Aquatic Resources Delineation Report for the Ohlendorf Trust-Osceola 130 Acre Site Within the USACE Memphis District

U.S. Army Corps of Engineers Memphis District Area of Responsibility—Mississippi County, Arkansas

JANUARY 2021

PREPARED FOR

Mississippi County, Arkansas Economic Development

PREPARED BY

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1 INTRODUCTION

On behalf of Mississippi County, Arkansas Economic Development (Mississippi County), SWCA Environmental Consultants (SWCA) conducted an intensive aquatic resources delineation for the Osceola 130 Acre Site, which is located approximately 3.59 miles south of the city of Osceola in eastern Mississippi County, Arkansas.

The project area of delineation (AOD) is a proposed industrial development area that encompasses approximately 578.75 acres of privately owned agricultural land along the south side of State Highway 198 and west of South County Road 623.

Any proposed project on the AOD will be constructed primarily with typical land clearing and grading for the construction of industrial development. Land grading will be conducted with heavy equipment including bulldozers and tractors with dirt pans for the potential fill and/or reroute of drainages within the project area. The project area will include construction of paved roads, gutter systems, and other infrastructure for industrial development.

The AOD falls under the jurisdiction of the U.S. Army Corps of Engineers (USACE) Memphis District. This report summarizes the findings from the aquatic resources delineation effort conducted within the 578.75-acre project area. Refer to Appendix A, Figure 1 for a project area location and vicinity map.

2 METHODS

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: Atlantic and Gulf Coastal Plain Region*, Version 2.0 (Regional Supplement) (USACE 2010). These publications provide the basis for identifying and delineating the boundaries of wetland communities and are the only methodologies approved by the USACE for performing formal wetland delineations.

2.1 Desktop Analysis Methods

Prior to initiating formal on-site field investigations, SWCA reviewed baseline data for the 578.75-acre project area, including U.S. Geological Survey (USGS) topographic quadrangle maps (USGS 2020), U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data (USFWS 2020), USGS National Hydrography Dataset (NHD) (USGS 2013) data, and aerial photographs of the AOD (Google Earth 2020).

The results of this desktop analysis were used to identify the likely locations of wetlands and waterbodies for field verification, as described below

2.2 Field Methodology

Desktop data were synthesized and reviewed by field biologists. They were used to identify areas with a higher likelihood of wetland and stream features in order to focus field survey efforts in those areas. The entire AOD was reviewed, though the desktop data were used to prioritize areas that required more thorough analyses in the field.

SWCA conducted a field evaluation to determine the likely presence or absence of wetlands and other jurisdictional waters in accordance with guidance and information available from the following sources:

- *Corps of Engineers Wetland Delineation Manual* (USACE 1987)
- *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region*, Version 2.0 (USACE 2010)
- *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils*, Version 8.2 (USDA NRCS 2018)
- Revised (December 2, 2008) guidance on Clean Water Act (CWA) jurisdiction following the Supreme Court decision in *Rapanos v. United States* and *Carabell v. United States* (revision to the joint memorandum issued by the USACE and the Environmental Protection Agency [EPA] on June 5, 2007) (EPA 2008)

The presence or absence of wetlands was determined in the field using routine determination methods outlined in the Manual and Regional Supplement (USACE 1987, 2010). Wetlands were identified by positive indicators of hydrology, hydrophytic vegetation, and hydric soils. Under normal conditions, all three parameters must be present for an area to be considered a wetland in accordance with Section 404 of the CWA.

2.2.1 Wetlands/Special Aquatic Sites

Wetlands were then classified according to the Cowardin System, as described in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). This is a hierarchical system based on the topographic position and vegetation type of a wetland, which aids resource managers and others by providing uniformity of concepts and terms used to define wetlands according to hydrologic, geomorphologic, chemical, and biological factors. Data collected at each site were used to approximate the wetland boundary and were recorded on USACE Atlantic and Gulf Coastal Plain wetland determination data forms. Wetland boundaries were recorded using a global positioning system (GPS) unit capable of sub-meter accuracy and were not flagged.

2.2.2 Hydrology

Wetland hydrology was primarily determined in the field by considering the frequency and duration of inundation, visual observation of saturation in the upper 16 inches of the soil profile, and the presence of primary wetland hydrologic indicators (such as oxidized rhizospheres on living roots, water-stained leaves, water marks, sediment deposits, or algal matting). Secondary indicators used to determine wetland hydrology include, but are not limited to, surface soil cracks, crayfish burrows, geomorphic position, and drainage patterns. Evidence of these secondary indicators is present even during dry periods and are therefore useful indicators of a wetland. If the area that was sampled displayed one or more primary hydrologic indicators or two or more secondary hydrologic indicators as listed in the Manual and Regional Supplement (USACE 1987, 2010), a positive wetland hydrology determination was made.

Rainfall has the most substantial influence on maintaining wetland hydrology. During the summer months, evapotranspiration rates are at their highest, which often results in receding water tables. Therefore, it is important to accurately evaluate the normality of rainfall with respect to its influence on wetland hydrology. This was achieved by employing the Direct Antecedent Rainfall Evaluation Method (DAREM) (Sprecher and Warne 2000). Using the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Wetland Evaluation Tables (WETS) (USDA NRCS 2020b) as a baseline for normal rainfall during a given month, the DAREM method assesses normal rainfall for each month by considering the 3-month period prior to the month being evaluated. Evaluation under these methods

classifies the condition of the site at the time of the delineation as either drier than normal, normal, or wetter than normal.

2.2.3 Vegetation

Vegetation within each sampling plot was identified to the species level, when possible, to determine the plant communities present. Hydrophytic vegetation, which is one parameter of a jurisdictional wetland, is defined as a plant community with over 50 percent of the dominant plant species ranked as obligate wetland (OBL), facultative wetland (FACW), or facultative (FAC). The appropriate wetland indicator status, as recorded in both the National Wetland Plant List: 2014 Update of Wetland Ratings – Northcentral and Northeast (Lichvar et al. 2016) and the 2018 National Wetland Plant List (USACE 2018), was assigned to each plant species. The absolute cover of each plant species within the plot area (2-meter [m] radius plot for herbaceous vegetation, 5-m radius for shrub/vine strata, 15-m radius for tree stratum) was visually estimated, and then the absolute percent cover was determined (e.g., each species may be rated up to 100 percent, and the total can be over 100 percent cover). Next, one of the following was used to determine the presence or absence of hydrophytic vegetation: the rapid test (i.e., all dominant species across all strata are OBL or FACW); the dominance test (i.e., 50/20 test; >50% of the total cover represented by plant species combined and including any species >20% of cover by itself, across all strata rated OBL, FACW, or FAC); or the prevalence index (i.e., average value of wetland indicator statuses [OBL=1…UPL=5] of all species in the plot, weighted by percent cover ≤3.0).

2.2.4 Soils

For each data point recorded, a soil test pit was dug to a depth of at least 16 inches and the soil profile was described by horizon to determine the presence or absence of hydric conditions. As defined by the National Technical Committee of Hydric Soils, a hydric soil is a "soil that formed under the conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" (USDA NRCS 2018). Each horizon was evaluated for: soil color; thickness; 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 the hydric soil indicators, and hydric soil determinations were made according to criteria listed in the Manual and Regional Supplement, and *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils*, Version 8.2 (USDA NRCS 2018). If the soil profile displayed one or more hydric soil indicators, a positive hydric soil determination was made.

2.2.5 Problematic Wetland Determinations

The requirement for meeting all three parameters may be waived in "problematic sites" or if "normal circumstances" are not met, which is a common scenario in an agricultural landscape where natural vegetation communities have been cleared for row-crop production. The USACE provides that "…wetland determinations on difficult or problematic sites must be based on the best information available to the field inspector, interpreted in light of his or her professional experience and knowledge of the ecology of wetlands in the region" (USACE 2010). In situations where one or more of the three criteria were deemed problematic, atypical, or disturbed, SWCA applied their professional judgement and on-site experience to extrapolate the presumed conditions under normal circumstances. For example, if hydric soil and wetland hydrology indicators were observed in an actively cultivated field, SWCA may compare the area with a nearby undisturbed reference plot to extrapolate what the vegetation community may contain under normal circumstances.

2.2.6 Streams

Streams (e.g., creeks, rivers, human-made ditches) were identified by the presence of an ordinary high-water mark (OHWM), which is usually identifiable by indicators such as the level of water present, scouring of the channel, or a vegetation line within the channel. The OHWM is a defining element for identifying the lateral limits of non-wetland waters. SWCA biologists recorded the approximate center line of waterbodies encountered during the wetland delineation using GPS units capable of sub-meter accuracy. Streams were further classified as perennial, intermittent, or ephemeral based on field observations.

A perennial stream has water flowing year-round during a typical year. The water table is located above the stream bed for most of the year and groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for perennial stream flow.

An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for intermittent stream flow.

An ephemeral stream has flowing water only during, and shortly after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water, and runoff from rainfall is the primary source of water for ephemeral stream flow.

As with streams, other surface waters (e.g., ponds, lakes, and irrigation canals) were delineated at the OHWM and classified as either natural, human-made, or modified. SWCA biologists recorded the OHWMs of all waterbodies encountered during the site delineation.

2.2.7 Mapping

The spatial extent of features was collected in the field using a Juniper Geode 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 United States (WOTUS).

2.2.8 Photographs

Biologists photographed each feature that was delineated in the field. 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 points, photograph points, or stream locations that have not been included in Appendix C are available upon request.

3 RESULTS

SWCA biologists performed a delineation of WOTUS within the AOD on December 3 and 10, 2020, to verify the results of the desktop review and to delineate all wetlands and waterbodies in the AOD that are potential jurisdictional WOTUS. Additional waters such as swales and erosional features, although not believed to be jurisdictional, were also delineated and included in this report to offer a full understanding of all water flow that occurs within the AOD. The following sections detail the results of this delineation.

3.1 Desktop Analysis

3.1.1 Landscape Setting

Topography within the AOD is relatively flat, with the elevations ranging from 236 to 241 feet above mean sea level. Review of Google Earth aerial imagery revealed that most of the AOD has been cleared and used for row-crop production for over 30 years. Surrounding land use consists of row-crop agriculture and pastureland on all sides along with areas of undeveloped forest land (east and west) and other industrial developments (northwest, west, and southwest). The AOD is bordered by State Highway 198 along the north-northwest boundary, a railroad along the south-southwest boundary, and Ditch No. 10 along the east boundary.

3.1.2 Hydrology

Wetland classes observed during the delineation display at least one primary or two secondary indicators of wetland hydrology, as defined by the USACE (2010). Upland classes either fail to display hydrology indicators or fail to meet one or more of the other two wetland criteria, as defined by the USACE (2010). Typical wetland hydrology indicators observed in the field could include water marks, water-stained leaves, moss trim lines, and FAC-neutral tests. However, no wetland hydrology indicators were observed at the data point locations recorded in the field.

Rainfall has the most substantial influence on maintaining wetland hydrology. During the summer months, evapotranspiration rates are at their highest, which often results in receding water tables. Therefore, it is important to accurately evaluate the normality of rainfall with respect to its influence on wetland hydrology. The NRCS WETS weather stations were used to determine the normality of rainfall using DAREM calculations. Data from the National Weather Service (NWS) Keiser, Arkansas, weather station in Mississippi County (Federal Information Processing Standards (FIPS) code: 05093) 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 December 2020 were calculated using observed rainfall data and comparative WETS data. The DAREM wetland hydrologic condition summary within the AOD during the survey period was determined to be normal, as summarized in Table 1.

Table 1. Mississippi County DAREM Wetland Hydrologic Condition During December 2020

Prior Month		WETS Percentile (in)		Measured Rainfall	Rainfall Condition[a]	Month Weight[b]	Score[c]
		30th	70th				
1st	November	2.87	5.61	2.23	1	3	3
2nd	October	2.24	4.59	5.41	3	2	6
3rd	September	2.01	4.30	2.07	2	1	2
						DAREM Score (i.e., Scores Total)	**11**

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

Data source: Keiser weather station (AR03; GHCN No. USC00033821) was used for WETS data and monthly rainfall data.
[a] 1 = measured rainfall that was less than the WETS 30th percentile; 2 = measured rainfall that was between the WETS 30th and 70th percentiles; and 3 = measured rainfall that was 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 × Weight.
DAREM = Direct Antecedent Rainfall Evaluation Method; WETS = Wetland Evaluation Tables (WETS)

3.1.3 Vegetation/Land Use

The AOD is located within one natural region and one subregion within the USACE Memphis District. This natural region generally corresponds to the USDA NRCS Land Resource Regions (LRRs), and subregions correspond to the Major Land Resource Areas (MLRAs) (USDA NRCS 2006). The following describes the MLRA within the project area, which is a subregion of the larger LRR.

LRR O – Mississippi Delta Cotton and Feed Grains Region: MLRA 131A – Southern Mississippi River Alluvium

This area makes up most of the Mississippi Alluvial Plain Section of the Coastal Plain Province of the Atlantic Plain. The landforms in the area are level or depressional to very gently undulating alluvial plains, backswamps, oxbows, natural levees, and terraces. The landform shapes range from convex on natural levees and undulating terraces to concave in oxbows. These landforms shape differentiate water-shedding from water-receiving positions, both of which play a major role in soil formation and hydrology. Soils in this MLRA are very deep, dominantly poorly drained and somewhat poorly drained, and dominantly loamy or clayey. This area once consisted entirely of bottom-land hardwood deciduous forests and mixed hardwood and cypress swamps. Currently, areas of bottom-land hardwood consist of water oak (*Quercus nigra*), Nuttall oak (*Quercus texana*), cherrybark oak (*Quercus pagoda*), pecan (*Carya illinoinensis*), red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), eastern cottonwood (*Populus deltoides*), and hickory (*Carya* spp.). Some of the major wildlife species in this area are white-tailed deer (*Odocoileus virginianus*), feral hogs (*Sus scrofa*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*), rabbit, gray squirrel (*Sciurus carolinensis*), American alligator (*Alligator mississippiensis*), water turtles, water snakes, frogs, otters (*Lontra canadensis*), beavers (*Castor canadensis*), armadillo (*Daypus novemcinctus*), crawfish, wild turkey (*Meleagris gallopavo*), mourning dove (*Zenaida macroura*), ducks, and geese. Most of the area is in farms, which produce cash crops of primarily cotton (*Gossypium* spp.), soybeans (*Glycine max*), milo (*Sorghum bicolor*), and corn (*Zea mays*). Catfish and crawfish are produced commercially on farm ponds that are contained by levees. Migratory waterfowl are harvested throughout the area, and hardwood timber is harvested on most forested wetlands. Most forested areas are managed for wildlife (USDA NRCS 2006).

3.1.4 Soils

According to the USDA NRCS (2020a) soil surveys for Mississippi County, five soil map units are present within the AOD (Appendix A, Figure 2). Of these five soil units, two soil units meet the hydric soil criteria and comprise 242.91 acres of the project area: Sharkey silty clay, 0 to 1 percent slopes, protected; and Sharkey-Steele complex, 0 to 1 percent slopes. However, the designation of "hydric" for a given soil map unit assigned by NRCS does not satisfy the hydric soil parameter requirement under the routine USACE wetland determination methods; documentation of hydric soil indicators in the field is necessary to confirm hydric soils for the purposes of a wetland delineation. Table 1 provides the flooding frequency and additional detail for these soil types within the project area. Refer to the datasheets in Appendix B for soil profile descriptions at each data point location and to Appendix D for a detailed description of each soil map unit within the project area.

Table 2. Mapped NRCS Soil Types Within the Osceola 130 Acre Site, Mississippi County, Arkansas

Map Unit Name (Unit Symbol)	Hydric Map Unit (Yes/No)	Hydric Component Characteristics		Acreage Within Project Area	Percentage Within Project Area
		Landform	Frequency of Flooding/Ponding		
Commerce silt loam, 0 to 1 percent slopes, north (Cm)	No	Natural levees	None/None	37.55	6.49%
Sharkey silty clay, 0 to 1 percent slopes, protected (Sh)	Yes	Backswamps	None/None	152.58	26.36%
Sharkey-Steele complex, 0 to 1 percent slopes (Sm)	Yes	Backswamps, flats	None/None	90.33	15.61%
Steele silty clay loam (Sr)	No	Alluvial flats	Rare to None/None	141.44	24.44%
Tunica silty clay, 0 to 1 percent slopes (Tu)	No	Backswamps	None/None	156.86	27.10%

Source: USDA NRCS (2020a).

Although an NRCS hydric listing alone is generally insufficient to determine if soils for a site are hydric, it does indicate that suitable soil properties or conditions exist that promote the formation of hydric soil conditions. As a result, the portions of the project area depicted as containing hydric soil map units were subjected to greater scrutiny with respect to the presence of hydric soil indicators during field data collection efforts.

3.1.5 National Wetlands Inventory

SWCA reviewed the USFWS NWI mapping system to determine the potential presence of wetland features within the AOD. The NWI wetland mapping system is a web-based viewer that depicts areas where the agency believes wetlands may occur. The data were reviewed by field biologists prior to the survey to provide context for the field survey. Based on this review, four riverine features (3.88 total acres) were identified within the AOD. Table 3 summarizes the riverine types within the project area. Appendix A, Figure 3 shows the locations of the NWI features in the project area.

Table 3. NWI Wetland Types Within the Osceola 130 Acre Site, Mississippi County, Arkansas

Wetland Type	Cowardin Code	Number	Acres	Percent of AOD
Riverine	R4SBC	1	0.69	0.12%
Riverine	R5UBFx	3	3.19	0.55%
	Total	**4**	**3.88**	**0.67%**

Source: USFWS (2020).

3.1.6 National Hydrography Database

SWCA reviewed USGS NHD mapping to determine the potential presence of streams and waterbodies within the AOD (Table 4; Appendix A, Figure 3). NHD data suggest the presence of approximately 12,065.43 total feet (2.29 miles) of NHD-mapped watercourses categorized as either intermittent stream/river (1,528.14 feet; 0.29 miles) or canal/ditch (10,537.29 feet; 2.00 miles) within the project area (USGS 2013). This may include natural features that have been modified and/or named waterways. The NHD data were reviewed by field biologists prior to survey to provide context for the field survey.

Table 4. NHD Watercourses Within the Osceola 130 Acre Site, Mississippi County, Arkansas

Feature Type	Length (feet)
Intermittent Stream/River	1,528.14
Canal/Ditch	10,537.29
Total	**12,065.43**

Source: USGS (2013).

3.1.7 Floodplains

SWCA reviewed the Federal Emergency Management Agency (FEMA) National Flood Hazard Layer which showed that the entire AOD is on panel #05093C0440E within Zone X (areas of 0.2-percent-annual-chance flood event). Zone X is an area determined to be outside of the 100-year floodplain (FEMA 2020). Appendix A, Figure 4 shows the floodplain areas surrounding the AOD.

3.2 Field Investigations

SWCA conducted field investigations on December 3 and 10, 2020, to assess the general site characteristics, ground-truth any mapped features identified during the desktop analysis, and delineate the boundaries of all features determined to be present based on the field survey. Photographs taken during field investigations of delineated features have been included in Appendix B. Listed below are wetlands and other features observed and their potential jurisdictional determinations.

3.2.1 Wetlands

SWCA did not observed any wetlands within the AOD during the field survey. However, two upland datapoints were taken to represent overall landcover and vegetation present within the entire AOD (Appendix A, Figure 5). Refer to Appendix C for representative photographs taken at each of the upland datapoint locations within the AOD.

3.2.2 Uplands

The entire AOD consisted of non-wetland areas of recently harvested soybean agricultural fields with little to no vegetation present at the time of the survey.

Refer to Appendix B for datasheets listing the herbaceous vegetation species and percentages observed at each upland data point location. Refer to Appendix C for photographs depicting herbaceous upland communities.

3.2.3 Waterbodies

SWCA identified and delineated a total of four waterbodies within the AOD. Three of the four features are considered jurisdictional, while the fourth lacks the presence of a defined bed and bank or OHWM. Due to this hydrologic determination, it is SWCA's opinion that this feature is not considered a WOTUS and, therefore, the only feature of the four delineated that is not within the jurisdiction of the USACE. Table 6 provides the OHWM widths and lengths for each of the features delineated within the AOD. Refer to Appendix A, Figure 5 for the locations of each waterbody delineated. Appendix C presents representative photographs of each waterbody encountered within the AOD.

3.2.3.1 EPHEMERAL DITCH

Feature SA001 is a named agricultural ditch (Ditch No. 11) and was classified by SWCA as a jurisdictional ephemeral ditch. SA001 flows into the AOD at the northern boundary and out of the project area on the eastern boundary where it joins the named jurisdictional feature, Ditch No. 10, through a culvert connection. A segment (approximately 2,014.08 feet) of SA002 is also ephemeral and transitions to intermittent before connecting to a named jurisdictional feature (Sandy Bayou) adjacent south, outside of the AOD.

3.2.3.2 INTERMITTENT DITCHES

Feature SA002 is an intermittent ditch at its southern end and ephemeral at its northern reach due to the grade of the land. This entire feature, at both its ephemeral and intermittent reaches, is considered jurisdictional by SWCA because of its hydrologic connection to Sandy Bayou running parallel to the southern boundary of the AOD. The southern, intermittent reach of this stream retains water longer than the northern reach, which primarily contains water from agricultural and storm water run-off.

SA003 is an intermittent ditch beginning within the AOD and is also connected to Sandy Bayou south of the AOD. SA003 was also considered to be jurisdictional due to this connection to another intermittent, named stream.

3.2.3.3 DRAINAGE SWALE

Feature SA004 is an ephemeral drainage swale with no defined bed and bank. Although it runs through the AOD, it is not connected to any other jurisdictional features and only contains water for short periods of time due to agricultural run-off from irrigation or rainfall to prevent ponding within the agricultural field. Therefore, SWCA determined that this feature is not considered jurisdictional under USACE.

Table 5. Waterbody Summary for the Osceola 130 Acre Site

Feature ID	Feature Name	Flow	Feature Type	Estimated Width Between OHWMs (feet)	Length Within Project Area (feet)
SA001	Ditch No. 11	Ephemeral	Ditch	9	3,058.32
SA002	UT to Sandy Bayou	Intermittent	Ditch	8.5	2,014.08
SA002	UT to Sandy Bayou	Ephemeral	Ditch	8.5	1,140.75
SA003	UT to Sandy Bayou	Intermittent	Ditch	8	1,676.86
SA004	N/A	Swale	WWC	-*	1,718.09
				Total	**9,608.10**

* Lack of discernable bed and bank, or OHWM.
N/A = not applicable; OHWM = ordinary high water mark; UT = unnamed tributary; WWC = Wet Weather Conveyance

4 SUMMARY

On December 3 and 10, 2020, SWCA biologists performed a delineation of WOTUS within the 578.75-acre AOD within the USACE Memphis District. SWCA identified and delineated a total of four waterbody features: one ephemeral ditch, one ditch with both an intermittent and ephemeral reach, one intermittent ditch, and one drainage swale within the project area. No wetlands were observed within the project area. Table 6 provides the total lengths and acreages of each type of waterbody feature delineated within the project area.

Table 6. Delineation Summary for the Osceola 130 Acre Site AOD

Feature Type	Total Acreage Within AOD	Total Linear Feet Within AOD	Jurisdictional Acreage Within AOD
Ephemeral Ditch SA001	0.76	3,058.32	0.76
Ephemeral Ditch Segment SA002	0.19	1,140.75	0.19
Intermittent Ditch Segment SA002	0.39	2,014.08	0.39
Intermittent Ditch SA003	0.33	1,676.86	0.33
Drainage Swale SA004	-†	1,718.09	0.00
Waterbodies Total*	**1.67**	**9,608.10**	**1.67**

† Lack of OWHM prevented calculation of acreage of linear features within the project area.
* Totals are prior to rounding.
AOD = area of delineation.

The delineated ephemeral and intermittent ditches within the AOD are likely jurisdictional according to SWCA's professional opinion. These linear features, although modified to flow around agricultural fields and for agricultural use, were immediately connected to named jurisdictional features located outside of the AOD. Therefore, three of the delineated features are potentially subject to USACE jurisdiction under Section 404 of the CWA due to their hydrologic connection to Ditch. No. 10 and Sandy Bayou. However, it is SWCA's professional opinion that the drainage swale is not a jurisdictional feature. This linear feature did not exhibit a defined bed and bank or exhibit an OHWM. The scope of this delineation effort was to ascertain the presence of potential jurisdictional waters. In SWCA's professional opinion, physical features delineated during this effort may be considered WOTUS (i.e., wetlands and waterbodies); however, this report is not a legal delineation of the boundaries of WOTUS or a determination of their jurisdictional status. Only the USACE has final and/or legal authority in determining the presence of jurisdictional WOTUS and the extent of their boundaries.

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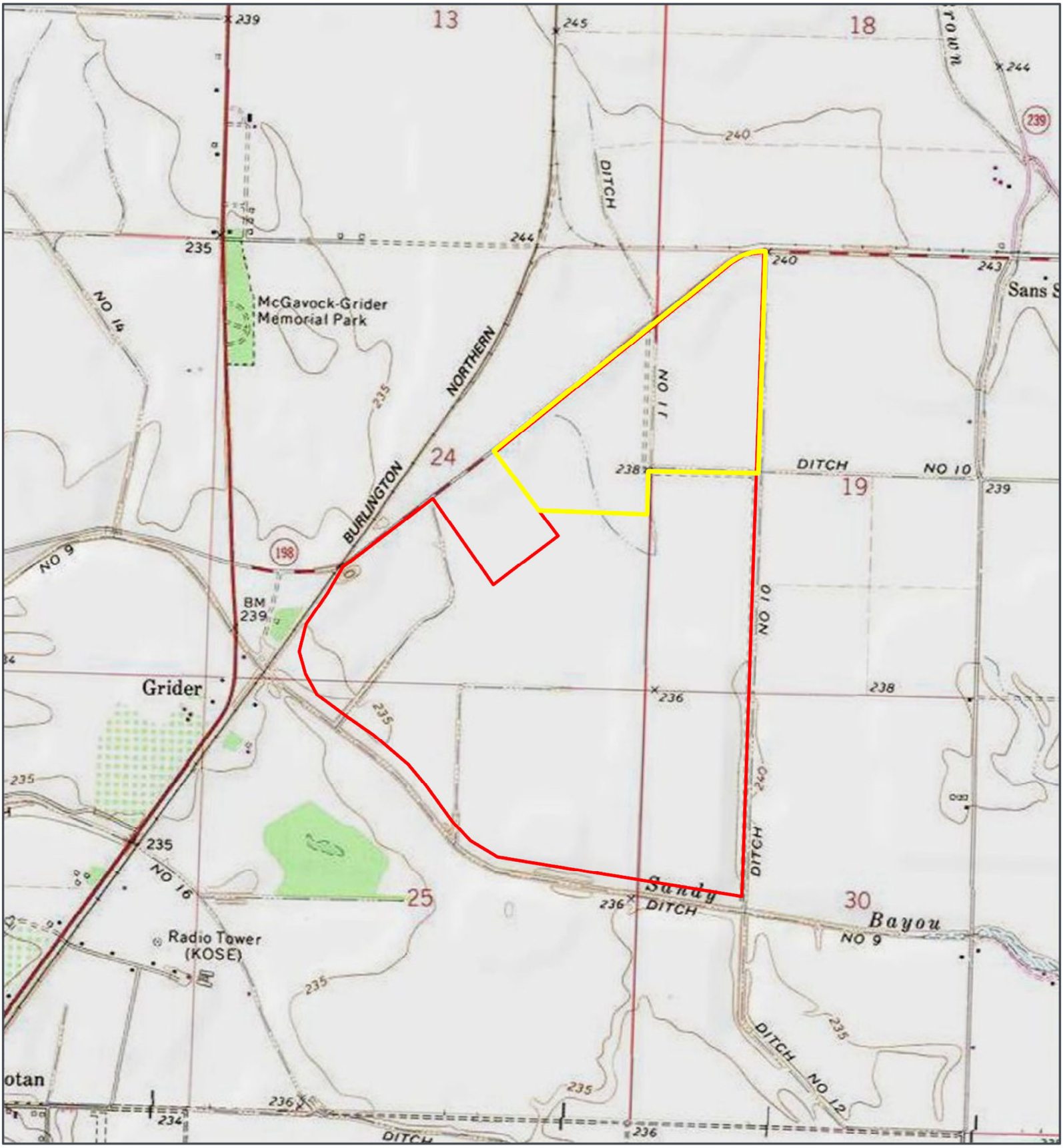
APPENDIX A

Vicinity and Delineation Maps



OHLENDORF TRUST PROPERTY
ENVIRONMENTAL SERVICES

Figure 1.
Vicinity Map

Project Area
Osceola 130

Mississippi County, AR
USGS 7.5' Quadrangle:
Osceola, AR, 35089-F8
12N 10E Section 24,25
12N 11E Section 18,19,30
NAD 1983 UTM Zone 16N
89.9687°W 35.643°N

Base Map: ESRI ArcGIS Online, accessed January 2021

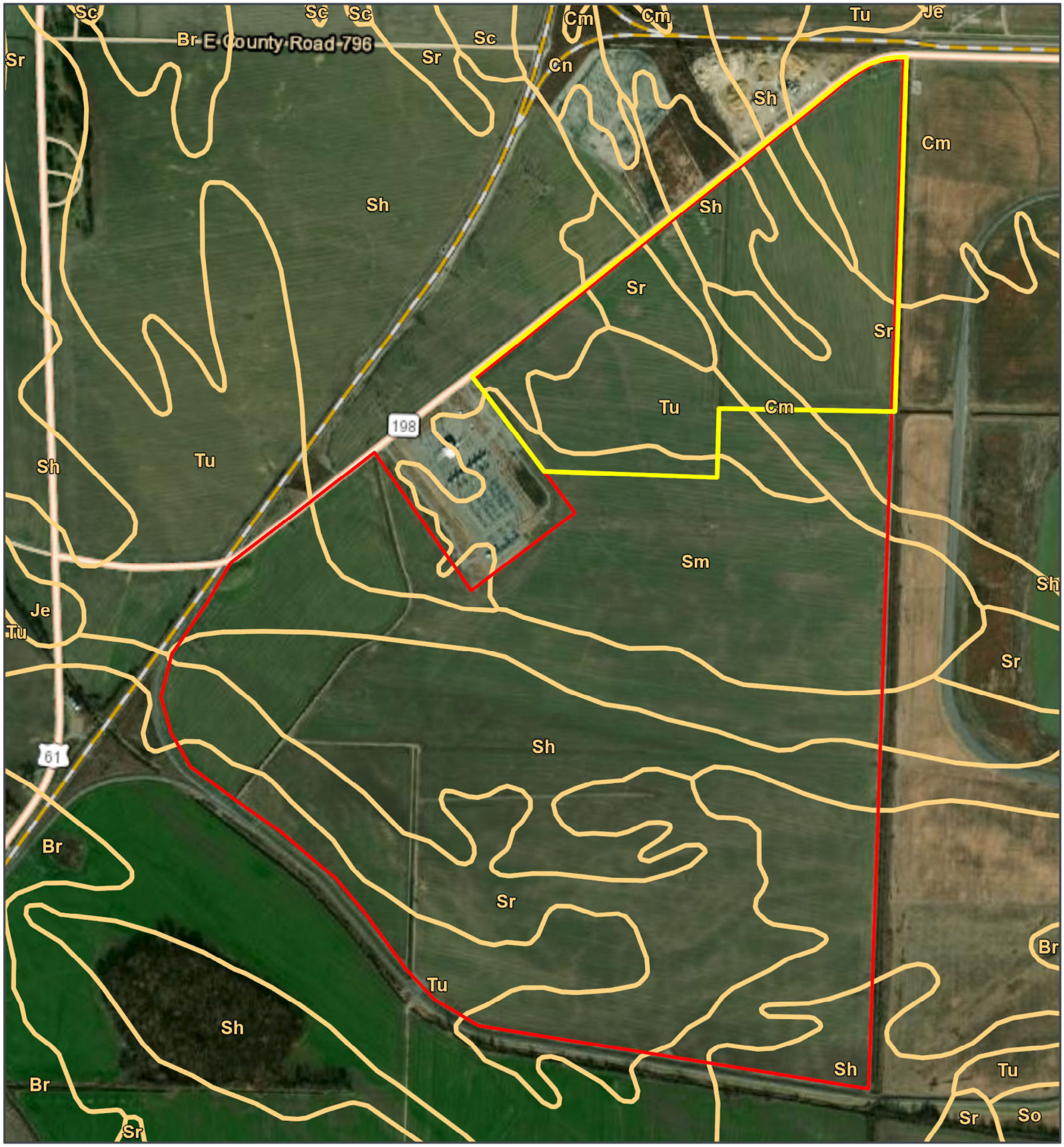
Updated: 1/28/2021
Project No. 64377
File: 64377 Ohlendorf Vicinity

N
1:24,000

Arkansas

0 1,000 2,000 Feet
0 320 640 Meters

SWCA®
ENVIRONMENTAL CONSULTANTS



OHLENDORF TRUST PROPERTY
ENVIRONMENTAL SERVICES

Figure 2.
Soil Map

Project Area
Osceola 130
Soil Unit

Mississippi County, AR
USGS 7.5' Quadrangle:
Osceola, AR, 35089-F8
12N 10E Section 24,25
12N 11E Section 18,19,30
NAD 1983 UTM Zone 16N
89.9687°W 35.643°N

N
1:15,000

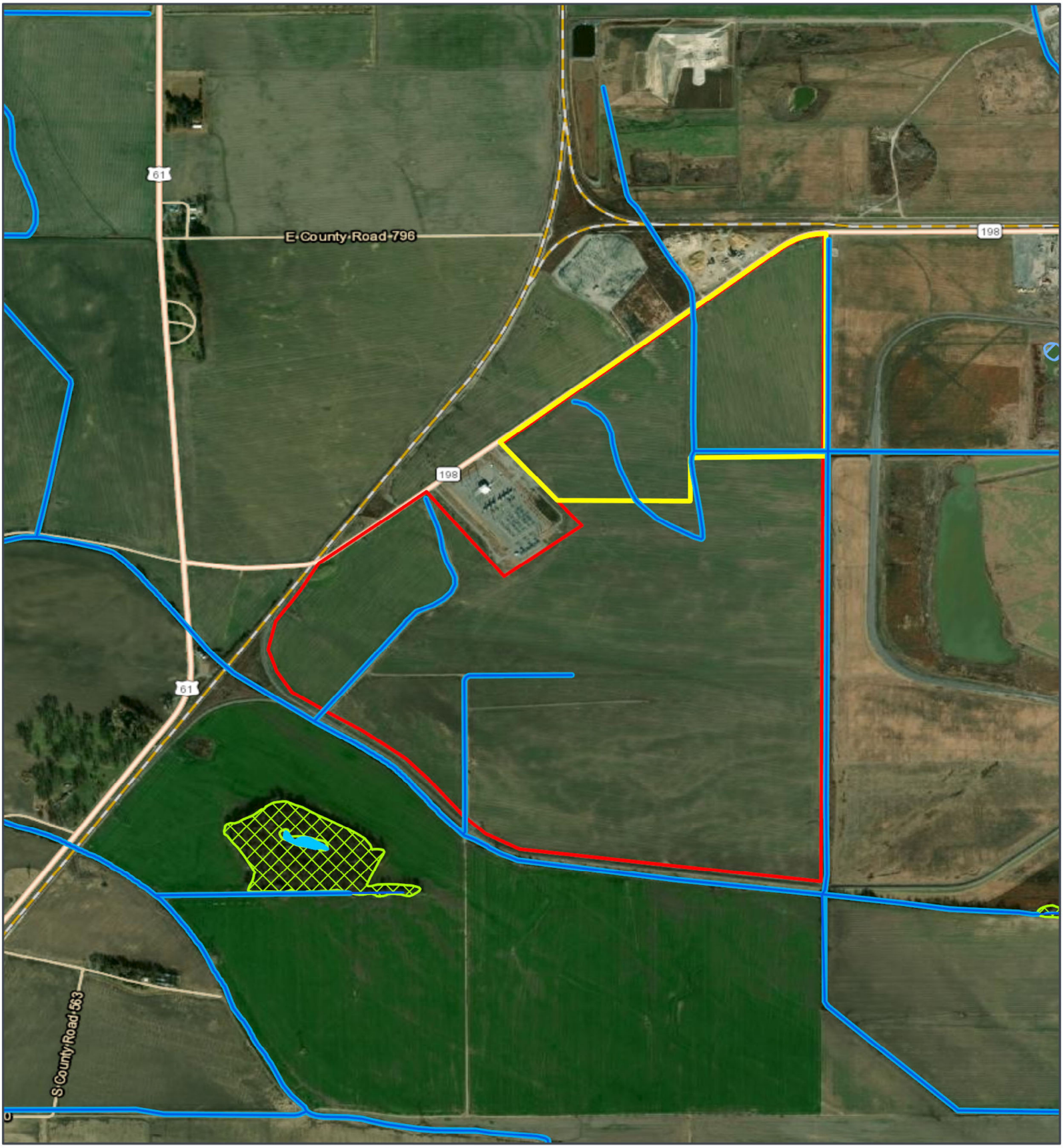
Arkansas

Base Map: ESRI ArcGIS Online, accessed January 2021

0 700 1,400 Feet
0 200 400 Meters

Updated: 1/28/2021
Project No. 64377
File: 64377 Ohlendorf Soils

SWCA®
ENVIRONMENTAL CONSULTANTS



OHLENDORF TRUST PROPERTY
ENVIRONMENTAL SERVICES

Figure 3.
NHD and NWI Map

- NHD Flowline
- NHD Waterbody
- Freshwater Forested Wetland
- Freshwater Pond
- Riverine
- Project Area
- Osceola 130

Mississippi County, AR
USGS 7.5' Quadrangle:
Osceola, AR, 35089-F8
12N 10E Section 24,25
12N 11E Section 18,19,30
GCS North American 1983
89.9693°W 35.6427°N

Base Map: ESRI ArcGIS Online, accessed January 2021

Updated: 1/28/2021
Project No. 64377
File: 64377 Ohlendorf Hydrography

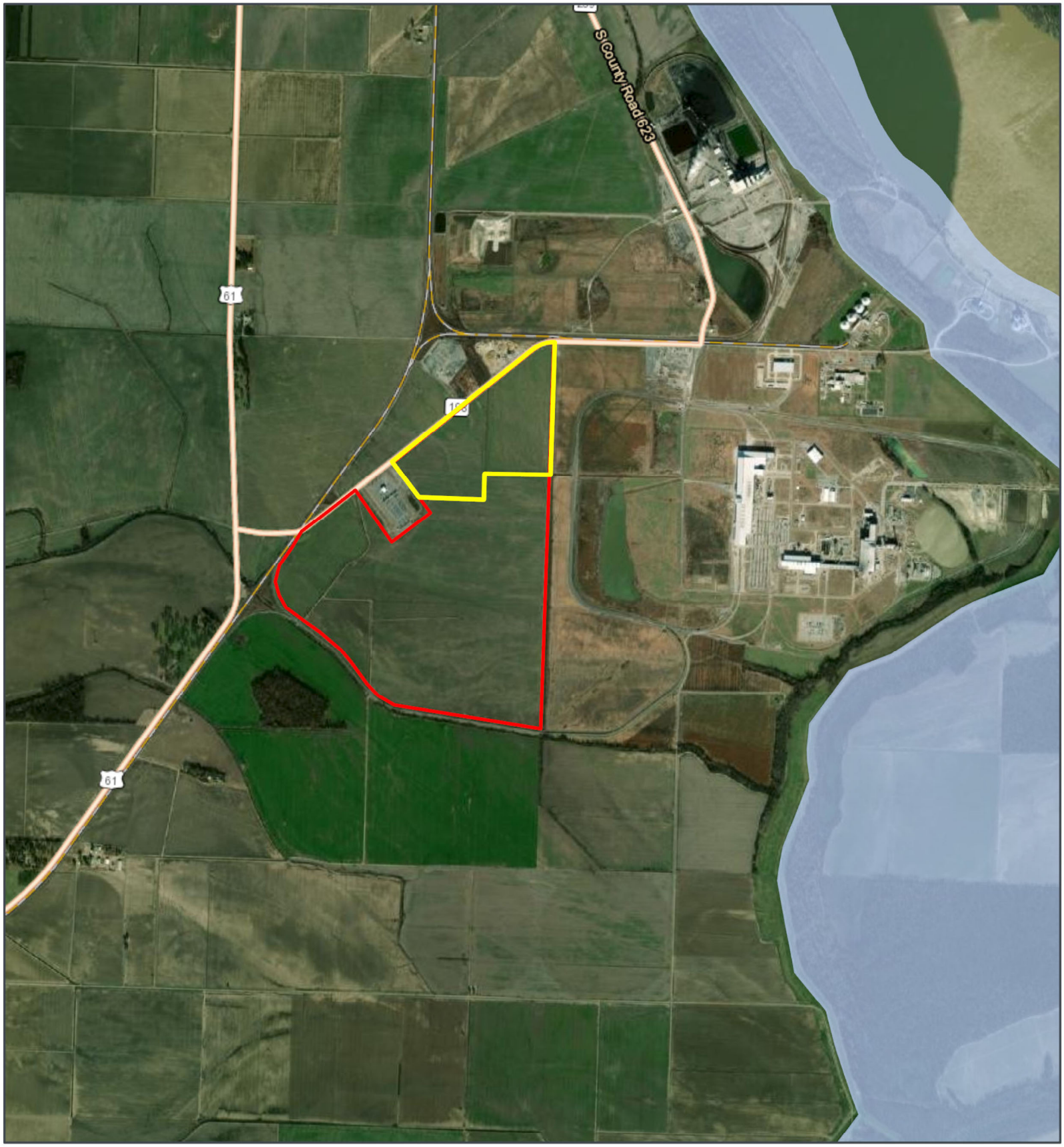
N

1:24,000

Arkansas

0 1,000 2,000 Feet
0 320 640 Meters

SWCA®
ENVIRONMENTAL CONSULTANTS



OHLENDORF TRUST PROPERTY
ENVIRONMENTAL SERVICES

Figure 4.
Floodplain Map

100-yr Floodplain
Project Area
Osceola 130

Mississippi County, AR
USGS 7.5' Quadrangle:
Osceola, AR, 35089-F8
12N 10E Section 24,25
12N 11E Section 18,19,30
NAD 1983 UTM Zone 16N
89.9606°W 35.6411°N

Base Map: ESRI ArcGIS Online, accessed January 2021

Updated: 1/28/2021
Project No. 64377
File: 64377 Ohlendorf Floodplain

N
1:40,000

Arkansas

0 1,000 2,000 Feet
0 530 1,060 Meters

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OHLENDORF TRUST PROPERTY
ENVIRONMENTAL SERVICES

Figure 5.
Delineation Map

- Data Point
- Photo Point
- Drainage Swale
- Ephemeral Ditch
- Intermittent Ditch
- Project Area
- Osceola 130

Mississippi County, AR
USGS 7.5' Quadrangle:
Osceola, AR, 35089-F8
12N 10E Section 24,25
12N 11E Section 18,19,30
NAD 1983 UTM Zone 16N
89.9687°W 35.643°N

Base Map: ESRI ArcGIS Online, accessed January 2021

Updated: 1/28/2021
Project No. 64377
File: 64377 Ohlendorf Delineation

N

1:15,000

Arkansas

0 700 1,400 Feet
0 200 400 Meters

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APPENDIX B

Field Datasheets

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

Project/Site: Ohlendorf Trust Property County: Mississippi Sampling Date: December 3, 2020
Applicant/Owner: Mississippi County, Arkansas Economic Development State: Arkansas Sample Point: DPA001_U
Investigator(s): H. Garner and H. Garner Section, Township, Range: S19-T12N-R10E
Landform (hillslope, terrace, etc.): Agricultural Field Local relief (concave, convex, none): None Slope (%): 0-5
Subregion (LRR or MLRA): Mississippi Delta Cotton and Feed Grains Region Lat: 35.642762° Long: -89.970737° Datum: NAD 1983 UTM Zone 15N
Soil Map Unit Name: Sharkey silty clay, 0 to 1 percent slopes, protected NWI Classification: Herbaceous Upland
Are climatic / hydrologic conditions on the site typical for this time of year? (Yes / No) Yes (if no, explain in Remarks.)
Are Vegetation **No**, Soil **No**, or Hydrology **No** significantly disturbed? Are "Normal Circumstances" present? Yes **X** No ____
Are Vegetation **No**, Soil **No**, or Hydrology **No** 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**	
Hydric Soil Present?	Yes ____	No **X**	**Is the Sampled Area within a Wetland?** Yes ____ No **X**
Wetland Hydrology Present?	Yes ____	No **X**	

Remarks:

This point was determined not to be within a wetland due to the lack of all three wetland criteria.

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): **N/A**
Water Table Present?	Yes ____	No **X**	Depth (inches): **>20**
Saturation Present? (includes capillary fringe)	Yes ____	No **X**	Depth (inches): **>20**

Wetland Hydrology Present? Yes ____ No **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No positive indication of wetland hydrology was observed.

VEGETATION (Five Strata) - Use scientific names of plants.

Sampling Point: **DPA001_U**

Tree Stratum (Plot size: 30 ft.)	Absolute % cover	Dominant Species?	Indicator Status
1. *None Observed*			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0		20% of total cover: 0	

Sapling Stratum (Plot size: 30 ft.)			
1. *None Observed*			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0		20% of total cover: 0	

Shrub Stratum (Plot size: 30 ft.)			
1. *None Observed*			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0		20% of total cover: 0	

Herb Stratum (Plot size: 30 ft.)			
1. *Glycine max*	10	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10 = Total Cover		
50% of total cover: 5		20% of total cover: 2	

Woody Vine Stratum (Plot size: 30 ft.)			
1. *None Observed*			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0		20% of total cover: 0	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **0** (A)

Total Number of Dominant Species Across All Strata: **1** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **0** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**N/A**	x 1 =	**N/A**
FACW species	**N/A**	x 2 =	**N/A**
FAC species	**N/A**	x 3 =	**N/A**
FACU species	**N/A**	x 4 =	**N/A**
UPL species	**N/A**	x 5 =	**N/A**
Column Totals:	**N/A** (A)		**N/A** (B)

Prevalence Index = B/A = **N/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 Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** _____ **No** **X**

Remarks: (if observed, list morphological adaptations below).

No positive indication of hydrophytic vegetation was observed (≥50% of dominant species indexed as FAC− or drier).

SOIL

Sampling Point: **DPA001_U**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-9	10YR 4/2	100	None	—	—	—	Loamy Sand	
9-20	10YR 5/3	100	None	—	—	—	Loamy Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soils 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)**
____ 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 Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) **(LRR O)**
____ 2 cm Muck (A10) **(LRR S)**
____ Reduced Vertic (F18) **(outside MLRA 150A,B)**
____ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
____ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
____ Red Parent Material (TF2)
____ Very Shallow Dark Surface (TF12)
____ 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:

No positive indication of hydric soils was observed.

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

Project/Site: Ohlendorf Trust Property County: Mississippi Sampling Date: December 10, 2020
Applicant/Owner: Mississippi County, Arkansas Economic Development State: Arkansas Sample Point: DPA002_U
Investigator(s): H. Garner and H. Garner Section, Township, Range: S24-T12N-R11E
Landform (hillslope, terrace, etc.): Agricultural Field Local relief (concave, convex, none): None Slope (%): 0-5
Subregion (LRR or MLRA): Mississippi Delta Cotton and Feed Grains Region Lat: 35.646166° Long: -89.960094° Datum: NAD 1983 UTM Zone 15N
Soil Map Unit Name: Steele silty clay loam NWI Classification: Herbaceous Upland
Are climatic / hydrologic conditions on the site typical for this time of year? (Yes / No) Yes (if no, explain in Remarks.)
Are Vegetation **No**, Soil **No**, or Hydrology **No** significantly disturbed? Are "Normal Circumstances" present? Yes **X** No ____
Are Vegetation **No**, Soil **No**, or Hydrology **No** 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**	
Hydric Soil Present?	Yes ____	No **X**	**Is the Sampled Area within a Wetland?** Yes ____ No **X**
Wetland Hydrology Present?	Yes ____	No **X**	

Remarks:

This point was determined not to be within a wetland due to the lack of all three wetland criteria.

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): **N/A**
Water Table Present?	Yes ____	No **X**	Depth (inches): **>20**
Saturation Present? (includes capillary fringe)	Yes ____	No **X**	Depth (inches): **>20**

Wetland Hydrology Present? Yes ____ No **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No positive indication of wetland hydrology was observed.

VEGETATION (Five Strata) - Use scientific names of plants.

Sampling Point: **DPA002_U**

Tree Stratum (Plot size: 30 ft.)	Absolute % cover	Dominant Species?	Indicator Status
1. *None Observed*			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0		20% of total cover: 0	

Sapling Stratum (Plot size: 30 ft.)			
1. *None Observed*			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0		20% of total cover: 0	

Shrub Stratum (Plot size: 30 ft.)			
1. *None Observed*			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0		20% of total cover: 0	

Herb Stratum (Plot size: 30 ft.)			
1. *Glycine max*	10	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10 = Total Cover		
50% of total cover: 5		20% of total cover: 2	

Woody Vine Stratum (Plot size: 30 ft.)			
1. *None Observed*			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0		20% of total cover: 0	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **0** (A)

Total Number of Dominant Species Across All Strata: **1** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **0** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**N/A**	x 1 =	**N/A**
FACW species	**N/A**	x 2 =	**N/A**
FAC species	**N/A**	x 3 =	**N/A**
FACU species	**N/A**	x 4 =	**N/A**
UPL species	**N/A**	x 5 =	**N/A**
Column Totals:	**N/A** (A)		**N/A** (B)

Prevalence Index = B/A = **N/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 Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** _____ **No** **X**

Remarks: (if observed, list morphological adaptations below).

No positive indication of hydrophytic vegetation was observed (≥50% of dominant species indexed as FAC− or drier).

SOIL

Sampling Point: **DPA002_U**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-9	10YR 4/2	100	None	—	—	—	Loamy Sand	
9-20	10YR 5/3	100	None	—	—	—	Loamy Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soils 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)**
____ 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 Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

____ 1 cm Muck (A9) **(LRR O)**
____ 2 cm Muck (A10) **(LRR S)**
____ Reduced Vertic (F18) **(outside MLRA 150A,B)**
____ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
____ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
____ Red Parent Material (TF2)
____ Very Shallow Dark Surface (TF12)
____ 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:

No positive indication of hydric soils was observed.

APPENDIX C

Photographic Log

Aquatic Features

Photo C-1. Ephemeral ditch SA001 (at PP001) facing west.

Photo C-2. Intermittent stream SA002 (at PP002) facing north.

Photo C-3. Intermittent ditch SA003 (at PP003) facing south.

Photo C-4. Drainage swale SA004 (at PP004) facing east.

UPLAND DATAPOINTS

Photo C-5. Herbaceous upland (DPA001_U) facing southwest through a plowed soybean agricultural field.

Photo C-6. Herbaceous upland (DPA002_U) facing south through a plowed soybean agricultural field.

APPENDIX D

Soil Map Unit Descriptions

Map Unit Description (Brief, Generated)

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 in this report, along with the maps, provide information on the composition of map units and properties of their components.

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.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief, Generated)

Mississippi County, Arkansas

Map Unit: Cm—Commerce silt loam, 0 to 1 percent slopes, north

Component: Commerce (90%)

The Commerce component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on natural levees on Mississippi River alluvial plains. The parent material consists of loamy 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 not flooded. It is not ponded. A seasonal zone of water saturation is at 22 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. The calcium carbonate equivalent within 40 inches, typically, does not exceed 1 percent.

Component: Aquepts (10%)

Generated brief soil descriptions are created for major soil components. The Aquepts soil is a minor component.

Map Unit: Sh—Sharkey silty clay, 0 to 1 percent slopes, protected

Component: Sharkey (90%)

The Sharkey component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on backswamps on Mississippi River alluvial plains. The parent material consists of clayey alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is very high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 4w. This soil meets hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Component: Dowling (4%)

Generated brief soil descriptions are created for major soil components. The Dowling soil is a minor component.

Component: Tunica (3%)

Generated brief soil descriptions are created for major soil components. The Tunica soil is a minor component.

Component: Commerce (3%)

Generated brief soil descriptions are created for major soil components. The Commerce soil is a minor component.

Map Unit: Sm—Sharkey-Steele complex, 0 to 1 percent slopes

Component: Sharkey (60%)

The Sharkey component makes up 60 percent of the map unit. Slopes are 0 to 1 percent. This component is on backswamps on Mississippi River marine terraces. The parent material consists of clayey alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is very high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3w. This soil meets hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 3 percent.

Component: Steele (30%)

The Steele component makes up 30 percent of the map unit. Slopes are 0 to 1 percent. This component is on backswamps, marine terraces. The parent material consists of sandy alluvium over clayey alluvium. Depth to a root restrictive layer is greater than 60 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 moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, March, April, May. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Component: Hayti (5%)

Generated brief soil descriptions are created for major soil components. The Hayti soil is a minor component.

Component: Mhoon (5%)

Generated brief soil descriptions are created for major soil components. The Mhoon soil is a minor component.

Map Unit: Sr—Steele silty clay loam

Component: Steele (80%)

The Steele component makes up 80 percent of the map unit. Slopes are 0 to 1 percent. This component is on alluvial flats, meander belts. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 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 moderate. This soil is rarely flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, March, April, May. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3w. This soil does not meet hydric criteria.

Component: Aquents (10%)

Generated brief soil descriptions are created for major soil components. The Aquents soil is a minor component.

Component: Tunica, flooded, long (5%)

Generated brief soil descriptions are created for major soil components. The Tunica, flooded, long soil is a minor component.

Component: Sharkey (5%)

Generated brief soil descriptions are created for major soil components. The Sharkey soil is a minor component.

Map Unit: Tu—Tunica silty clay, 0 to 1 percent slopes

Component: Tunica (93%)

The Tunica component makes up 93 percent of the map unit. Slopes are 0 to 1 percent. This component is on backswamps, alluvial plains. The parent material consists of clayey alluvium over loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 5 inches during January, February, March, April, December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3w. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Component: Sharkey (7%)

Generated brief soil descriptions are created for major soil components. The Sharkey soil is a minor component.

Data Source Information

Soil Survey Area: Mississippi County, Arkansas
Survey Area Data: Version 18, Jun 9, 2020