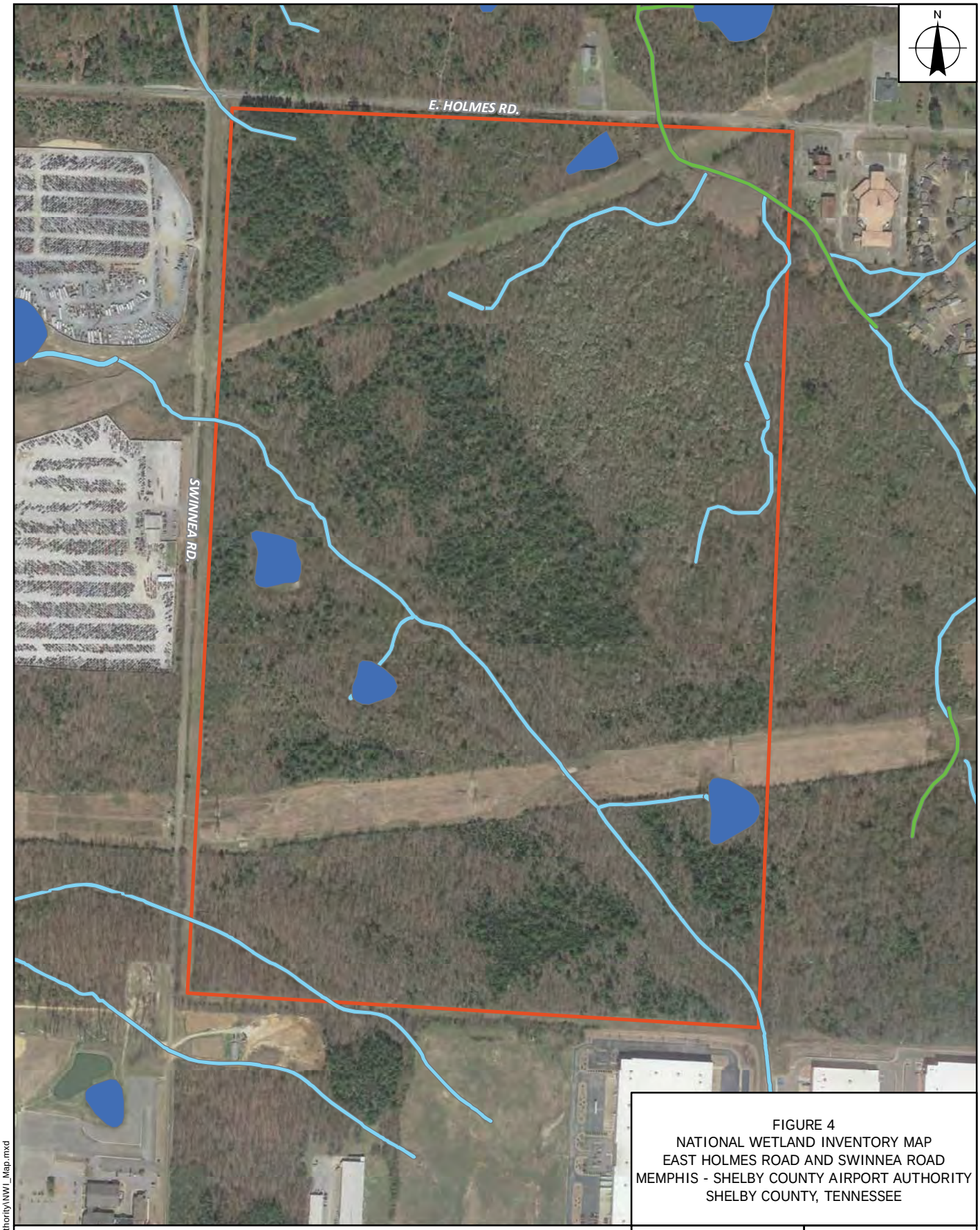

FIGURE 4
NATIONAL WETLAND INVENTORY MAP
EAST HOLMES ROAD AND SWINNEA ROAD
MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY
SHELBY COUNTY, TENNESSEE

LEGEND

- FRESHWATER FORESTED/ SHRUB WETLAND
- FRESHWATER POND
- RIVERINE
- APPROXIMATE SUBJECT PROPERTY BOUNDARY

NAD 1983 STATE PLANE TENNESSEE FEET

0 300 600

SCALE IN FEET

REQUESTED BY:	AC
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DATE:	4/21/2020
PROJECT:	0888821806

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Sources: Google Earth Pro Imagery - 03/14/2018; NWI - ttps://www.fws.gov/wetlands

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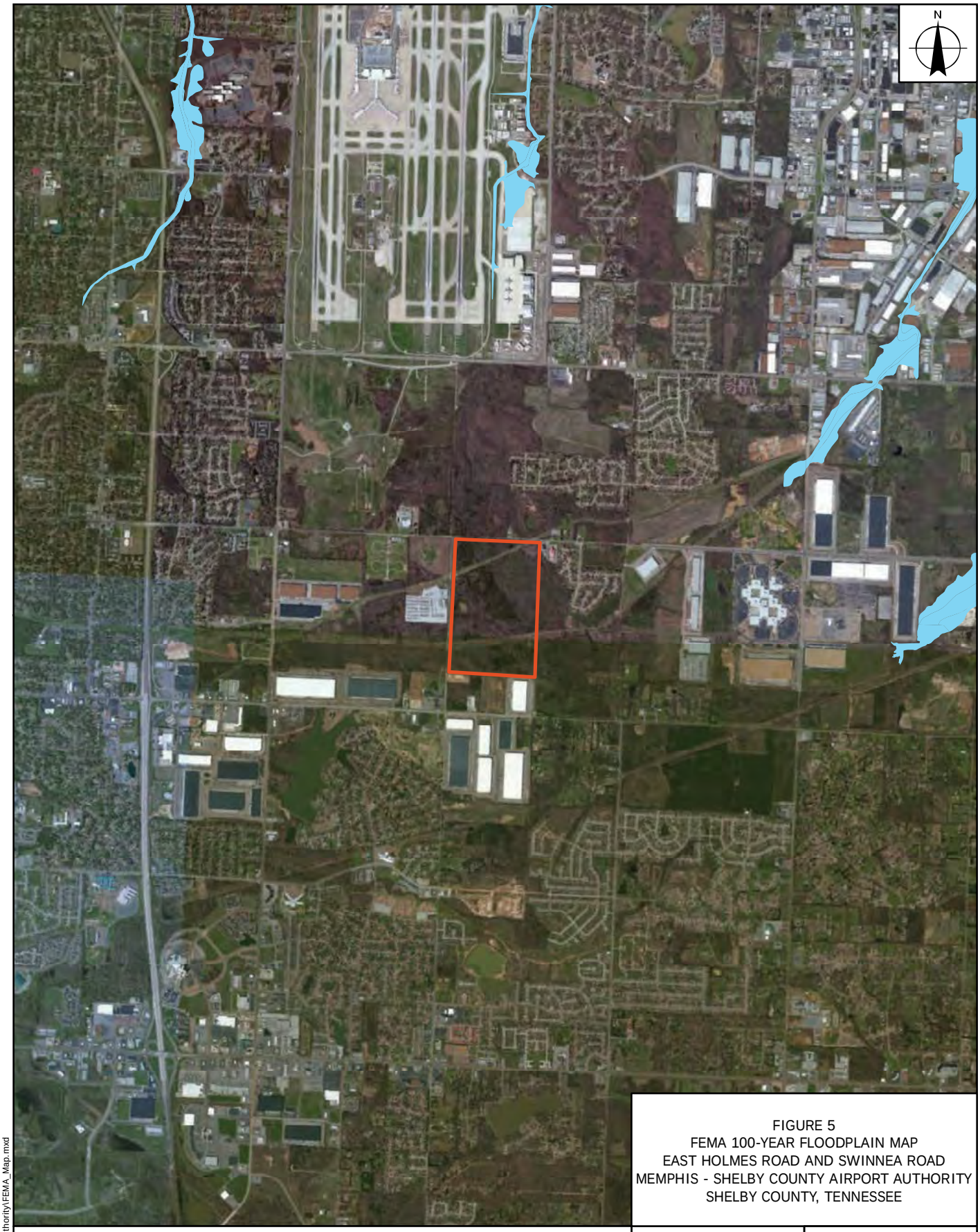

FIGURE 5
FEMA 100-YEAR FLOODPLAIN MAP
EAST HOLMES ROAD AND SWINNEA ROAD
MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY
SHELBY COUNTY, TENNESSEE

LEGEND

FEMA 100-YEAR FLOODPLAIN

APPROXIMATE SUBJECT PROPERTY BOUNDARY

NAD 1983 STATE PLANE
TENNESSEE FEET

0 2,000 4,000

SCALE IN FEET

REQUESTED BY:	AC
DRAWN BY:	MS
DATE:	4/21/2020
PROJECT:	0888821806

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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LEGEND

- STREAM
- WET WEATHER CONVEYANCE
- 60/40 WETLAND/UPLAND MOSAIC
- WETLAND
- POND
- APPROXIMATE SUBJECT PROPERTY BOUNDARY

NAD 1983 STATE PLANE TENNESSEE FEET

0 260 520

SCALE IN FEET

FIGURE 6
AERIAL AQUATIC RESOURCES MAP
EAST HOLMES ROAD AND SWINNEA ROAD
MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY
SHELBY COUNTY, TENNESSEE

REQUESTED BY:	AC
DRAWN BY:	MS
DATE:	4/23/2020
PROJECT:	0888821806

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Source: Google Earth Pro Imagery - 03/14/2018

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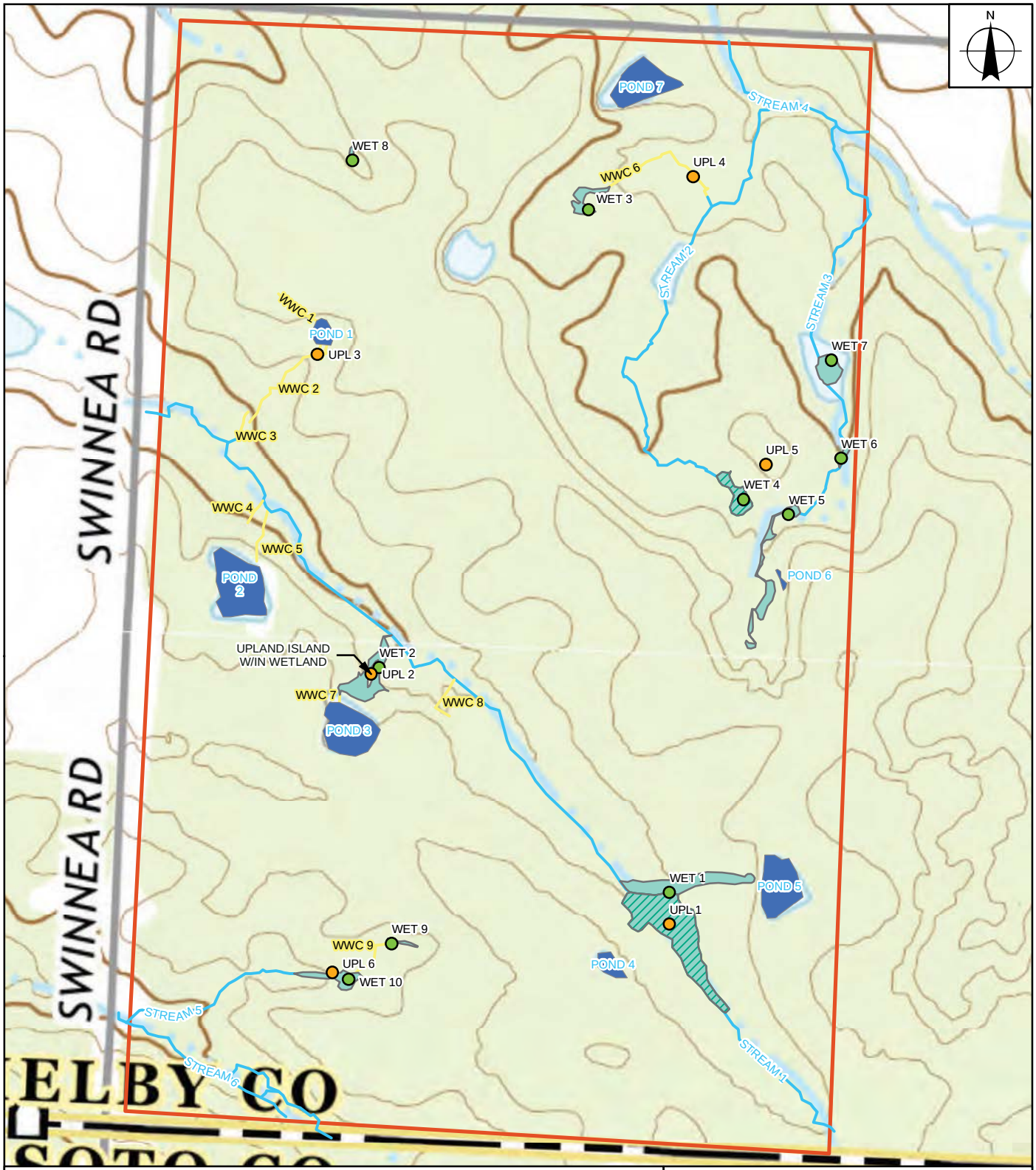

LEGEND

- UPLAND
- WETLAND
- STREAM
- WET WEATHER CONVEYANCE
- 60/40 WETLAND/UPLAND MOSAIC
- WETLAND
- POND
- APPROXIMATE SUBJECT PROPERTY BOUNDARY

NAD 1983 STATE PLANE
TENNESSEE FEET

0 260 520

SCALE IN FEET

FIGURE 7
TOPOGRAPHIC AQUATIC RESOURCES MAP
EAST HOLMES ROAD AND SWINNEA ROAD
MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY
SHELBY COUNTY, TENNESSEE

REQUESTED BY:	AC
DRAWN BY:	MS
DATE:	4/23/2020
PROJECT:	0888821806

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Source: U.S. Geological Survey. Pleasant Hill Quadrangle, Tennessee [Map]. Photorevised 2018. 1:24,000. 7.5 Minute Series.Southeast Memphis Quadrangle, Tennessee [Map]. Photorevised 2019. 1:24,000. 7.5 Minute Series.

LEGEND

- PHOTO LOCATION
- STREAM
- WET WEATHER CONVEYANCE
- 60/40 WETLAND/UPLAND MOSAIC
- WETLAND
- POND
- APPROXIMATE SUBJECT PROPERTY BOUNDARY

NAD 1983 STATE PLANE TENNESSEE FEET

0 260 520

SCALE IN FEET

FIGURE 8
PHOTO LOCATION MAP
EAST HOLMES ROAD AND SWINNEA ROAD
MEMPHIS - SHELBY COUNTY AIRPORT AUTHORITY
SHELBY COUNTY, TENNESSEE

REQUESTED BY:	AC
DRAWN BY:	MS
DATE:	4/28/2020
PROJECT:	0888821806

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Source: Google Earth Pro Imagery - 03/14/2018

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Attachment B
TDEC Hydrologic Determination Field Data Sheets, Precipitation Table, and USACE Wetland Determination Data Forms

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/15/2020

Named Waterbody: Unnamed	Date/Time: 1500
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : Stream 1
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110103	Lat/Long: From: 34.99528, -89.96329
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 35.00221, -89. 97194
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown	
Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Collin silt loam 0 to 2% slopes, occasionally flooded, brief duration, Falaya silt loam	Source: Web Soil
Surrounding Land Use : Undeveloped, Transmission Line, Commercial, Gas pipeline	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate (Slight) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream

Secondary Indicator Score (if applicable) = 27.75

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 14)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	(2)	3
2. Sinuous channel	0	(1)	2	3
3. In-channel structure: riffle-pool sequences	0	1	(2)	3
4. Sorting of soil textures or other substrate	0	1	(2)	3
5. Active/relic floodplain	(0)	0.5	1	1.5
6. Depositional bars or benches	0	1	(2)	3
7. Braided channel	0	(1)	2	3
8. Recent alluvial deposits	0	(0.5)	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	0	1	2	(3)
11. Grade controls	0	0.5	(1)	1.5
12. Natural valley or drainageway	0	0.5	(1)	1.5
13. At least second order channel on existing USGS or NRCS map	(No = 0)		Yes = 3	

B. Hydrology (Subtotal = 6.25)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	(0)	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	(2)	3
16. Leaf litter in channel (January – September)	1.5	(1)	0.5	0
17. Sediment on plants or on debris	0	0.5	(1)	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		(Yes = 1.5)	

C. Biology (Subtotal = 7.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	(0)
21. Rooted plants in the thalweg [1]	3	(2)	1	0
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	0	(1)	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	0	1	2	(3)
27. Iron oxidizing bacteria/fungus	0	0.5	(1)	1.5
28.Wetland plants in channel bed [2]	(0)	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 27.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

19. 10YR 5/2
20. Strong network of fibrous roots upstream, fewer dowstream
21. 1 patch of grass on bar in thalweg
23. 1 observed wit intense searching
26. Filamentous algae seen throughout reach

Notes : 1. Continuous bed and bank throughout most of channel w/ 1 large interruption at Wetland 1

2. ~ 1.1 ratio upstream, fairly straight after the first 1/4

3. 4-5 riffle/pool sequences observed along reach w/ large areas of pools or little hydrologic diversity

4. Incised through soil profile throughout most of reach (minus Wetland 1 and 2 culverts) and sorting of coarse texture in pools

6. Some bars and benches observed throughout reach, excluding Wetland 1

7. 2 islands observed upstream of Wetland 1

8. Some small areas of fresh deposit observed on benches

10. 1 large headcut upstream and 1 large headcut midway through reach

11. Several large roots and logs throughout reach acting with both moderate and strong longevity

12. Direction of flow apparent, topo contour lines show sloping with sloping toward reach observed, some artificial berms

15. Flow easily observed in riffle areas, some areas of only pools or runs

16. 10% of thalweg covered in leaf litter, mostly in pools

17. Sediment found on plants and debris, and in small isolated patches along margins

18. Sporadic patches of wrack lines observed, numerous drift piles seen throughout reach

27. Iron oxidizing observed upstream and along wetland 1

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/16/2020

Named Waterbody: Unnamed	Date/Time: 1130
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : Stream 2
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110103	Lat/Long: From: 35. 00183, -89.96506
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 35.00559, -89.96457
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown	
Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Falaya silt loam, Loring silt loam 2 to 5% slopes, Gullied land, Memphis silt loam, 2 to 5% slopes, moderately eroded	Source: Web Soil
Surrounding Land Use : Undeveloped, gas pipeline	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate (Slight) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream

Secondary Indicator Score (if applicable) = 22.25

Justification / Notes :

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 12.5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	(3)
2. Sinuous channel	0	(1)	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	(3)
5. Active/relic floodplain	(0)	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	0	(0.5)	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	(0)	1	2	3
11. Grade controls	0	0.5	(1)	1.5
12. Natural valley or drainageway	(0)	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	(No = 0)		Yes = 3	

B. **Hydrology** (Subtotal = 4.75)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	(0)	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	(3)
16. Leaf litter in channel (January – September)	1.5	(1)	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	(0.5)	1	1.5
19. Hydric soils in channel bed or sides of channel	(No = 0)		Yes = 1.5	

C. **Biology** (Subtotal = 5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	(2)	1	0
21. Rooted plants in the thalweg [1]	3	(2)	1	0
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	0	(1)	2	3
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5
28.Wetland plants in channel bed [2]	(0)	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 22.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 1. Steep "V" banks

2. ~ 1.1 ratio

3. Channel has good hydrologic diversity downstream but upstream is mostly pools

4. Throughout most of channel it is cut into soil profile with excellent sorting of soil textures

6. Bars and benches readily observed throughout most of reach

8. Small amounts of deposited silt on some benches

11. A few medium roots and woody present throughout reach and several small root clusters acting with moderate longevity

15. Flow is evident throughout reach

16. About 15% of the upstream side had leaf litter present

17. Some sediment observed in isolated areas upstream

18. Small organic piles observed upstream and midway through reach

20. Few fibrous roots observed in thalweg

21. Rumex crispus, willow, geranium maculatum, carex cherokeensis, sambucus canadensis

26. Some algae observed upstream

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/16/2020

Named Waterbody: Unnamed	Date/Time: 1445
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : Stream 3
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110103	Lat/Long: From: 35.00149, -89.96402 To: 35.00541, -89.96377
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Falaya silt loam, Gullied land, Water	Source: Web Soil
Surrounding Land Use : Undeveloped, Commercial	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight ( ) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream

Secondary Indicator Score (if applicable) = 26.25

Justification / Notes :

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 13)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	(3)
2. Sinuous channel	0	(1)	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	(3)
4. Sorting of soil textures or other substrate	0	1	2	(3)
5. Active/relic floodplain	(0)	0.5	1	1.5
6. Depositional bars or benches	0	1	2	(3)
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	0	(0.5)	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	(0)	1	2	3
11. Grade controls	0	0.5	(1)	1.5
12. Natural valley or drainageway	0	(0.5)	1	1.5
13. At least second order channel on existing USGS or NRCS map	(No = 0)		Yes = 3	

B. **Hydrology** (Subtotal = 4.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	(0)	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	(2)	3
16. Leaf litter in channel (January – September)	1.5	(1)	0.5	0
17. Sediment on plants or on debris	0	(0.5)	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5
19. Hydric soils in channel bed or sides of channel	(No = 0)		Yes = 1.5	

C. **Biology** (Subtotal = 8.75)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2	(1)	0
21. Rooted plants in the thalweg [1]	3	(2)	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	(2)	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	(2)	3
26. Filamentous algae; periphyton	0	1	(2)	3
27. Iron oxidizing bacteria/fungus	0	0.5	(1)	1.5
28.Wetland plants in channel bed [2]	(0)	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 26.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

26. Small patches observed in upstream areas
27. Iron oxidizing bacteria observed in a few areas along reach

Notes : 1. Strong continuous bed and bank observed downstream, upstream had some obvious interuptions

2. 1.2 ratio

3. Riffle and pool sequences prevalent downstream, but less diversity upstream

4. Downstream has strong sorting and incised in soil profile, upstream has little sorting and not as incised

6. Well developed bars and benches observed throughout most of reach, except between upstream wetlands

8. Small amounts observed on a few benches

11. Several small roots and some large wood debris acting with moderate longevity

12. Topo lines show slight sloping toward reach

15. Moving water easily seen in riffles and runs with some upstream areas of less hydrologic diversity

16. ~10% of leaf litter in channel

17. Sediment observed on organic drift piles in sporadic patches

18. Numerous small t medium drift piles observed throughout channel

20. Occasional patches of fibrous roots in thalweg and along margins, mostly upstream

21. Some small upland plants in the upstream area between wetlands

22. ~20 crayfish found in 1 sweep, but only in upstream half of reach

25. Sideswimmers, Chirinomidae, Corydalidae found with some effort

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/16/2020

Named Waterbody: Unnamed	Date/Time: 1200
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : Stream 4
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110103	Lat/Long: From: 35.00536, -89.96338
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 35.00622, -89.96512
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Falaya silt loam	Source: Web Soil
Surrounding Land Use : Undeveloped, Gas pipeline, Gravel pit	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate (Slight) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection		(Stream)
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream

Secondary Indicator Score (if applicable) =

Justification / Notes : Groundwater connection in 3 areas along west bank

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/15/2020

Named Waterbody: Unnamed	Date/Time: 1150
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : Stream 5
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110301	Lat/Long: From: 34.99665, -89.96997
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 34.99608, -89.97201
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown	
Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Collin silt loam 0 to 2% slopes, occasionally flooded, brief duration, Loring silt loam 8 to 12% slopes, eroded, Water	Source: Web Soil
Surrounding Land Use : Undeveloped, Transmission Line	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight ( ) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream

Secondary Indicator Score (if applicable) = 23.5

Justification / Notes :

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 12)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	(2)	3
2. Sinuous channel	0	(1)	2	3
3. In-channel structure: riffle-pool sequences	0	1	(2)	3
4. Sorting of soil textures or other substrate	0	1	(2)	3
5. Active/relic floodplain	(0)	0.5	1	1.5
6. Depositional bars or benches	0	1	(2)	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	0	(0.5)	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	0	1	(2)	3
11. Grade controls	0	0.5	(1)	1.5
12. Natural valley or drainageway	0	(0.5)	1	1.5
13. At least second order channel on existing USGS or NRCS map	(No = 0)		Yes = 3	

B. **Hydrology** (Subtotal = 6.25)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	(0)	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	(2)	3
16. Leaf litter in channel (January – September)	1.5	(1)	0.5	0
17. Sediment on plants or on debris	0	0.5	(1)	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		(Yes = 1.5)	

C. **Biology** (Subtotal = 5.25)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2	1	(0)
21. Rooted plants in the thalweg [1]	3	(2)	1	0
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	0	0.5	(1)	1.5
25. Macrobenthos (record type & abundance)	0	1	(2)	3
26. Filamentous algae; periphyton	0	(1)	2	3
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5
28.Wetland plants in channel bed [2]	(0)	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 23.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

21. 2-4 upland plants observed upstream
24. Several tadpoles observed
25. With some effort 2 Gammaridae and 1 Corydalidae observed
26. With intense searching 2 small patches were seen

Notes : 1. Clearly defined bed and bank with occasional interuptions

2. ~ 1.2 ratio

3. 4 riffle-pool sequences observed in channel

4. Slightly incised in soil profile, sorting of coarse materials from surrounding material easily observed and distinction between coarse and fines observed is a few places

6. 6 bars/benches observed in reach

8. Some alluvial deposits seen on benches

10. 1 large headcut midway through reach

11. Large wood and roots in channel providing moderate longevity

12. A slight downward grade into channel bed

15. Moving water observed in riffle areas with some standing pools

16. ~ 20% of the channel is covered in leaf litter

17. Sediment on some debris piles and channel margins

18. Numerous organic piles observed along reach, some wrack lines

19. 10YR 5/1

20. Strong network of fibrous roots observed through much of reach

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/15/2020

Named Waterbody: Unnamed	Date/Time: 1230
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : Stream 6
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110301	Lat/Long: From: 34.99517, -89.96962
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 34.99608, -89.97201
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Collin silt loam 0 to 2% slopes, occasionally flooded, brief duration, Loring silt loam 8 to 12% slopes, east	Source: Web Soil
Surrounding Land Use : Undeveloped, Transmission Line, Commercial	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight ( ) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream

Secondary Indicator Score (if applicable) = 22.5

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =9.75)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 6.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 6.25)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 22.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

21. poison ivy, privet, giant cane, Virginia creeper, observed upstream in thalweg
23. 1-2 found with intense searching
25. 2 water boatman found with intense searching
26. Found a few areas with large clumps of algae
28. 1 patch of OBL Ludwigia palustris

Notes : 1. Bed and bank demarcation observed with 1 medium area of less demarcation

2. ~ 1.2 ratio

3. Several riffle/pools downstream but uniform hydrology upstream with standing water

4. Slightly incised in soil profile downstream, coarse texture sorting downstream with upstream having little sorting and not as incised in profile

6. Bars and benches observed downstream with 1 observed upstream

7. 1 island within braid

8. Some small areas of fresh deposit observed on benches

11. Several large roots and logs acting with some longevity

12. Downstream has sloping into stream (also seen with topo lines), with upstream flat with surroundings

15. Flow observed in riffles downstream and standing pools upstream

16. ~ 20% of the channel is covered in leaf litter

17. Sediment found along margins but not much in thalweg

18. Several drift piles observed along reach, sporadic wrack lines

19. 10YR 5/1

20. Strong network of fibrous roots observed through most of reach

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/16/2020

Named Waterbody: Unnamed	Date/Time: 0830
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : WWC 1
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110103	Lat/Long: From: 35.00349, -89.97050
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 35.00323, -89.97003
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown	
Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Loring silt loam, 2 to 5% slopes, Grenada complex, 5 to 12% slopes, severely erroded	Source: Web Soil
Surrounding Land Use : Undeveloped, Gas pipeline	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight ( ) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		(WWC)
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) =

Justification / Notes : 1 isolated pool with 2 rusted drums in thalweg. Drains upland area to pond

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/16/2020

Named Waterbody: Unnamed	Date/Time: 0900
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : WWC 2
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110301	Lat/Long: From: 35.00298, -89.96989
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 35.00215, -89.97085
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown	
Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Falaya silt loam, Grenada complex, 5 to 12% slopes, severely eroded, Loring silt loam 2 to 5% slopes	Source: Web Soil
Surrounding Land Use : Undeveloped	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate (Slight) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 12.25

Justification / Notes : connects to bermed pond downstream

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4.75)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	(1)	2	3
2. Sinuous channel	0	(1)	2	3
3. In-channel structure: riffle-pool sequences	(0)	1	2	3
4. Sorting of soil textures or other substrate	(0)	1	2	3
5. Active/relic floodplain	(0)	0.5	1	1.5
6. Depositional bars or benches	0	(1)	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	(0)	0.5	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	0	1	(2)	3
11. Grade controls	0	0.5	(1)	1.5
12. Natural valley or drainageway	(0)	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	(No = 0)		Yes = 3	

B. Hydrology (Subtotal = 5.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	(2)	3
15. Water in channel and >48 hours since sig. rain	0	1	(2)	3
16. Leaf litter in channel (January – September)	1.5	1	(0.5)	0
17. Sediment on plants or on debris	0	(0.5)	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5
19. Hydric soils in channel bed or sides of channel	(No = 0)		Yes = 1.5	

C. Biology (Subtotal = 2)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	(0)
21. Rooted plants in the thalweg [1]	3	2	1	(0)
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	0	(1)	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	(1)	1.5
28.Wetland plants in channel bed [2]	(0)	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 1. 1 area upstream has defined bed and bank

2. ~ 1.1

6. 1 bench observed at upstream curve

10. 1 large headcut starts reach from pond

11. Small roots in 4 places and some minor wood acting with short-term longevity

15. 1 isolated pool and bottom of headcut, 2 areas of standing water at upstream fork for about 30ft

16. ~60% leaf litter coverage

17. Sediment found on isolated drift piles

18. Numerous small to medium drift piles throughout reach

20. Strong network of fibrous roots in thalweg

21. Grasses, clovers, poison ivy, privet, observed throughout channel

26. some dried algae crusts observed in 2 small areas

27. Upstream 1/4 of reach has iron floc and oxidizing bacteria from pond seep

14. 1 upstream fork originates from seepage from pond on other side of berm

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/16/2020

Named Waterbody: Unnamed	Date/Time: 1000
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : WWC 3
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110103	Lat/Long: From: 35.00229, -89.97082
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 35.00203, -89.97094
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown	
Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Grenada complex, 5 to 12% slopes, severly eroded, Falaya silt loam	Source: Web Soil
Surrounding Land Use : Undeveloped	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight (Absent)	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		(WWC)
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) =

Justification / Notes : Meeting finger from stream

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/16/2020

Named Waterbody: Unnamed	Date/Time: 1015
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : WWC 4
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110103	Lat/Long: From: 35.00117, -89.97077
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 35.00140, -89.97059
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Grenada complex, 5 to 12% slopes, severely eroded, Falaya silt loam	Source: Web Soil
Surrounding Land Use : Undeveloped	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate (Slight) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 5.25

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4.75)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	(1)	2	3
2. Sinuous channel	0	(1)	2	3
3. In-channel structure: riffle-pool sequences	(0)	1	2	3
4. Sorting of soil textures or other substrate	(0)	1	2	3
5. Active/relic floodplain	(0)	0.5	1	1.5
6. Depositional bars or benches	(0)	1	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	(0)	0.5	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	0	1	(2)	3
11. Grade controls	0	0.5	(1)	1.5
12. Natural valley or drainageway	0	(0.5)	1	1.5
13. At least second order channel on existing USGS or NRCS map	(No = 0)		Yes = 3	

B. Hydrology (Subtotal = 0.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	(0)	1	2	3
15. Water in channel and >48 hours since sig. rain	(0)	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	(0)
17. Sediment on plants or on debris	0	(0.5)	1	1.5
18. Organic debris lines or piles (wrack lines)	0	(0.5)	1	1.5
19. Hydric soils in channel bed or sides of channel	(No = 0)		Yes = 1.5	

C. Biology (Subtotal = 0)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	(0)
21. Rooted plants in the thalweg [1]	3	2	1	(0)
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	(0)	1	2	3
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5
28.Wetland plants in channel bed [2]	(0)	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 5.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 1. Bed and bank not clearly defined except for at the headcut and when it slopes into stream 1

2. ~ 1.1

10. 1 large headcut at beginning of reach

11. 3 areas of medium to large roots acting with moderate longevity

12. Upland slightly slopes towards reach

16. Almost all of channel bed is covered with leaf litter except at headcut

17. Sediment found in 2 small isolated areas

18. 2 drift piles observed at headcut and 1 large root

20. Strong fibrous root network observed

21. Ferns, poison ivy, sycamore, privet, elm found growing in thalweg

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/16/2020

Named Waterbody: Unnamed	Date/Time: 1040
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : WWC 5
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110103	Lat/Long: From: 35.00079, -89.97064
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 35.00131, -89.97052
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Grenada complex, 5 to 12% slopes, severely eroded, Falaya silt loam, Collins silt loam 0 to 2% slopes, occasionally flood, brief duration	Source: Web Soil
Surrounding Land Use : Undeveloped	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate (Slight) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 11.75

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4.5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	(1)	2	3
2. Sinuous channel	(0)	1	2	3
3. In-channel structure: riffle-pool sequences	(0)	1	2	3
4. Sorting of soil textures or other substrate	0	(1)	2	3
5. Active/relic floodplain	(0)	0.5	1	1.5
6. Depositional bars or benches	(0)	1	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	(0)	0.5	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	0	1	(2)	3
11. Grade controls	0	(0.5)	1	1.5
12. Natural valley or drainageway	(0)	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	(No = 0)		Yes = 3	

B. Hydrology (Subtotal = 5.75)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	(2)	3
15. Water in channel and >48 hours since sig. rain	0	1	(2)	3
16. Leaf litter in channel (January – September)	1.5	1	(0.5)	0
17. Sediment on plants or on debris	0	(0.5)	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	(No = 0)		Yes = 1.5	

C. Biology (Subtotal = 1.5)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	(0)
21. Rooted plants in the thalweg [1]	3	2	1	(0)
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5
28.Wetland plants in channel bed [2]	(0)	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 1. Bed and bank observed at breach in berm around pond

4. Small amounts of soil sorting of coarse material

10. 1 large headcut downstream

11. Some small roots at downstream end

14. Overflow from breach in pond berm and 1 seep observed at base of berm

15. Flow observed in surface holes and riffle area

16. ~35% of channel is covered in leaf litter

17. Some sediment observed on minor drift piles

18. Several small debris piles at roots and 2 large piles closer to stream

20. Strong fibrous root network

21. Privet, poison ivy, Japanese honeysuckle, Virginia creeper

26. Dried filamentous algae crusts observed in the first upstream quarter of reach

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/16/2020

Named Waterbody: Unnamed	Date/Time: 1330
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : WWC 6
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110103	Lat/Long: From: 35.00470, -89.96651
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 35.00465, -89.96531
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Loring silt loam, 5 to 12% slopes, severely eroded, Falaya silt loam, Loring silt loam 2 to 5% slopes, Gullied land	Source: Web Soil
Surrounding Land Use : Undeveloped, Gas pipeline	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate (Slight) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 13.25

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 7)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3.25)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 13.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 1. Bed and bank observed through about 40% of reach, 1 area of sheet flow

2. 1.1 ratio

3. most of reach is a run with 2 riffle areas

4. Downstream has some coarse sorting of soil textures, incised in soil profile in 2 places downstream

6. 1 bar and 2 benches

11. A few medium to large roots throughout thalweg acting with moderate longevity

15. 3 isolated pools and 1 area of wet hydrophytic zone

16. ~20% leaf litter coverage

18. Several small debris piles seen throughout reach, 2 areas of wrachlines

20. Strong fibrous root network in most of thalweg

21. Poison ivy, privet, and Virginia creeper observed in reach

26. 1 dried filamentous algae crusts present in sheet flow area

28. 2 small willows

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/15/2020

Named Waterbody: Unnamed	Date/Time: 1400
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : WWC 7
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110103	Lat/Long: From: 34.99940, -89.96956
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 34.99948, -89.96955
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Grenada complex, 5 to 12% slopes, severly eroded, Water	Source: Web Soil
Surrounding Land Use : Undeveloped	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate (Slight) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		(WWC)
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) =

Justification / Notes : Breach in berm from pond 3 connecting to Wetland 2.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/15/2020

Named Waterbody: Unnamed	Date/Time: 1430
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : WWC 8
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110103	Lat/Long: From: 34.99931, -89.96820 To: 34.99967, -89.96816
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Collin silt loam 0 to 2% slopes, occasionally flooded, brief duration, Grenada complex, 5 to 12% slopes, severly eroded	Source: Web Soil
Surrounding Land Use : Undeveloped	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight (Absent)	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		(WWC)
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) =

Justification / Notes : Upland drainage into Stream 1, water was present, some sorting of soil textures. No continuous bed and bank observed, dominated by upland veg. in much of reach.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

04/15/2020

Named Waterbody: Unnamed	Date/Time: 1000
Assessors/Affiliation: V. Thornton QHP-IT, A. Conti QHP-IT / EnSafe Inc.	Project ID : WWC 9
Site Name/Description: MSCAA - E. Holmes Road	
Site Location: Southeast of E. Holmes Road and Swinnea Road, Memphis, TN	
HUC (12 digit): 080102110301	Lat/Long: From: 34.99699, -89.96884
Previous Rainfall (7-days) : 04/08/2020 - 04/14/2020 3.02in	To: 34.99668, -89.96923
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown Source of recent & seasonal precip data : NOAA and Memphis International Airport NOAA Weather Station	
Watershed Size :	County: Shelby County, TN
Soil Type(s) / Geology : Loring silt loam 2 to 5% slopes, Loring silt loam 8 to 12% slopes, eroded, Water	Source: Web Soil
Surrounding Land Use : Undeveloped, Transmission Line	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate (Slight) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	N/A	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	N/A	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 11.75

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 5)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	(1)	2	3
2. Sinuous channel	0	(1)	2	3
3. In-channel structure: riffle-pool sequences	0	(1)	2	3
4. Sorting of soil textures or other substrate	0	(1)	2	3
5. Active/relic floodplain	(0)	0.5	1	1.5
6. Depositional bars or benches	0	(1)	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	(0)	0.5	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	0	(1)	2	3
11. Grade controls	0	(0.5)	1	1.5
12. Natural valley or drainageway	(0)	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	(No = 0)		Yes = 3	

B. Hydrology (Subtotal = 4.5)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	(0)	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	(2)	3
16. Leaf litter in channel (January – September)	1.5	(1)	0.5	0
17. Sediment on plants or on debris	0	0.5	(1)	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5
19. Hydric soils in channel bed or sides of channel	(No = 0)		Yes = 1.5	

C. Biology (Subtotal = 2.25)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	1	(0)
21. Rooted plants in the thalweg [1]	3	(2)	1	0
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	(0)	1	2	3
27. Iron oxidizing bacteria/fungus	0	(0.5)	1	1.5
28.Wetland plants in channel bed [2]	(0)	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : 1. Majority of channel has obvious interruptions

2. ~ 1:1.1

3. Mostly uniform with 1-2 spots of hydrologic diversity

4. Not incised in soil profile, has some sorting of coarse materials from fines

6. 1 bar and 1 small bench observed throughout reach

10. 1 small headcut observed

11. A few small temporary grade controls seen

15. Water throughout reach but flow seen in only 1 spot

16. less than 20% leaf litter

17. Sediment observed in isolated areas on drift piles and plants

18. Drift piles found throughout reach and sporadic patches of wrack lines

19. 10YR3/4

20. Strong network of fibrous roots in channel

21. Some upland plants rooted in thalweg (Geum candadense, Sambucus canadensis)

27. 1 patch of iron oxidizing bacteria observed in reach

Calculation of Normal Weather Conditions per Tennessee Department of Environmental Conservation Protocol Shelby County, Tennessee									
		Long-Term Rainfall Records			Actual Rainfall Memphis International Airport Weather Station (NOAA)	Condition (dry, wet, normal)	Condition Value	Month Weight Value	Product of Previous Two Columns
	Month	Minus One Std. Dev. (DRY)	Normal (Mean Inches)	Plus One Std. Dev. (WET)					
1st Prior Month	March 2020	2.96 (σ = 2.08)	5.04	7.12 (σ = 2.08)	9.41	Wet	3	X3	9
2nd Prior Month	February 2020	1.98 (σ = 2.28)	4.26	6.54 (σ = 2.28)	6.34	Normal	2	X2	4
3rd Prior Month	January 2020	1.51 (σ = 2.85)	4.36	7.21 (σ = 2.85)	6.44	Normal	2	X1	2
								Sum =	**15**

If sum is:	
6-9	The prior period has been drier than normal
10-14	The prior period has been normal
15-18	The prior period has been wetter than normal

Condition Value:	
Dry =	1
Normal =	2
Wet =	3

Conclusions: Previous 3-month period has had wetter than normal precipitation. Actual precipitation data from Memphis International Airport Weather Station and 30-year normal precipitation data for Shelby County, Tennessee, from the National Weather Service NOAA Online Weather Data; local monthly precipitation standard deviations for the previous 3 months from the NOAA Research Physical Sciences Division for Shelby County, Tennessee (https://www.esrl.noaa.gov/psd/).

Precipitation Summary, April 01 through April 14, 2020 Memphis International Airport Weather Station	
Date	**Precipitation (inches)**
04/01/2020	0
04/02/2020	0
04/03/2020	0
04/04/2020	0
04/05/2020	0
04/06/2020	0
04/07/2020	0.18
04/08/2020	0
04/09/2020	0
04/10/2020	0
04/11/2020	0.29
04/12/2020	2.60
04/13/2020	0.13
04/14/2020	0
Total	**3.20**

Source: Memphis International Airport weather station, approximately 1.00 mile north of the property.

30-Year Precipitation Averages for April for Shelby County, Tennessee (Closest NOAA data to the site; Memphis International Airport)	
Metric	**Value (inches)**
Mean	5.57
Standard Deviation	2.96

Source: https://www.esrl.noaa.gov

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-15-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: WET 1

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 34.997631 Long: -89.965395 Datum: NAD83

Soil Map Unit Name: Collins silt loam, 0-2% slopes, occasionally flooded, brief duration NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland 1 is a comprised mostly of a 60/40 wetland/upland mosaic; there is an offshoot drainageway from Pond 5 into Wetland 1 that is excluded from the mosaic. See Figures 6 and 7 for geographic representation of wetlands and other onsite aquatic resources.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 3
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 2

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:
Hydrologic input is received from Stream 1 to the south and Pond 5 to the east. Throughout the wetland, Stream 1 completely loses is morphology and dissipates into overland surface water flow as it drains in a northwesterly direction and eventually regains stream morphology before flowing out of the forested area as Stream 1. Approximately 1.14 acres is wetland/upland mosaic area, while 0.47 acres that is fed by drainage from Pond 5 is true wetland.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WET 1

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	35	Yes	FAC
2. *Liquidambar styraciflua*	25	Yes	FAC
3. *Ulmus americana*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
	70	=Total Cover	
50% of total cover: 35		20% of total cover: 14	
Sapling/Shrub Stratum (Plot size: r = 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Herb Stratum (Plot size: r = 5')			
1. *Carex blanda*	10	Yes	FAC
2. *Juncus coriaceus*	10	Yes	FACW
3. *Lonicera japonica*	5	No	FACU
4. *Parthenocissus quinquefolia*	5	No	FACU
5. *Rosa multiflora*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35	=Total Cover	
50% of total cover: 18		20% of total cover: 7	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WET 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/1	100					Loamy/Clayey	roots present
3-11	10YR 4/6	70	10YR 6/4	20	C	M		Distinct redox concentrations
			10YR 5/1	10	C	M		Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric matrix present in the top 3 inches below ground surface.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-15-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: WET 2

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): sloped Local relief (concave, convex, none): none Slope (%): 0-12

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 34.999768 Long: -89.969078 Datum: NAD83

Soil Map Unit Name: Co & GgD3 (see remarks) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland 2 exhibits drainage patterns indicative of periods of overland sheet flow though most of its area, except for an upland "island" area.
Hydrologic input received via seepage through the Pond 3 containment berm upgradient of Wetland 2.
Co = Collins silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration
GgD3 = Grenada complex, 5 to 12 percent slopes, severely eroded

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- X Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 3
Water Table Present?	Yes X	No ____	Depth (inches): 2
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 2

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:
Hydrology is fed by seepage through pond berm upgradient of Wetland 2 (D2). Perched water table (A2) observed is likely from shallow surface water around data collection point filling the soil pit. B9: Few leaves present.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WET 2

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	35	Yes	FAC
2. *Ligustrum sinense*	25	Yes	FAC
3. *Prunus serotina*	10	No	FACU
4.			
5.			
6.			
7.			
8.			
	70	=Total Cover	
50% of total cover: 35		20% of total cover:	14

Sapling/Shrub Stratum (Plot size: r = 15')			
1. *Ulmus americana*	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	15	=Total Cover	
50% of total cover: 8		20% of total cover:	3

Herb Stratum (Plot size: r = 5')			
1. *Parthenocissus quinquefolia*	40	Yes	FACU
2. *Ligustrum sinense*	10	No	FAC
3. *Toxicodendron radicans*	10	No	FAC
4. *Rubus argutus*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	65	=Total Cover	
50% of total cover: 33		20% of total cover:	13

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WET 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	65	10YR 4/1	20	C	M	Mucky Loam/Clay	mucky
			10YR 4/6	15	C	M		Prominent redox concentrations
2-12	10YR 5/6	60	10YR 5/1	30	C	M	Loamy/Clayey	Prominent redox concentrations
			10YR 3/6	10	C	M		Faint redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- X 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric matrix present in the top 3 inches below ground surface.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-16-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: WET 3

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): flat area near toe of slope Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.004463 Long: -89.966759 Datum: NAD83

Soil Map Unit Name: Loring silt loam, 5 to 12 percent slopes, severely eroded NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland 3 is a low-lying, mostly flat area just south of the toe of a slope that rises up to the gas pipeline easement cleared area; the wetland drains eastward into WWC 6.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- X Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 2

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:
D2: Drains into a linear non-water of the United States. D3: hard cap at 9 inches; possibly concrete from historical foundation.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WET 3

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Diospyros virginiana*	40	Yes	FAC
2. *Liquidambar styraciflua*	35	Yes	FAC
3. *Ulmus americana*	25	Yes	FAC
4. *Liquidambar styraciflua*	20	No	FAC
5.			
6.			
7.			
8.			
	120	=Total Cover	
50% of total cover: 60		20% of total cover:	24

Sapling/Shrub Stratum (Plot size: r = 15')			
1. *Diospyros virginiana*	15	Yes	FAC
2. *Quercus nigra*	15	Yes	FAC
3. *Ligustrum sinense*	10	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	40	=Total Cover	
50% of total cover: 20		20% of total cover:	8

Herb Stratum (Plot size: r = 5')			
1. *Smilax rotundifolia*	10	Yes	FAC
2. *Diospyros virginiana*	3	Yes	FAC
3. *Ulmus americana*	3	Yes	FAC
4. *Cyperus pseudovegetus*	2	No	FACW
5. *Persicaria maculosa*	2	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	=Total Cover	
50% of total cover: 10		20% of total cover:	4

Woody Vine Stratum (Plot size: r = 30')			
1. *Smilax rotundifolia*	30	Yes	FAC
2.			
3.			
4.			
5.			
	30	=Total Cover	
50% of total cover: 15		20% of total cover:	6

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 10 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WET 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 5/1	85	10YR 5/6	15	C	M	Loamy/Clayey	few roots and organic debris present
2-9	10YR 5/4	75	10YR 5/1	15	C	M	Loamy/Clayey	Distinct redox concentrations
			10YR 3/4	10	C	M		Faint redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Unkown (concrete?)

Depth (inches): 9

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Possible historical building foundations may be present around this area.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-16-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: WET 4

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): 2-5

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.001613 Long: -89.964715 Datum: NAD83

Soil Map Unit Name: Gs and MeB2 (see remarks) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Gs = Gullied land, silty (udorthent, silty)
MeB2 = Memphis silt loam, 2 to 5 percent slopes, moderately eroded, northern phase
Wetland 4 is a 60/40 wetland/upland mosaic immediately upgradient of and adjacent to the inception of a Stream 2. Surface water observed in less than 50 percent of the wetland, and drainage patterns indicate times of overland sheet flow.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)	____ Aquatic Fauna (B13)	____ Surface Soil Cracks (B6)
X High Water Table (A2)	____ Marl Deposits (B15) **(LRR U)**	____ Sparsely Vegetated Concave Surface (B8)
X Saturation (A3)	____ Hydrogen Sulfide Odor (C1)	X Drainage Patterns (B10)
____ Water Marks (B1)	____ Oxidized Rhizospheres on Living Roots (C3)	____ Moss Trim Lines (B16)
____ Sediment Deposits (B2)	____ Presence of Reduced Iron (C4)	____ Dry-Season Water Table (C2)
____ Drift Deposits (B3)	____ Recent Iron Reduction in Tilled Soils (C6)	____ Crayfish Burrows (C8)
____ Algal Mat or Crust (B4)	____ Thin Muck Surface (C7)	____ Saturation Visible on Aerial Imagery (C9)
____ Iron Deposits (B5)	____ Other (Explain in Remarks)	X Geomorphic Position (D2)
____ Inundation Visible on Aerial Imagery (B7)		____ Shallow Aquitard (D3)
X Water-Stained Leaves (B9)		X FAC-Neutral Test (D5)
		____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 2
Water Table Present?	Yes X	No ____	Depth (inches): 1
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 12

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:
Wetland 4 is a 60/40 wetland/upland mosaic immediately upgradient of and adjacent to the inception of a Stream 2. Surface water observed in less than 50% of the area. Wetland 4 drains into Stream 2.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WET 4

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus americana*	55	Yes	FAC
2. *Quercus nigra*	25	Yes	FAC
3. *Ulmus americana*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
	90	=Total Cover	
50% of total cover: 45		20% of total cover:	18
Sapling/Shrub Stratum (Plot size: r = 15')			
1. *Ulmus americana*	20	Yes	FAC
2. *Ligustrum sinense*	10	Yes	FAC
3. *Quercus rubra*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
	35	=Total Cover	
50% of total cover: 18		20% of total cover:	7
Herb Stratum (Plot size: r = 5')			
1. *Styrax americanus*	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	5	=Total Cover	
50% of total cover: 3		20% of total cover:	1
Woody Vine Stratum (Plot size: r = 30')			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)
Prevalence Index = B/A =	

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WET 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 5/1	100					Loamy/Clayey	Topped with organic debris
3-8	10YR 6/1	60	10YR 5/6	40	C	M	Loamy/Clayey	Prominent redox concentrations
8-12	10YR 6/1	50	10YR 5/6	25	C	M	Loamy/Clayey	Prominent redox concentrations
			10YR 3/3	20	C	M		Distinct redox concentrations
			10YR 2/2	5	C	M		Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- X Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-16-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: WET 5

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): drainageway Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.001480 Long: -89.964156 Datum: NAD 83

Soil Map Unit Name: Fm and Gs (see remarks) NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
Fm = Falaya silt loam
Gs = Gullied land, silty (udorthent, silty)
Wetland 5 is a winding drainageway, very narrow at some portions of its length, that drains into Stream 3. There is a shallowly-ponded depressional area where the data was collected.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- X Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches): 6
Water Table Present?	Yes X	No	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 12

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:
Water table observed is likely seepage from surrounding surface water into soil pit.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WET 5

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus americana*	40	Yes	FAC
2. *Liquidambar styraciflua*	25	Yes	FAC
3. *Quercus nigra*	15	No	FAC
4.			
5.			
6.			
7.			
8.			
	80	=Total Cover	
50% of total cover: 40	20% of total cover: 16		
Sapling/Shrub Stratum (Plot size: r = 15')			
1. *Ulmus americana*	25	Yes	FAC
2. *Ligustrum sinense*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	35	=Total Cover	
50% of total cover: 18	20% of total cover: 7		
Herb Stratum (Plot size: r =5')			
1. *Campsis radicans*	15	Yes	FAC
2. *Lonicera japonica*	10	Yes	FACU
3. *Ligustrum sinense*	5	No	FAC
4. *Smilax rotundifolia*	5	No	FAC
5. *Toxicodendron radicans*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	=Total Cover	
50% of total cover: 20	20% of total cover: 8		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)
Prevalence Index = B/A =		

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WET 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/1	85	10YR 6/2	15	C	M		Distinct redox concentrations
3-12	10YR 6/2	55	10YR 4/6	25	C	M		Prominent redox concentrations
			10YR 3/3	15	C	M		Distinct redox concentrations
			10YR 3/2	5	C	M		Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- X Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-16-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: WET 6

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): drainageway Local relief (concave, convex, none): none Slope (%):

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.002069 Long: -89.963553 Datum: NAD 83

Soil Map Unit Name: Falaya silt loam NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland 6 exhibits numerous scattered puddles of shallow surface water and mucky surface soil within a drainageway area where Stream 3 completely loses its morphology througout this wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- X Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 12

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WET 6

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus americana*	60	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	60	=Total Cover	
50% of total cover: 30		20% of total cover:	12
Sapling/Shrub Stratum (Plot size: r = 15')			
1. *Cayra glabra*	30	Yes	FACU
2. *Ligustrum sinense*	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	50	=Total Cover	
50% of total cover: 25		20% of total cover:	10
Herb Stratum (Plot size: r =5')			
1. *Smilax rotundifolia*	10	Yes	FAC
2. *Acer negundo*	5	Yes	FAC
3. *Ligustrum sinense*	5	Yes	FAC
4. *Lonicera japonica*	5	Yes	FACU
5. *Parthenocissus quinquefolia*	5	Yes	FACU
6. *Chasmanthium latifolium*	3	No	FAC
7. *Galium aparine*	2	No	FACU
8. *Carex blanda*	1	No	FAC
9.			
10.			
11.			
12.			
	36	=Total Cover	
50% of total cover: 18		20% of total cover:	8
Woody Vine Stratum (Plot size: r = 30')			
1. *Parthenocissus quinquefolia*	5	Yes	FACU
2.			
3.			
4.			
5.			
	5	=Total Cover	
50% of total cover: 3		20% of total cover:	1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 55.6% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)
Prevalence Index = B/A =	

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WET 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/1	100					Loamy/Clayey	
3-10	10YR 5/2	70	10YR 3/4	25	C	M	Loamy/Clayey	Distinct redox concentrations
			10YR 2/2	5	C	M		Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- X Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-16-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: WET 6

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): drainageway Local relief (concave, convex, none): none Slope (%):

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.003052 Long: -89.963711 Datum: NAD 83

Soil Map Unit Name: Falaya silt loam and Gullied land, silty (udorthent, silty) NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
Wetland 7 exhibits numerous scattered puddles of shallow surface water and mucky surface soil within a drainageway area where Stream 3 completely loses its morphology througout this wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- X Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15) **(LRR U)**
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- X Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches): 1
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 12

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WET 6

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	30 =Total Cover		
50% of total cover: 15	20% of total cover: 6		
Sapling/Shrub Stratum (Plot size: r = 15')			
1. *Ligustrum sinense*	35	Yes	FAC
2. *Ulmus americana*	30	Yes	FAC
3. *Acer negundo*	25	Yes	FAC
4. *Carya glabra*	15	No	FACU
5. *Quercus nigra*	5	No	FAC
6.			
7.			
8.			
	110 =Total Cover		
50% of total cover: 55	20% of total cover: 22		
Herb Stratum (Plot size: r =5')			
1. *Lonicera japonica*	30	Yes	FACU
2. *Ligustrum sinense*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40 =Total Cover		
50% of total cover: 20	20% of total cover: 8		
Woody Vine Stratum (Plot size: r = 30')			
1. *Toxicodendron radicans*	15	Yes	FAC
2.			
3.			
4.			
5.			
	15 =Total Cover		
50% of total cover: 8	20% of total cover: 3		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WET 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					Loamy/Clayey	Mucky, roots present
3-6	10YR 3/1	100					Loamy/Clayey	
6-12	10YR 5/1	50	10YR 3/4	30	C	M	Loamy/Clayey	Distinct redox concentrations
			10YR 4/6	20	C	M		Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- X Iron-Manganese Masses (F12) **(LRR O, P, T)**
- X Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-15-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: WET 9

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 34.9969967 Long: -89.9688007 Datum: NAD83

Soil Map Unit Name: Loring silt loam, 8 to 12 percent slopes, eroded NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	

Remarks:
Wetland 9 is a depressional feature with ponded surface water observed. Wetland 9 drains at the western end into a linear non-WOTUS that subsequently drains into Wetland 10.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches): 3
Water Table Present?	Yes X	No	Depth (inches): 2
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 12

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WET 9

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	45	Yes	FAC
2. *Populus deltoides*	15	Yes	FAC
3. *Quercus nigra*	15	Yes	FAC
4. *Ulmus americana*	15	Yes	FAC
5.			
6.			
7.			
8.			
	90	=Total Cover	
50% of total cover: 45		20% of total cover: 18	
Sapling/Shrub Stratum (Plot size: r = 15')			
1. *Quercus nigra*	20	Yes	FAC
2. *Ligustrum sinense*	10	Yes	FAC
3. *Carya glabra*	5	No	FACU
4. *Diospyros virginiana*	5	No	FAC
5.			
6.			
7.			
8.			
	40	=Total Cover	
50% of total cover: 20		20% of total cover: 8	
Herb Stratum (Plot size: r = 5')			
1. *Chasmanthium latifolium*	40	Yes	FAC
2. *Geum canadense*	5	No	FAC
3. *Ligustrum sinense*	5	No	FAC
4. *Lonicera japonica*	5	No	FACU
5. *Parthenocissus quinquefolia*	5	No	FACU
6. *Sambucus canadensis*	5	No	FAC
7. *Liquidambar styraciflua*	3	No	FAC
8. *Galium aparine*	2	No	FACU
9. *Toxicodendron radicans*	2	No	FAC
10.			
11.			
12.			
	72	=Total Cover	
50% of total cover: 36		20% of total cover: 15	
Woody Vine Stratum (Plot size: r = 30')			
1. *Toxicodendron radicans*	15	Yes	FAC
2.			
3.			
4.			
5.			
	15	=Total Cover	
50% of total cover: 8		20% of total cover: 3	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WET 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 5/2	85	5YR 4/6	10	C	M	Loamy/Clayey	Prominent redox concentrations
			7.5YR 5/8	5	C	PL		Prominent redox concentrations
2-12	10YR 5/6	83	7.5YR 5/6	12	C	M	Loamy/Clayey	Faint redox concentrations
			10YR 5/1	5	C	M		Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-15-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: WET 10

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): depression & linear drainageway Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 34.996614 Long: -89.969313 Datum: NAD83

Soil Map Unit Name: Water NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No	**Is the Sampled Area**
Hydric Soil Present?	Yes X No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X No	

Remarks:
Wetland 10 is a depressional area that receives hydrologic input at its eastern end from a linear non-WOTUS, traversing through a low-elevation or breached point in a berm, and extending westward beyond the berm as a narrow drainageway that connects to Stream 5.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 6
Water Table Present?	Yes X	No ___	Depth (inches): 3
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 15

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WET 10

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	25	Yes	FAC
2. *Platanus occidentalis*	20	Yes	FACW
3. *Quercus nigra*	15	Yes	FAC
4. *Ulmus americana*	15	Yes	FAC
5. *Ligustrum sinense*	10	No	FAC
6. *Liquidambar styraciflua*	10	No	FAC
7. *Carya glabra*	5	No	FACU
8.			
	100	=Total Cover	
50% of total cover: 50	20% of total cover: 20		
Sapling/Shrub Stratum (Plot size: r = 15')			
1. *Ligustrum sinense*	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	15	=Total Cover	
50% of total cover: 8	20% of total cover: 3		
Herb Stratum (Plot size: r = 5')			
1. *Microstegium vimineum*	60	Yes	FAC
2. *Parthenocissus quinquefolia*	30	Yes	FACU
3. *Carex blanda*	15	No	FAC
4. *Rosa multiflora*	12	No	FACU
5. *Parthenocissus quinquefolia*	5	No	FACU
6. *Rubus argutus*	3	No	FAC
7. *Galium aparine*	2	No	FACU
8.			
9.			
10.			
11.			
12.			
	127	=Total Cover	
50% of total cover: 64	20% of total cover: 26		
Woody Vine Stratum (Plot size: r = 30')			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WET 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 5/1	80	10YR 5/6	20	C	M	Loamy/Clayey	Prominent redox concentrations
6-15	10YR 4/1	85	10YR 5/8	10	C	M		Prominent redox concentrations
			10YR 5/4	5	C	M		Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-15-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: UPL 1

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 34.997306 Long: -89.965413 Datum: NAD83

Soil Map Unit Name: Collins silt loam, 0-2% slopes, occasionally flooded, brief duration NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Upland 1 is taken within the 60/40 wetland/upland mosaic area of Wetland 1, to confirm that upland soil conditions exist within the mosaic area. See Figures 6 and 7 for geographic representation of Wetland 1 mosaic area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: UPL 1

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus americana*	5	Yes	FAC
2. *Acer rubrum*	10	Yes	FAC
3. *Pyrus calleryana*	10	Yes	UPL
4.			
5.			
6.			
7.			
8.			
	25	=Total Cover	
50% of total cover: 13	20% of total cover: 5		

Sapling/Shrub Stratum (Plot size: r = 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:	20% of total cover:		

Herb Stratum (Plot size: r = 5')			
1. *Carex blanda*	15	Yes	FAC
2. *Smilax rotundifolia*	5	Yes	FAC
3. *Parthenocissus quinquefolia*	3	No	FACU
4. *Ulmus americana*	2	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25	=Total Cover	
50% of total cover: 13	20% of total cover: 5		

Woody Vine Stratum (Plot size: r = 30')			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 5/3	70	10YR 5/1	20	C	M	Loamy/Clayey	
			10YR 4/4	10	C	M		Faint redox concentrations
2-12	10YR 4/3	78	10YR 6/3	10	C	M	Loamy/Clayey	Faint redox concentrations
			10YR 3/4	10	C	M		Faint redox concentrations
			10YR 5/1	3	C	M		Distinct redox concentrations
			10YR 2/2	2	C	M		Faint redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-15-20

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: UPL 2

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): sloped Local relief (concave, convex, none): convex Slope (%): 5-12

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 34.99971 Long: -89.969186 Datum: NAD83

Soil Map Unit Name: Grenada complex, 5 to 12 percent slopes, severely eroded NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland 2 data was collected at an upland "island" mound within Wetland 2 area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:
Upland 2 data was collected at an upland "island" within Wetland 2 area; as such, there is hydrology nearby (i.e., throughout Wetland 2) that is not applicable to the upland "island" area. See Wetland 2 Data Form for additional details.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UPL 2

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ligustrum sinense*	70	Yes	FAC
2. *Liquidambar styraciflua*	25	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	95 =Total Cover		
50% of total cover: 48	20% of total cover: 19		

Sapling/Shrub Stratum (Plot size: r = 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Herb Stratum (Plot size: r = 5')			
1. *Parthenocissus quinquefolia*	25	Yes	FACU
2. *Ligustrum sinense*	5	No	FAC
3. *Carex blanda*	3	No	FAC
4. *Acer rubrum*	2	No	FAC
5. *Galium aparine*	2	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	37 =Total Cover		
50% of total cover: 19	20% of total cover: 8		

Woody Vine Stratum (Plot size: r = 30')			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)
Prevalence Index = B/A =	

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: UPL 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/3	70	10YR 4/6	30	C	M		Distinct redox concentrations
4-12	10YR 4/6	85	10YR 3/3	15	C	M		Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Possibly fill material present within the upland "island" area.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-16-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: UPL 3

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%):

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.0028964 Long: -89.9700026 Datum: NAD83

Soil Map Unit Name: Grenada complex, 5 to 12 percent slopes, severely eroded NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes X	No	

Remarks:
Data was collected at Upland 3 to investigate the potential presence/absence of hydric soil between 2 linear non-waters of the U.S. that receive hydrology from seepage / overflow from a berm that containing Pond 1 surface water. Hydric soil not observed at Upland 3.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- X Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15) **(LRR U)**
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches): 1
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 10

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: UPL 3

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus americana*	50	Yes	FAC
2. *Liquidambar styraciflua*	30	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	80	=Total Cover	
50% of total cover: 40		20% of total cover:	16

Sapling/Shrub Stratum (Plot size: r = 30')			
1. *Ligustrum sinense*	10	Yes	FAC
2. *Quercus falcata*	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	20	=Total Cover	
50% of total cover: 10		20% of total cover:	4

Herb Stratum (Plot size: r = 5')			
1. *Chasmanthium latifolium*	10	Yes	FAC
2. *Ligustrum sinense*	5	Yes	FAC
3. *Smilax rotundifolia*	5	Yes	FAC
4. *Carya glabra*	3	No	FACU
5. *Lonicera japonica*	3	No	FACU
6. *Solidago gigantea*	3	No	FACW
7. *Galium aparine*	2	No	FACU
8. *Myosotis macrosperma*	2	No	FAC
9. *Quercus falcata*	2	No	FACU
10. *Rubus argutus*	2	No	FAC
11.			
12.			
	37	=Total Cover	
50% of total cover: 19		20% of total cover:	8

Woody Vine Stratum (Plot size: r = 30')			
1. *Parthenocissus quinquefolia*	5	Yes	FACU
2. *Vitis rotundifolia*	5	Yes	FAC
3.			
4.			
5.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover:	2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 77.8% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 4/6	45	10YR 6/1	40	C	M		Prominent redox concentrations
			10YR 3/6	15	C	M		Faint redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: roots

Depth (inches): 10

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-16-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: UPL 4

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%):

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.004842 Long: -89.965499 Datum: NAD83

Soil Map Unit Name: Gullied land, silty (udorthent, silty) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes X	No	

Remarks:
Data was collected at Upland 4 to investigate the potential presence/absence of hydric soil due to observation in the field of a puddle (approximately 10' x 10') that drains into a nearby linear non-water of the U.S. Hydric soil not observed at Upland 4.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- X Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15) **(LRR U)**
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes X No Depth (inches): 3

Water Table Present? Yes No X Depth (inches):

Saturation Present? Yes No X Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:
There is a small (10' x 10') puddle next to Upland 4 data collection point that drains into linear non-water of the U.S.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: UPL 4

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pyrus calleryana*	30	Yes	UPL
2. *Populus deltoides*	25	Yes	FAC
3. *Liquidambar styraciflua*	20	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	75	=Total Cover	
50% of total cover: 38		20% of total cover:	15
Sapling/Shrub Stratum (Plot size: r = 15')			
1. *Ulmus americana*	30	Yes	FAC
2. *Diospyros virginiana*	20	Yes	FAC
3. *Carya glabra*	15	No	FACU
4. *Styrax americanus*	15	No	FACW
5.			
6.			
7.			
8.			
	80	=Total Cover	
50% of total cover: 40		20% of total cover:	16
Herb Stratum (Plot size: r = 5')			
1. *Ligustrum sinense*	20	Yes	FAC
2. *Carex blanda*	5	No	FAC
3. *Lonicera japonica*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	=Total Cover	
50% of total cover: 15		20% of total cover:	6
Woody Vine Stratum (Plot size: r = 30')			
1. *Lonicera japonica*	15	Yes	FACU
2.			
3.			
4.			
5.			
	15	=Total Cover	
50% of total cover: 8		20% of total cover:	3

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71.4% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 3/3	60	10YR 3/1	40	C	M	Loamy/Clayey	Faint redox concentrations
1-5	10YR 3/3		10YR 4/2	10	C	M	Loamy/Clayey	Faint redox concentrations
		60	10YR 2/1	35	C	M		Faint redox concentrations
5-11	10YR 5/6		10YR 5/2	35	C	PL	Loamy/Clayey	Prominent redox concentrations
			10YR 5/1	5				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-16-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: UPL 5

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%):

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 35.001973 Long: -89.964461 Datum: NAD83

Soil Map Unit Name: Gullied land, silty (udorthent, silty) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: UPL 5

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Cornus florida*	20	Yes	UPL
2. *Juniperus virginiana*	20	Yes	FACU
3. *Pyrus calleryana*	20	Yes	UPL
4. *Ulmus alata*	15	Yes	FACU
5.			
6.			
7.			
8.			
	75	=Total Cover	
50% of total cover: 38		20% of total cover:	15
Sapling/Shrub Stratum (Plot size: r = 15')			
1. *Carya illinoinensis*	10	Yes	FACU
2. *Ilex vomitoria*	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	15	=Total Cover	
50% of total cover: 8		20% of total cover:	3
Herb Stratum (Plot size: r = 5')			
1. *Polytrichum commune*	50	Yes	UPL
2. *Lespedeza cuneata*	10	No	FACU
3. *Polystichum acrostichoides*	10	No	FACU
4. *Ligustrum sinense*	5	No	FAC
5. *Lonicera japonica*	5	No	FACU
6. *Parthenocissus quinquefolia*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	85	=Total Cover	
50% of total cover: 43		20% of total cover:	17
Woody Vine Stratum (Plot size: r = 30')			
1. *Lonicera japonica*	10	Yes	FACU
2.			
3.			
4.			
5.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover:	2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 12.5% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	7.5YR 3/2	100					Loamy/Clayey	
1-3	10YR 4/3	100					Loamy/Clayey	
3-12	10YR 4/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: East Holmes Road and Swinnea Road City/County: Memphis, Shelby County Sampling Date: 4-15-2020

Applicant/Owner: Memphis - Shelby County Airport Authority State: TN Sampling Point: UPL 6

Investigator(s): Aaron Conti, Velita Thornton Section, Township, Range:

Landform (hillside, terrace, etc.): berm Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 34.996679 Long: -89.969516 Datum: NAD83

Soil Map Unit Name: Water NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No X**
Wetland Hydrology Present?	Yes	No X	

Remarks:
Upland 6 was taken as an upland reference data point for Wetland 9, on top of a berm that nearly bisects Wetland 9.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
NWI, NRCS Soil Survey, USGS, ESRI, Google Earth

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UPL 6

Tree Stratum (Plot size: r = 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	35	Yes	FAC
2. *Ulmus americana*	15	Yes	FAC
3. *Quercus michauxii*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
	60	=Total Cover	
50% of total cover: 30		20% of total cover:	12
Sapling/Shrub Stratum (Plot size: r = 15')			
1. *Ligustrum sinense*	10	Yes	FAC
2. *Ulmus americana*	10	Yes	FAC
3. *Quercus nigra*	10	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	30	=Total Cover	
50% of total cover: 15		20% of total cover:	6
Herb Stratum (Plot size: r = 5')			
1. *Podophyllum peltatum*	45	Yes	FACU
2. *Parthenocissus quinquefolia*	25	Yes	FACU
3. *Toxicodendron radicans*	20	Yes	FAC
4. *Lonicera japonica*	5	No	FACU
5. *Galium aparine*	3	No	FACU
6. *Acer negundo*	2	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
	100	=Total Cover	
50% of total cover: 50		20% of total cover:	20
Woody Vine Stratum (Plot size: r = 30')			
1. *Toxicodendron radicans*	15	Yes	FAC
2. *Parthenocissus quinquefolia*	5	Yes	FACU
3.			
4.			
5.			
	20	=Total Cover	
50% of total cover: 10		20% of total cover:	4

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 70.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 5/4	83	10YR 3/2	10	C	M	Loamy/Clayey	Distinct redox concentrations
			10YR 5/3	5	C	M		Faint redox concentrations
			10YR 5/8	2	C	M		Prominent redox concentrations
2-10	10YR 5/6	92	10YR 3/3	5	C	M	Loamy/Clayey	Distinct redox concentrations
			10YR 2/2	3	C	M		Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Roots and organic debris present in top layer (0-2"). Berm may be historically constructed from fill material.

Attachment C
Photo Log

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 1: Photo of wet weather conveyance (WWC) 1, facing north. (35.003335°, -89.970269°)

Photo 2: Photo of pond 1, facing north. (35.002988°, -89.969974°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 3: Overview of WWC 2 (and Upland 3 data point), taken from the Pond 1 south berm, facing south. (35.002988°, -89.969974°)

Photo 4: Overview of WWC 3, facing south. (35.002716°, -89.970382°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 5: Representative overview photo of Stream 1, facing northwest. (35.001349°, -89.970553°)

Photo 6: Overview of WWC 4, facing north. (35.001296°, -89.970704°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 7: Overview of Pond 2, which drains via a seep into WWC 5, facing south. (35.000748°, -89.970652°)

Photo 8: Overview of WWC 5, facing north. (35.001265°, -89.970543°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 9: View of breach in Pond 3 berm, which drains into WWC 7, facing south. (34.99942°, -89.969566°)

Photo 10: Overview of WWC 7, which receives drainage from Pond 3 breach, facing west (34.999476°, -89.969582°).

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 11: Overview of Wetland 2, which receives drainage from WWC 7 and drains into Stream 1, facing south. (34.99977°, -89.969094°)

Photo 12: Overview of upland "island" (Upland 2) within Wetland 2, facing south. (34.999704°, -89.969185°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 13: Representative view of WWC 8, facing west. (34.999498°, -89.96831°)

Photo 14: Overview of Wetland 1, a mostly 60%/40% wetland/upland mosaic wetland, facing south. Wetland 1 is located within a drainageway absent of stream morphology. (34.99763°, -89.965424°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 15: Overview of Upland 1, taken within the wetland/upland mosaic area, facing south. (34.997301°, -89.965408°)

Photo 16: Overview of Wetland 3, facing north. (35.004463°, -89.96676°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 17: Representative view of WWC 6, facing east. (35.004929°, -89.966132°)

Photo 18: Overview of Upland 4, adjacent to a small puddle (left) near WWC 6, facing southeast. (35.004841°, -89.965494°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 19: Overview of Wetland 4, a 60%/40% wetland/upland mosaic wetland, which drains into Stream 2, facing north. (35.001611°, -89.964722°)

Photo 20: Representative view of Stream 2 flowing out of the forested area, facing south. (35.005294°, -89.964738°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 21: Overview of Wetland 5, which drains into Stream 3, facing east. (35.001478°, -89.964156°)

Photo 22: View of Stream 3 gaining morphology between Wetlands 5 and 6, facing south. (35.001614°, -89.963828°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
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Photo 23: Overview of Wetland 6, in a drainageway lacking stream morphology, facing south. (35.002064°, -89.963546°)

Photo 24: Overview of Wetland 7, a geomorphically-positioned drainageway lacking stream morphology, facing north. (35.00305°, -89.963707°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
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Photo 25: View of Stream 4, which receives drainage from Streams 2 and 3, facing south. (35.005933°, -89.965021°)

Photo 26: Overview of Wetland 9, which drains into WWC 9, facing east. (34.996997°, -89.968798°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
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Photo 27: Representative view of WWC 9, facing east. (34.996751°, -89.969106°)

Photo 28: View of Wetland 10, which drains into Stream 5, facing east. (34.996613°, -89.969307°)

Photo 29: View of the berm (Upland 6) bisected by Wetland 10. (34.996672°, -89.969509°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
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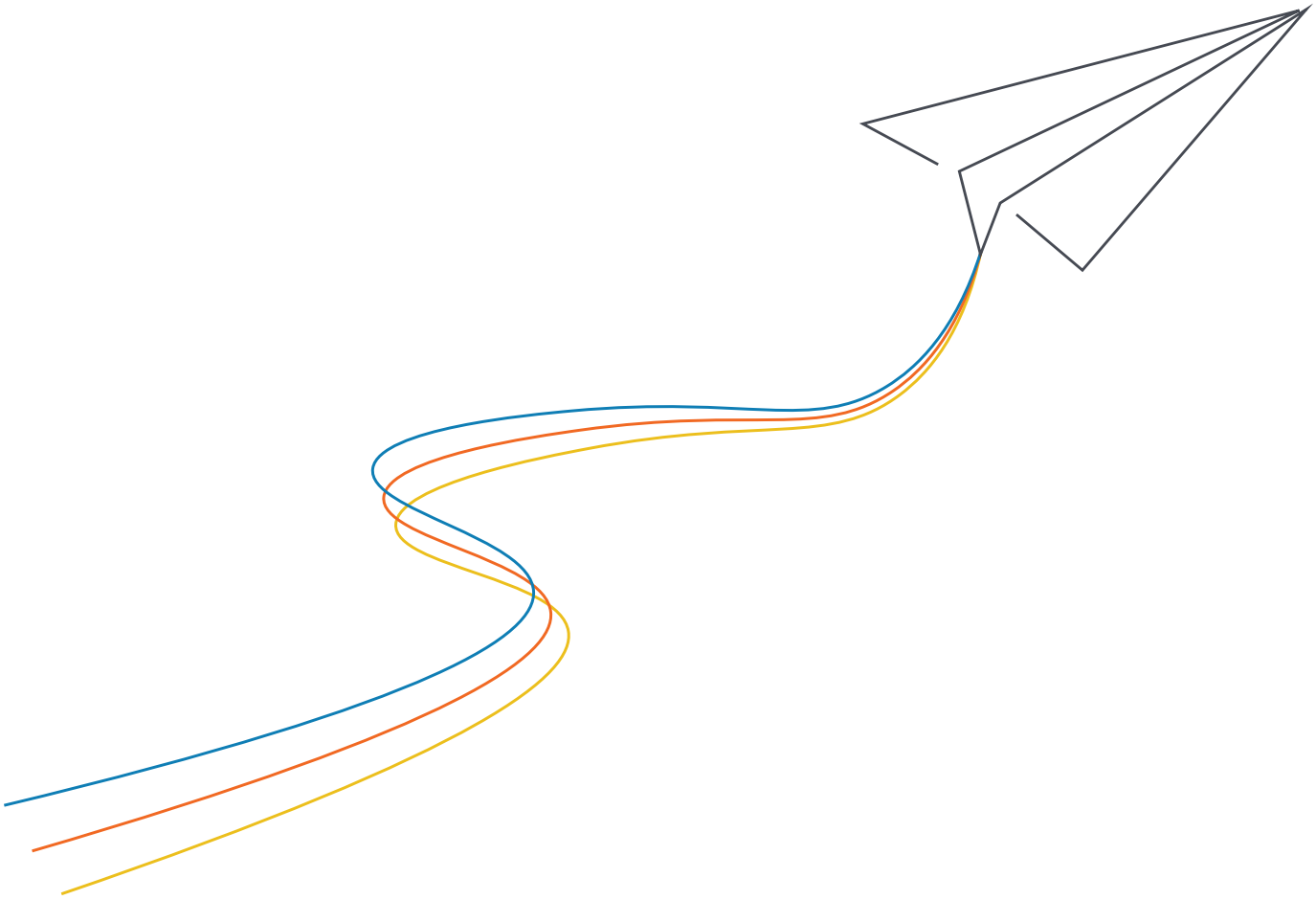
Photo 30: View of Stream 5, showing a reach with weak bed and bank demarcation, facing east. (34.996663°, -89.970313°)

Photo 31: View of Stream 6, showing a reach with strong bed and bank demarcation. (34.995628°, -89.970949°)

Photo Log – East Holmes Road and Swinnea Road
Aquatic Resource Assessment
April 15 and 16, 2020

Photo 32: View of no stream feature at northwest corner of Site, facing south. The topographic map shows a blue line stream leaving the Site in the northwest corner, but the stream feature is no longer present. (35.006216°, -89.972039°)

Photo 33: View of Stream 1 historical impact, where it enters an approximately 200-foot-long culvert at the south utility line easement, facing south. (34.997768°, -89.96608°)



Memphis
INTERNATIONAL AIRPORT