
Woodlands
Memphis, Shelby County, TN
General ARAP – Wetland

Prepared for:

PFMT HOLDINGS, LLC

5055 Pleasant View Road

Memphis, TN 38134

Prepared By:

W.H. Porter Consultants, PLLC

6055 Primacy Parkway, Suite 115

Memphis, TN 38119

Section 6: Project Description

Section 6.1

Scope of Project

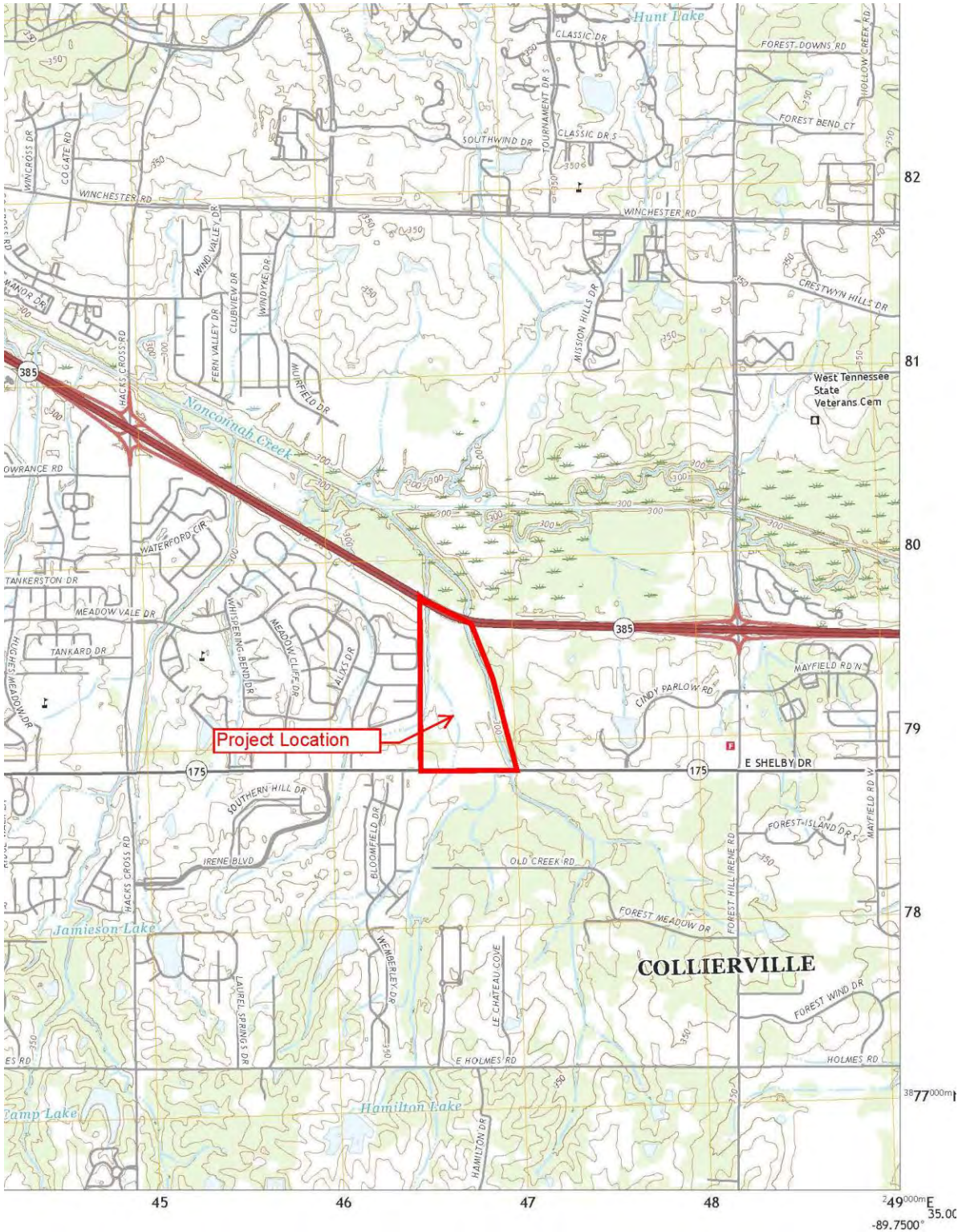
The Woodlands Subdivision consists of subdividing 62.14 acres for the development of 120 residential lots. The project site is located approximately 4800 feet west of the EAST SHELBY DRIVE and Forest Hill Irene Road intersection. The site is bordered by the Buckingham Farms Subdivision and the Polk Chapel CME Church to the east, by EAST SHELBY DRIVE and Bill Morris Parkway to the south and north, respectively, and by the Southwest Tennessee Community College to the east. The approximate latitude and longitude of the area is 35° 01' 15"N and 89° 46' 385"W. The drainage generate from the property flows towards the east into a miscellaneous tributary of Nonconnah Creek (ID: TN0801021100720_0999) (Stream classifications are based on a review of the TDEC Division of Water Resources online database.)

One wetland is present on this site, per an environmental analysis of the site was conducted by SWCA Environmental Consultants on October 7, 2020. The analysis resulted in a total of 6.31 acres of wetlands on the site, which are separated in four separate location. The proposed development will completely remove Wetland WA001 (0.280 acres). Wetland WA002 (2.70 acres) and WA003 (3.33 acres) are located within the proposed common open space and will not be impacted by this development. The total impact to the wetland is 0.130 acres, which fall with the general ARAP for wetland disturbance. The environmental assessment conducted by SWCA is included in this report.

Additionally, the general ARAP will cover two (2) outfall channels that extend into the miscellaneous tributary of Nonconnah Creek. The purpose of the channel is to direct the drainage into the tributary with the intention of preventing the creation of accidental wetlands.

Section 6.2

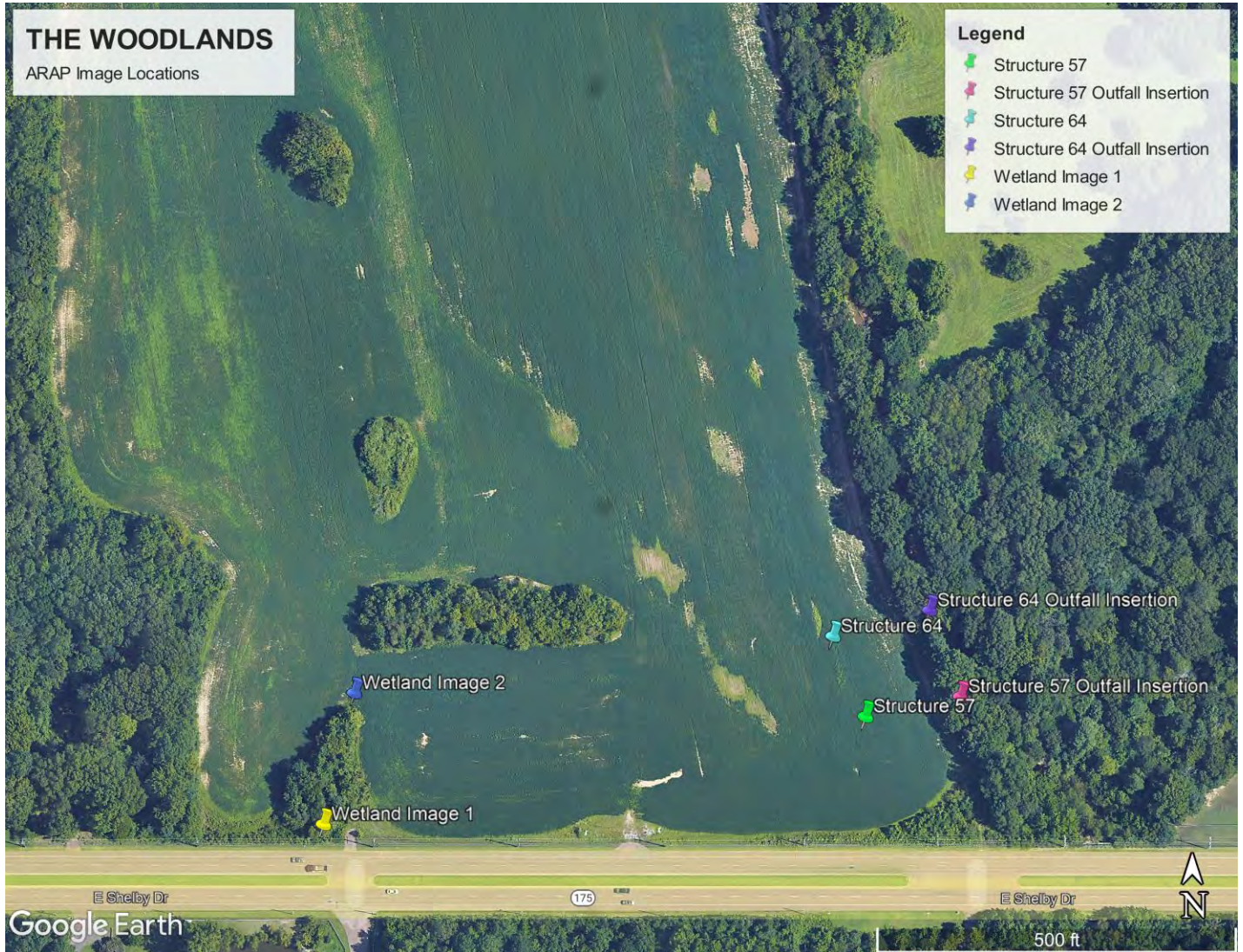
USGS Topographic Map



Section 6.3

Photographs

– see Aquatic Delineation conducted by SWCA Environment Consultants



The Woodlands Subdivision

General ARAP



Wetland Image 1
(South, Looking North)



Wetland Image 2
(North, Looking South)



Structure 57 Insertion



(Looking downstream, to the north)

Structure 57 Insertion

(Looking upstream, to the south)

The Woodlands Subdivision

General ARAP



Structure 64 Insertion
(Looking downstream, to the north)



Structure 64 Insertion
(Looking upstream, to the South)

Section 6.4

Existing Stream

The subject stream required for the General ARAP is a miscellaneous tributary of Nonconnah Creek. It borders the east side of the property, with approximately 2,700 feet of the stream within the property line, and flows from south to north. The predominant soil type on the site is Falaya silt loam. The ditch is 13 to 14 feet deep and 42 to 58 feet wide at the top banks. The riparian vegetation consists primarily of bottomland hardwoods.

Existing Wetland

Three wetlands are present on the site. Two wetlands (one forested, the other scrub-shrub) are located on the north portion of the site, south of SR-385. Wetland WA002 is a forested wetland and totals 2.70 acres. Wetland WA003 is a scrub-shrub wetland and totals 3.33 acres. An additional wetland is located on the south side of the property near Shelby Drive. Wetland WA001 is a forested wetland and totals 0.28 acres.

Section 6.5

Proposed Stream

The miscellaneous tributary of Nonconnah Creek will maintain the same cross section pre and post construction.

Proposed Wetland

Wetlands WA002 and WA003 will not be impacted with development activities associated with this development and therefore will maintain the current wetland characteristics. Wetland WA001 is located at the westernmost entrance to the proposed development. Of the 0.28 acres of existing wetland, 0.13 acres will be removed to make way for the proposed entrance. The remaining 0.15 acres of wetland are to not to be altered and shall maintain its current characteristics.

Section 6.6

Wetland Delineation

Wetlands are located on the site, see the Environmental Assessment conducted by SWCA Environment Consultants on October 08, 2020. The report determined that there are 0.130 acres of wetlands within the project boundary. The majority of the wetlands are located within proposed common open spaces and are not to be altered. For additional information, the assessment is attached to this permit applications.

Section 6.7

Hydrologic Jurisdictional Determinations

SWCA conducted a site assessment on October 8, 2020. Three wet weather conveyances were located within the Area of Determination. However, the miscellaneous tributary of Nonconnah Creek was not considered in the determination, but was assumed to be a stream.

Section 7.0: Project Rationale

The proposed development is located adjacent to wetlands, per the Environment Assessment conducted by SWCA. The projects intends to keep most of the sensitive areas unaltered to the greatest intent possible. This permit is intended to cover work associated with the construction of lots and detention basin on existing wetlands. Additionally, the construction of the development will require the installation of drainage and sewer infrastructure to service the development.

Wetlands

A wetland exists in the southwest quarter of the site and pools around an existing concrete box culvert. A portion of this wetland will be disturbed to make way for the proposed Right-of-Way. The alignment for the Right-of-Way was maintained to keep with the intent of East Shelby Drive's construction of East Shelby Drive has existing median cuts, allowing for direction changes and denoting the intended location for future turning lanes. Additionally, the affected wetland is a man-made wetland. During the construction of East Shelby Drive, a reinforced concrete box culvert was constructed to allow drainage to flow from south to north. However, the outlet of the box culvert is located within a low spot on the property, and without proper maintenance, the area was allowed to become a wetland.

The location of the western subdivision entrance was controlled by the median cut, which also coincides with the existing wetland. Due to the proximity of the wetland adjacent to East Shelby Drive, outright avoidance was not practicable. Therefore, impact minimization was the reasonable approach. The entrance road nearly bisects the wetland and an elevation about three feet of embankment. In an effort to impact the least amount of wetland possible, a retaining wall is proposed outside the proposed road's right-of-way. The retaining wall will create a barrier between the proposed improvements and the existing wetland. Silt-fence will be installed behind the retaining wall to limit the amount sediment leaving the disturbed area.

The wetlands to north are not proposed to be disturbed with the activities of this development. Silt-fence and an average 30 foot natural buffer are to be maintained between the disturbed area and the edge of the wetlands.

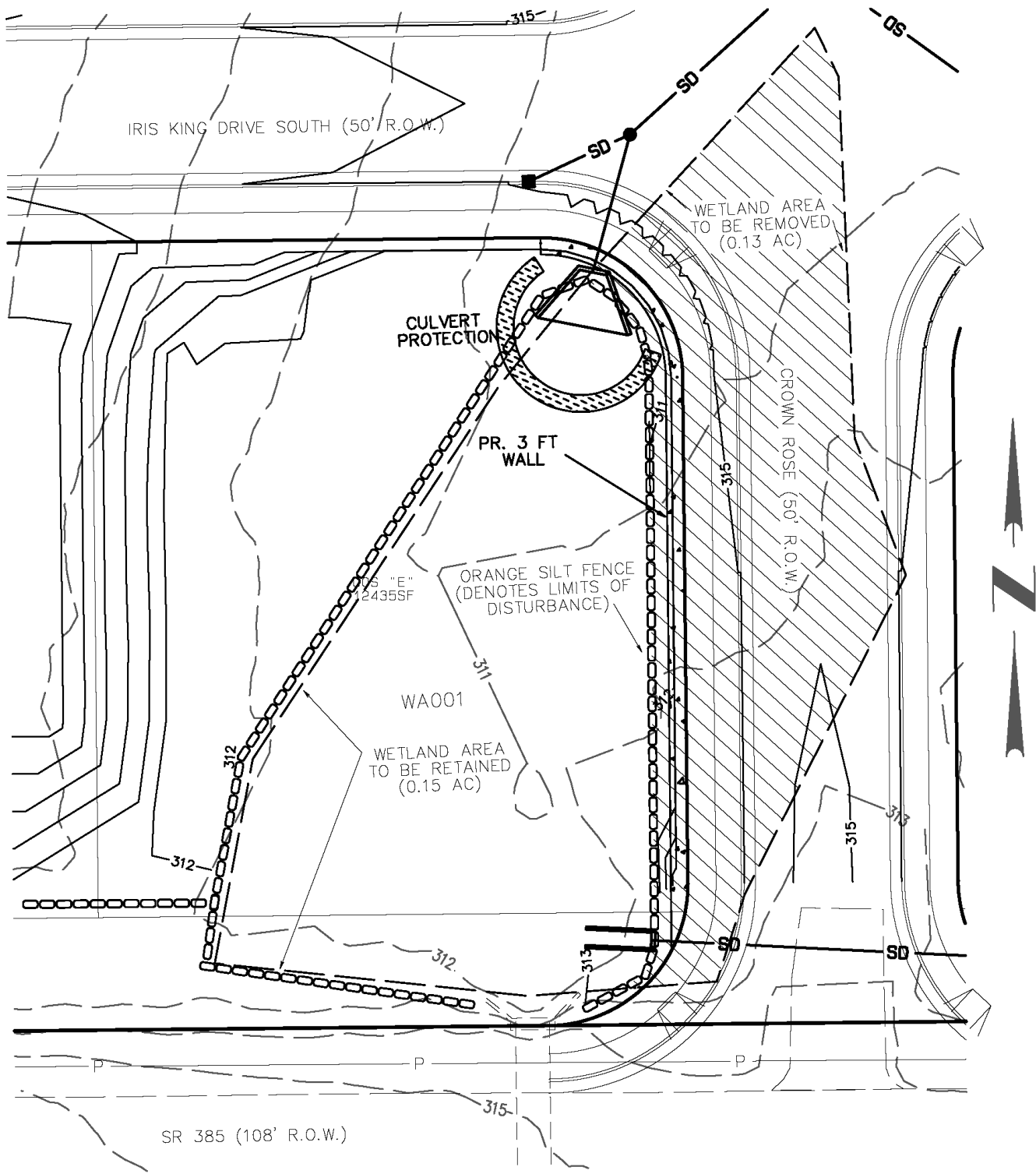


Exhibit 1 – Wetland Disturbance – Plan

Outfalls

Channels will be constructed for drainage structures 57 and 64. These channels will serve the dual purpose of creating a constant slope, to prevent the creation of future wetlands, and to reduce erosion flowing into the tributary of Nonconnah Creek. Class B riprap will be placed directly at the headwall, and class A riprap will be placed along the bank slope.

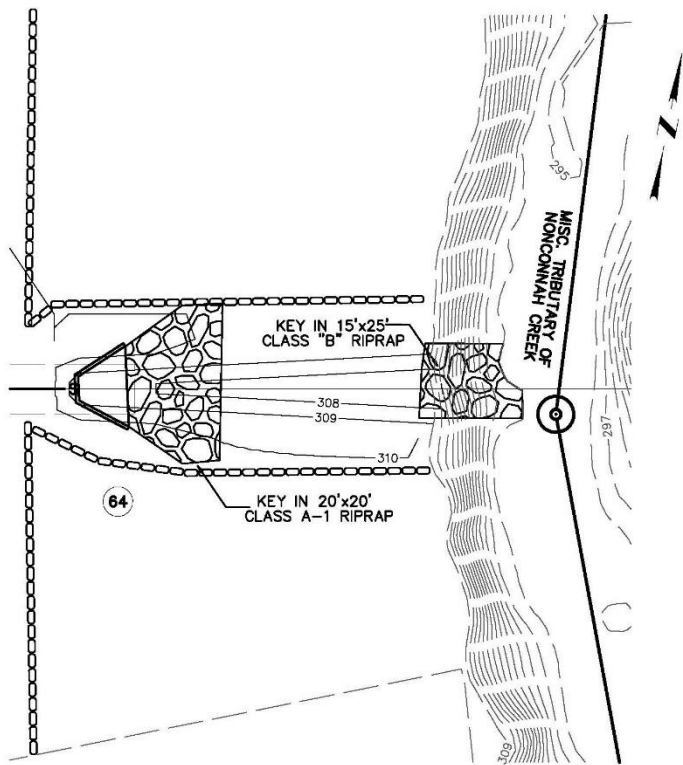


Exhibit 2 – Structure 64 Outfall – Plan

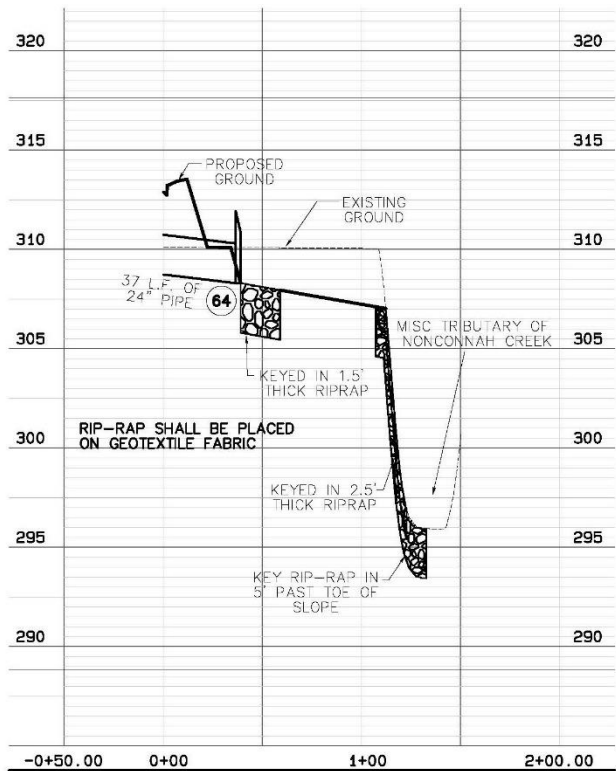


Exhibit 3 – Structure 64 Outfall – Profile

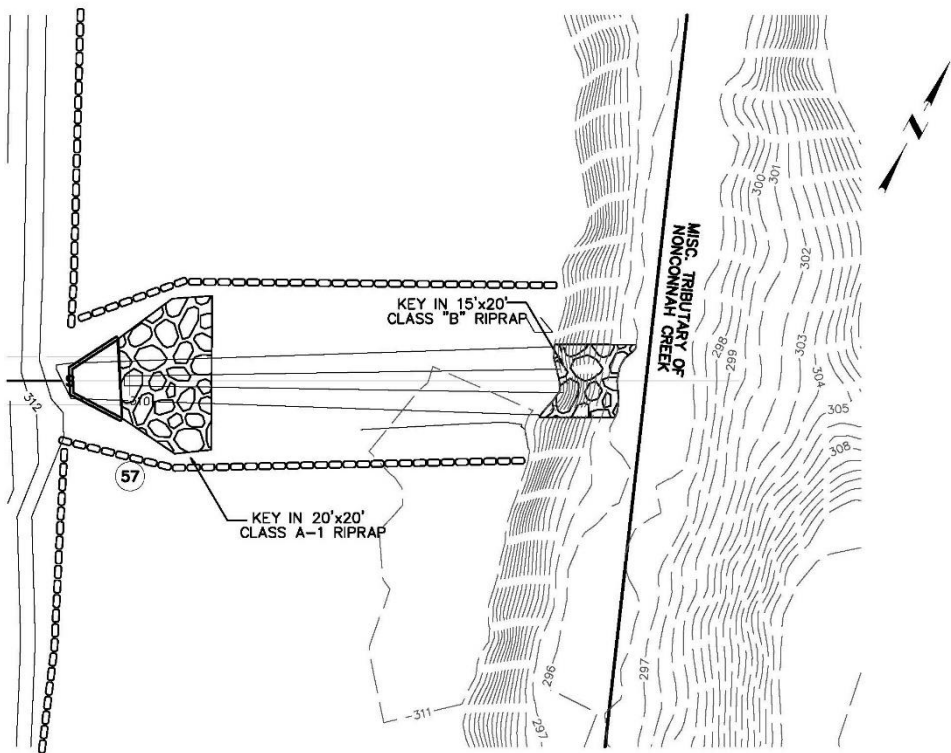


Exhibit 4 – Structure 57 Outfall – Plan

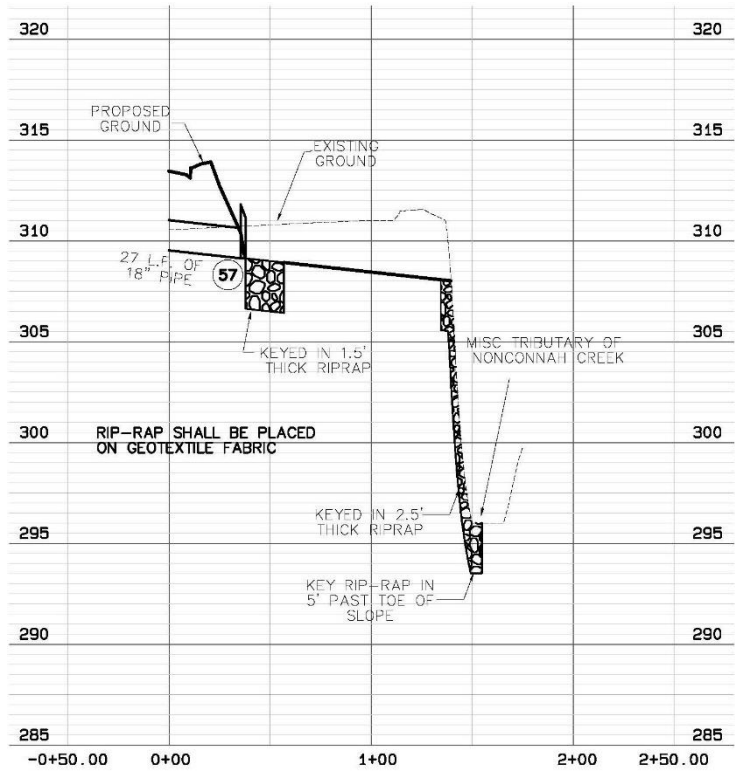


Exhibit 5 – Structure 57 Outfall – Profile

Section 8: Technical Information

Section 8.1

See attached.

Section 8.2

Wetland

First, orange silt-fence will be placed three (3) feet off of the proposed retaining wall. No alterations to the wetlands will occur beyond this point. Once the silt-fence has been installed, construction of the retaining wall may begin. When the retaining wall is complete, grading activities may begin for the road embankment over the exiting wetland to be removed. During construction activities, it is imperative that no silt shall be allowed to enter the wetland. The contractor shall be responsible for installing additional BMPs to ensure that the wetland remains protected.

The initial excavation work shall be conducted when little rainfall is expected to keep sediment laden water from encroaching in to the exiting wetlands. Heavy duty equipment will be utilized for fill operation when constructing the roadway, but at no point shall equipment be allowed to enter the wetland.

Stream

The storm drainage system will connect to the eastern stream in two locations. Prior to excavation work, the silt-fence shall be installed adjacent to the proposed swale. The contractor will begin work by excavating a swale from the proposed headwall locations to the western bank of the stream. Once the swale has is complete, sod shall be installed to immediately stabilize the ditch. The headwalls will be installed and work associated with the storm sewer system shall commence. Finally, rip-rap shall be installed at the headwall to control scouring and rip-rap shall be installed along the western bank of the stream at its confluence with the proposed ditch. The rip-rap shall be installed flush with the surface of the stream.

The initial excavation work shall be conducted when little rainfall is expected to keep sediment laden water from encroaching in to the exiting wetlands. Heavy duty equipment will be utilized for fill operation when constructing the roadway, but at no point shall equipment be allowed to enter the wetland.

Section 8.3

Silt-fence will be placed three (3) feet off the embankment limits of the retaining wall. No work shall be allowed past this point. The contractor shall have the option of placing additional silt-fence or other BMPs to ensure that no run-off from the site enters the unaltered wetlands.

The contractor shall perform all work associated with this permit during dry periods and rain is not expected during the duration of the work. When the contractor is excavating the ditches to the stream, the contractor will ensure that upstream drainage shall not be allowed to enter the storm drainage system until the work associated with the outfall ditch is complete. However, as a minimum Dandy Bag sediment control devices shall be installed at all inlets conveying water to the outfall ditches.

Silt-fence and an average 30 foot natural buffer are to be maintained between the disturbed area and the edge of the wetlands WA002 and WA003.

Section 10: Alternative

Being the nature of the proposed work, no alternatives were studied.

Section 11: Mitigation

No mitigation is warranted for this project.



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
1-888-891-8332 (TDEC)

Application for Aquatic Resource Alteration Permit (ARAP) & State §401 Water Quality Certification

OFFICIAL STATE USE ONLY	Site #:	Permit #:	
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Section 1. Applicant Information (individual responsible for site, signs certification below)

Applicant Name (company or individual):		SOS #:	Status:
Primary Contact/Signatory:		Signatory's Title or Position:	
Mailing Address:	City:	State:	Zip:
Phone:	Fax:	E-mail:	

Section 2. Alternate Contact/Consultant Information (a consultant is not required)

Alternate Contact Name:			
Company:		Title or Position:	
Mailing Address:	City:	State:	Zip:
Phone:	Fax:	E-mail:	

Section 3. Fee (application will be incomplete until fee is received)

No Fee	Fee Submitted with Application	Amount Submitted: \$ _____
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Current application fee schedules can be found at the Division of Water Resources webpage at:
<https://www.tn.gov/environment/permit-permits/water-permits/1/aquatic-resource-alteration-permit--arap-.html>
or by calling (615) 532-0625. Please make checks payable to "Treasurer, State of Tennessee".

Billing Contact (if different from Applicant):	Name:	Email:
Address:	Phone:	

Section 4. Project Details (fill in information and check appropriate boxes)

Site or Project Name:	Nearest City, Town or Major Landmark:		
Street Address or Location (include zip):			
County(ies):	MS4 Jurisdiction:	Latitude (dd.dddd):	
		Longitude (dd.dddd):	
Resources Proposed for Alteration:	Stream / River	Wetland	Reservoir
Name of Water Resource (for more information, access http://tdeconline.tn.gov/dwr):			
Brief Project Description (a more detailed description is required under Section 8):			

Does the proposed activity require approval from the U.S. Army Corps of Engineers, the Tennessee Valley Authority, or any other federal, state, or local government agency? Yes No

If Yes, provide the permit reference numbers:

Will the activity require a 401 Water Quality Certification: Yes No

If Yes, attach any 401 WQC pre-filing meeting request documentation

Is the proposed activity associated with a larger common plan of development: Yes No

If Yes, submit site plans and identify the location and overall scope of the common plan of development.

Plans attached? Yes No

If applicable, indicate any other federal, state, or local permits that are associated with the overall project site (common plan of development) that have been obtained in the past (e.g., construction general permit and/or other ARAP):

Application for Aquatic Resource Alteration Permit (ARAP) & State §401 Water Quality Certification

Section 5. Project Schedule (fill in information and check appropriate boxes)		
Proposed start date:	Estimated end date:	
Is any portion of the activity complete now?	Yes	No
If yes, describe the extent of the completed portion:		

The required information in Sections 6-11 must be submitted on a separate sheet(s) and submitted in the same numbered format as presented below. If any question is not applicable, state the reason why it is not applicable.

Section 6. Description	Attached Yes No
6.1 A narrative description of the scope of the project	
6.2 USGS topographic map indicating the exact location of the project (can be a photographic copy)	
6.3 Photographs of the resource(s) proposed for alteration with location description (photo locations should be noted on map)	
6.4 A narrative description of the existing stream and/or wetland characteristics including, but not limited to, dimensions (e.g., depth, length, average width), substrate and riparian vegetation	
6.5 A narrative description of the proposed stream and/or wetland characteristics including, but not limited to, dimensions (e.g., depth, length, average width), substrate and riparian vegetation	
6.6 In the case of wetlands, include a wetland delineation with delineation forms and site map denoting location of data points	
6.7 A copy of all hydrologic or jurisdictional determination documents issued for water resources on the project site	

Section 7. Project Rationale	Attached Yes No
Describe the need for the proposed activity, including, but not limited to the purpose, alternatives considered and rationale for selection of least impactful alternative, and what will be done to avoid or minimize impacts to water resources	

Section 8. Technical Information	Attached Yes No
8.1 Detailed plans, specifications, blueprints, or legible sketches of present site conditions and the proposed activity. Plans must be 8.5.x 11 inches. Additional larger plans may also be submitted to aid in application review. The detailed plans should be superimposed on existing and new conditions (e.g., stream cross sections where road crossings are proposed)	
8.2 For the proposed activity and compensatory mitigation, provide a discussion regarding the sequencing of events and construction methods and any proposed monitoring	
8.3 Depiction and narrative on the location and type of erosion prevention and sediment control (EPSC) measures for the proposed alterations and any other measures to treat, control, or manage impacts to waters	

Section 9. Water Resources Degradation (degree of proposed impact)
<p>Note that in most cases, activities that exceed the scope of the General Permit limitations are considered greater than <i>de minimis</i> degradation to water quality.</p> <p>Please provide your basis for concluding the proposed activity will cause one of the following levels of water quality degradation:</p> <ol style="list-style-type: none"> a. <i>De minimis</i> degradation, no appreciable permanent loss of resource values b. Greater than <i>de minimis</i> degradation (if greater than <i>de minimis</i> complete Sections 10-11) <p><i>For information and guidance on the definition of de minimis and degradation, refer to the Antidegradation Statement in Chapter 0400-40-03-.06 of the Tennessee Water Quality Criteria Rule:</i> https://publications.tnsosfiles.com/rules/0400/0400-40/0400-40.htm</p> <p><i>For more information on specifics on what General Permits can cover, refer to the Natural Resources Unit webpage at:</i> https://www.tn.gov/environment/permit-permits/water-permits1/aquatic-resource-alteration-permit--arap-.html</p>

Application for Aquatic Resource Alteration Permit (ARAP) & State §401 Water Quality Certification

Section 10. Detailed Alternatives Analysis		Attached Yes No	
10.1	Analyze all reasonable alternatives and describe the level of degradation and permanent loss of resource value caused by each alternative. Assessment must consider options other than the "Preferred" and "No Action" alternatives. Provide associated rationale for selecting or rejecting all alternatives considered and demonstration that the least impactful practicable alternative was selected.	<input type="checkbox"/>	<input type="checkbox"/>
10.2	Discuss the social and economic consequences of each alternative	<input type="checkbox"/>	<input type="checkbox"/>
10.3	Demonstrate that the degradation associated with the preferred alternative will not violate water quality criteria for uses designated in the receiving waters, and is necessary to accommodate important economic and social development in the area	<input type="checkbox"/>	<input type="checkbox"/>

Section 11. Compensatory Mitigation		Attached Yes No	
11.1	A detailed discussion of the proposed compensatory mitigation. Provide evidence of credit reservation if proposing to utilize a third-party provider.	<input type="checkbox"/>	<input type="checkbox"/>
11.2	Analysis of any proposed appreciable loss of resource value using the TN Stream Mitigation Guidelines. Provide Stream Quantification Tool (SQT) results if applicable. Include Existing Condition Score (ECS) and debit/credit calculations.	<input type="checkbox"/>	<input type="checkbox"/>
11.3	Describe how the compensatory mitigation would result in no net loss of resource value	<input type="checkbox"/>	<input type="checkbox"/>
11.4	Provide a detailed monitoring plan for the compensatory mitigation site if permittee-responsible project is proposed	<input type="checkbox"/>	<input type="checkbox"/>
11.5	Describe the long-term protection measures for the compensatory mitigation site if permittee-responsible project is proposed (e.g., deed restrictions, conservation easement)	<input type="checkbox"/>	<input type="checkbox"/>

Certification and Signature			
<p>An application submitted by a corporation must be signed by a principal executive officer; from a partnership or proprietorship, by the partner or proprietor respectively; from a municipal, state, federal or other public agency or facility, the application must be signed by either a principal executive officer, ranking elected official, or other duly authorized employee.</p> <p>I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information 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. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury. The project proponent hereby requests that the certifying authority review and take action on this CWA 401 certification request within the applicable reasonable period of time.</p>			
<u>Frances M. Terhune</u> Printed Name	<u>Secretary</u> Official Title	<u>[Signature]</u> Signature	<u>11/11/21</u> Date

Note that this form must be signed by the principal executive officer, partner or proprietor, or a ranking elected official in the case of a municipality; for details see **Certification and Signature** statement above. For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC). Submit the completed ARAP Application form (keep a copy for your records) to the appropriate EFO for the county(ies) where the proposed activity is located, addressed to **Attention: ARAP Processing**. You may also electronically submit the complete application and all associated attachments to water.permits@tn.gov.

EFO	Street Address	Zip Code	EFO	Street Address	Zip Code
Memphis	8383 Wolf Lake Drive, Bartlett	38133-4119	Cookeville	1221 South Willow Ave.	38506
Jackson	1625 Hollywood Drive	38305-4316	Chattanooga	1301 Riverfront Pkwy., Ste. 206	37402
Nashville	711 R S Gass Boulevard	37243	Knoxville	3711 Middlebrook Pike	37921
Columbia	1421 Hampshire Pike	38401	Johnson City	2305 Silverdale Road	37601





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TECHNICAL MEMORANDUM

To: Mr. Lew Hoffman
Tennessee Dept. of Environment and Conservation
Memphis Environmental Field Office
8383 Wolf Lake Road
Memphis, Tennessee 38133

From: Heath Garner, SWCA Sr. Ecologist/Natural Resource Project Manager

Date: October 30, 2020

Re: **Woodlands Development Hydrologic Determination / SWCA Project No. 63003**

On behalf of W.H. Porter Consultants, PLLC (W.H. Porter), SWCA Environmental Consultants (SWCA) conducted an intensive aquatic resources delineation on the proposed Woodlands Development Project (project) southeast of Germantown in southeast Shelby County, Tennessee. The proposed project encompasses approximately 62.5 acres of privately owned grassland/pasture and forested uplands located between Bill Morris Parkway and Highway 175.

The proposed project will be constructed primarily with typical land clearing and grading for the construction of a housing development. Land grading will be done with heavy equipment including bulldozers and tractors with dirt pans, including the potential fill and/or reroute of drainages within the project footprint. The project will include construction of paved roads, gutter systems, and other infrastructure for residential development. Construction of the proposed project will employ best management practices (BMPs) during dirt moving and establishing final surface contours during construction. Construction of the proposed project is not yet scheduled.

The proposed project falls under the jurisdiction of the U.S. Army Corps of Engineers (USACE) Memphis District and Tennessee Department of Environment and Conservation (TDEC). This report summarizes the findings from the hydrologic determination effort conducted on October 7, 2020 in conjunction with an aquatic resources delineation within the 62.5-acre proposed project area. Refer to Appendix A for a project location and vicinity map.

Methods

SWCA evaluated on-site aquatic resources including streams and wetlands. Streams were identified and characterized by the flow status and presence of an ordinary high water mark (OHWM), while wetlands were identified by the presence of hydrophytic vegetation, hydrology, and hydric soils. Methods for conducting USACE wetland delineations are described within the *Corps of Engineers Wetlands Delineation Manual* (Manual) (USACE 1987) and the *Regional Supplement to the Corps of Engineers*

Wetland Delineation Manual: Midwest Region, Version 2.0 (Regional Supplement) (USACE 2010). Non-wetland aquatic resources (rivers, streams, channels, ponds, etc.) were identified by the presence of an ordinary high-water mark (OHWM) using the recommendations from the 2005 USACE Regulatory Guidance Letter (RGL) 05-05: Ordinary High Water Mark Identification. These publications provide the basis for identifying and delineating the boundaries of aquatic communities and are the only methodologies approved by the USACE for performing formal wetland delineations. Watercourses were further identified as either “Streams” or “Wet Weather Conveyance” (WWC) according to the Tennessee Department of Environment and Conservation’s (TDEC) *Guidance for Making Hydrologic Determinations* which outlines the Primary Field Indicators of WWCs and streams in addition to the Secondary Field Indicators to be used in the absence of any primaries indicators (see Attachment B). Photographs were taken of each identified aquatic resource during the site reconnaissance and referenced in Attachment A.

Vegetation

The appropriate wetland indicator status, as recorded in the National Wetland Plant List: AGCP Region and Western Gulf Coastal Plain Subregion (Lichvar et al. 2016), was assigned to each plant species observed within a 30-foot-radius plot (data point) and along each linear watercourse. Hydrophytic and non-hydrophytic (or upland) plant species were differentiated by their respective indicator status, as described below:

- Obligate (OBL) – occur almost always under natural conditions in wetlands.
- Facultative wetland (FACW) – usually occur in wetlands, but occasionally found in non-wetlands.
- Facultative (FAC) – equally likely to occur in wetlands or non-wetlands.
- Facultative upland (FACU) – usually occur in non-wetlands, but occasionally found in wetlands.
- Upland (UPL) – may occur in wetlands in another region but occur almost always under natural conditions in non-wetlands in the region specified.

Plants with indicator statuses of OBL, FACW, and FAC are considered hydrophytes, while plants with statuses of FACU and UPL are considered non-hydrophytes. Plant communities with 1) all OBL and/or FACW dominant species, 2) greater than 50 percent dominant hydrophytic species, or 3) a prevalence index for hydrophytic vegetation less than or equal to 3.0 were determined to meet the USACE criteria of a hydrophytic community.

Soils

Hydric soil determinations were made according to criteria listed in the appropriate wetland delineation manual/supplement and *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 8.2* (U.S. Department of Agriculture [USDA] Natural Resources Conservation Service [NRCS] 2018). Soil pits were excavated to a depth of up to 20 inches, and the soil profile was then described by horizon. Each horizon was evaluated for soil color; thickness; the color, abundance, and contrast of redoximorphic features (i.e., depletions or mottles); and soil texture. Munsell Soil Color Charts were used to determine the color of the soil matrix and redoximorphic features (X-Rite 2010). The “feel” or “ribbon” test was used to determine soil texture (Thien 1979). The soil profile was studied for hydric soil indicators listed in the Manual/Regional Supplement. If the soil profile displayed one or more hydric soil indicators, a positive hydric soil determination was made.

Watercourses

The Tennessee Department of Environment and Conservation's (TDEC's) *Guidance for Making Hydrologic Determinations* (TDEC 2020) was also considered when identifying aquatic features within the project area. This guidance outlines the primary and secondary field indicators used to classify types of watercourses. TDEC defines a watercourse as any human-made, modified, or natural hydrologic feature with a defined channel which discretely conveys flowing water. A watercourse is further classified by TDEC as either a stream or a wet weather conveyance (WWC) (TDEC 2020). The TDEC Hydrologic Determination primary field indicators for a WWC and a stream are listed below.

WWCs are watercourses that contain one or more of the following indicators:

- Water flow only in a direct response to precipitation runoff in their immediate locality.
- A channel that remains above the ground water table.
- Is not suitable for drinking water supplies.
- Does not have sufficient water to support fish, or multiple populations of aquatic organisms whose life cycle includes an aquatic phase of at least 2 months.

Streams are watercourses that contain one or more of the following indicators:

- Flowing water after ≥ 7 rain-free days.
- A natural connection to the ground water table.
- Displays evidence of being used as a drinking-water supply.
- Contains multiple populations of obligate lotic organisms or fish.

If none of the above indicators are observed during the field investigation, a watercourse can still be classified using a series of 28 secondary geomorphic, hydrologic, and biologic indicators, each of which is assigned a score based on its quality/quantity (Appendix B). If the sum of these scores reaches the minimum threshold of 19, the watercourse is considered a stream, otherwise it is considered a WWC.

Mapping

The spatial extent of features was collected in the field using a Juniper Geode global positioning system (GPS) receiver capable of submeter accuracy through the Environmental Systems Research Institute (ESRI) Collector app on an android tablet. Coordinates of vertices were recorded along the perimeter of each wetland and other potential waters of the U.S.

Photographs

Biologists photographed each watercourse within the project area. Photographs of wetland, stream, and upland data point locations were taken to support the presence or absence of aquatic features. Photographs representative of each feature type and vegetation type are provided in Appendix C. Photographs at specific data point, photograph point, or stream locations not included in Appendix C are available upon request. A delineation map showing the location of each delineated aquatic resource and photograph locations can be found in Appendix A.

Results

Soils

Wetland classes display at least one hydric soil indicator, as defined by the USACE (2010). Typical hydric soil indicators identified included depleted matrix and stripped matrix. Upland classes either fail to display hydric soil indicators or fail to meet one or more of the other two wetland criteria, as defined by the USACE (2010). Additionally, streams usually have hydric soils associated with their bed and/or bank. According to the USDA NRCS (2020a) soil surveys for Shelby County, Tennessee, four soil map units are present within the project area, one of which meets the hydric soil criteria. Table 1 below shows the names and hydric characteristics of the soil map units within the project area. Refer to Appendix D for a detailed description of each soil map unit within the project area.

Table 1. Soil Map Units Within the Proposed Project Area

Soil Map Unit	Hydric	Hydric Component Characteristics			Location in Project Area Where Encountered
		Soil Component Name and Percent	Landform	Hydric Criteria*	
Calloway silt loam, 0 to 2 percent slopes (Ca)	No	N/A	Loess hills and plains	N/A	uplands
Falaya silt loam (Fm)	Yes	Waverly (9%)	Flood plains	2	SA001a, SA001b, SA002
Grenada silt loam, 2 to 5 percent slopes (GaB)	No	N/A	Loess hills and plains	N/A	uplands
Grenada silt loam, 2 to 5 percent slopes, eroded (GaB2)	No	N/A	Loess hills and plains	N/A	uplands

* Hydric Criteria:

2. Map unit components in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, or Andic, Cumulic, Pachic, or Vitrandic subgroups that:
 - a. Will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
 - b. Show evidence that the soil meets the definition of a hydric soil;
3. Map unit components that are frequently ponded for long duration or very long duration during the growing season that:
 - a. Will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
 - b. Show evidence that the soil meets the definition of a hydric soil; or
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
 - a. Will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
 - b. Show evidence that the soils meet the definition of a hydric soil.

N/A = not applicable.

Hydrology and Determination of “Normal Weather Conditions”

The NRCS WETS weather stations were used to determine the normality of rainfall using DAREM calculations. Data from the National Weather Service (NWS) Germantown 4SE, Shelby County (FIPS 47157), Tennessee weather station was used to determine the measured rainfall for the 3 months prior to the start of the delineation efforts (USDA NRCS 2020b). The DAREM calculations for the survey month of October 2020 were calculated using observed rainfall data and comparative WETS data. The DAREM wetland hydrologic condition summary within the project area during the survey period was determined to be normal, as summarized in Table 2.

Table 2. Shelby County DAREM Wetland Hydrologic Condition During October 2020

Prior Month		WETS Percentile (in)		Measured Rainfall	Rainfall Condition ^a	Month Weight ^b	Score ^c
		30 th	70 th				
1 st	September	1.23	4.03	2.46	2	3	6
2 nd	August	2.49	4.19	3.53	2	2	4
3 rd	July	2.62	5.07	1.35	1	1	1
DAREM Score (i.e., Scores Total)							11

DAREM Score	6	7	8	9	10	<u>11</u>	12	13	14	15	16	17	18
DAREM Wetland Hydrologic Condition	Drier than normal				<u>Normal</u>					Wetter than normal			

Data source: GERMANTOWN 4SE weather station (TN04; GHCN No. USC00403447) for WETS data and monthly rainfall data.

^a 1 = measured rainfall that were less than the WETS 30th percentile, 2 = measured rainfall that were between the WETS 30th and 70th percentiles, and 3 = measured rainfall that were greater than the WETS 70th-percentile.

^b 1st prior month = 3, 2nd prior month = 2, and 3rd prior month = 1.

^c Scores are the product of the Condition x Weight.

Watercourses

SWCA identified and delineated a total of three watercourses within the proposed project area including one contiguous, and one broken ephemeral WWCs (consisting of two residual segments). Table 2 provides the OHWM widths, hydrologic determinations, lengths, acreages for each of the watercourses delineated within the project area. Refer to Appendix C for representative photographs of each type of watercourse encountered within the project area.

Table 2. Watercourse Summary for the Proposed Project Area

Feature ID	Feature Name	Flow	HD Score	Waters of the State*	Feature Type	Estimated Width Between OHWMs (feet)	Ingress to Project Area (Lat/Long)	Egress from Project Area (Lat/Long)	Length Within Project Area (feet)	Acres Within Project Area
SA001a	UT to Hebron Branch	Ephemeral	P	No	WWC	-*	35.020788/-89.776602	SA002b	101.18	-*
SA002b	UT to Hebron Branch	Ephemeral	P	No	WWC	-*	35.024659/-89.777447	35.025741/-89.778111	446.28	-*
SA002	UT to Hebron Branch	Ephemeral	P	No	WWC	-*	Start 35.027428/-89.777826	35.028126/-89.778223	234.25	-*
Total									781.71	-

*No discernable bed and bank or OHWM or subsequent acreage

UT = Unnamed Tributary

P = Primary Indicator Determined

Delineated Wetlands

A total of two (2) palustrine forested (PFO) wetlands and one palustrine scrub-shrub (PSS) were identified within the project area during the aquatic resource delineation. These PFO wetlands are associated with the current drainage of SA001 and adjoining intermittent streams (east and west, but outside of the project area), providing hydrology during and after rain events and supporting saturated soils long enough to support hydrophytic vegetation. All watercourses and wetlands are addressed in an

associated aquatic resource delineation report completed in association with the Woodlands Development project.

SUMMARY

SWCA biologists performed a hydrologic determination (HD) of waters of the state of Tennessee within the 62.5-acre proposed project area within the USACE Memphis District on October 7, 2020. This HD effort was completed concurrently with an aquatic resource delineation of the project area to determine presence of potential Waters of the U.S. (WOTUS) that may be jurisdiction of the USACE Memphis District.

SWCA identified and delineated a total of three watercourses including three ephemeral WWCs within the USACE Memphis District. Table 3 provides the total linear feet and acreages of each type of watercourse feature delineated within the project area.

Table 3. Delineation Summary for the Proposed Project Area

Feature Type	Total Acreage within Project Area	Total Linear Feet within Project Area	Total Jurisdictional Acreage within Project Area	Total Jurisdictional Linear Feet within Project Area
WWC	-	781.71	0.000	0.00
Total	-	781.71	0.000	0.00

The scope of this HD effort was to ascertain the presence of watercourses and potential jurisdictional areas including waters of the state. In SWCA's professional opinion, some of the physical features delineated during this effort may be considered waters of the U.S. (i.e., wetlands) and State. Conversely, the three linear watercourses were determined as WWCs and not considered waters of the U.S. or waters of the state. However, this report is not a legal delineation of the boundaries of waters of the U.S. or a determination of their jurisdictional status. Only the USACE and/or TDEC has final and/or legal authority in determining the presence of jurisdictional waters of the U.S./State and the extent of their boundaries. This technical memorandum serves as a hydrologic determination of linear watercourses within the proposed Woodlands project area. Concurrence of these findings by TDEC is requested by SWCA on behalf of W.H. Porter Consultants, PLLC.

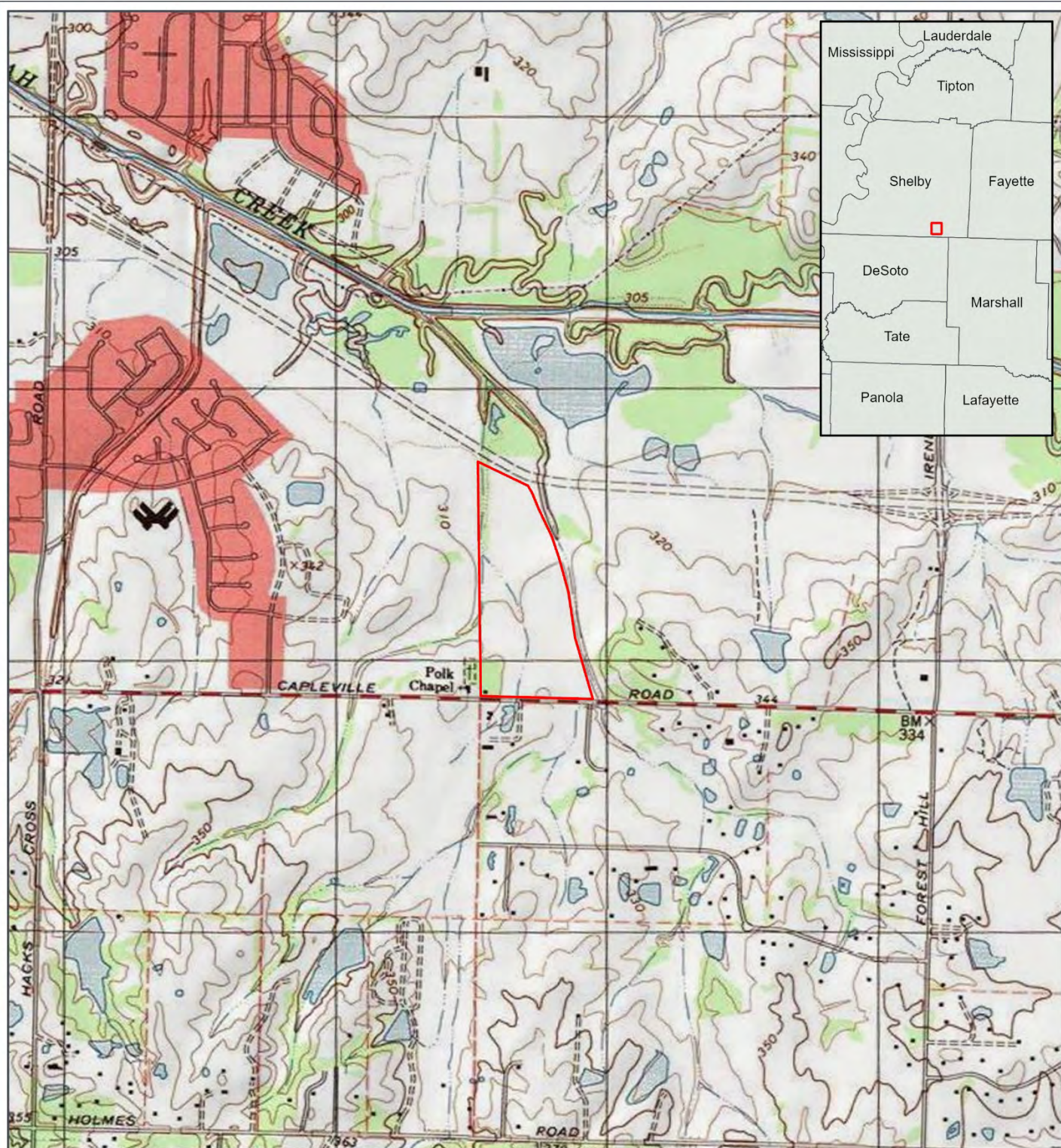
vbv

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APPENDIX A

Figures



WOODLANDS DEVELOPMENT
Vicinity Map

 Area of Delineation

Shelby County, TN
USGS 7.5' Quadrangle:
Germantown, TN, 35089-A7

NAD 1983 UTM Zone 16N
89.7758°W 35.0245°N

Base Map: ESRI ArcGIS Online,
accessed October 2020

Updated: 10/29/2020
Project No. 63003
File: Woodlands Vicinity Map





WOODLANDS DEVELOPMENT
**Aquatic Resource
Delineation Map**

SWCA
ENVIRONMENTAL CONSULTANTS

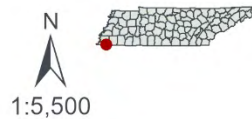
- Data Point
- ▲ Photo Point
- Wet-Weather Conveyance
- ▨ Forested Wetland
- ▨ Scrub-Shrub Wetland
- ▭ Area of Delineation

Shelby County, TN
USGS 7.5' Quadrangle:
Germantown, TN, 35089-A7

NAD 1983 UTM Zone 16N
89.7758°W 35.0245°N

Base Map: ESRI ArcGIS Online,
accessed October 2020

Updated: 10/29/2020
Project No. 63003
File: Woodlands Delineation Map



1:5,500



APPENDIX B

HD Datasheets

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

County: Shelby	Named Waterbody: Nonconnah Creek	Date/Time: 10/07/20 16:58
Assessors/Affiliation: Heath Garner / SWCA Environmental Consultants		Project ID : Project 63003
Site Name/Description: Woodlands Development		
Site Location: 150-acres between Bill Morris Parkway and Shelby Drive		
USGS quad: Collierville	HUC (12 digit): 080102110102	Lat/Long: 35.020899/ -89.776594
Previous Rainfall (7-days) : 0"		
Precipitation this Season vs. Normal : very wet <input type="checkbox"/> wet <input type="checkbox"/> average <input checked="" type="checkbox"/> dry <input type="checkbox"/> drought <input type="checkbox"/> unknown <input type="checkbox"/>		
Source of recent & seasonal precip data : NOAA		
Watershed Size : 1,890 acres	Photos: Y or N (circle) Number : 165820,165842	
Soil Type(s) / Geology : Falaya silt loam		Source: USDA
Surrounding Land Use : Row-crop agriculture and single-family residential housing		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Slight <input type="checkbox"/> Absent <input type="checkbox"/>		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	<input checked="" type="checkbox"/>	WWC <input type="checkbox"/>
2. Defined bed and bank absent, dominated by upland vegetation / grass	<input type="checkbox"/>	WWC <input checked="" type="checkbox"/>
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	<input type="checkbox"/>	WWC <input type="checkbox"/>
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	<input type="checkbox"/>	WWC <input type="checkbox"/>
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	<input checked="" type="checkbox"/>	Stream <input type="checkbox"/>
6. Presence of fish (except <i>Gambusia</i>)	<input checked="" type="checkbox"/>	Stream <input type="checkbox"/>
7. Presence of naturally occurring ground water table connection	<input checked="" type="checkbox"/>	Stream <input type="checkbox"/>
8. Flowing water in channel and 7 days since last precipitation in local watershed	<input type="checkbox"/>	Stream <input type="checkbox"/>
9. Evidence watercourse has been used as a supply of drinking water	<input checked="" type="checkbox"/>	Stream <input type="checkbox"/>

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

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 1.4*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) = N/A

Justification / Notes :

Although mapped as intermittent by 7.5-minute USGS topographic map, the stream has been impounded upstream by a reservoir, creating drier conditions down-stream over the past 30+years. These drier conditions have allowed the historic stream channel to be tilled and farmed with the channel graded and filled throughout the entire length on the property with the exception of lower, forested areas. As such no continuous bed and bank is present, no evidence of ground water table connection , and no sustained flow exists within the drainage.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
2. Sinuous channel	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
3. In-channel structure: riffle-pool sequences	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
4. Sorting of soil textures or other substrate	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
5. Active/relic floodplain	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
6. Depositional bars or benches	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
7. Braided channel	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
8. Recent alluvial deposits	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
9. Natural levees	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
10. Headcuts	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
11. Grade controls	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
12. Natural valley or drainageway	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
13. At least second order channel on existing USGS or NRCS map	<input type="checkbox"/> No = 0		<input type="checkbox"/> Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
15. Water in channel and >48 hours since sig. rain	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
16. Leaf litter in channel (January – September)	<input type="checkbox"/> 1.5	<input type="checkbox"/> 1	<input type="checkbox"/> 0.5	<input type="checkbox"/> 0
17. Sediment on plants or on debris	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
18. Organic debris lines or piles (wrack lines)	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
19. Hydric soils in stream bed or sides of channel	<input type="checkbox"/> No = 0		<input type="checkbox"/> Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel ¹	3	2	1	0
21. Rooted plants in channel ¹	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
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 ²	0	0.5	1	2

¹ Focus is on the presence of upland plants.

² Focus is on the presence of aquatic or wetland plants.

Total Points = N/A

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score ≤ 19 points

Notes :

[illegible]

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

County: Shelby	Named Waterbody: Nonconnah Creek	Date/Time: 10/07/20 17:36
Assessors/Affiliation: Heath Garner / SWCA Environmental Consultants		Project ID : Project 63003
Site Name/Description: Woodlands Development		
Site Location: 150-acres between Bill Morris Parkway and Shelby Drive		
USGS quad: Collierville	HUC (12 digit): 080102110102	Lat/Long: 35.02568/ -89.77793
Previous Rainfall (7-days) : 0"		
Precipitation this Season vs. Normal : very wet <input type="checkbox"/> wet <input type="checkbox"/> average <input checked="" type="checkbox"/> dry <input type="checkbox"/> drought <input type="checkbox"/> unknown <input type="checkbox"/>		
Source of recent & seasonal precip data : NOAA		
Watershed Size : 1,890 acres	Photos: Y or N (circle) Number : 173628	
Soil Type(s) / Geology : Falaya silt loam		Source: USDA
Surrounding Land Use : Row-crop agriculture and single-family residential housing		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Slight <input type="checkbox"/> Absent <input type="checkbox"/>		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	<input checked="" type="checkbox"/>	WWC <input type="checkbox"/>
2. Defined bed and bank absent, dominated by upland vegetation / grass	<input type="checkbox"/>	WWC <input checked="" type="checkbox"/>
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	<input type="checkbox"/>	WWC <input type="checkbox"/>
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	<input type="checkbox"/>	WWC <input type="checkbox"/>
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	<input checked="" type="checkbox"/>	Stream <input type="checkbox"/>
6. Presence of fish (except <i>Gambusia</i>)	<input checked="" type="checkbox"/>	Stream <input type="checkbox"/>
7. Presence of naturally occurring ground water table connection	<input checked="" type="checkbox"/>	Stream <input type="checkbox"/>
8. Flowing water in channel and 7 days since last precipitation in local watershed	<input type="checkbox"/>	Stream <input type="checkbox"/>
9. Evidence watercourse has been used as a supply of drinking water	<input checked="" type="checkbox"/>	Stream <input type="checkbox"/>

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

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 1.4*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) = N/A

Justification / Notes :

Although mapped as intermittent by 7.5-minute USGS topographic map, the stream has been impounded upstream by a reservoir, creating drier conditions down-stream over the past 30+years. These drier conditions have allowed the historic stream channel to be tilled and farmed with the channel graded and filled throughout the entire length on the property with the exception of lower, forested areas. As such no continuous bed and bank is present, no evidence of ground water table connection , and no sustained flow exists within the drainage.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
2. Sinuous channel	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
3. In-channel structure: riffle-pool sequences	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
4. Sorting of soil textures or other substrate	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
5. Active/relic floodplain	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
6. Depositional bars or benches	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
7. Braided channel	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
8. Recent alluvial deposits	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
9. Natural levees	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
10. Headcuts	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
11. Grade controls	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
12. Natural valley or drainageway	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
13. At least second order channel on existing USGS or NRCS map	<input type="checkbox"/> No = 0		<input type="checkbox"/> Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
15. Water in channel and >48 hours since sig. rain	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
16. Leaf litter in channel (January – September)	<input type="checkbox"/> 1.5	<input type="checkbox"/> 1	<input type="checkbox"/> 0.5	<input type="checkbox"/> 0
17. Sediment on plants or on debris	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
18. Organic debris lines or piles (wrack lines)	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
19. Hydric soils in stream bed or sides of channel	<input type="checkbox"/> No = 0		<input type="checkbox"/> Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel ¹	3	2	1	0
21. Rooted plants in channel ¹	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
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 ²	0	0.5	1	2

¹ Focus is on the presence of upland plants.

² Focus is on the presence of aquatic or wetland plants.

Total Points = N/A

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score ≤ 19 points

Notes :

[illegible]

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

County: Shelby	Named Waterbody: Nonconnah Creek	Date/Time: 10/07/20 17:44
Assessors/Affiliation: Heath Garner / SWCA Environmental Consultants		Project ID : Project 63003
Site Name/Description: Woodlands Development		
Site Location: 150-acres between Bill Morris Parkway and Shelby Drive		
USGS quad: Collierville	HUC (12 digit): 080102110102	Lat/Long: 35.027394/ -89.777803
Previous Rainfall (7-days) : 0"		
Precipitation this Season vs. Normal : very wet <input type="checkbox"/> wet <input type="checkbox"/> average <input checked="" type="checkbox"/> dry <input type="checkbox"/> drought <input type="checkbox"/> unknown <input type="checkbox"/>		
Source of recent & seasonal precip data : NOAA		
Watershed Size : 1,890 acres	Photos: Y or N (circle) Number : 174420	
Soil Type(s) / Geology : Falaya silt loam		Source: USDA
Surrounding Land Use : Row-crop agriculture and single-family residential housing		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe <input type="checkbox"/> Moderate <input type="checkbox"/> Slight <input type="checkbox"/> Absent <input checked="" type="checkbox"/>		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	<input checked="" type="checkbox"/>	WWC <input type="checkbox"/>
2. Defined bed and bank absent, dominated by upland vegetation / grass	<input type="checkbox"/>	WWC <input checked="" type="checkbox"/>
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	<input type="checkbox"/>	WWC <input type="checkbox"/>
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	<input type="checkbox"/>	WWC <input type="checkbox"/>
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	<input checked="" type="checkbox"/>	Stream <input type="checkbox"/>
6. Presence of fish (except <i>Gambusia</i>)	<input checked="" type="checkbox"/>	Stream <input type="checkbox"/>
7. Presence of naturally occurring ground water table connection	<input checked="" type="checkbox"/>	Stream <input type="checkbox"/>
8. Flowing water in channel and 7 days since last precipitation in local watershed	<input type="checkbox"/>	Stream <input type="checkbox"/>
9. Evidence watercourse has been used as a supply of drinking water	<input checked="" type="checkbox"/>	Stream <input type="checkbox"/>

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

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 1.4*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) = N/A

Justification / Notes :

Eroded drainage feature associated with run-off from periodic flooding events of forested and scrub-shrub wetlands located on the north end of the project area. Unmapped by USGS. No defined, continuous bed and bank and swale dominated by overstory tree root systems. No ground water table connection, no presence of aquatic lotic organisms, or fauna.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
2. Sinuous channel	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
3. In-channel structure: riffle-pool sequences	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
4. Sorting of soil textures or other substrate	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
5. Active/relic floodplain	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
6. Depositional bars or benches	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
7. Braided channel	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
8. Recent alluvial deposits	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
9. Natural levees	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
10. Headcuts	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
11. Grade controls	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
12. Natural valley or drainageway	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
13. At least second order channel on existing USGS or NRCS map	<input type="checkbox"/> No = 0		<input type="checkbox"/> Yes = 3	

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
15. Water in channel and >48 hours since sig. rain	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
16. Leaf litter in channel (January – September)	<input type="checkbox"/> 1.5	<input type="checkbox"/> 1	<input type="checkbox"/> 0.5	<input type="checkbox"/> 0
17. Sediment on plants or on debris	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
18. Organic debris lines or piles (wrack lines)	<input type="checkbox"/> 0	<input type="checkbox"/> 0.5	<input type="checkbox"/> 1	<input type="checkbox"/> 1.5
19. Hydric soils in stream bed or sides of channel	<input type="checkbox"/> No = 0		<input type="checkbox"/> Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel ¹	3	2	1	0
21. Rooted plants in channel ¹	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	1	1.5
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macroinvertebrates (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 ²	0	0.5	1	2

¹ Focus is on the presence of upland plants.

² Focus is on the presence of aquatic or wetland plants.

Total Points = N/A

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score ≤ 19 points

Notes :

[illegible]

APPENDIX C

Photographic Log

EPHEMERAL DRAINAGE



Photo C-1. Ephemeral drainage SA001 entrance to AOD



Photo C-2. Ephemeral drainage SA001 within PFO Wetland WA001



Photo C-3. NHD-mapped location of SA001



Photo C-4. Ephemeral drainage SA001 exiting AOD



Photo C-5. Ephemeral eroded drainage SA002.

WETLAND, UPLAND, and PHOTOGRAPH POINTS



Photo C-6. Palustrine forested wetland WA001 (at datapoint DP001_PFO).



Photo C-7. Herbaceous (agri) upland at datapoint DP001_U associated with WA001.



Photo C-8. Forested upland (at datapoint DP002_U).



Photo C-9. Palustrine forested wetland WA002 (at SA001b start).



Photo C-10. Palustrine forested wetland WA002 (at DP002_PFO)



Photo C-11. Forested upland (at datapoint DP005_U)



Photo C-12. Palustrine scrub-shrub wetland WA003 (at datapoint DP003_PSS)



Figure C-13. Representative photo of palustrine scrub-shrub wetland WA003



Photo C-14. Representative photo of hydric soil indicators (Falaya silt loam) within WA001, WA002, and WA003.



Photo C-15. Sewer line access (manhole) within eastern side of AOD (within soybean field).



Photo C-16. Intermittent stream adjoining west boundary of AOD



Photo C-17. Intermittent stream adjoining east boundary of AOD.

APPENDIX D

Soil Map Unit Descriptions

Map Unit Description (Brief, Generated)

Shelby County, Tennessee

[Minor map unit components are excluded from this report]

Map unit: Ca - Calloway silt loam, 0 to 2 percent slopes

Component: Calloway (100%)

The Calloway component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on loess hills on plains. The parent material consists of loess. Depth to a root restrictive layer, fragipan, is 15 to 30 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 19 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Map unit: Fm - Falaya silt loam

Component: Falaya (91%)

The Falaya component makes up 91 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains on plains. The parent material consists of silty alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is occasionally flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Map unit: GaB - Grenada silt loam, 2 to 5 percent slopes

Component: Grenada (100%)

The Grenada component makes up 100 percent of the map unit. Slopes are 2 to 5 percent. This component is on loess hills on plains. The parent material consists of noncalcareous loess. Depth to a root restrictive layer, fragipan, is 18 to 33 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 23 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Map unit: GaB2 - Grenada silt loam, 2 to 5 percent slopes, eroded

Component: Grenada (100%)

The Grenada component makes up 100 percent of the map unit. Slopes are 2 to 5 percent. This component is on loess hills on plains. The parent material consists of fine-silty noncalcareous loess. Depth to a root restrictive layer, fragipan, is 17 to 36 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.