**Dewberry**

ARCHITECTS ENGINEERS CONSULTANTS

# Draft Environmental Assessment

Tulsa Port of Catoosa
Barge Fleeting Area Project
Rogers County, Oklahoma
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# Draft Environmental Assessment

**Tulsa Port of Catoosa**
**Barge Fleeting Area Project**
**Rogers County, Oklahoma**

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ABFE | advisory base flood elevation |
| ACHP | Advisory Council on Historic Preservation |
| APE | Area of Potential Effects |
| AST | Aboveground Storage Tank |
| | |
| BFA | Barge Fleeting Area |
| BFFA | Barge Fleeting Fill Area |
| bgs | below ground surface |
| BMP | Best Management Practice |
| | |
| CAA | Clean Air Act |
| CAS | Cojeen Archaeological Services, LLC |
| CEQ | Council on Environmental Quality |
| CERC-NFRAP | Comprehensive Environmental Response, Compensation, and Liability Information System-No Further Remedial Action Planned |
| CFR | Code of Federal Regulations |
| CO | carbon monoxide |
| CORRACTS | Correction Action Report |
| CRS | cultural resource survey |
| CWA | Clean Water Act |
| CY | cubic yards |
| CZMA | Coastal Zone Management Act |
| | |
| dB | decibel |
| DFIRM | Digital Flood Insurance Rate Map |
| DNL | Day-Night Average Sound Level |
| | |
| EA | Environmental Assessment |
| EO | Executive Order |
| EPA | U.S. Environmental Protection Agency |
| ESA | Environmental Site Assessment |
| | |
| GLO | General Land Office |

| | |
|---|---|
| FEMA | Federal Emergency Management Agency |
| FINDS | Facility Index Systems/Facility Registry System |
| FIRM | Flood Insurance Rate Map |
| FONSI | Finding of No Significant Impact |
| FPPA | Farmland Protection Policy Act |
| | |
| HIST LUST | Historic Leaking Underground Storage Tank |
| | |
| IO | Isolated Occurrences of Artifact |
| | |
| LUST | Leaking Underground Storage Tank |
| | |
| MSL | mean sea level |
| MKARNS | McClellan-Kerr Arkansas River Navigation System |
| | |
| National Register | National Register of Historic Places |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| NISTAC | Nationwide Infrastructure Support Technical Assistance Consultants |
| $NO_2$ | nitrogen dioxide |
| NOAA | National Oceanic and Atmospheric Administration |
| NORM | Naturally Occurring Radioactive Material |
| NPDES | National Pollutant Discharge Elimination System |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NWI | National Wetlands Inventory |
| | |
| OAS | Oklahoma Archaeological Survey |
| ODEQ | Oklahoma Department of Environmental Quality |
| ONHIP | Oklahoma Natural Heritage Inventory Program |
| $O_3$ | ozone |
| OSHA | Occupational Safety and Health Administration |
| | |
| PA | Preferred Alternative |

| | |
|---|---|
| Pb | lead |
| PEM | Palustrine emergent wetlands |
| $PM_{2.5/10}$ | particulate matter less than 2.5 microns/10 microns |
| PSS | Palustrine scrub-shrub wetlands |
| Port | Tulsa Port of Catoosa |
| Port Authority | City of Tulsa-Rogers County Port Authority |
| | |
| RCRA-CESQG | Resource Conservation and Recovery Act-Conditionally Exempt Small Quantity Generators |
| RCRA-NonGen | Resource Conservation and Recovery Act-Non Generators |
| RM | River Mile |
| | |
| SHPO | State Historic Preservation Office |
| $SO_2$ | sulfur dioxide |
| SWP3 | Stormwater Pollution Prevention Plan |
| | |
| THPO | Tribal Historic Preservation Officer |
| TRIS | Toxic Chemical Release Inventory System |
| | |
| U.S. | United States |
| USACE | U.S. Army Corps of Engineers |
| USCB | U.S. Census Bureau |
| USDA | U.S. Department of Agriculture |
| USFWS | U.S. Fish and Wildlife Service |
| UST | Underground Storage Tank |

# 1.0 INTRODUCTION

This Environmental Assessment (EA) was prepared by Dewberry Engineers Inc. (Dewberry), on behalf of the Tulsa Port of Catoosa (Port), in support of two federal actions which are necessary for the proposed expansion of the Port's Barge Fleeting Area (BFA). These two federal actions are: the conveyance or lease of United States Army Corps of Engineers (USACE) owned land to the Port, and the authorization through permits issued by the USACE under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

Alternatives to each federal action and their potential impacts were analyzed in accordance with the National Environmental Policy Act (NEPA) of 1969 (PL 91-190) and all other applicable laws to support the intent of NEPA by ensuring that applicable environmental information is available to other federal, state, and local agencies and the general public. In addition, under the Section 404(b)(1) guidelines, the USACE may only permit discharges of dredged or fill material into waters of the United States that represent the least damaging practicable alternative, so long as the alternative does not have other significant adverse environmental consequences. Guidance to prepare this EA and ensure compliance with NEPA are contained in the Council on Environmental Quality Regulations for Implementing NEPA (40 CFR 1500 through 1508), NEPA Scope of Analysis (USACE 33 CFR Parts 230 and 325, February 3, 1988), and USACE Engineering Regulation (ER) 200-2-2, Procedures for Implementing NEPA (March 4, 1988). This EA discloses the potential environmental impacts anticipated from both proposed actions which are necessary to provide a safe and efficient location for the Port towboat operator to store and moor barges within the Port's terminal basin.

The USACE's regulatory authority over this project stems from Section 10 of the Rivers and Harbors Act of 1899, USC 403, which governs activities in "Navigable Waters of the United States" as defined in the Code of Federal Regulations, 33 CFR 322.2, and Section 404 of the Clean Water Act, Public Laws 92-500 and 95-217, which governs the discharge of dredged or fill material in "Waters of the United States."

## 1.1 Project Description

### 1.1.1 Port Location

The Port (**Photo 1-1**) is situated on the northeastern edge of Tulsa, Oklahoma, in Rogers County, at the head of navigation for the McClellan-Kerr Arkansas River Navigation System (MKARNS). This 445-mile long waterway links Oklahoma and the surrounding five-state area with ports on the 25,000-mile long U.S. inland waterway system, as well as to domestic and foreign ports beyond, by way of the Mississippi River and New Orleans, 1,044 river miles to the east and south.

**Photo 1-1**: Aerial view of the Port.

### 1.1.2 Port Establishment and Ownership

The 2,500-acre Port complex was acquired and initially developed using the proceeds of a $21.2 million general obligation bond issued by the citizens of the City of Tulsa and Rogers County. Together, they formed The City of Tulsa-Rogers County Port Authority (Port Authority), an agency of the State of Oklahoma, to be the landlord/developer for the Port under a 99-year lease.

The Port opened for business in December 1970, concurrent with the opening of the MKARNS. Its first barge load of material, consisting of 600 tons of newsprint, arrived on January 21, 1971.

### 1.1.3 Port Authority Mission

The Port Authority's mission is to encourage industries that would regularly employ economical and environmentally friendly barge transportation to locate operations at the Port. As a result, over 60 percent of the Port's current industrial base either ship by barge, or buy from those who do, at least once annually.

### 1.1.4 Port Operation

The largest volume commodities handled at the Port are grains (wheat) and fertilizers. Wheat is planted on Midwest farms in the fall and spring of each year. The harvest of winter wheat begins in mid-May and continues through mid-July within the region served by the Port. After a few weeks, the spring wheat harvest begins in mid-August and continues through mid-September. Winter wheat is planted in mid-August through October, while spring wheat is planted April through May. Fertilizers are imported during planting seasons and the wheat is exported during harvests. On average, while it only takes a matter of hours to transfer wheat from the field to the local grain cooperative, it may take several weeks to transport the wheat from the cooperative to the Port's grain terminals by truck or railcar and then another several weeks to load onto a barge for transportation to a Gulf Coast port for export overseas. However, during the time between off-loading the fertilizer and loading of the wheat, these barges must be stored. While the timeframes for winter wheat planting and spring wheat harvest seem to overlap, the same is not true for the spring wheat planting and winter wheat harvest. There is approximately a four-week gap and it is during this time when eastern Oklahoma often receives its largest rainstorms, some of which result in high water events along either the Verdigris River or Bird Creek or both.

Currently, empty barges are stored within the Port's terminal basin, moored at times at the asphalt, petroleum, nitrogen, and molasses terminal docks when they are not in use. When a specific commodity designated barge tow is approaching, the Port will receive a 48-hour notice from the designated towboat captain of the tow's impending arrival. It is the Port towboat operator's responsibility to clear the specific dock of stored barges within the subsequent 48 hours. Upon the designated tow's arrival, the tow's barges are immediately off-loaded and the tow is turned around to begin its return trip. In the Port's current configuration, designated tows put a great deal of pressure on the Port towboat operator. In addition, the efficiency of the Port towboat operator is interrupted by having to stop what they were doing to move stored barges from a specific dock until the designated tow has come and gone.

### 1.1.5 Proposed Project

The Port has proposed to construct, operate, and maintain a BFA at the former Verdigris River channel at approximately Verdigris River Mile 50 (**Figure 1-1**). The BFA would be used to store both empty and loaded barges prior to and after transfer of cargo at the existing Port terminal. In effect, the proposed BFA would serve as a temporary "parking lot" for the barges using the docks. **Figure 1-2** shows the relative location of the proposed BFA and the applicant's existing terminal.

The proposed BFA would be located west of the MKARNS Navigation Channel, south of the Bird Creek Cut-off, east of the former Bird Creek channel and north of the Burlington Northern Santa Fe Railroad. It would have a 2,300-foot long, 300-foot wide toe-to-toe mooring area and the capacity to store more than 60 barges, assuming the barges are the standard, covered hopper barge size of 195 feet long by 35 feet wide. Barges would be moored three-abreast on both sides of the BFA, with 90 feet of clear water between the moored barges to allow for towboat operations.

The BFA would be constructed with three vertical to one horizontal, grassed side slopes. Rock riprap would be placed on the side slopes of the BFA from 10 feet above the normal pool water surface to the slope toe for stabilization due to minor wave action. Mooring deadmen and cables would be installed high on the side slopes along each bank for the barges to be tied off to. It is estimated that there would be 1.55 million cubic yards of excavation; approximately 1.225 million cubic yards of this material would be hauled to the proposed Barge Fleeting Fill Area (BFFA), located across Bird Creek from the BFA. The remaining excavated material would be used within the BFA to achieve final grades.

In order for construction of the BFA to proceed, the Port proposes to acquire approximately 87 acres, through a lease of USACE-owned property located immediately south of and adjacent to the Port's existing facility. Portions of the site were once used as a dredge disposal facility, but have not been used as such since the construction of the MKARNS. The property is a triangular island parcel bounded by the Bird Creek Constructed Channel (called the Bird Creek Cut-off) to the north, the former Bird Creek channel to the west, and the former Verdigris channel to the east, all of which are shallow watercourses. The properties on the opposite banks of these watercourses are currently owned by the Port. Given its distance from the MKARNS navigation channel and the generally shallow depth of the streams surrounding it, the USACE has abandoned its use of this property as a dredge disposal facility in favor of using three other dredge disposal facilities directly adjacent to the MKARNS. This former disposal facility has not been used as such by the USACE since the Port became operational in 1971 and the USACE does not intend to use this facility in the future (McQueen, Personal Communications, 2009). Under the MKARNS Land Use Allocations, it is zoned for industrial use and identified in various USACE documents as "Cut-off 18-12."

## 1.2 Project Purpose and Need

### 1.2.1 Purpose

The purpose of this proposed action is to provide a safe and efficient location for the Port towboat operator to store and fleet barges outside of the Port's existing slack-water terminal area. The construction of the BFA will allow the Port towboat operator to move demurred barges to a location outside the slack-water terminal basin and to position active barges at their respective commodity terminals for loading / offloading. This additional maneuvering room will ultimately allow the Port towboat operator to be able to reposition a greater number of barges within the normal business day.

### 1.2.2 Need

Commercial transportation on the MKARNS is anticipated to increase as a result of steady growth in river transportation in the nation, especially within the inland navigation system. As river transportation increases, the need for barge fleeting is expected to increase proportionally with increased use of the navigation system. In order to sustain the current demand for waterways transportation and accommodate future Port needs arising from the forecasted growth and increase in commercial navigation, additional area to efficiently fleet and maneuver barges is needed. Logistically and economically, the location of any additional fleeting needs to be situated adjacent to, or geographically close to their existing industrial facility and current fleeting operational area to best serve their customers.

<u>Barge Storage and Operational Flexibility</u>

The Port currently loads and unloads, on average, 45 barges per day in the Port terminal area. The Port's towboat and fleet operators have indicated that their ability to fleet barges (storage and delivery operations) is adversely affected once the number of barges in the Port terminal exceeds 60. It is quite common in the springtime for there to be more than 100 barges in the Port terminal basin at any time. Springtime in the Midwest brings rain; this is when many crops are planted, which requires fertilizer brought in on barges. Winter wheat, which is loaded on and transported via barges, is also harvested at this time throughout the Colorado-Kansas-Oklahoma-Texas region. Large rain events can result in high water flooding within the Arkansas and Mississippi River basins. Such flooding results in the number of barges exceeding 140 in the Port terminal area. The barges are held at the Port until river levels drop, due to the difficulty for towboat captains to control their tows when traveling downstream.

An example of this barge congestion in the Port terminal area was experienced during the May 2008 high-water event. **Photos** 1-2 and 1-3 taken during that period show over 140 barges moored within the Port channel. Most of these barges are loaded with the year's winter wheat harvest and were ready to be moved downstream to New Orleans for shipment overseas. As the **Photos** attest, space for the towboats to maneuver around the moored barges was pinched in several locations. Harvested wheat continued to be brought into the Port by rail from Kansas and points beyond, so space had to be held open at the Port's three dry bulk operations, due to limited silo storage.

Due to the Port channel congestion, clear water between moored barges can be less than 70 feet (**Photo 1-2**). The width of a standard barge is 35 feet, which does not provide ample maneuvering room and limits the towboat operators to moving one barge at a time, as shown in **Photo 1-3**.

**Photo 1-2:** Barge congestion at the Port.

**Photo 1-3:** During barge congestion in the Port channel, maneuvering room for towboat operators is extremely compromised.

Construction of a new BFA would provide additional mooring space, thus reducing congestion and providing the towboat captains greater operational flexibility.

### Anticipated Port Growth

Over 69 million tons of cargo, in over 42,800 barges, has been handled at the Port from January 1971 through May 2012. The current average annual barge cargo volume at the Port over the past five years is 2.2 million tons in 1,250 barges. It is projected that this cargo volume would increase by a minimum of 100,000 tons per year in 65 barges over the next decade. By 2022 the Port would be realizing an average annual barge shipping volume of 3.2 million tons in a little over 2,100 barges. These projections are even more significant given that the MKARNS navigation channel is anticipated to be deepened as authorized in Section 136 of the Energy and Water Development Appropriations Act of 2004, which authorized a navigation project depth of 12 feet for the MKARNS. The MKARNS Environmental Impact Statement (2005) addressed the issues and impacts associated with river flow management, navigation channel depth increase, and navigation channel depth maintenance within the MKARNS. Currently, commercial navigation is not at optimum productivity within the MKARNS since its nine-foot draft navigation channel limits towboat loads compared to the Lower Mississippi River's authorized 12-foot draft channel. Therefore, the MKARNS is currently undergoing expansion from a nine-foot to 12-foot draft channel as future federal funding allows.

This growth projection is primarily based on the Panama Canal Expansion project currently under construction and anticipated to be completed in late 2015. With these improvements, container ships from the Far East which currently cannot sail into the Gulf of Mexico without taking a circuitous route around the cape of South America, must off-load their containers at western U.S. ports such as San Diego, Long Beach, and Oakland. The Panama Canal widening improvements would allow even the mega-container ships to pass through the canal and sail into ports such as Mobile, Galveston, and New Orleans. Containers destined for the middle and upper Midwest can be off-loaded directly onto Port bound barges. It is anticipated that soon after the initial arrival of these ships in New Orleans, regularly scheduled Container-on-Barge service would be initiated to the Port.

Typically, when an area sees a significant increase in container traffic, a regional transload facility is developed by a railroad or trucking company. The Port is ideally located for such a facility. The Port not only has access to an inland navigation system that is connected to the world, but also has access to two Class 1 railroads (Burlington Northern Santa Fe and Union Pacific) and a Class 3 railroad (Southern Kansas and Oklahoma), and is in close proximity to the interstate highway system. In addition, the Tulsa International Airport is located less than ten miles to the west, with world class aerospace industrial facilities immediately adjacent to the main north-south runway.

Other cargos that can be economically transported by barge periodically come into play. The federal government's recent scrutiny of the Keystone Pipeline construction has renewed interest in the transportation of bulk crude oil on the MKARNS. A plan currently being tested entails the transport of crude oil from Cushing, Oklahoma by tanker truck to the Port and loading the oil into tank barges for transport to Gulf Coast refineries.

Another bulk cargo transported by barge from the Port is scrap steel. There is a profitable market for scrap steel from the United States to be purchased by Far East steel manufacturers. The scrap is loaded into covered hopper barges and towed across the Pacific Ocean directly to its destination.

The latest commodity considered for transport by barges is sand used in the hydraulic fracturing (fracking) process during natural gas well production. The fracking process pumps a liquid/sand/chemical mixture into new and existing natural gas wells to create space between layers of natural gas bearing shales. Once fissures are created, the natural gas can escape from the shale and be collected above ground for processing. It has been estimated that to complete an average natural gas well, it takes 1.5 million cubic feet of fracking sand. Both the Port of Muskogee and Port of Catoosa have been contacted about off-loading multiple barges of sand in the past several months. Domestic natural gas exploration remains active, especially with dramatically fluctuating oil prices in recent years.

The Port terminal is currently home to approximately 65 industrial facilities employing an estimated 3,500 people. Over the past five years, it has realized an average of three new industrial locations/expansions annually. Upon reaching total development, the Port expects to have 100 industries employing over 5,000 people. The current consortium of industries in operation at the Port have invested over $1 billion in capital improvements, while generating annual payrolls exceeding $150 million.

# 2.0 ALTERNATIVES ANALYSIS

## 2.1 Introduction

As described earlier, the proposed project involves two federal actions: the lease of USACE owned land to the Port and the authorization of permits by the USACE under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Alternatives considered for each action are summarized below.

### 2.1.1 Federal Action #1 – Real Estate Instrument/Property Access

#### 2.1.1.1 Alternative 1: Conveyance of Property - Federal Property and Administrative Services Act

Under this alternative, the needed property would be transferred by a public sale, negotiated sale or public benefit conveyance to the Port pursuant to the requirements of the Federal Property Act. Under this authority, properties undergo US Department of Defense, federal agency and homeland security screening before being determined to be eligible for a negotiated sale of public benefit conveyance. Property with a value in excess of $50,000 must be turned over to the General Services Administration (GSA) for disposal. The GSA conducts the aforementioned federal and homeland security screening and determines which disposal method is in the best interest of the federal government. A disposal under this authority would also be subject to congressional reporting as specified in 10 USC § 2668, which states that all disposals in excess of $750,000 must be presented and reviewed by the Committee on Armed Services of the Senate and the Committee on Armed Services of the House of Representatives. This method of conveyance involves a high level of risk because the Department of Defense and other federal agencies, as well as homeless organizations, would have an opportunity to obtain the property through the screening process before it would be offered for sale by the GSA. Once the screening process is complete, the GSA would then sell the subject property by public auction.

#### 2.1.1.2 Alternative 2: Granting an Easement

Under this alternative, the Port would have legal access to use the property through a long-term, 50-year easement agreement pursuant to 10 USC § 2668, which reads:

> *If the Secretary of a military department finds that it will not be against the public interest, the Secretary may grant, upon such terms as the Secretary considers advisable, easements for rights-of-way over, in, and upon public lands permanently withdrawn or*

*reserved for the use of that department, and other lands under the Secretary's control for—*

1) *railroad tracks;*
2) *gas, water, sewer, and oil pipe lines;*
3) *substations for electric power transmission lines and pumping stations for gas, water, sewer, and oil pipe lines;*
4) ***canals;***
5) *ditches;*
6) *flumes;*
7) *tunnels;*
8) *dams and reservoirs in connection with fish and wildlife programs, fish hatcheries, and other improvements relating to fish-culture;*
9) *roads and streets;*
10) *poles and lines for the transmission or distribution of electric power;*
11) *poles and lines for the transmission or distribution of communications signals (including telephone and telegraph signals);*
12) *structures and facilities for the transmission, reception, and relay of such signals; and*
13) *any other purpose that the Secretary considers advisable.*

This alternative allows for the Tulsa District Chief of Real Estate to enter into a non-competitive easement agreement with the Port for a term not to exceed 50 years. The interest granted under this agreement would authorize the Port to build, operate and maintain a canal (BFA) on the subject property. This is a relatively low-risk alternative because the proposed usage and execution authority are clearly defined in 10 USC § 2668, and both are within the authority delegated to the Tulsa District Chief of Real Estate.

#### 2.1.1.3 Alternative 3: Lease (Preferred Alternative)

Under this alternative, the subject parcel would be leased to the Port pursuant to 10 USC § 2667, which is the general leasing authority of the military departments and is used for all Department of the Army leasing that is not specifically authorized by other statutes. Leases granted under this authority must satisfy the requirements of the statute, which read:

a. *The lease has been determined to promote the national defense or be in the public's interest;*
b. *The property is under the control of the Army;*
c. *The property is not for the time needed for public use;*
d. *The property is not excess property, as defined by Section 3 of the Federal Property and Administrative Services Act of 1949, as amended;*

*e. The lease will not be for more than 5 years, unless the Secretary determines that a longer period will promote the national defense or the public interest;*

*f. The interest of the lessee of property leased under this section may be taxed by State or local governments. All leases shall provide that, if and to the extent that leased property is later made taxable by state or local governments under an act of Congress, the lease shall be renegotiated; and*

*g. The total consideration, in cash or in kind, is not less than the estimated fair market rental of the leased interest. The fair market value of the leased interest should take into account the property, the restrictions on use and access to the property, the terms and degree of Government control in the lease document, the termination rights, and any other specifics of the type of use.*

Leases can be granted under this authority for any legitimate purpose. Leases under this authority grant the Lessee exclusive use of the leased area so long as they comply with the terms and conditions set forth in the lease. Waiver of competition and lease terms up to 25 years must be approved by the Secretary. A long-term lease under this authority would have to endure four levels of review, concurrence and execution.

#### 2.1.1.4 Alternative 4: Land Exchange

Under this alternative, the Port would exchange land currently under its ownership for land owned by the USACE in accordance with the requirements under River and Harbor Improvements, USC 33 Chapter 12, Navigation and Navigable Waters, 33 USC 558b and Application to Authorized Works for Flood Control, 33 USC 558b-1, which authorize the Secretary of the Army to exchange lands acquired for river and harbor and flood control for privately-owned land required for such purposes. To comply with federal regulations regarding the exchange, the purposes and values of the involved parcels must demonstrate a clear benefit to the US Government. This method of conveyance involves a high level of risk because of the detailed level of documentation associated with this real estate action. The final approval of this transaction rests with both the Department of Justice and the Secretary of the Army.

The primary means under which a clear benefit to the Government would need to be demonstrated would be the relative acreages associated in the proposed land exchange. The Port owns approximately 34 acres of land along the west bank of the MKARNS and west of an existing, active USACE dredge disposal facility (**Figure 2-1**). There are two other active disposal facilities along the east bank of the MKARNS in this same area of the navigation system. The island and adjacent property that are currently USACE-owned are approximately 87 acres

(**Figure 2-1**). The disparity in acreages immediately precludes a comparable exchange between the USACE and the Port. In addition, the USACE currently operates the three disposal facilities at the head of the MKARNS, and they are adequate for the current and future dredging requirements in this area of the navigation system. The USACE has neither the need nor the funding to expand the size of any of these current disposal facilities. As such, the additional 34-acre parcel adjacent to the west bank disposal facility and currently owned by the Port is not needed by the USACE.

The disparity in acreages between the two parcels, and the potential cost that would be incurred by the US Government in order to expand the active disposal facility space, do not support the requirements of 33 USC 558b and 558b-1. With this alternative, there is no clear benefit to the US Government; therefore, this alternative was dismissed from further evaluation.

#### 2.1.1.5 Alternative 5: No Action

Under the No Action Alternative, there would be no transfer of property from the USACE to the Port. As such, the Port would not be able to expand their fleeting facilities for barge storage at their current facility. This alternative was dismissed as that it does not meet the project purpose and need.

### 2.1.2 Federal Action #2 – USACE Permit Approval of Proposed Project

The second federal action and second set of alternatives relates to the construction of the BFA and filling of the BFFA, both of which may require USACE approval. Ownership and/or legal access to the property does not affect the USACE permit decision; however, legal access by the Port to the site is required for construction. Given that this activity is considered a water dependent activity and would also require the potential placement of fill material into waters of the United States, the Port would submit an Individual Permit Application for a USACE Permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. The proposed project has the potential to result in both impacts and benefits to the built, natural, and social environments. In order to select the most appropriate alternative that meets the proposed project’s purpose and need, an analysis of alternatives was conducted. This section summarizes the extensive planning that led to the recommendation of the Preferred Alternative (PA).

For the Permit Decision action, three outcomes/alternatives are relevant:

- **USACE Permit Alternative 1**: The USACE would issue the permits required to authorize construction of the BFA either with or without specific conditions.
- **USACE Permit Alternative 2:** The USACE would deny the permits at a specific location because another practicable alternative location exists that would be the least environmentally damaging alternative.
- **USACE Permit Alternative 3:** The USACE would deny the Port's application for the DA permits. This Alternative is considered as the No Action Alternative.

The process that led to the recommendation of the PA was a multi-phase evaluation which began with the project team's development of several BFA construction options which were considered in order to meet the project's purpose and need. By the end of the screening process, a total of eight concepts were developed. These initial concepts were evaluated to determine if they would meet the proposed project's purpose and need. Due to the proposed project's water dependency, concepts were considered along waterways, including Verdigris River cut-off (RM 49.5), former private terminal west of Bird Creek, Verdigris River cut-off near Rogers Point Park, oxbow south of I-44 bridge, east bank of the Verdigris River Channel (RM 49.5), Yonkipin Lake (RM 49.5), and American Electric Power Service Company of Oklahoma (AEP-PSO) Black Fox site at approximate RM 32. For comparison purposes, the No Action Alternative was included as one of the eight initial concepts. **Figure 2-1** presents the location of these eight concepts in relation to the Port.

### 2.1.3 Concepts Considered and Dismissed

Beginning in the summer of 2009, progress meetings among the project team members, including the Port, were held to discuss, develop and ultimately decide on the concepts that would be dismissed or advanced. Four of the eight concepts were dismissed based upon their distance from the Port or development/construction issues. **Figure 2-2** presents an overall figure of concepts considered and dismissed. A summary of the concepts that were considered and dismissed is provided in **Table 2-1,** below.

**Table 2-1**
**Concepts Considered and Dismissed**

| Concept | Reason for Abandonment/Dismissal |
|---|---|
| **Concept 4** | Eliminated due to its proximity to Rogers Point Park and potential impacts to the park facility related to the site's development as a barge fleeting area. |
| **Concept 6** | This property is designated as an active ACOE dredge disposal facility, requiring ACOE approval and disposal prior to its development as a barge fleeting area, making it economically impractical with time constraints. In addition, unsafe conditions exist for barge storage due to exposure to the river current. |
| **Concept 7** | Removed from consideration due to the lake's perched condition over bedrock, 20-feet above the Verdigris River, which if excavated would drain Yonkipin Lake. |
| **Concept 8** | Eliminated due to its 15-mile one-way distance from the Port terminal (below Johnson's Port 33), making it economically and operationally impractical. |

### 2.1.4 Alternatives Advanced

Build Alternatives (formerly called concepts) 2, 3, and 5, as well as the No Action Alternative (1), were advanced as part of the alternatives analysis process. As part of the analysis conducted to evaluate build alternatives, environmental constraints maps were developed for the entire project study area. The constraints maps included information from online state and federal agency websites, Geographic Information System (GIS) data layers, and responses to requests from regulatory agencies. Furthermore, a preliminary site reconnaissance was conducted to field verify and/or add environmental constraints to the maps.

The environmental constraints maps were reviewed by the project team during the initial analysis of build alternatives and helped guide the decision making process by highlighting environmental concerns for each of the alternatives.

Because the proposed project seeks to safely and efficiently expand the Port's fleeting capacity, those sites located in closest proximity to the Verdigris River and to the Port terminal were favored over more distant sites. Alternative 2 emerged as the recommended PA based on its access and proximity to the existing port terminal operations and the MKARNS.

The alternatives advanced for consideration are discussed in the section below. **Table 2-2** presents a summary of the Alternatives Screening Matrix for the advanced alternatives.

#### 2.1.4.1 No Action Alternative

This alternative would leave the existing conditions unchanged. No additional fleet storage space would be created to improve Port operations, which would hinder future growth of water-borne transportation at this port terminal. By not providing additional barge fleeting space, growth at the Port would be obstructed and not meet the purpose and need of the project. Therefore, this alternative was eliminated.

## Table 2-2
## Alternatives Screening Matrix

| Criteria | Build Alternatives | | | No Action Alternative |
|---|---|---|---|---|
| | 2 (PA) | 3 | 5 | |
| **Meets Purpose and Need** | Yes | Yes | Yes | No |
| **Barge Mooring Capacity** | 62 | 50 | 77 | N/A |
| **Land Acquisition** | 40 Ac. (USACE) | 13 Ac. (USACE) | 25 Ac. (USACE);<br>25 Ac. on island (private);<br>40 Ac. on west bank (private) | N/A |
| **Open Water Impacts** | 2,550 LF | 496 LF | 300 LF | N/A |
| **Distance to Port Terminal** | 1,000 ft. | 5,500 ft. | 3 miles | N/A |
| **Fleeting Area Current** | Yes; slow | No | Yes; slow | N/A |
| **Fleeting Area Oxygenation** | Floating aerators proposed | Floating aerators Proposed | Floating aerators proposed | N/A |
| **Est. Maintenance Costs (yr.)** | $50,000 | $100,000 | $50,000 | N/A |
| **Est. Operational Costs (yr.)** | $130,000 | $182,000 | $260,000 | N/A |
| **Est. Capital Costs (yr.)** | $11,800,000 | $40,000,000 | $16,800,000 | N/A |

#### 2.1.4.2 Alternative 2 - Former Verdigris River Channel (Preferred Alternative)

This alternative involves over-excavating the former Verdigris River channel, west of the Navigation Channel, south of the Bird Creek Cut-off, east of the former Bird Creek channel and north of the Burlington Northern Santa Fe Railroad (**Figure 2-3**). Under this alternative, the proposed BFA would be created by excavating the existing channel to a wider and deeper channel in the location of the former Verdigris River channel, immediately south and west of the Port's slack-water terminal channel at the confluence of the Bird Creek cut-off and Verdigris River, i.e., the beginning of the MKARNS.

The proposed BFA would have a 2,300-foot long, 300-foot wide toe-to-toe mooring area. A multi-cell box culvert would connect the former Bird Creek channel with the Fleeting Area, maintaining the current that exists through this area. This alternative is in close proximity to the existing Port terminal channel, thus reducing operating costs of fleeting barges compared to the more distant alternatives. Approximately, 3.6 acres of forested wetland would be excavated, 2,550 linear feet (LF) of jurisdictional open water would also be excavated and 1,900 LF of anticipated, non-jurisdictional open water would be filled in the BFFA under Alternative 2.

#### 2.1.4.3 Alternative 3 - Former Private Terminal West of Bird Creek

This alternative is located within the undeveloped 500-acre parcel west of Bird Creek and south of the Port's industrial park (**Figure 2-4**). It would utilize a previously excavated slip that was constructed to be a private barge terminal. However, construction was halted after more rock excavation was required than funding allowed. This area sat abandoned for a number of years until the Port purchased the property several years ago. The existing slip is approximately 160 feet wide and 3,200 feet long. The west end of the slip is not dug to depth and would require deepening. The existing width allows two barges to be moored on one side and one on the other without additional widening. This leaves a 55-foot wide path of open water between the moored barges for towboat operations.

This alternative would require an access channel to be constructed within the Bird Creek Cut-off. Extensive bedrock exists within this area requiring significant blasting to deepen the channel within the bedrock to allow for towboat/barge operations between the east end of the cut-off and the mouth of the proposed fleeting area. In addition, 496 LF of anticipated, non-jurisdictional open water would be disturbed with this alternative.

Towboat operation would be difficult during high water events on Bird Creek with this alternative. The Port's towboats would need to execute a tight turn when entering or exiting the Cut-off access channel. During high water events, this turn would be made more difficult due to increased velocities on Bird Creek. Although this alternative meets the project purpose and need, it provides less barge mooring space than the PA, does not provide the efficient movement or maneuvering of barges to and from the Port, and expenses associated with rock removal and disposal to deepen or widen the cut-off would be cost prohibitive. Therefore, this alternative was dismissed from consideration as a viable alternative.

#### 2.1.4.4 Alternative 5 - Cut-off South of I-44 Bridge

Many river ports utilize cut-offs created by river re-routings, for safer and more efficient operations (**Figure 2-5**). Such a cut-off is located three miles downstream of the Port below the I-44 Bridge. The cut-off is of similar length as Alternative 2 (3,500 LF), and the excavation volume is anticipated to be similar as well. The fleeting area would be 300 feet wide toe-to-toe. An unnamed creek flows into the elbow of the cut-off. This creek would be routed into the fleeting area through a multi-cell box culvert and would result in a current running through the fleeting area. The relatively long distance from the Port's existing terminal basin under this alternative would increase operating costs.

As with Alternative 3, during high water events on the Verdigris River, the Port's towboat operators would have difficulties entering the cut-off fleeting area from the north due to the high river velocities. In addition, approximately 300 LF of open water would be disturbed with this alternative.

Although this alternative meets the project purpose and need, it was dismissed from consideration due to its distance from the Port and anticipated problems with barge maneuverability during high water events on the river.

## 2.2 Preferred Alternative

Alternative 2 was chosen as the PA due to its close proximity to the Port terminal and Navigation Channel. A discussion of proposed construction activities associated with the PA is provided below.

### 2.2.1 Fleeting Area Excavation

The BFA under the PA would be 2,300 feet long and 300 feet wide, with a depth of 12 feet below normal pool elevation 532.00 above mean sea level (abmsl). The BFA would have the capacity to store more than 60 barges, assuming the barges are the standard covered hopper barge size of 195 feet long by 35 feet wide. Barges would be moored three-abreast on both sides of the BFA, with 90 feet of clear water between the moored barges to allow for towboat operations.

The BFA would be constructed with three-to-one grassed side slopes. Rock riprap would be placed on the side slopes from the BFA bottom to 10 feet above normal water surface elevation. A maintenance road at the top of the east bank would be constructed to an elevation of 582.00, and to 584.00 on the west bank. The Maximum Possible Flood elevation is 580.00 along this stretch of the Verdigris River. Mooring deadmen with cables would be installed high on the side slopes along each bank for the barges to be tied off to. The BFA Site Plan and Grading Plan for the PA are included in **Appendix A.**

It is estimated that there would be a total of approximately 1.55 million cubic yards of excavation; approximately 1.225 million cubic yards of this material would be hauled to the proposed BFFA. The remaining excavated material would be used to achieve the final grades desired for the BFA.

### 2.2.2 Temporary Haul Road

A temporary single span structure would be installed across the Bird Creek Cut-off to allow earth material to be transported from the BFA to the BFFA. The 90-foot long single span structure will have a clear width of approximately 14 feet. The location of the temporary structure was selected based upon the narrowest section of the Bird Creek Cut-off and will span the Cut-off approximately 70 feet between the rock walls of the channel. The bridge would be designed for HS20 vehicular traffic loads. Bridge abutments would be constructed of precast concrete blocks. The final design and selection of the temporary bridge structure and foundation will be the responsibility of the Contractor, under the final approval by the Port's Project engineer.

Once construction of the BFA has been completed, the temporary haul road would be removed, but the temporary Bird Creek Cut-off crossing would remain in place until a permanent vehicle bridge has been constructed. All disturbed areas would be restored to original grades and replanted with native vegetation in order to prevent erosion.

### 2.2.3 Excess Excavation Placement

The excess excavation would be hauled across the Bird Creek Cut-off, as described above, to the proposed BFFA. This area consists of approximately 292 acres on the north side of Bird Creek, south of the existing Port Industrial Park. Soil would be placed in eight-inch lifts and compacted to 90 percent of Standard Proctor density. The proposed Bird Creek North Grading

Plan is included in **Appendix A.** The excavated material would be graded to an elevation approximately one foot higher than the 100-year floodwater surface elevation, which ranges from 571.90 at the Burlington Northern Santa Fe – Bird Creek Bridge to 564.50 at the northeast corner of the proposed BFFA. The BFFA includes an open water feature that was been classified by Kleinfelder (**Appendix A**) as non-jurisdictional based on its lack of hydrologic connectivity to Waters of the United States. This classification would need to be confirmed with the USACE prior to its disturbance. However, should the USACE determine that the open water is jurisdictional, resulting in the open water being regulated by the USACE, additional sites would need to be considered and evaluated for the disposal of excess fill material. An alternatives' analysis would need to be performed that would address avoidance, minimization and compensation with regard to the disposal site selected.

# 3.0 EXISTING ENVIRONMENT

This chapter presents a summary of several analyses that were undertaken to identify existing conditions in the BFA and the BFFA, as well as potential mitigation areas. The BFA and BFFA study areas for this analysis are defined as shown in **Figure 1-1**. Data on wetlands, terrestrial ecology, and threatened and endangered (T&E) species at the BFA and BFFA were taken from reports prepared by Kleinfelder Central, Inc. in 2011 and 2012 (**Appendix A**). Data on archaeological resources were taken from reports prepared by Christopher A. Cojeen Archaeological Services, LCC (CAS) in 2010 and 2011, and in 2012 on the BFA and BFFA (**Appendix B**).

## 3.1 Geology and Soils

### 3.1.1 Geology

The BFA and BFFA study areas are located entirely within the Claremore Cuesta Plains Geomorphic province (within the Prairie Plains Physiographic Region), an area generally described as "resistant Pennsylvanian sandstones and limestone dipping gently westward, forming cuestas between broad shale plains" (Curtis, Jr., Ham and Johnson 2008). A cuesta is a ridge formed by gently tilted sedimentary rock strata with a steep cliff or escarpment on one side and a gentle dip or back slope on the other. This landform occurs in areas of tilted strata and is caused by the differential weathering and erosion of the hard capping layer and the soft underlying layer, which erodes more rapidly.

The bedrock consists predominantly of shale containing some thin-bedded to massive buff sandstone and beds of limestone. The bedrock deposits are of Pennsylvanian Age and underlie more recent alluvium deposits of sand, silt, clay and gravel associated with the floodplains and terrace deposits of streams.

A geotechnical study on the BFA site was performed in July 2011. Major strata encountered during subsurface exploration included native material of silty clay with varying amounts of sand and clay. Overburden depths ranged from 32 to 50 feet below existing ground surface. Shale and sandstone bedrock was encountered from 32 to 40 feet below the existing ground surface. Bedrock encountered consisted of highly weathered to weathered shale.

### 3.1.2 Soils

Soil types within the BFA and BFFA study areas were extracted from the Natural Resource Conservation Service (NRCS) Soil Data Mart. The soil map units described below are organized by the county in which they are located. **Figure 3-1** depicts their location and extent within the study areas.

BarG – Barge silty clay loam, 0 to 30 percent slopes. This soil unit occurs on spoil banks dredged from rivers in long, narrow, convex ridges parallel to the stream. This unit consists of nearly level to steep, well-drained soils that formed in materials weathered from loamy alluvium of Pleistocene age. These soils have slow to rapid runoff, depending on the amount of compaction, age, amount of weathering, and slope with moderately slow permeability. These soils are located in the Cherokee Prairies and Arkansas Valley and Ridges. Slopes range from 0 to 30 percent.

Os – Osage clay, 0 to 1 percent slopes, occasionally flooded. This soil unit consists of very deep, poorly-drained, very slowly permeable soils that formed in thick clayey alluvium. These soils are poorly-drained with low to very low permeability. These soils are on found on floodplains along major streams and have slopes ranging from 0 to 1 percent.

Vd – Verdigris silt loam, 0 to 1 percent slopes, occasionally flooded. This soil unit consists of very deep, well-drained soils that formed in silty alluvium on floodplains in the Cherokee Prairies major land resource area. These soils are well-drained with negligible to very low runoff and permeability is classified as moderate. These soils are occasionally subject to flooding.

Ve – Verdigris clay loam, 0 to 1 percent slopes, occasionally flooded. This soil unit is similar to the Verdigris silt loam; however, it is subject to occasional flooding.

Vf – Verdigris silty clay loam, 0 to 2 percent slopes, frequently flooded. This soil unit is similar to the Verdigris silt loam; however, it is subject to frequent flooding.

## 3.2 Water Resources

### 3.2.1 Surface Water

The Verdigris River Basin covers approximately 4,400 square miles and encompasses all or parts of 11 counties in southeastern Kansas and six counties in northeastern Oklahoma. The Verdigris River is a tributary of the Arkansas River. The Arkansas River originates in central Colorado, where it flows southeast into and across Kansas before crossing into Oklahoma just south of Arkansas City. The main stem of the Verdigris River enters Oklahoma at the northeastern corner of Nowata County and flows in a south-southeasterly direction for about 135 miles to its junction with the Arkansas River near Muskogee, Oklahoma. Elevation ranges from 1,650 feet above mean sea level (MSL) at its headwaters in Kansas to 680 feet above MSL at the state line, to 385 feet above MSL where it meets the Arkansas River. Near the Town of Oologah, Oklahoma, the Verdigris River is dammed to form Lake Oologah, a major USACE flood control facility for eastern Oklahoma.

The Bird Creek Basin covers approximately 1,136 square miles and encompasses all or parts of five counties in northeastern Oklahoma. Bird Creek is tributary to the Verdigris River and originates in Osage County, flowing in a southeasterly direction before joining the Verdigris River in Rogers County, south of the Port terminal basin.

According to the 2010 Oklahoma Integrated Water Quality Report, both the Verdigris River and Bird Creek are classified as Category 5A waterbodies. Category 5A waterbodies do not attain water quality standards and are considered impaired or threatened for one or more designated uses by a pollutant(s).

The BFA study area includes a portion of the former channel of the Verdigris River, which was disconnected from the main river channel when a straighter, dredged connection to the Port was constructed in the early 1970s. This portion of the former river channel now consists of a shallow, silted-in side channel connected to the Bird Creek "Cut-off". There is little flow through this side channel, which is expected to continue to silt-in over time.

The larger BFFA study area borders the northern/western stream bank of Bird Creek. In addition, shallow-ponded surface waters associated with various delineated wetland areas are located within this parcel. Many of these ponded areas appear to have been created and/or enlarged by beaver dams, as further discussed in the report *Delineation of Potentially Jurisdictional Waterbodies Report, Evaluation of Historic Wetlands and Threatened and Endangered Species Potential Habitat* (Kleinfelder, 2011) (**Appendix A**).

### 3.2.2 Groundwater

The project site is located in the Cherokee Group Groundwater Basin located in northeast Oklahoma. Basin rock units are principally comprised of interbedded shale and sandstone with thin limestone stringers and thin beds of coal. Groundwater occurrence and availability in this unit is limited. Groundwater is also present in the overlying alluvium and terrace deposits that consist mainly of unconsolidated sand, silt, clay and gravel.

The geotechnical study performed in July 2011 encountered groundwater within the unconsolidated deposits between 10 and 42 feet below existing ground surface.

### 3.2.3 Floodplains

Bird Creek, which hydrologically connects the BFA and BFFA study areas, is a studied stream under the Federal Emergency Management Agency (FEMA). Portions of the two study areas are located within the 100-year floodplain of Bird Creek. **Figure 3-2** depicts the 100-year and 500-year floodplains of Bird Creek and the Verdigris River within the vicinity of the study areas. Activities in floodplains are regulated at the federal level pursuant to FEMA regulations.

### 3.2.4 Waters of the United States, including Wetlands

The US Fish and Wildlife Service (USFWS) maintains digital mapping, known as the National Wetlands Inventory, of the nation’s wetlands and deepwater habitats. This mapping was prepared using high altitude imagery, supplementary information, and limited ground truth spot checks. The wetlands are classified according to “*A Classification of Wetlands and Deepwater Habitats of the United States*” by L. Cowardin. The NWI wetland types located within the study area are depicted on **Figure 3-3**. Since NWI mapping is not based on surveyed delineations, potential impacts to waters/wetlands in the BFA and BFFA were not assessed based on the location or extent of wetlands as depicted in that mapping. Instead, waters/wetlands in the BFA and BFFA were field delineated, as described below.

Waters of the United States and wetlands within the BFA and BFFA were delineated by Kleinfelder in December 2010 (BFFA and small portion of the BFA) and November 2011 (portion of BFA) in accordance with the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987). The 1987 Manual is the federal delineation manual used in the Clean Water Act Section 404 Regulatory Program for the identification and delineation of wetlands. The 1987 Manual has been updated through a series of Regional Supplements, Guidance Documents and Memoranda from the USACE. The *Draft Interim Regional Supplement* *to the Corps of Engineers Wetland Delineation Manual: Midwest Region* is currently used for wetland delineations in northeastern Oklahoma.

The BFA contains nine potentially jurisdictional waterbodies. Of these nine jurisdictional waterbodies, three are jurisdictional wetlands and six are open water areas. The BFFA contains 12 waterbodies, one mapped, blue-line intermittent stream; three unmapped intermittent streams; two mapped wetlands; three unmapped wetlands; and two mapped ponds. Of these waterbodies, at least seven are anticipated to be potentially jurisdictional. **Figure 3-4** generally presents potentially jurisdictional waters on the BFA and BFFA study areas. Refer to **Appendix A** for a detailed breakdown of potentially jurisdictional wetlands and open waters within the project area. Wetlands and open waters within the study areas were delineated and mapped in the field.

### 3.3 Transportation

Transportation within the vicinity of the proposed project includes highway, rail and waterway transportation. Within the study area is Interstate 44 (I-44), US Highway 66 and Oklahoma State Highway 167 and 266. I-44 is a major link in the interstate highway network. Route 66 is a major collector highway and Routes 167 and 266 are primary arterial roadways. The study area is also served directly by the Burlington Northern/Santa Fe (BNSF) which provides freight rail service to the Port. The study area also lies at the head of the MKARNS. As part of the MKARNS, the Verdigris River provides barge traffic access to the Port Industrial Park.

### 3.4 Infrastructure and Utilities

The study area is currently vacant and undeveloped. There are no utilities or infrastructure located on either the BFA or the BFFA.

### 3.5 Land Use and Zoning

This section considers existing land use and zoning for areas potentially affected by the proposed project. The analysis includes assessments of existing land use, zoning, public policy, neighborhood character, community facilities (neighborhood institutions, such as schools, community centers, hospitals, etc.), open spaces and demographic characteristics.

Land Use refers to the activity that occurs on land and within the buildings and structures that occupy it. Types of land use include: residential; commercial; industrial; public and semi-public institutional; transportation, communications and utilities; open space; and vacant land. The zoning ordinance controls the use, density, and bulk (i.e., the size of the building in relation to the size of the lot) of development within a municipality. A zoning ordinance is divided into two parts: zoning text and zoning maps. Text establishes zoning districts and sets forth the regulations governing land use and development in each district. Maps depict the location of the zoning districts.

### 3.5.1 Land Use

The project site is located in unincorporated Rogers County, Oklahoma. Immediately south of the project site, across the BNSF railway easement, is the City of Catoosa. The BFFA and the BFA are located within the Port property boundaries. Currently, both of these areas are undeveloped, although portions of the BFFA are used for agricultural purposes.

Land uses surrounding the project area are mixed. To the north of the project area is the Port Industrial Park and Terminal Basin. The Port is a master-planned industrial park and includes approximately 65 industrial companies and incorporates a mix of warehouse and industrial uses.

Directly south of the BFFA, and across the BNSF railway easement, is an undeveloped strip of land that has been identified by the City of Catoosa as Development Sensitive. Beyond this strip are residential neighborhoods. To the southeast is the City of Tulsa Wastewater Treatment Plant. A commercial area is located southwest of the project site along Route 167. To the west, along North 193rd East Avenue, is Fellowship Tabernacle, Sherwood Construction offices/yard, and private residences.

### 3.5.2 Zoning

Within Rogers County there are incorporated and unincorporated areas. Most of the study area is located within unincorporated Rogers County. However, there are some non-contiguous parcels in the southern portion of the study area that are in the incorporated City of Catoosa. The Rogers County Zoning Ordinance controls the zoning within the project area. The City of Catoosa controls the zoning located in the incorporated City of Catoosa. The four basic types of zoning districts are residential, commercial, agriculture and industrial. These basic categories can be further broken down (e.g., lower-, medium-, and higher-density residential; neighborhood commercial, highway commercial or office commercial; and light industrial or heavy industrial).

The study area includes 11 distinct zoning districts, as shown on **Figure 3-5** and listed in **Table 3-1.**

**Table 3-1**

**Rogers County Zoning Classifications**

| Zone | Classification | Definitions |
|---|---|---|
| I-2 | Industrial | Light Industrial |
| I-3 | Industrial | Medium Industrial |
| I-4 | Industrial | Heavy Industrial |
| A-G | Agricultural | Agriculture |
| A-I | Agricultural/Industrial | Agriculture likely to transition to industrial use |
| A-R | Agricultural/Residential | Agriculture likely to transition to residential use |
| C-4 | Commercial | General Commercial |
| RS-25 | Residential | Residential Low Density |
| RS-60 | Residential | Residential Low Density |
| RS-40 | Residential | Residential Medium Density |
| RST-40 | Residential | Single Family Manufactured houses |

*Source: Rogers County Planning Department, City of Catoosa Zoning Code*

### 3.6 Socioeconomics and Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (FR 1994). The Executive Order focused attention on Title VI of the Civil Rights Act of 1964 by providing that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations." It is the USACE's policy to fully comply with Executive Order 12898 by incorporating environmental justice concerns into decision-making processes. In this regard, the USACE ensures that it would identify, disclose, and respond to potential adverse social and environmental impacts on minority and/or low-income populations within the area affected by a proposed USACE action.

A minority or low–income community or population is considered as any readily identifiable group of minority or low-income persons living in geographic proximity. A minority is classified by the U.S. Census as African-American, Hispanic-American, Asian- and Pacific-American, American Indian, Eskimo, or Aleut, and other non-Caucasian persons. A low-income community or population is classified as having a household income at or below the U.S. Department of Health and Human Services poverty guidelines.

Data from the 2010 Census on race and ethnicity within the study area was collected and analyzed. Population data is collected at census tract and block group level (**Table 3-2**). Five Census Block Groups are located within the study area, as identified below.

- Census tract 504.05, Block Group 1
- Census tract 504.06, Block Group 1
- Census tract 504.07, Block Group 1
- Census tract 504.08, Block Group 1
- Census tract 506.02, Block Group 1

According to the 2010 Census, a total of 13,645 persons resided within the census tracts located in these block groups. Almost 80% of the study area's population was White, while American Indian and Alaska Native comprised nearly 10%. Approximately 1% was Black or African-American. Asians also accounted for just 1% of the population in the study area. "Other" race groups comprised approximately 2% of the study area's population. Those who were two or more races comprised 6% of the population. Persons of Hispanic or Latino origin and who may be of any race were nearly 4% of the population.

## Table 3-2
## 2010 Population and Race

| | State of Oklahoma | | Rogers County | | Study Area | |
|---|---|---|---|---|---|---|
| Population | **3,751,351** | | **86,905** | | **13,645** | |
| **2010 Racial Characteristics of the Study Area** | Number | Percent | Number | Percent | Number | Percent |
| White | 2,706,845 | 72% | 65,412 | 75% | 10,891 | 80% |
| **Minorities:**<br>Black or African American | 277,644 | 7% | 865 | 1% | 117 | 1% |
| American Indian and Alaska Native | 321,687 | 9% | 11,382 | 13% | 1,420 | 10% |
| Asian | 65,076 | 2% | 932 | 1% | 146 | 1% |
| Native Hawaiian and Other Pacific Islander | 4,369 | 0.1% | 53 | 0.1% | 1 | 0.1% |
| Other | 154,409 | 4% | 1,212 | 1% | 232 | 2% |
| Population of two or more races | 221,301 | 6% | 7,046 | 8% | 836 | 6% |
| Total Minority | 1,044,506 | 28% | 21,490 | 25% | 2,752 | 20% |
| **Hispanic (may be of any race)** | 332,007 | 9% | 3,229 | 4% | 519 | 4% |

*Source: 2010 US Census: Population and Housing*

The distribution and frequency of minority and low-income populations within the study area is portrayed in **Table 3-3**. Overall, the minority population within the project area was below or similar to the state and county percentages.

**Table 3-3**
**Minority Populations within the Project Area**

| Census Tract | Block Group | Population in Sample | Minority Population | Percentage of Minority | Persons of Hispanic Origin | Percentage of Hispanic |
|---|---|---|---|---|---|---|
| **State of Oklahoma** | | 3,751,351 | 1,044,506 | 28% | 332,007 | 9% |
| **Rogers County** | | 86,905 | 21,490.00 | 25% | 3,229 | 4% |
| **504.05** | 1 | 3,033 | 427 | 14% | 114 | 3% |
| **504.06** | 1 | 2,263 | 313 | 14% | 59 | 3% |
| **504.07** | 1 | 2,354 | 577 | 25% | 105 | 4% |
| **504.08** | 1 | 3,002 | 801 | 27% | 137 | 5% |
| **506.02** | 1 | 2,993 | 636 | 21% | 104 | 3% |

*Source 2010 US Census Population and Housing*

Poverty levels for the project area are reported only at the census tract level and are estimates based on the 2006-2010 American Community Survey. Only one census tract, Census Tract 504.08, had a percentage of the population with income below the poverty line, which was similar to or significantly higher than, the state, county or surrounding area as shown in **Table 3-4**.

**Table 3-4**
**Population within Project Area with Incomes below Poverty Line**

| Census Tract | Population in Sample | Population with 2006-2010 Incomes Below The Poverty Line | Percent Below the Poverty Line |
|---|---|---|---|
| State of Oklahoma | 3,559,437 | 577,247 | 16.2% |
| Rogers County | 84,040 | 84,040 | 9.5% |
| 504.05 | 3,782 | 310 | 8.2% |
| 504.06 | 2,174 | 61 | 2.8% |
| 504.07 | 2,173 | 36 | 1.7% |
| 504.08 | 2,734 | 443 | 16.2% |
| 506.02 | 2,772 | 152 | 5.5% |

*Source: U.S. Census Bureau, Census 2006-2010 American Community Survey*

## 3.7 Hazardous Waste

### 3.7.1 EDR Database Search Results

An Environmental Data Resources, Inc. (EDR) database search conducted in March 2012 found no hazardous waste listings for the BFA/BFFA study areas. However, six properties were identified within one mile of the study area boundary and include:

- Agrico Chemical Co.
- Solvay Fluorides LLC
- OKG Bulkhandling, Inc.
- Steel and Pipe Supply
- Asphalt Technology

- BJ’s Pit Stop

The six properties are discussed in the following sections.

**Agrico Chemical Co.**, is located west of the Town of Verdigris, approximately 4,700 feet north and hydraulically up-gradient of the study area boundary. This site appears on the Comprehensive Environmental Response, Compensation, and Liability Information System - No Further Remedial Action Planned (CERCLIS-NFRAP), Correction Action Report (CORRACTS), and Resource Conservation and Recovery Act-Conditionally Exempt Small Quantity Generators (RCRA-CESQG) regulatory lists. Due to this site’s distance from the study area boundary, the nature of the databases listed for the Agrico property and the information presented in the EDR Report, this CERCLIS-NFRAP, CORRACTS and RCRA-CESQG site does not pose an environmental concern to the property or the proposed BFA project.

**Solvay Fluorides, LLC** is located at 5010 North Skiatook Road and is approximately 1,200 feet up-gradient of the northern study area boundary. This site appears on the RCRA-CESQG, Toxic Chemical Release Inventory System (TRIS), and Facility Index Systems/Facility Registry System (FINDS) regulatory lists. Due to the site’s distance from the study area boundary, the nature of the databases listed for the Solvay Fluorides, LLC property and the information presented in the EDR Report, this RCRA-CESQG, TRIS and FINDS, this site does not pose an environmental concern to the property or the proposed BFA project.

**OKG Bulkhandling, Inc.,** located at 980 Fort Gibson Road, is approximately 1,000 feet up-gradient of the study area boundary. This site appears on the Resource Conservation and Recovery Act-Non Generators (RCRA-NonGen) and FINDS regulatory lists. Due to the site’s distance from the study area boundary, the nature of the databases listed for the OKG Bulkhandling, Inc. property and the information presented in the EDR Report, this RCRA-NonGen site does not pose an environmental concern to the property or the proposed BFA project.

**Steel and Pipe Supply,** located at 1003 and 1050 Fort Gibson Road, is approximately 1,000 feet up-gradient of the northern study area boundary. This site appears on the RCRA-NonGen, FINDS and Aboveground Storage Tank (AST) regulatory lists. Due to the site’s distance from the study area boundary, the nature of the databases listed for the Steel and Pipe Supply property and the information presented in the EDR Report, this RCRA-NonGen, FINDS and AST site does not pose an environmental concern to the property or the proposed BFA project.

**Asphalt Technology,** located at 24606 South Highway 66, is approximately 1,800 feet down-gradient of the study area boundary. This site appears on the BROWNFIELDS regulatory list.

Due to the site's distance from the study area boundary, the nature of the databases listed for Asphalt Technology and the information presented in the EDR Report, this BROWNFIELDS site does not pose an environmental concern to the property or the proposed BFA project.

**BJ's Pit Stop,** located at 5500 SW Highway 66, is approximately 1,800 feet east and down-gradient of the study area boundary. This site appears on the Leaking Underground Storage Tank (LUST), Underground Storage Tank (UST), and Historic-Leaking Underground Storage Tank (HIST LUST) regulatory lists. Due to the site's distance from the study area boundary, the nature of the databases listed for the BJ's Pit Stop property and the information presented in the EDR Report, this LUST, UST, and HIST LUST site does not pose an environmental concern to the property or the proposed BFA project.

### 3.7.2 Unmapped "Orphan" Sites

EDR listed 38 regulated/reported environmental sites that could not be mapped, due to poor or inadequate address information. These sites are known as "orphan" sites. After a review of the EDR orphan site list, it is the opinion of Dewberry that these sites do not pose an environmental concern to the subject property and the proposed BFA project based on their location and site type.

### 3.7.3 USEPA EnviroFacts

Dewberry searched the USEPA's online EnviroFacts database for information that may pertain to the environmental condition of the study area. A total of 17 sites were listed for zip code 74015 in Catoosa, Rogers County, Oklahoma. The listings were reviewed to determine the likelihood of potential impacts to the subject property. Based on a review of the information obtained from USEPA's online EnviroFacts database, there were no sites found to pose an environmental concern to the subject property and the proposed BFA project.

## 3.8 Air Quality

The U.S. Environmental Protection Agency (EPA) and the Oklahoma Department of Environmental Quality (ODEQ), regulate air quality in Oklahoma. The Clean Air Act (42 U.S.C. 7401–7671q), as amended, gives EPA the responsibility for establishing the primary and secondary National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) that set accep**Table** concentration levels for six criteria pollutants: fine particulate matter (PM10), very fine particulate matter (PM2.5), sulfur dioxide, carbon monoxide, nitrous oxides (NOx), ozone (O3), and lead. Short-term standards (1-, 8-, and 24-hour periods) have been established for pollutants that contribute to acute health effects, while long-term standards (annual averages) have been established for pollutants that contribute to chronic health effects. On the basis of the severity of the pollution problem, areas that do not attain the standards are categorized as marginal, moderate, serious, severe, or extreme.

Air quality in Oklahoma is measured and regulated by the Oklahoma Department of Environmental Quality (ODEQ) - Air Quality Division. Currently, the State of Oklahoma is in attainment of all National Ambient Air Quality Standards.

## 3.9 Noise

Noise is defined as unwanted or intrusive sound. Noise impacts on the human environment range from intensity levels that interfere with communication and daily activities to those that can cause adverse health effects. Noise levels naturally decrease as the receptor moves further away from the source. Noise sensitive receptors include residential areas in proximity to the BFFA and BFA, as well as the residential area and a church along North 193rd East Avenue.

No noise surveys have been conducted within the study area. Therefore, an evaluation of existing noise levels must be based on land usage. Noise generated in the project area is related to transportation uses such as highways, railroads and waterways and industrial uses within the Port terminal area. In general, land vehicles cause greater noise effects than waterway transportation. However, horns and whistles of waterway transportation vehicles generate the highest noise levels. The background noise resulting from the current level of activity at the Port, as well as from the heavy industrial businesses located within the industrial park, is substantial.

## 3.10 Biological Resources

### 3.10.1 Terrestrial Ecology

The Osage Cuestas ecoregion is an irregular to undulating plain that is underlain by interbedded, westward-dipping sandstone, shale, and limestone. East-facing cuestas and low hills are present. Topography is distinct from the nearby Flint Hills, Ozark Highlands, and Cherokee Plains ecoregions. Natural vegetation is mostly tallgrass prairie, but a mix of tallgrass prairie and oak–hickory forest is native to eastern areas. Overall, the mosaic of natural vegetation is unlike the neighboring Cross Timbers and Ozark Highlands ecoregions. Today, rangeland, cropland, riparian forests, and on rocky hills, oak woodland or oak forest occur; cropland is not as common as in the neighboring Cherokee Plains Ecoregion. (Woods et al, 2005).

Natural vegetation for this ecoregion consists mostly of tallgrass prairie (dominants: big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), and Indiangrass (*Sorghastrum nutans*), grading eastward into a mosaic of tallgrass prairie and oak–hickory forest; and on rocky hilltops, cross timbers (dominants: blackjack oak (*Quercus marilandica*), post oak (*Quercus stellata*), and little bluestem (*Sorghastrum nutans*)). Tallgrass prairie is native on deep loams derived from shale or limestone. Bottomland forests are native on floodplains and low terraces. Currently, on rocky hills, dry upland forest and woodland is found. Dry prairie composed of short and tall grasses occurs on shallow, gravelly soils of limestone scarps. In riparian areas are forests containing boxelder (*Acer negundo*), silver maple (*Acer saccharinum*), bur oak (*Quercus macrocarpa*), Shumard oak (*Quercus shumardii*), American elm (*Ulmus americana*), hackberry (*Celtis occidentalis*), pecan (*Carya illinoensis*), walnut (*Juglans* sp.), sycamore (*Platanus occidentalis*), and eastern cottonwood (*Populus deltoides*).

Land cover and land use for this ecoregion is a mosaic of rangeland, grassland, cropland, and especially in more rugged areas, woodland. Wooded riparian corridors occur on the wettest bottomlands. Wheat, soybeans, grain sorghum, and alfalfa hay are major crops. Livestock (especially cattle) farming is important. Strip mining for coal and oil production have degraded water quality in some streams (Woods et al., 2005).

On-site plant communities within the BFA and BFFA study areas are typical of the ecoregion discussed above, and include boxelder (*Acer negundo*), hackberry (*Celtis occidentalis*), silver maple (*Acer saccharinum*), black willow (*Salix nigra*), and cottonwood (*Populus deltoides*) as the dominant overstory species. Many of these species demonstrate significant damage from a severe ice storm in 2007. As such, there is a lot of downed woody material throughout the project area. The understory includes broadleaf uniola (*Chasmanthium latifolium*), poison ivy (*Toxicodendron radicans*), wild grape (*Vitis* sp.), and greenbrier (*Smilax bona-nox*). In cleared and/or sunnier areas of the project site, a monoculture of Johnson grass (*Sorghum halepense*) is present. In some places, the understory has been disrupted by feral hogs, especially in those areas along the toe of slope of the railroad right-of-way.

Wildlife species observed during field surveys within the project study area are summarized in **Table 3-5** below.

## Table 3-5
## Animal Species Observed within Project Study Area

| Common Name | Scientific Name |
|---|---|
| **Birds** (Sibley, 2000) | |
| American Crow | *Corvus brachyrhynchos* |
| American Goldfinch | *Spinus tristis* |
| Belted Kingfisher | *Ceryle alcyon* |
| Bewick's Wren | *Thryomanes bewickii* |
| Blue Jay | *Cyanocitta cristata* |
| Canada Goose | *Branta canadensis* |
| Carolina Chickadee | *Poecile carolinensis* |
| Cedar Waxwing | *Bombycilla cedrorum* |
| Great Blue Heron | *Ardea herodias* |
| Mallard | *Anas platyrhynchos* |
| Northern Cardinal | *Cardinalis cardinalis* |
| Pileated Woodpecker | *Dryocopus pileatus* |
| Red-tailed Hawk | *Buteo jamaicensis* |
| Tufted Titmouse | *Baeolophus bicolor* |
| White Breasted Nuthatch | *Sitta carolinensis* |
| Unidentified Ducks | --- |
| Unidentified Geese | --- |
| **Mammals** (Caire et al., 1989) | |
| American Beaver | *Castor canadensis* |
| Eastern Cottontail | *Sylvilagus floridanus* |
| Eastern Gray Squirrel | *Sciurus carolinensis* |
| Nine-banded Armadillo | *Dasyppus novemcinctus* |
| White-tailed Deer | *Odocoileus virginianus* |
| **Invertebrates** | |
| Unidentified Crayfish | --- |

### 3.10.2 Aquatic Ecology

Both the Verdigris River and Bird Creek are classified as warm water aquatic communities by the 2010 Oklahoma Integrated Water Quality Report. A warm water aquatic community is classified as a subcategory of the beneficial use category "Fish and Wildlife Propagation," where the water quality and habitat are adequate to support climax fish communities suitable for the full range of warm water benthos.

The aquatic resources within the MKARNS have undergone changes since the creation of the navigation channel. Prior to the construction of locks, dams and reservoirs within the MKARNS, the fish fauna were reported to have contained fewer and smaller sport fishes than currently assessed in the river (USACE, 2005). However, construction of the navigation system has resulted in increased occurrence of minimum flows, stabilized channel conditions and the creation of reservoirs that provide habitat for lake fishes, but limit habitat for native riverine species.

Monitoring and stocking programs of fisheries resources continue to be a cooperative effort between the USACE and state wildlife agencies. The focus has primarily been upon popular sport fish, such as largemouth bass, crappie, walleye, blue catfish, flathead catfish, white bass, and striped bass.

A survey for mussels within the MKARNS study area was undertaken in 2004 by Ecological Specialists, Inc. for the USACE. The purpose of the survey was to address impacts to freshwater mussels from dredging and dredge disposal associated with the widening and deepening of the navigational channel. In general, the study found that the MKARNS consists of a navigation channel with loose sand substrate, and channel borders that range from steep rip-rapped banks to extensive shallow mud flats. Mussel beds were primarily found in substrate consisting of a sand, silt, and clay mixture. Patches of mussels were found along the banks and in coves, with gently sloping banks. Mussels were absent from homogeneous substrate, such as the 100% sand in the channel and areas near the banks that contained a high percentage of silt. Overall, very few mussel beds were found within the MKARNS.

The conclusion of the freshwater mussel survey was that the MKARNS does not provide an abundance of habitat for mussels. All mussel species observed under this study were considered common species, and it was concluded that the river does not support a significant mussel community.

Prior to the construction of the MKARNS on the Verdigris River, the river contained a diverse assemblage of native mussels (Boeckman and Bidwell, 2008). Impoundments constructed on the river have significantly altered the riverine system. The study performed by Boeckman and Bidwell involved the sampling of 31 locations along the Verdigris River to document the status of freshwater native mussels in Oklahoma following the introduction of the zebra mussel. The 2008 study sampled 31 sites (20 above Oologah Lake and 11 below) between July and October 2006. Sites below Oologah Lake were located from one to 25 km below the Oologah Lake dam. As the 2008 survey stated, habitat beyond this point in the vicinity of the Port was considered unsuitable due to dredging in the MKARNS Navigation Channel. Likewise, based upon the 2004 MKARNS survey, and findings of the 2008 Boeckman and Bidwell survey, it is unlikely that the shallow, muddy-bottomed, homogeneous substrate of Bird Creek or the former Verdigris River channel (i.e., proposed BFA) would provide viable habitat to support a mussel population.

### 3.10.3 Threatened and Endangered Species

State Listed Species

A data request for information on threatened and endangered (T&E) species within the study area was sent to the Oklahoma Natural Heritage Inventory Program (ONHIP). The response, dated January 27, 2011 (**Appendix C**), included information from the Natural Heritage Database on occurrences of any rare wildlife species or wildlife habitat within the study area. The only species listed for the study area was the Water Nymph Crayfish (*Orconectes nais*). The current State rank for this species is Unknown. Although little is known or documented about the Water Nymph Crayfish, general habitat requirements for crayfish species include flowing to non-flowing water in streams and ditches with mud or sand bottoms and an abundance of organic debris. Living/rooted vegetation is not a necessity.

Adequate data on the distribution and population size of Oklahoma crayfish is limited. However, a recent survey of the crayfish fauna has shown that the fauna distribution is not completely known. Since 1989, there have been four new records added that bring the total number of crayfish species in Oklahoma to 28. Additionally, an evaluation of museum species is contributing recent records for several rare crayfish, including most of the species living outside of caves that are identified as Oklahoma Wildlife Species of Greatest Conservation Need in the Comprehensive Wildlife Conservation Strategy. Identification of these specimens is very cost effective compared to additional field surveys and has yielded new records for species such as the Menae Crayfish, the Midget Crayfish, the Ouachita Mountain Crayfish and the Southwestern Creek Crayfish. There has been a gap in the crayfish data where current information such as this can now be used for conservation planning, allowing state rankings to be updated and proper management practices to be put into place. However, based on these records, these species of crayfish are not believed to be present within the study area.

### Federally Listed Species

The list of federally listed species and designated critical habitat areas in Rogers County, Oklahoma was reviewed (USFWS, 2012). These sources were reviewed to determine if the proposed project has the potential for adverse impacts to listed species or their habitat. Based upon the habitat descriptions of those species that were indicated to occur in Rogers County, a qualitative comparison to the habitat present within the BFA and BFFA that could increase the potential for listed species to be present or adjacent to the proposed project was made during field reconnaissance efforts. The qualitative comparison was based upon regional and local ecological characteristics including soils, terrain, hydrology, and vegetation. The USFWS was not directly contacted. Notes were also taken on livestock grazing, development, pollution and other disturbances that could decrease the potential for listed species to be present. **Table 3-6** includes listed and candidate species that are either present, have the potential to be present, or have been observed in the past in Rogers County.

**Table 3-6**
**USFWS Listed and Protected Species**
**Rogers County, Oklahoma**

| Common Name | *Scientific Name* | Federal Listing | Critical Habitat |
|---|---|---|---|
| American Burying Beetle | *Nicrophorus americanus* | E | No |
| Interior Least Tern | *Sterna antillarum* | E | No |
| Piping Plover | *Charadrius melodus* | T | No |
| Whooping Crane | *Grus americana* | E | No |
| Western Prairie Fringed Orchid | *Platanthera praeclara* | T | No |
| Arkansas Darter | *Etheostoma cragini* | C | No |
| Neosho Mucket Mussel | *Lampsilis rafinesaqueana* | C | No |
| Rabbitsfoot Mussel | *Quadrula cylindrica* | C | No |
| Bald Eagle | *Haliaeetus leucocephalus* | DL* | No |
| T = threatened, E = endangered, C = candidate, DL = delisted<br>*Bald Eagle is protected under the Bald and Golden Eagle Protection Act | | | |

*Note: No critical habitat has been designated for the nine species listed above in Rogers County, Oklahoma (USFWS Critical Habitat Mapper)*

During the field activities conducted by Kleinfelder in December 2010 and November 2011, the BFA and BFFA were evaluated for the potential presence of suitable habitat for threatened or endangered species. The presence of bald eagles has been documented in various downstream portions of the MKARNS, along the Verdigris River. The known presence of bald eagles along other parts of the navigation system indicates that they are not affected by barge traffic and/or normal recreational boating activity as they nest, perch, or forage. The bald eagle prefers large trees or high perches along large waterways for both perching and nesting. Although some suitable roosting, nesting, and foraging habitat exists along Bird Creek and the MKARNS, no bald eagles or nests were observed during various site surveys conducted in 2009, 2010, and 2011. In addition, contact with the George Miksch Sutton Avian Research Center in Bartlesville, Oklahoma, in August 2012 confirmed that one inactive bald eagle nesting site is known to occur approximately four miles northeast of the Port and one active nest is approximately eight miles from the Port facilities. There are no known or mapped bald eagle nests in this area of the navigation system.

As discussed in detail in the Kleinfelder reports (**Appendix A**) suitable habitat may exist in the project area for the American Burying Beetle (ABB). The ABB is federally listed as endangered. This species is found in 22 counties in eastern Oklahoma. An additional six Oklahoma counties lie within the historic range of the ABB and two others have had unconfirmed sightings since 1992. This insect species is present on less than 10% of its original range. Mature forest is its preferred natural habitat, but it can be found in hedgerows, grasslands, and shrublands. This scavenger needs small vertebrates (from 50-200 grams in size) to feed upon. Habitat requirements for the ABB include areas with loose, well-drained soils with a well-formed litter layer from oak-hickory and oak-pine forests, as well as open native grassland and open native fields along forest edges. According to the USFWS, pastures where native grasses have been displaced by cultivation of Bermuda grass (*Cynodon dactylon*) are not expected to support the ABB. There is no Critical Habitat designated for the ABB in Rogers County (USFWS, 1991).

Portions of the study areas have potentially suitable habitat for the ABB, excluding the developed urban areas and gravel areas of the existing BNSF Right-of-Way. There are approximately 49 acres (Kleinfelder, 2011) and 130 acres (Kleinfelder, 2012) of forested and upland grassland plant communities that provide potentially suitable ABB habitat within the BFFA and BFA, respectively.

Suitable habitat does not exist within the project limits to support the remainder of the species listed in **Table 3-6**.

### 3.11 Cultural Resources

As no historic architectural resources are located within the viewshed of the project area, the cultural resources study was limited to the assessment of archaeological resources. The summary provided in this section is based on the findings of two archaeological surveys conducted by Cojeen Archaeological Services, LCC (CAS), prepared as part of the proposed project (CAS 2010, 2011) studies.

As part of this analysis, an Area of Potential Effects (APE) was defined and historic properties within the APE that are listed in or potentially eligible for listing in the National Register of Historic Places (National Register) were identified. An APE is defined as a location potentially impacted by construction (physical effect) or that may experience effects once construction is completed (contextual effect). An APE is defined in 36 CFR Part 800.16(d) as:

> *the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.*

The APE for archaeological resources includes all areas of proposed ground disturbance. Such impacts associated with the proposed project include subterranean disturbances, excess excavation, and dredging, new barge fleeting areas, installation of rock riprap on the side slopes, and installation of a temporary gravel-surfaced haul road.

In order to assist in identifying known or potential historic properties that may exist within the APE, archival research was conducted at the Oklahoma Archeological Survey (OAS), University of Oklahoma, Norman, Oklahoma and the Rogers County Court House, Claremore, Oklahoma. In addition, early and mid-20th century maps, as well as mid-to-late-20th century and current aerial Photographs were examined for structures, trails and roads in the APE. General Land Office (GLO) plat maps of the APE were also examined, including the original survey dated 04/09/1898 (survey completed 07/03/1896) (Bureau of Land Management 2008). Also consulted were the Oklahoma Historic Preservation Office (SHPO) files on properties determined eligible for listing in the National Register. No properties listed in or determined eligible for listing in the National Register (i.e., Oklahoma SHPO Determinations of Eligibility listings, October 2009, supplemental listing April 2010) are located within the APE.

In order to identify archaeological resources in the APE, two archaeological surveys were conducted as part of this project (CAS 2010, 2011). In November 2010, CAS conducted a preliminary archaeological site assessment of an approximately 30-acre study area on Tulsa Port Authority lands located in portions of the NE/4 of Sections 17 T20N, R15E, Rogers County, Oklahoma. The approximately 30 acres of land area studied represents the portion of the footprint of proposed impact on the east bank of Bird Creek. In November and December 2011, CAS conducted an additional archaeological assessment of an approximately 115-acre study area, on USACE and Port lands located in portions of Sections 8, 16 and 17 T20N, R15E, Rogers County, Oklahoma.

Survey methodology began with pedestrian reconnaissance transects of no more than 50-foot interval spacing. Surface inspections were aimed at identifying any previously documented potential historic and prehistoric archaeological resources and locating surface indications that would suggest the presence of unidentified historic properties. Areas of proposed ground disturbance were visually inspected and focused on the topography and whether landscape modifications and construction activities may have destroyed areas with a high potential to contain significant resources and cause changes in the character or use of historic properties. Maps of previously recorded historic and prehistoric archaeological sites were consulted prior to the site visits. Surface inspection was augmented by hand dug shovel tests of no more than 50-foot intervals in lower visibility settings in an attempt to locate archaeological resources. Matrix was screened through one-quarter inch screen mesh, excavated to between 30 and 70 centimeters (cm). In addition to the archaeological shovel testing, two soil cores placed in relatively intact portions of the APE were examined by a geomorphologist to identify possible intact buried soil horizons.

### 3.12 Previously Identified Archaeological Sites

No previously recorded prehistoric and/or historic-period archaeological sites are located within the APE, according to the maps, files, and reports held by OAS in Norman, Oklahoma. One previously identified prehistoric archaeological site, Site 34RO345, is located within one-quarter-mile south of the study area and is discussed below.

Prehistoric Site 34RO345 is an unassigned prehistoric camp recorded during a cultural resources survey for the nine-acre dredging project located along Spunky Creek. Artifacts recovered from the site include small pieces of fired clay, four bifaces, three unifaces, two pieces of fire-cracked rock, and 691 fragments of debitage. The recorder noted the possibility for intact site stratigraphy is high. National Register status of this site was not assessed.

### 3.13 Archaeological Field Results

As discussed earlier, in order to identify archaeological resources in the APE, two archaeological surveys were conducted as part of this project (CAS 2010, 2011). A total of 123 shovel tests was excavated as part of these studies. Of these, 102 shovel tests were excavated as part of the 115-acre tract and 21 shovel tests were excavated as part of the 30-acre tract. The investigations revealed two historic-period archaeological sites and three isolated occurrences of artifacts (IO). These include Site 34RO343 and Site 34RO347.

Site 34RO343 is the remains of a mid-20th century farmstead located on a terrace overlooking the Verdigris River channel to the west. Features observed at the site include a concrete block house foundation (Feature 1), a poured cement cellar (Feature 2), two 12 inch (30 cm) cement circular casings (Feature 3), a possible water well represented by a metal pipe set in concrete (Feature 4), and two rectangular poured cement stem wall foundations (Feature 5). The five features and associated artifacts were observed on the surface in a moderately wooded setting over a 360x215 feet area with leaf litter and sparse understory showing 40-50% visibility. The 1942, 1958 and 1964 aerial Photographs show three discernible standing structures. The farmstead is extant on the 1972 aerial Photograph.

Based on the lack of archaeological integrity of the artifacts (a mixture of flotsam, modern dumping activity and occupation-related debris) and the poor condition of the features, the site does not appear to be eligible under Criterion C or D of the National Register. A records check of the NE/NE of Section 17 T20N, R15E did not suggest association with an event or important persons. Therefore, this site does not appear to be eligible under Criterion A or B of the National Register. No further investigation for 34RO343 is recommended.

Site 34RO347 is the remains of a concrete block outbuilding of unknown function. The roof and upper portions of the walls are missing leaving a rectangular stem wall approximately five feet tall. Two railroad ties intersect the center of the outbuilding and protrude from the east side. Approximately 10 feet west of the feature is a six-inch metal pipe with a hook on top that appears to have held a pulley. Push piles of cleared timber and dirt are evident surrounding the structure and adjacent to the two-track road trending generally north-south through the site area. Sheet metal, steel cable and concrete fragments were noted in push piles north, south and west of the outbuilding. Modern debris including glass and aluminum food containers, aluminum cans and plastic bottles were also observed on the surface and in the push piles surrounding the structure.

Aerial Photographs from 1942, 1958 and 1964 show two to three structures in the approximate location of Site 34RO347. The 1972 aerial Photograph shows the terrace where the site area was once located transformed to a peninsula with the construction of the Bird Creek cut-off, cleared of all vegetation with dredge soil dumped on the surface. A single structure, what appears to be the concrete block outbuilding, is visible in the site area on the 1972 aerial Photograph. However the resolution of the Photograph is not sufficient to determine if the structure is intact.

Based on the poor condition of the outbuilding and lack of archaeological integrity of the artifacts, Site 34RO347 does not appear to be eligible under Criterion C or D of the National Register. An initial records check of the NE/NE of Section 17 T20N, R15E revealed no association with significant events or persons, therefore this site does not appear to be eligible under Criterion A or B of the National Register. No further archeological investigation for Site 34RO347 is recommended.

Additionally, three IOs were located. IOs by their isolated nature are not considered National Register-eligible resources, and no further archeological concern is warranted for the identified IOs.

Scott Fine, Oklahoma State University PhD candidate under Brian Carter, examined two soil cores. Both showed weak soil structure, accumulating from an alluvial setting. Because of the weak soil structures and alluvial nature of deposition (thin deposits) confidence in plant remains for C-14 dating was low and was not utilized as a field method. Moreover, no artifacts or evidence of human occupation was observed in the cores.

### 3.14 Aesthetics and Scenic Resources

Aesthetics is a personal and subjective evaluation of a visual scene, and is difficult to quantify. Rogers County is predominantly agricultural with other land uses including residential, industrial, and recreational areas. Route 66 and Route 167 are roadways that are generally at grade, with trees adjacent to the road, which obscures an observer's view of the study area. Views from the Route 66 Bridge over the Verdigris River are also obscured by the adjacent railway and mature tree canopy.

# 4.0 POTENTIAL IMPACTS AND PROPOSED MITIGATION FOR THE PROPOSED ACTION

This section describes what, if any, impacts to resources described in Section 3.0 are anticipated based on the lease of the USACE property with the proposed improvements, as well as the No Action Alternative. If applicable, cumulative impacts are also discussed. A brief discussion of the threshold used to determine what, if any, potential impacts may occur based on the proposed improvements also is provided for each resource. In addition, a discussion of compensatory mitigation for open waters, wetlands and terrestrial impacts are discussed under Sections 4.2.1.1, 4.2.1.4 and 4.10.1.1, respectively, which are impacted resources requiring mitigation. With regard to the lease action, land use and socioeconomics are the two resources identified as impacted resources. No other impacts are anticipated with regard to the lease action on remaining resources, such as geology, water resources, transportation, infrastructure/utilities, zoning, environmental justice, hazardous waste, air quality, noise, biological resources, cultural resources or aesthetics/scenic resources.

## 4.1 Geology and Soils

### 4.1.1 Preferred Alternative

Construction Impacts

Under the PA, soils, and at depth, weathered bedrock, would be excavated along the former Verdigris River channel to create a 2,300-foot long, 300-foot wide, 14-foot deep open water area for barge storage. It is estimated that there would be a total of approximately 1.55 million cubic yards of excavation; approximately 1.225 million cubic yards of this material would be hauled to the proposed BFFA, located across Bird Creek from the BFA. The remaining excavated material would be re-used within the BFA as on-site grading material. This would result in short-term impacts to native soils from creating unstable conditions through desiccation, excavation, movement, re-grading and stockpiling, and minor long term impacts to soils from a slight increase in barge traffic, resulting in sediment suspension, after completion of the project.

Consideration during construction must be given to the instability of the native materials once subjected to vegetation stripping/grubbing, drying, transporting, compacting and re-grading. Best management practices (BMPs) would be implemented based on the moisture content of the soils, and appropriate stabilization techniques employed to ensure their stability for re-use on site in berms or fill areas in the BFFA. BMPs outlined in the proposed project's Stormwater Pollution Prevention Plan (SWP3) would be strictly adhered to, to ensure proper use and grading of excavated material.

Reuse of the excavated material in the upland BFFA is anticipated to have a minor direct, long-term effect on the soils and topography of the BFFA. Erosion and compaction would occur from reuse and grading activities. Runoff and erosion would be minimized during reuse/grading by use of BMPs. Excavated saturated material will be allowed to dry out adjacent to the BFA excavation within temporarily diked areas. Once the material is considered dried and compaction-ready, excavated material will be moved over to the BFFA for final grading. The addition of excavated material to the BFFA would serve to raise the elevation of the reuse site.

Operational Impacts

Once constructed, impacts to geology and soils are not anticipated. Maintenance dredging of the fleeting area would be required to maintain appropriate depths for operations. BMPs would be employed to ensure proper handling and disposal of dredge material.

#### 4.1.2 No Action Alternative

Without construction of the BFA/BFFA, geology and soils would remain unchanged. There would be no impact to geology or soils.

### 4.2 Water Resources

#### 4.2.1 Preferred Alternative

##### 4.2.1.1 Surface Water

Construction Impacts

Surface water and local drainage patterns would be interrupted during the construction stage of the BFA. During construction, blocking/damming of the former channels of the Verdigris River and Bird Creek from the Bird Creek Cut-off would temporarily discontinue the minimal flows currently traveling through these connected waterways. Upon completion of construction, the blocks/dams would be removed and flow would be restored through the new BFA and the former Bird Creek channel via a culvert that would be installed to connect the proposed BFA with the former Bird Creek channel to maintain a connection between these two waterbodies.

Within the BFFA, 1,900 LF of the total 3,300 LF of non-jurisdictional open water will be filled as part of this project. BMPs, such as grass-lined channels, ditch checks, sediment basins and soil curtains, will be constructed and installed to minimize sediment intrusion and particle suspension in the remaining, adjacent non-jurisdictional open water area within the BFFA.

Vegetation clearing and berm installation would create cleared areas susceptible to minor erosion, thereby potentially contributing to siltation and turbidity within the former channels of the Verdigris River and Bird Creek. However, minimal impacts to the adjacent Verdigris River and Bird Creek are anticipated due to the temporary blocking / damming of the two former channels during construction and utilization of BMPs. BMPs envisioned include silt fence, fiber rolls and / or brush barriers along the waters' edge and at the toe of downhill slopes during clearing & grubbing and rough grading activities; sediment traps for areas draining 5 acres or less; mulching, mulching mats, compost blankets, geotextile fabrics, soil roughening, and / or slope diversions to control erosion on slopes following completion of rough grading operations; water wagon or truck dispersion of water for dust control; and finally restoration / re-vegetation of constructed grades using native trees, plants and grasses to permanently control erosion.

Operational Impacts

Surface water flow would continue through the BFA, which would be hydrologically connected to both the former channel of Bird Creek (via proposed culvert), as well as to the Bird Creek Cut-off, maintaining the previous drainage patterns and flow. The normal pool elevation for the Verdigris River is elevation 532.0 feet above (MSL), which would be maintained within the BFA for fleeting operations. Periodic maintenance dredging of the BFA would increase turbidity and would add to the normal silt load of the river. Towboat activities in the BFA, in the Bird Creek Cut-off and Verdigris River, could also cause turbidity from propeller wash. However, the median 14-foot depth of the channel will likely not be disturbed by the 8.5-foot draft of the towboat. In addition, empty barges would be stored within the BFA with less draft than the towboats positioning the barges. Therefore, no impacts to surface waters resulting from the operation of the BFA are anticipated with the project.

#### 4.2.1.2 Groundwater

Construction Impacts

Based upon the depth to groundwater and proposed excavation depths for the project, it is not anticipated that groundwater would be intercepted or disturbed during project construction. No pumping of groundwater is proposed during construction of the project. Groundwater may discharge into the BFA during high rainfall events; however, dewatering of the disturbance area would address any increased flows into the excavation as part of BMPs to be employed during construction activities. Therefore, no impacts are anticipated to groundwater resources.

Operational Impacts

Operations at the BFA do not require groundwater pumping. No impacts are anticipated related to the operation of the BFA.

#### 4.2.1.3 Floodplains

Construction Impacts

Bird Creek, which hydrologically connects the BFA and BFFA study areas, is a studied stream under FEMA. Portions of the two study areas are located within the 100-year floodplain of Bird Creek. Activities in floodplains are regulated at the federal level pursuant to FEMA regulation Executive Order 11988. The goal of this project with regard to floodplain impacts is to achieve a “no rise” increase to the 100-year floodplain elevation of those floodplain areas within the vicinity of the project. A “No Rise” Certification is being prepared as part of this project by an Oklahoma professional engineer.

Operational Impacts

No impacts to floodplains are anticipated with the operation of the BFA.

#### 4.2.1.4 Waters of the United States, including Wetlands

Construction Impacts

According to Section 404 of the Clean Water Act (CWA) of 1972, work (dredging) within navigable waters and the placement of fill material into Waters, including intermittent streams and wetlands, requires authorization by the USACE (EPA, 1972). The type of authorization (e.g., individual permit, nationwide permit, regional permit, or letter of permission from the District Engineer) depends on the acreage, volume, linear distance along a stream course, and purpose of the activity.

Project area disturbance would result in 3.6 acres of wetland impacts, open water impacts, including 2,550 LF (5.7 acres) of jurisdictional open water excavation, and 1,900 LF (6.5 acres) of non-jurisdictional man-made linear pond elimination by filling. In addition, 774 LF (0.4 acres) of minor jurisdictional waters draining to the Bird Creek Cut-off will be filled with the project. Refer to **Figure 4-1** for project area impacts. It is anticipated that the project would be permitted under an Individual Permit, pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.

In preparation for submission of USACE permits, a mitigation site search was conducted to address the need for compensatory wetland mitigation for project impacts to waters/wetlands that would result from the proposed project. Impacts to all waters/wetlands would be mitigated in accordance with the USACE's 2008 Mitigation Rules and the USACE Tulsa District's October 2004 *Aquatic Resource Mitigation and Monitoring Guidelines*.

The following provides details of a potential site identified during the mitigation site search. A 115 acre site was identified that fronts the Verdigris River channel to the south, agricultural fields to the west, Highway 266 to the north, and a commercial development to the east (**Figure 4-2**). An improved pasture, located along the river, makes up the approximate southern half of the property, while the northern half contains a mixture of bottomland forest, intermittent streams, upland areas, and constructed ponds. Wetland delineation activities identified approximately 71.01 acres of potentially jurisdictional Waters onsite (0.40 acres of streams, 4.87 acres of ponds and 65.74 acres of forested/emergent wetland). Based on observed site conditions, there are opportunities for enhancing the existing jurisdictional waters onsite by removing non-native species, converting the man-made pond back to bottomland hardwood, and converting the improved pasture to native grassland. With the establishment of a conservation restriction, this native grassland would then function as a protective buffer for the to-be-enhanced wetlands.

In addition, to supplement the potential mitigation site described above, mitigation to compensate for unavoidable impacts to jurisdictional waters resulting from the construction of the BFA, the Port is also considering the enhancement and/or creation of aquatic resources in the immediate vicinity of the BFFA (**Figure 4-1**). Preliminary mitigation plans would be provided as part of the permit application for all mitigation proposed to off-set project impacts.

Operational Impacts

Once construction is completed, no additional impacts to wetlands or open waters are anticipated with the operation of the BFA.

### 4.2.2 No Action Alternative

Surface waters, groundwater, floodplains and wetlands/waters of the United States located in and adjacent to the former channels of the Verdigris River and Bird Creek and on the BFA/BFFA would remain undisturbed. There would be no impact to surface waters, groundwater, floodplains or wetlands/waters of the United States under the No Action Alternative.

## 4.3 Transportation

### 4.3.1 Preferred Alternative

Once completed, the proposed project is not expected to significantly increase vehicular traffic on the local roadway, rail or waterway network. During construction there may be a short-term increase in truck and vehicular traffic at the site; however, this would be a temporary impact.

### 4.3.2 No Action Alternative

Under the No-Action Alternative, the proposed barge fleeting area improvements would not occur and the existing facility will remain in its current condition. Specifically, the Port facility will not be able to efficiently handle the increased number of barges that it has experienced, especially during high water events.

## 4.4 Infrastructure and Utilities

### 4.4.1 Preferred Alternative

The study area does not currently include any infrastructure and utilities. Under the proposed project, the former channel of the Verdigris River and the mouth of Bird Creek Cut-off would be widened to provide additional docking area for barges, especially during high water events. The barges are not motorized and do not require utility connections. During construction, it is anticipated that the contractor will place a temporary office trailer(s) at the construction yard. These trailers will require utilities (i.e., electric, telephone, etc.). Following construction, the office trailer(s) and temporary utility services will be removed.

### 4.4.2 No Action Alternative

Under the No Action Alternative, the proposed barge fleeting area improvements would not occur and the existing facility will remain in its current condition. Specifically, the Port facility will not be able to efficiently handle the increased number of barges that it has experienced, especially during high water events.

## 4.5 Land Use and Zoning

### 4.5.1 Preferred Alternative

No significant land use impacts are anticipated following completion of construction. At the BFFA, the land use would change from agricultural use to industrial development. At the BFA, with the lease of the Corps property to the Port, land use would change from undeveloped to waterway. Because of the proximity of the project area to the Port Industrial Park and the project area's relative distance from residential areas, no significant impacts to surrounding areas are expected. Regarding zoning, the underlying zoning of this area would also remain unchanged and no significant impacts are anticipated.

The proposed improvements would offer numerous benefits by creating a more efficient movement of goods through the Port and surrounding region.

#### 4.5.2 No Action Alternative

For the No Action Alternative, the land use and zoning would remain unchanged and as a result, no impacts would occur.

### 4.6 Socioeconomics and Environmental Justice

To determine socioeconomic impacts, the USACE property lease and the proposed improvements were evaluated in relation to job creation and community cohesion. For EJ populations, census data was collected from the census block group level that encompasses the project area and then compared to the surrounding community, as well as to the entire State of Oklahoma.

#### 4.6.1 Preferred Alternative

During construction of the proposed improvements, jobs would be created, thereby benefiting the local economy. It is expected that local or regional construction contractors would be utilized for these improvements and they would in turn spend their money in and around the local and regional area.

In addition, the USACE lease of the property to the Port and the proposed improvements would allow the Port to accommodate an increase in barge traffic resulting from the current expansion of the Panama Canal. Once the canal is widened, mega-container ships can reach Gulf of Mexico ports such as Mobile, New Orleans and Galveston. The Port would then become an important multi-modal component in the distribution of goods and services in and out of these regional ports. This added activity would in turn have a positive impact on the local economy.

The lease and subsequent implementation of the proposed improvements would create an opportunity for future business expansion within the Port creating new jobs and having a positive impact on the local economy.

There are no acquisitions of private land. All improvements would be constructed on land leased to the Port from the USACE. No minorities or low income populations would be disproportionately impacted by the proposed improvements.

#### 4.6.2 No Action Alternative

Under the No Action Alternative, there would be no impacts to socioeconomic resources or EJ populations. There would be no land acquisitions and no minorities or low income populations would be disproportionately impacted.

### 4.7 Hazardous Waste

To determine potential hazardous material and waste impacts, the proposed improvements were evaluated relative to existing conditions at the site. Particular attention was paid to the area of proposed ground disturbance and excavation.

#### 4.7.1 Preferred Alternative

Under the PA, soils in the BFA would be excavated to the required depth to accommodate barges and towboat drafts. Reuse and grading of excavated materials in the BFFA would bury existing soils at that location. Properties identified within the one-mile radius search for hazardous materials/wastes are not located within the disturbance area and do not pose an environmental concern for the project. Therefore, no impact is anticipated.

#### 4.7.2 No Action Alternative

The No Action Alternative would leave the ground surface undisturbed. No impact related to hazardous materials and waste would occur.

### 4.8 Air Quality

#### 4.8.1 Preferred Alternative

There would be minor, temporary adverse impacts to air quality as a result of exhaust emissions from the dredge equipment and any associated machinery, vessels, and vehicles associated with the construction of the PA. Criteria air pollutant emissions resulting from diesel fuel combustion include nitrogen dioxides ($NO_2$), sulfur dioxide ($SO_2$), carbon monoxide (CO), volatile organic compounds (VOCs), and particulate matter (PM10/PM2.5). After construction, air pollutant emissions are expected to be no more than the No Action Alternative because the USACE will continue to perform maintenance dredging in the navigation channel, and to the Port in its Terminal Basin. Minor additional long-term emissions also would be generated by the increased towboat operations in the BFA. However, since the State of Oklahoma is in attainment for all criteria air pollutants at this time, air quality impacts during construction and operation of the BFA are expected to be minor and would not affect overall air quality in the region.

### 4.8.2 No Action Alternative

Under the No Action Alternative, the proposed project would not occur and the existing facility would remain in its current condition; barge storage would continue to be handled in the Port's Terminal Basin, and the BFA / BFFA would remain undisturbed, and there would be no temporary impacts to air quality.

## 4.9 Noise

### 4.9.1 Preferred Alternative

The background noise resulting from the current level of activity at the Port, including the heavy industrial businesses located within the Port Industrial Park, is substantial. Noise generated by the machinery necessary to perform earthwork associated with the BFA and BFFA, would temporarily increase noise levels in the area. However, due to the relative remoteness of the area and the short construction period, this would only have minimal effects. In addition, Rogers County does not have a noise ordinance. As a result, no noticeable changes to noise levels from the construction or operation of the proposed project are anticipated.

### 4.9.2 No Action Alternative

Without construction of the BFA/BFFA, current noise levels would remain unchanged.

## 4.10 Biological Resources

The project study area is host to a variety of biological resources, including terrestrial habitat and biota, aquatic habitats and biota, and potential for federally threatened and endangered species. The principal impacts to biological resources would result from construction activities.

### 4.10.1 Preferred Alternative

#### 4.10.1.1 Terrestrial Ecology

<u>Construction Impacts</u>

Approximately 37 acres of mature forest would be cleared for the project. The densest portion of forest which would be cleared is located within the BFA construction area. Approximately 66 acres of sparse, mixed scrub-shrub area would be cleared along the construction access road and within the BFFA. Approximately 3.6 acres of forested wetland would be cleared with the proposed project. Upon completion of construction within the BFA, berms would be seeded with an appropriate grass mixture and maintained periodically through mowing.

Clearing of forest and the conversion of forested area to mowed turf would permanently disrupt the normal nesting, feeding and foraging habits of terrestrial wildlife currently utilizing the BFA and BFFA sites. Those species displaced would likely move to undisturbed forest adjacent to the site. Therefore, no significant impact is anticipated for displaced species.

Impacts to 26 acres of mature forest within the upland riparian zone of the former Verdigris River channel will require compensatory mitigation at a minimum ratio of one-to-one acres replaced to acres removed. In order to mitigate for impacts to the upland riparian zone, the Port of Catoosa will prepare an enforceable mitigation plan in consultation with the USACE that will address not only aquatic resources but also riparian/upland resources impacted by BFA project construction. In addition to avoidance and minimization, the Port will provide compensatory mitigation with a primary goal to compensate for impacts resulting from the clearing of approximately 26 acres of hardwood forest as well as impacts to the waterways during the construction of the proposed BFA (**See Figures 4-1, 4-2 and 4-3**). No managed grasslands exist within the BFA or BFFA project area, therefore none will be impacted requiring mitigation.

Operational Impacts

No impacts are anticipated with the operation of the BFA.

#### 4.10.1.2 Aquatic Ecology

Construction Impacts

Dewatering and excavation of the former channel of the Verdigris River would destroy nesting, feeding and resting areas utilized by aquatic species. However, the channel is largely silted in with minimal flow due to the prior “construction” of the Bird Creek Cut-off. There is little quality habitat available to support a diverse, high quality population of aquatic species, as noted in Section 3.10 of this report. Therefore, impacts associated with the excavation of this former river channel are considered to be minor, with negligible impacts anticipated to species currently utilizing the channel.

Operational Impacts

Upon completion of the excavation and establishment of the pool elevation, aquatic species accustomed to activities associated with fleeting barges would adapt to post-construction conditions. Therefore, no impacts as a result of operations are anticipated.

#### 4.10.1.3 Threatened and Endangered Species

Construction Impacts

Although some suitable habitat for roosting, nesting, and foraging exists along Bird Creek and the MKARNS, no bald eagles or nests were observed during various site surveys conducted by the Port consultants and the USACE in 2009, 2010, and 2011. Furthermore, contact with the GM Sutton Avian Research Center in Bartlesville, Oklahoma, in August 2012, confirmed that one inactive bald eagle nesting site is known to occur approximately four miles northeast of the Port and one active nest is mapped approximately eight miles from the Port facilities. There are no known or mapped bald eagle nests in the study area. Should bald eagles be encountered during construction of the proposed BFA and BFFA, construction would be temporarily suspended, pending coordination with the USFWS to determine the necessary protocols to avoid impacts to this species. At this time, the USACE has determined that the proposed project should have no effect on the bald eagle.

The ABB is the only federally-protected threatened and endangered species potentially inhabiting portions of the site. As such, an ABB presence/absence survey would be undertaken in accordance with the published ABB protocols to determine the presence/absence of the ABB within the proposed construction areas. Upon completion of the study, results would be supplied to the pertinent agencies for review. Should the ABB be found in the proposed project area, a formal consultation process with the USFWS would be initiated prior to construction. Until the results of the presence/absence survey are known, the USACE cannot make a determination regarding the potential impact of the proposed project on the ABB.

The USACE has determined that the proposed project should have no effect on the Neosho mucket mussel, the Rabbitsfoot mussel, the Arkansas darter, the Interior least tern, the piping plover, the whooping crane, and/or the western prairie fringed orchid. No suitable habitat for any of these species was observed within the study area.

<u>Operational Impacts</u>

No impacts to threatened and endangered species are anticipated with the operation of the BFA.

#### 4.10.2 No Action Alternative

Terrestrial habitats, aquatic resources and potential habitat for the ABB located either adjacent to, or in the vicinity of, the former channel of the Verdigris River and on the BFA/BFFA would remain undisturbed. Therefore, no impacts are anticipated.

### 4.11 Cultural Resources

#### 4.11.1 Preferred Alternative

No properties listed in or determined eligible for listing in the National Register are located in the APE. Based on the findings of the archaeological surveys conducted for the proposed project, no additional study is warranted. As a result, no impact to cultural resources is expected as no historic properties are located within the APE.

#### 4.11.2 No Action Alternative

As there would be no ground disturbance and no construction activities under the No Action Alternative, there would be no impact to historic properties or archaeological resources.

### 4.12 Aesthetics and Scenic Resources

#### 4.12.1 Preferred Alternative

The proposed project would have only minor short-term visual impacts related primarily to construction activities. Construction activities would require the removal of vegetation along the former channels of the Verdigris River and Bird Creek and within the BFFA. Construction activities would be short-term and with time, vegetation would grow back. Proposed construction associated with this project are compatible with adjacent uses, and the continued development within the Port Terminal. Excavated soil material from the BFA would be spread on the BFFA; however, the elevation of this site would not change significantly and would not be seen from surrounding areas. In addition, because of the relatively remote locations of both the BFA and the BFFA, no significant visual impacts are anticipated.

### 4.12.2 No Action Alternative

Under the No Action Alternative, the BFA/BFFA would not be constructed and aesthetic and scenic resources would remain unchanged. Therefore, no impacts are anticipated.

# 5.0 AGENCY COORDINATION, PUBLIC INVOLVEMENT, PERMITS AND FEDERAL COMPLIANCE

## 5.1 Agency Coordination

The Port and/or its consultants have coordinated closely with regional, federal, state and county agencies over the course of the development of the proposed project. This coordination has been performed in such a way that the relevant concerns of the agencies have been considered in the development of the proposed project's design, and in the assessment of environmental impacts.

Following is a list of all meetings held to date with regional, state and county agencies, as well as with local governing bodies and others with whom coordination has occurred during the course of the proposed project. **Appendix C** contains minutes to the meetings listed below.

**Table 5-1**

**Agency Coordination**

| Date of Meeting | Subject Matter | Agencies/Jurisdictions Involved |
|---|---|---|
| July 27, 2009 | Scoping Meeting | • US Dept. of Commerce - Economic Development Admin (EDA)<br>• USACE-Regulatory<br>• USACE-Environmental<br>• USACE-Cultural Resources<br>• USFWS<br>• Indian Nations Council of Governments (INCOG)<br>• Port |
| Sept. 21, 2009 | Scoping Clarification Meeting | • USACE-Regulatory<br>• USACE-Environmental<br>• USACE-Cultural Resources<br>• Port |

**Table 5-1 (Continued)**

**Agency Coordination**

| Date of Meeting | Subject Matter | Agencies/Jurisdictions Involved |
|---|---|---|
| May 3, 2011 | Initial Environmental Results Review Meeting | • USACE-Real Estate<br>• USACE-Counsel<br>• USACE-Navigation<br>• USACE-Operations<br>• USACE-Ft. Gibson Office<br>• USACE-Regulatory<br>• USACE-Environmental<br>• Port<br>• Dewberry |
| February 14, 2012 | EA Progress Briefing with USACE-Tulsa District | • USACE-Regulatory<br>• USACE-Environmental<br>• USACE-Cultural Resources<br>• Port<br>• Dewberry |
| June 21, 2012 | New American Burying Beetle Protocols | • USFWS<br>• USACE-Environmental<br>• Dewberry |
| January 30, 2013 | EA draft comments with USACE-Tulsa District | • USACE-Regulatory<br>• USACE-Environmental<br>• USACE-Counsel<br>• Port<br>• Dewberry |

## 5.2 Public Involvement

It is anticipated that additional coordination meetings with regulatory agencies, public officials and the general public would be scheduled as the project advances. In addition, a public hearing would be scheduled at a future date as part of the NEPA and/or permitting processes.

### 5.3 Permits

USACE permits will be required in regard to the disturbance of wetlands and open waters. Section 10 and 404 permits address these impacts and this permit application will be submitted for USACE review and approval prior to the anticipated start of construction.

ODEQ permits address water quality concerns from proposed construction projects. A Section 401 Water Quality Certificate must be obtained to certify that the proposed project will not violate the water quality standards of the State and a Stormwater Pollution Prevention Plan permit will be required to certify that sediment will not be deposited into the Verdigris River watershed as a result of construction activities.

Finally, the USFWS will require an incidental take permit for the ABB should an ABB be trapped as part of the ABB Presence/Absence survey to be conducted prior to the start of construction, within the designated period of that year.

A Section 10/404 Permit from the USACE would be required for all impacts to wetlands/waters associated with the project. This permit application would be submitted for USACE review and approval prior to the anticipated start of construction.

State permits and approvals would be required from the ODEQ for the proposed project. These permits, approvals and certifications are summarized below:

- A Section 401 Water Quality Certificate must be obtained from the ODEQ to certify that the proposed project would not violate the water quality standards of the state;
- A review of hydraulic calculations by the local engineering department to make a determination with regard to the minor rise upstream resulting from project construction;
- A Conditional Letter of Map Revision must be obtained from Rogers County/FEMA; and
- Approval of a Stormwater Pollution Prevention Plan by ODEQ, which will include Best Management Practices, National Pollutant Discharge Elimination System (NPDES) and Soil Erosion and Sediment Control Plans (SESC).

**Table 5-2** presents project compliance with applicable Federal environmental statutes.

## Table 5-2

## Relationship of Plans to Environmental Protection Statutes and Other Environmental Requirements

| **Policy** | **Compliance Status** |
|---|---|
| Archeological and Historic Preservation Act, 1974, as amended, 16 U.S.C. 469, *et seq* | All plans in full compliance |
| Clean Air Act, as amended, 42 U.S.C. 7609, *et seq* | All plans in full compliance |
| Clean Water Act, 1977, as amended (Federal Water Pollution Control Act), 33 U.S.C. 1251, *et seq* | All plans in full compliance |
| Endangered Species Act, 1973, as amended, 16 U.S.C. 1531, *et seq* | All plans in full compliance |
| Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1-12, *et seq* | All plans in full compliance |
| Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, *et seq* | All plans in full compliance |
| Land and Water Conservation Fund Act, 1965, as amended, 16 U.S.C. 4601, *et seq* | All plans in full compliance |
| National Historic Preservation Act, 1966, as amended, 16 U.S.C. 470a, *et seq* | All plans in full compliance |
| National Environmental Policy Act, as amended, 42 U.S.C. 4321, *et seq* | All plans in full compliance (1) |
| Native American Graves Protection and Repatriation Act, 1990, 25 U.S.C. 3001-13, *et seq* | All plans in full compliance |
| Rivers and Harbors Act, 33 U.S.C. 401, *et seq* | All plans in full compliance |
| Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, *et seq* | All plans in full compliance |

**Table 5-2 (Continued)**

**Relationship of Plans to Environmental Protection Statutes and Other Environmental Requirements**

| **Policy** | **Compliance Status** |
|---|---|
| Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, *et seq* | All plans in full compliance |
| Water Resources Planning Act, 1965 | All plans in full compliance |
| Floodplain Management (E.O. 11988) | All plans in full compliance |
| Protection of Wetlands (E.O. 11990) | All plans in full compliance |
| Environmental Justice (E.O. 12898) | All plans in full compliance |
| Protection of Children (E.O. 13045) | All plans in full compliance |
| Farmland Protection Policy Act, 7 U.S.C. 4201, *et seq* | All plans in full compliance |

Note: Full Compliance - Having met all requirements of the statutes, Executive Orders, or other environmental requirements for the current stage of planning.

(1) National Environmental Policy Act of 1969 requires an environmental review prior to a Federal agency making an irretrievable commitment of Federal resources.

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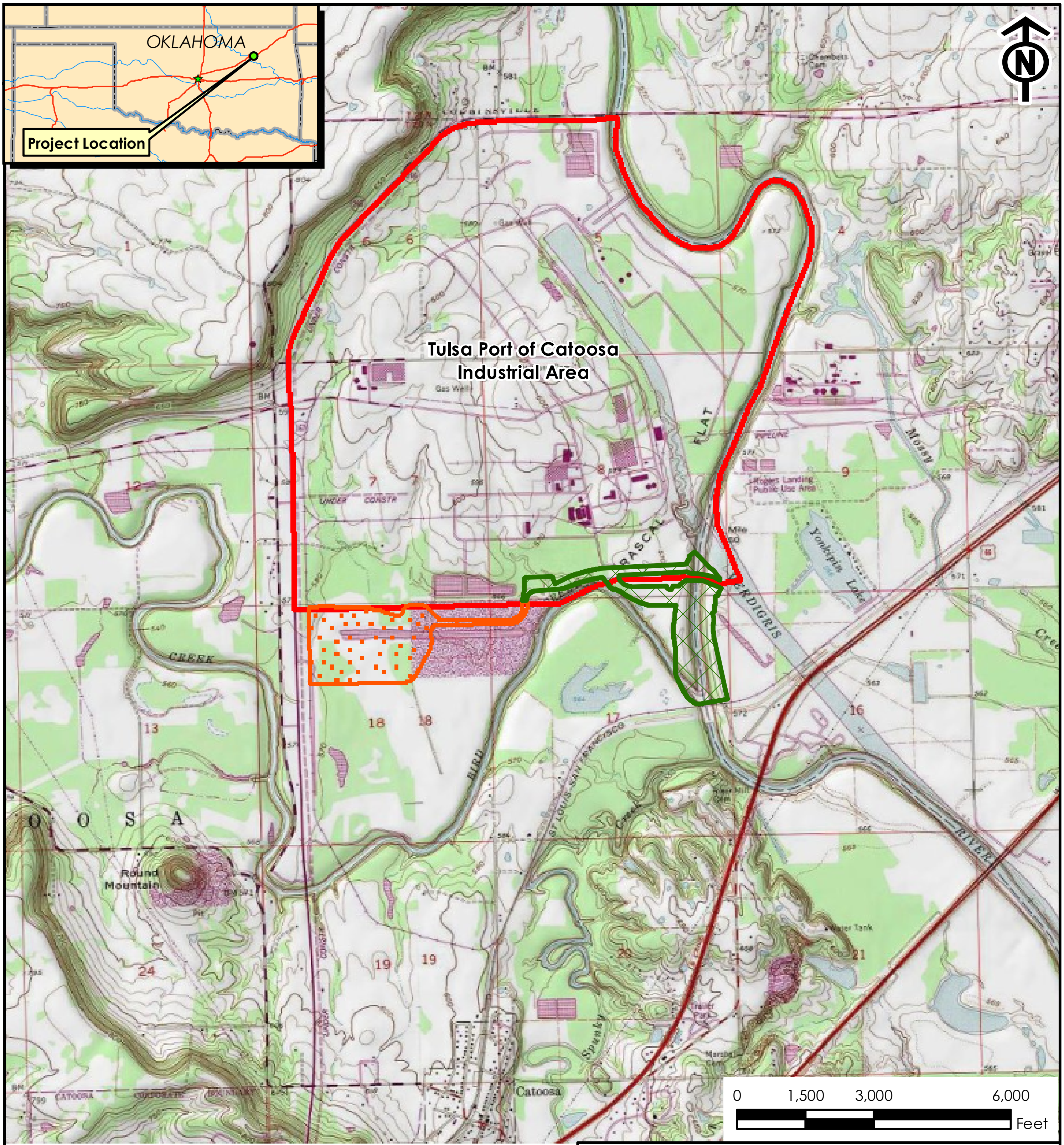
# FIGURES



## LEGEND:

🟧 Barge Fleeting Fill Study Area (BFFA)

🟩 Barge Fleeting Study Area (BFA)

🟥 Port Industrial Area

Source: USA Topographic Maps Online Service, ESRI

**TULSA PORT OF CATOOSA**
**ENVIRONMENTAL ASSESSMENT**

## PROJECT LOCATION MAP

Tulsa Port of Catoosa
Rogers County, Oklahoma

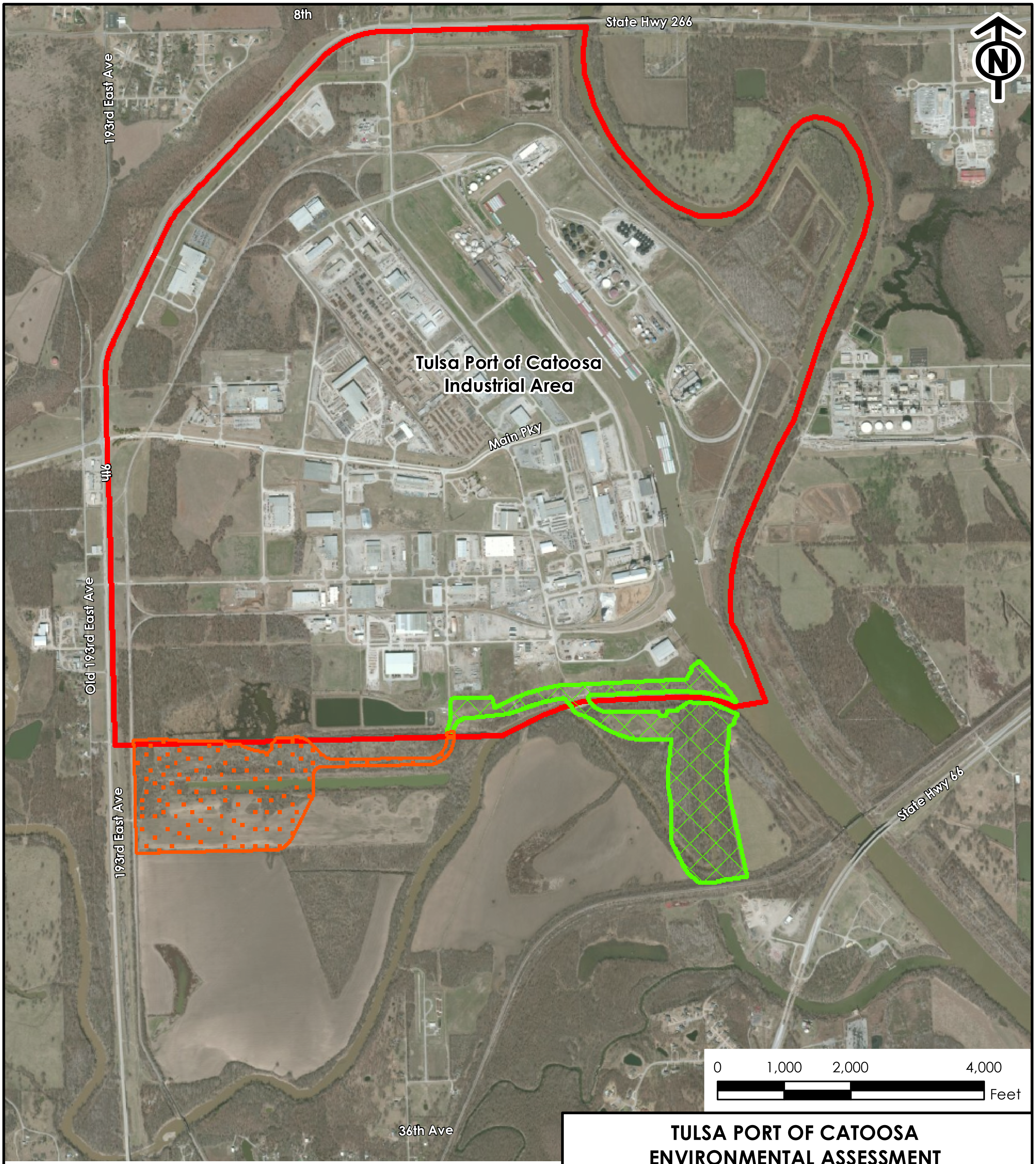
SCALE: 1" = 3000'

DATE: February 2013

Dewberry®

**FIGURE 1-1**

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Project Location Map.mxd



**LEGEND:**

- 🟧 Barge Fleeting Fill Study Area (BFFA)
- 🟩 Barge Fleeting Study Area (BFA)
- 🟥 Port Industrial Area

Source: World Imagery Online Service, ESRI

## TULSA PORT OF CATOOSA
## ENVIRONMENTAL ASSESSMENT

## SITE LOCATION MAP

Tulsa Port of Catoosa
Rogers County, Oklahoma

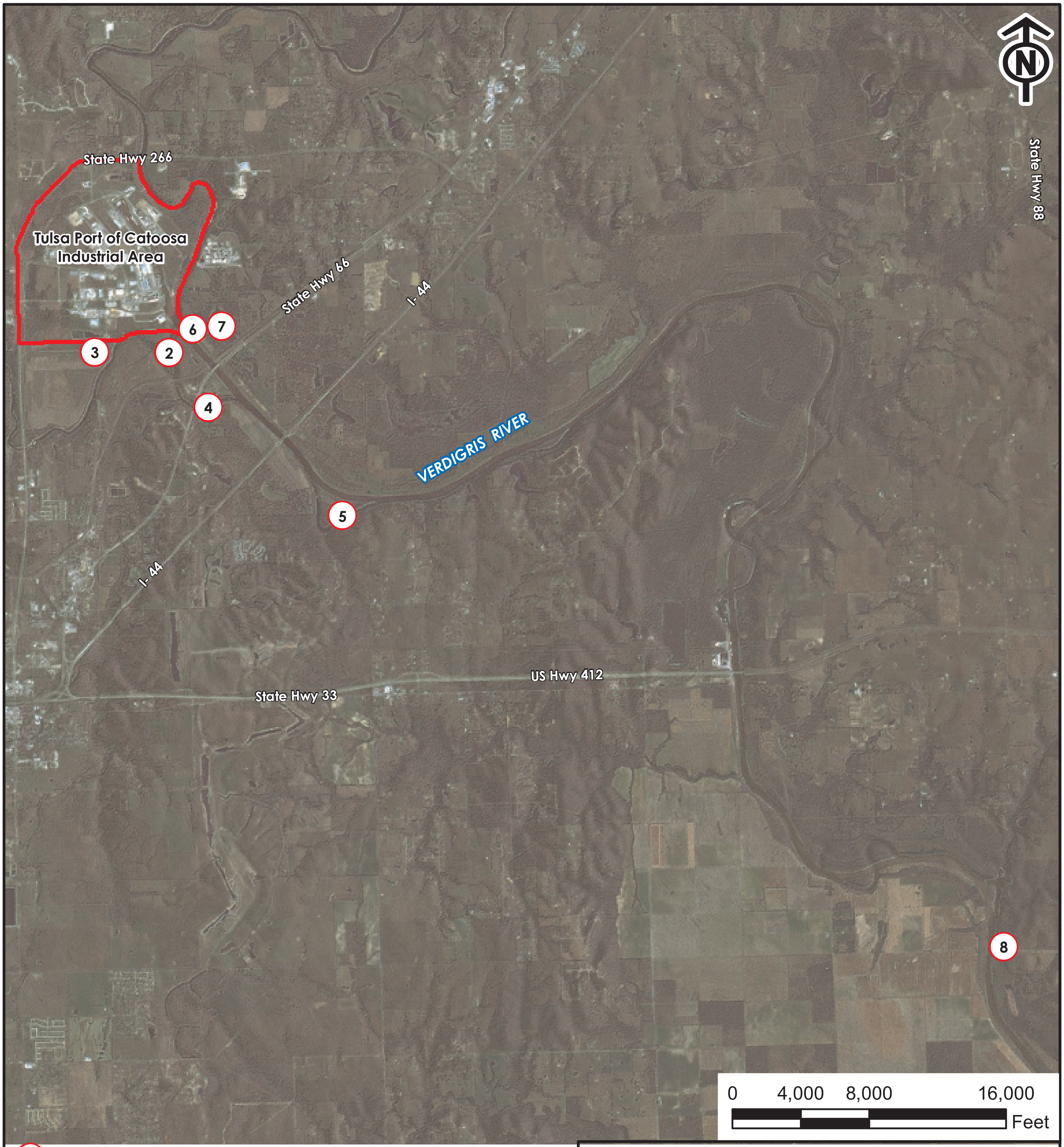
SCALE: 1" = 2000'

DATE: February 2013

Dewberry®

**FIGURE 1-2**

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Proposed Project Site Location Map.mxd



① No Action
② Initial Preferred Alternative-Former Verdigris River Channel
③ Former Private Terminal West of Bird Creek
④ Former Verdigris River Channel Adjacent to Rogers Point Access Area
⑤ Oxbow South of I-44 Bridge
⑥ East Bank of the Verdigris River, Adjacent to Terminal Area
⑦ Yonkipin Lake
⑧ Former Black Fox Power Station Site

## TULSA PORT OF CATOOSA
## ENVIRONMENTAL ASSESSMENT

# ALTERNATIVE CONCEPTS

Tulsa Port of Catoosa
Rogers County, Oklahoma

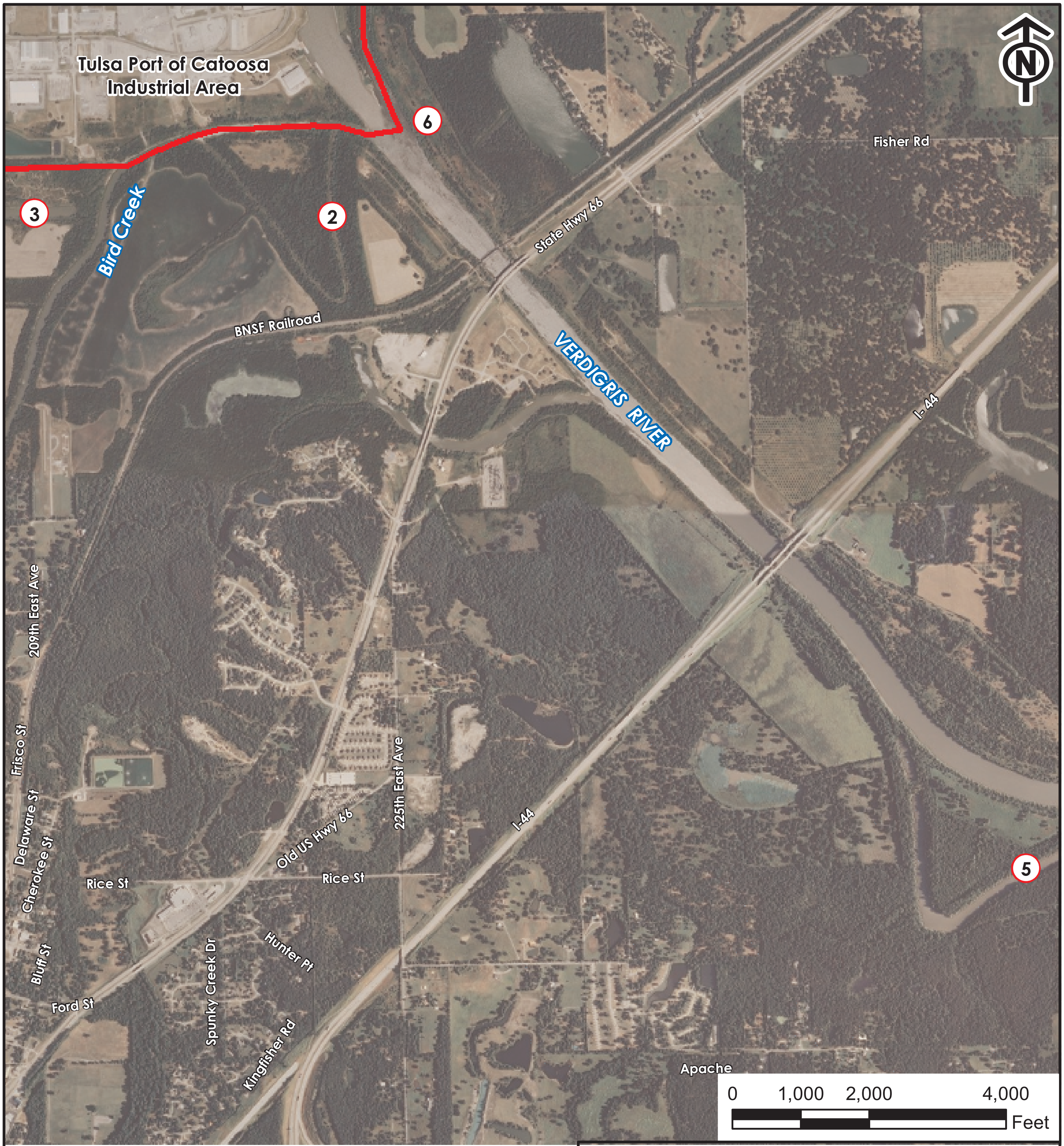
SCALE: 1" = 2000'
DATE: February 2013

Dewberry®

**FIGURE 2-1**

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Alt_Con.mxd

Source: World Imagery Online Service, ESRI



**BUILD ALTERNATIVES:**

① No Action

② Initial Preferred Alternative-Former Verdigris River Channel

③ Former Private Terminal West of Bird Creek

⑤ Oxbow South of I-44 Bridge

⑥ East Bank of the Verdigris River, Adjacent to Terminal Area

Source: World Imagery Online Service, ESRI

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Build_Con.mxd

## TULSA PORT OF CATOOSA ENVIRONMENTAL ASSESSMENT

## BUILD ALTERNATIVES

Tulsa Port of Catoosa
Rogers County, Oklahoma

SCALE: 1" = 2000'

DATE: February 2013

Dewberry®

**FIGURE 2-2**

② Initially Preferred Alternative-Former Verdigris River Channel

Source: World Imagery Online Service, ESRI

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Build_Con-2.mxd

TULSA PORT OF CATOOSA
ENVIRONMENTAL ASSESSMENT

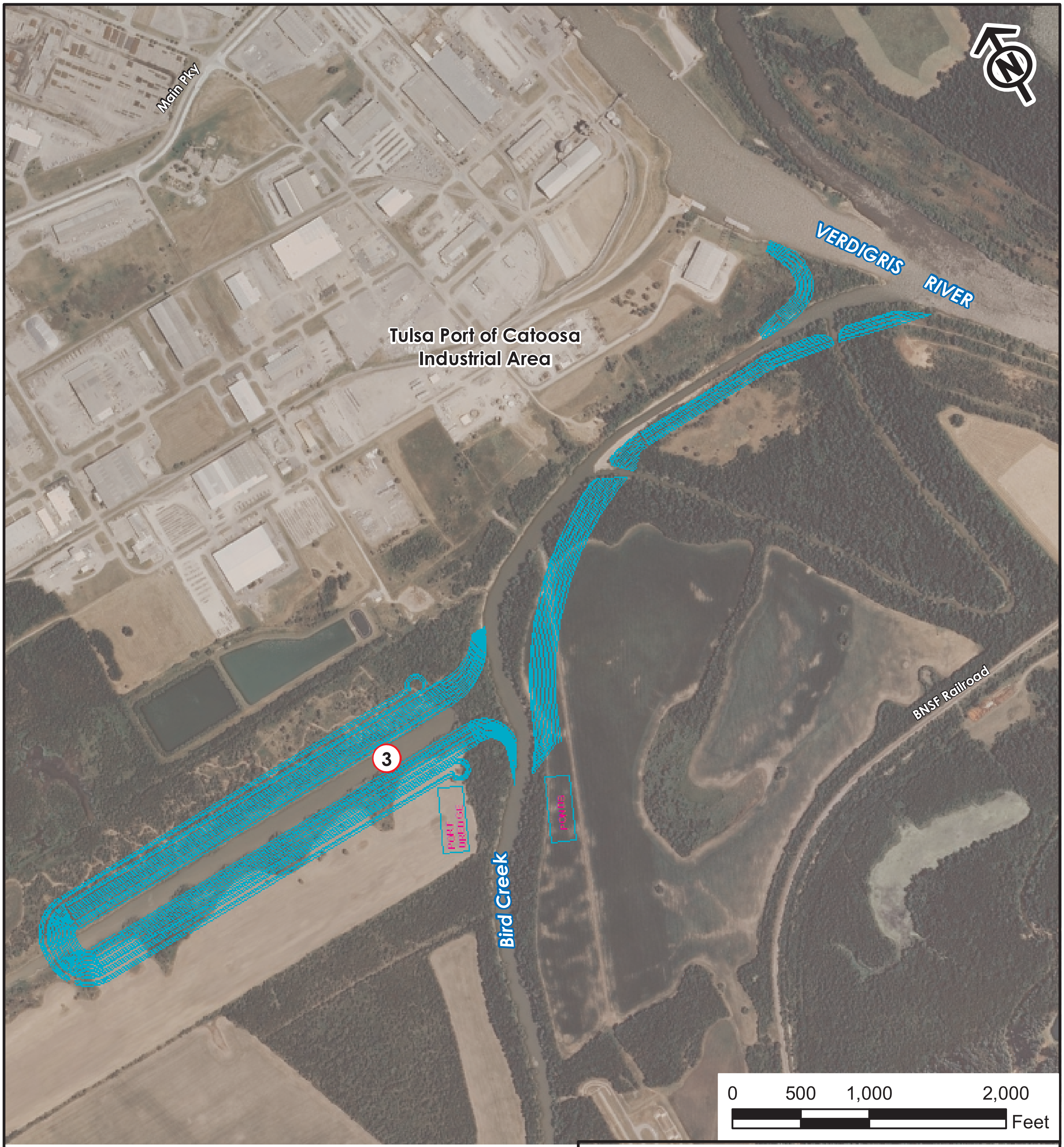
## BUILD ALTERNATIVE 2

Tulsa Port of Catoosa
Rogers County, Oklahoma

SCALE: 1" = 500'
DATE: February 2013

Dewberry®

FIGURE 2-3



③ Former Private Terminal West of Bird Creek

Source: World Imagery Online Service, ESRI

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Build_Con-3.mxd

## TULSA PORT OF CATOOSA
## ENVIRONMENTAL ASSESSMENT

## BUILD ALTERNATIVE 3

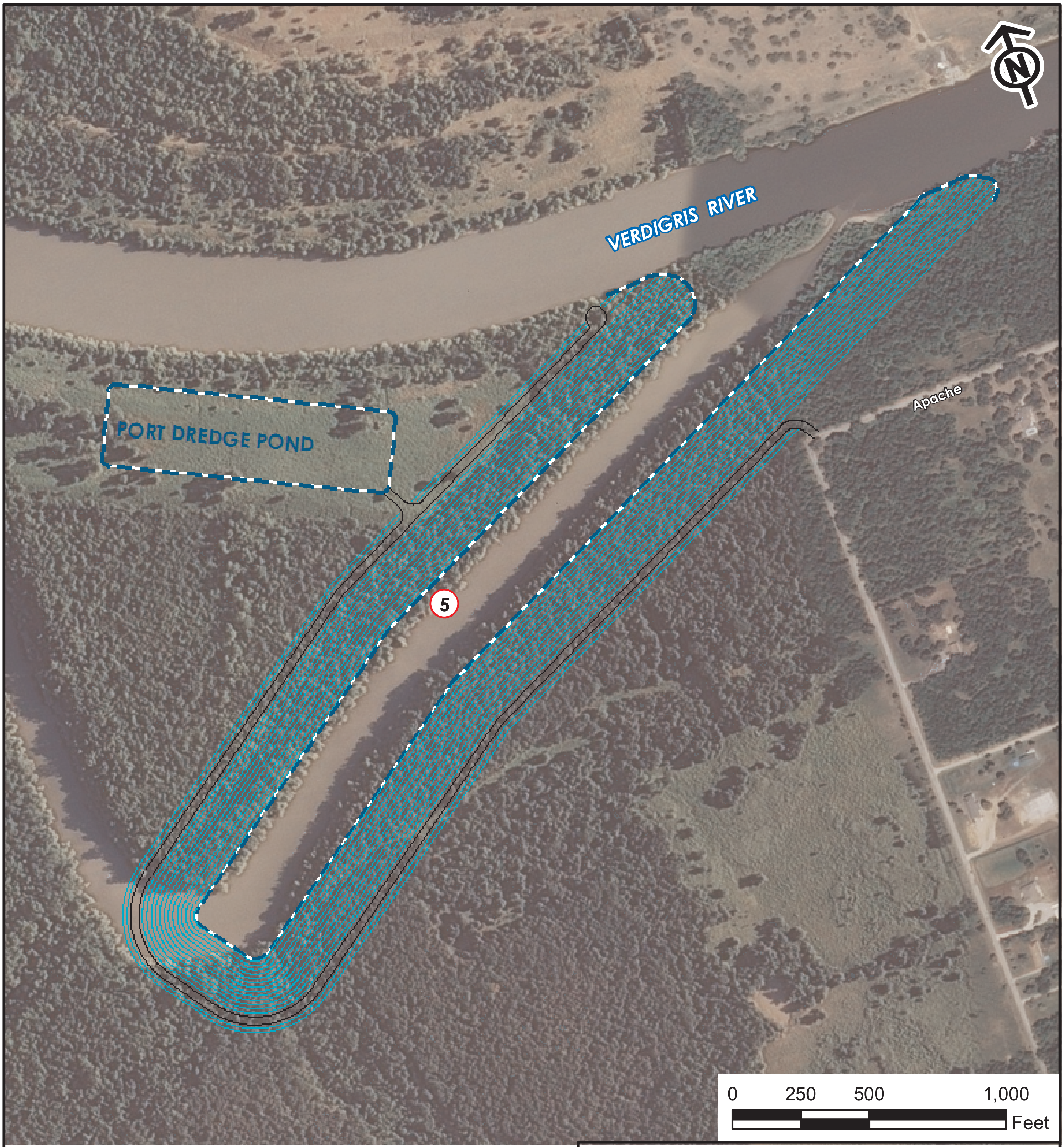
Tulsa Port of Catoosa
Rogers County, Oklahoma

SCALE: 1" = 1000'

DATE: February 2013

Dewberry®

FIGURE 2-4



⑤ **Oxbow South of I-44 Bridge**

Source: World Imagery Online Service, ESRI

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Build_Con-5.mxd

**TULSA PORT OF CATOOSA**
**ENVIRONMENTAL ASSESSMENT**

## BUILD ALTERNATIVE 5

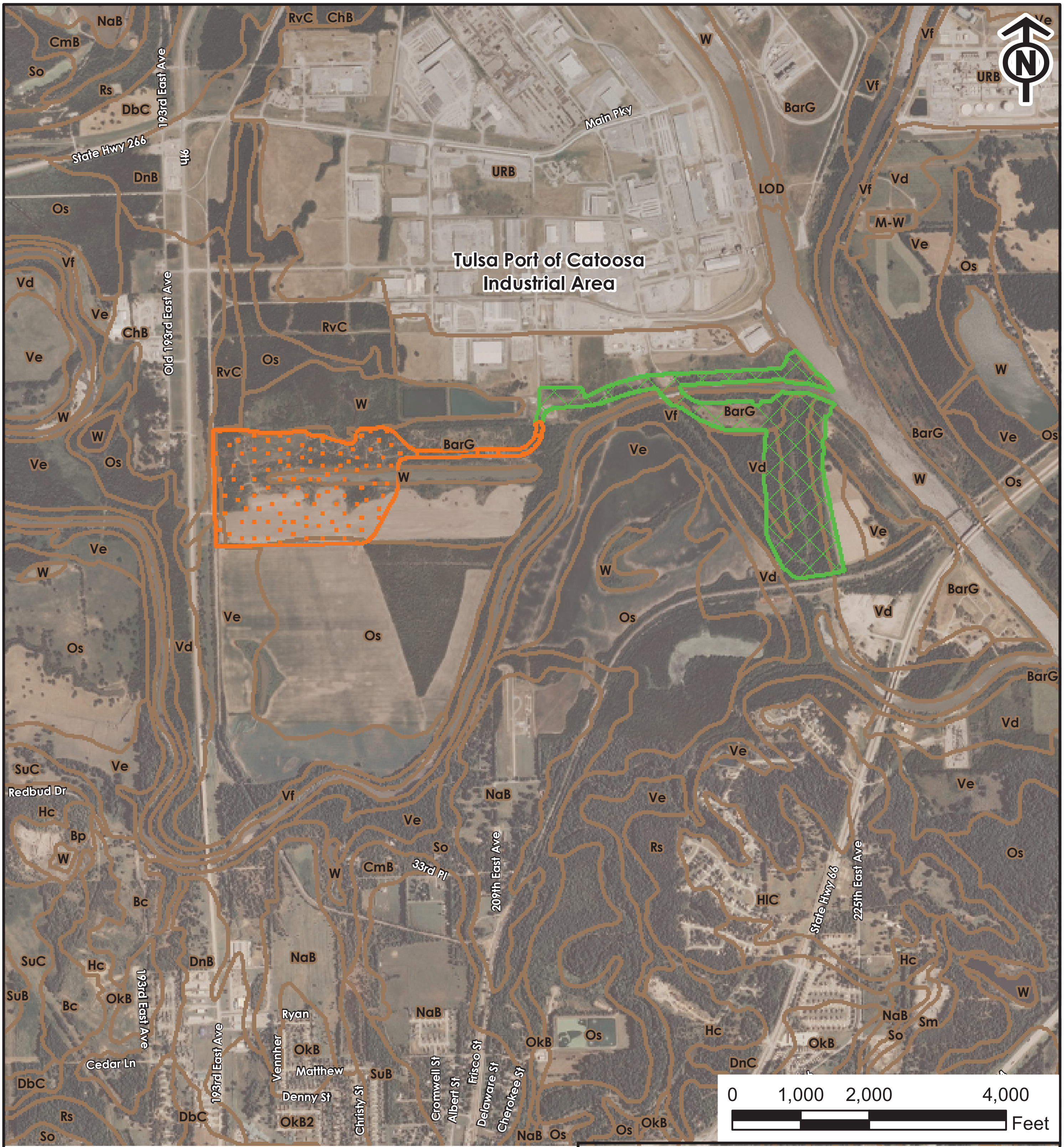
Tulsa Port of Catoosa
Rogers County, Oklahoma

SCALE: 1" = 500'

DATE: February 2013

**Dewberry®**

**FIGURE 2-5**



Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Soils_Map2.mxd

**LEGEND:**

▨ Barge Fleeting Fill Study Area (BFFA)

▨ Barge Fleeting Study Area (BFA)

☐ Soils

| | |
|---|---|
| BarG | - Barge silty clay loam, 0 to 30 percent slopes |
| Vd | - Verdigris silt loam, 0 to 1 percent slopes, occasionally flooded |
| Ve | - Verdigris clay loam, 0 to 1 percent slopes, occasionally flooded |
| Vf | - Verdigris silty clay loam, 0 to 2 percent slopes, frequently flooded |
| Os | - Osage clay, 0 to 1 percent slopes, occasionally flooded |
| RvC | - Riverton gravelly loam |
| W | - Water |

Source: Natural Resources Conservation SSURGO database for Rogers County, Oklahoma

**TULSA PORT OF CATOOSA**
**ENVIRONMENTAL ASSESSMENT**

## SSURGO SOILS MAP

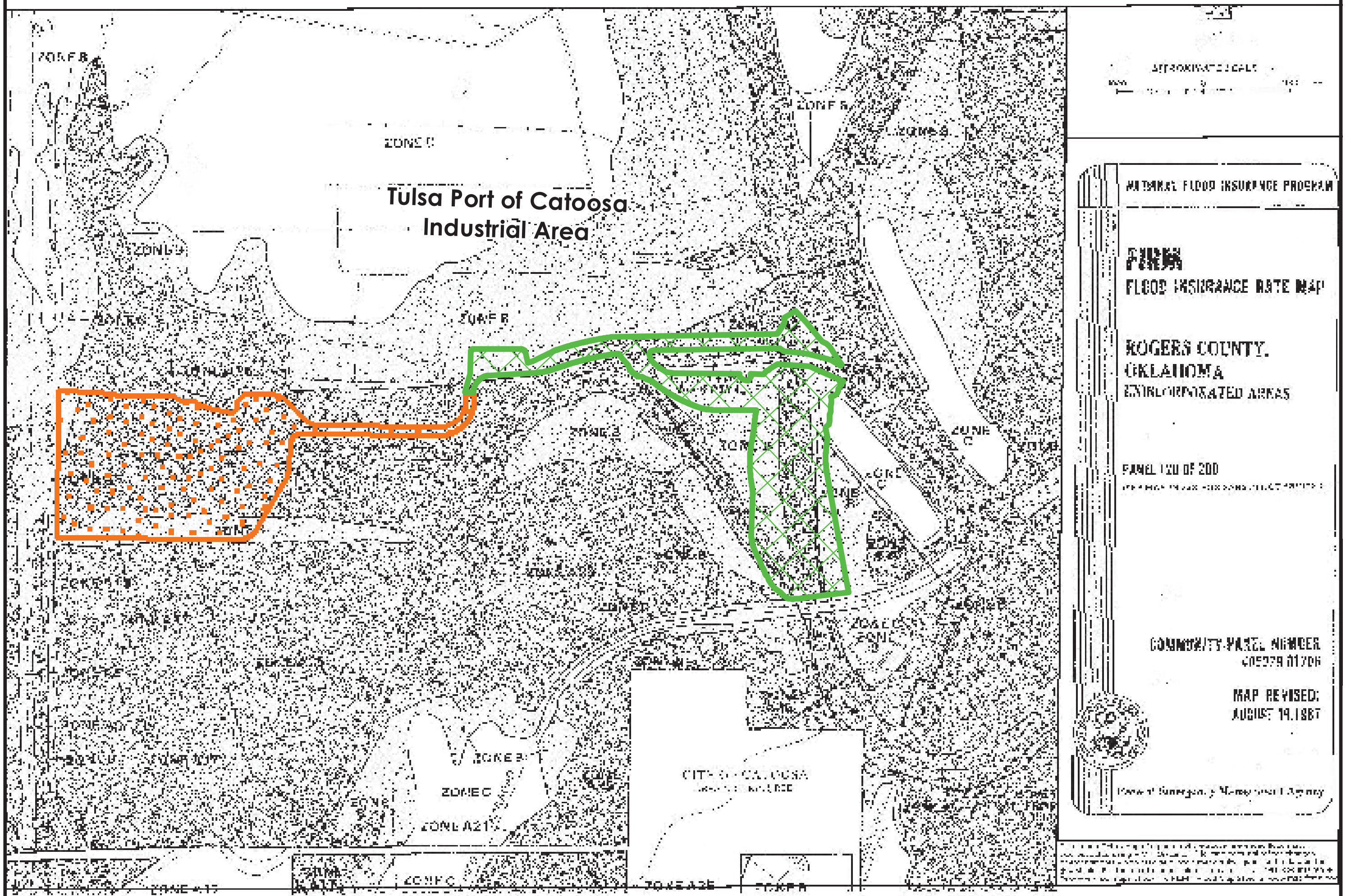
Tulsa Port of Catoosa
Rogers County, Oklahoma

SCALE: 1" = 2000'

DATE: February 2013

Dewberry®

**FIGURE 3-1**



## LEGEND:

- 🟧 Barge Fleeting Fill Study Area (BFFA)
- ☒ Barge Fleeting Study Area (BFA)

TULSA PORT OF CATOOSA
ENVIRONMENTAL ASSESSMENT

# FEMA FLOODPLAIN MAP

Tulsa Port of Catoosa
Rogers County, Oklahoma

SCALE: 1" = 2000'

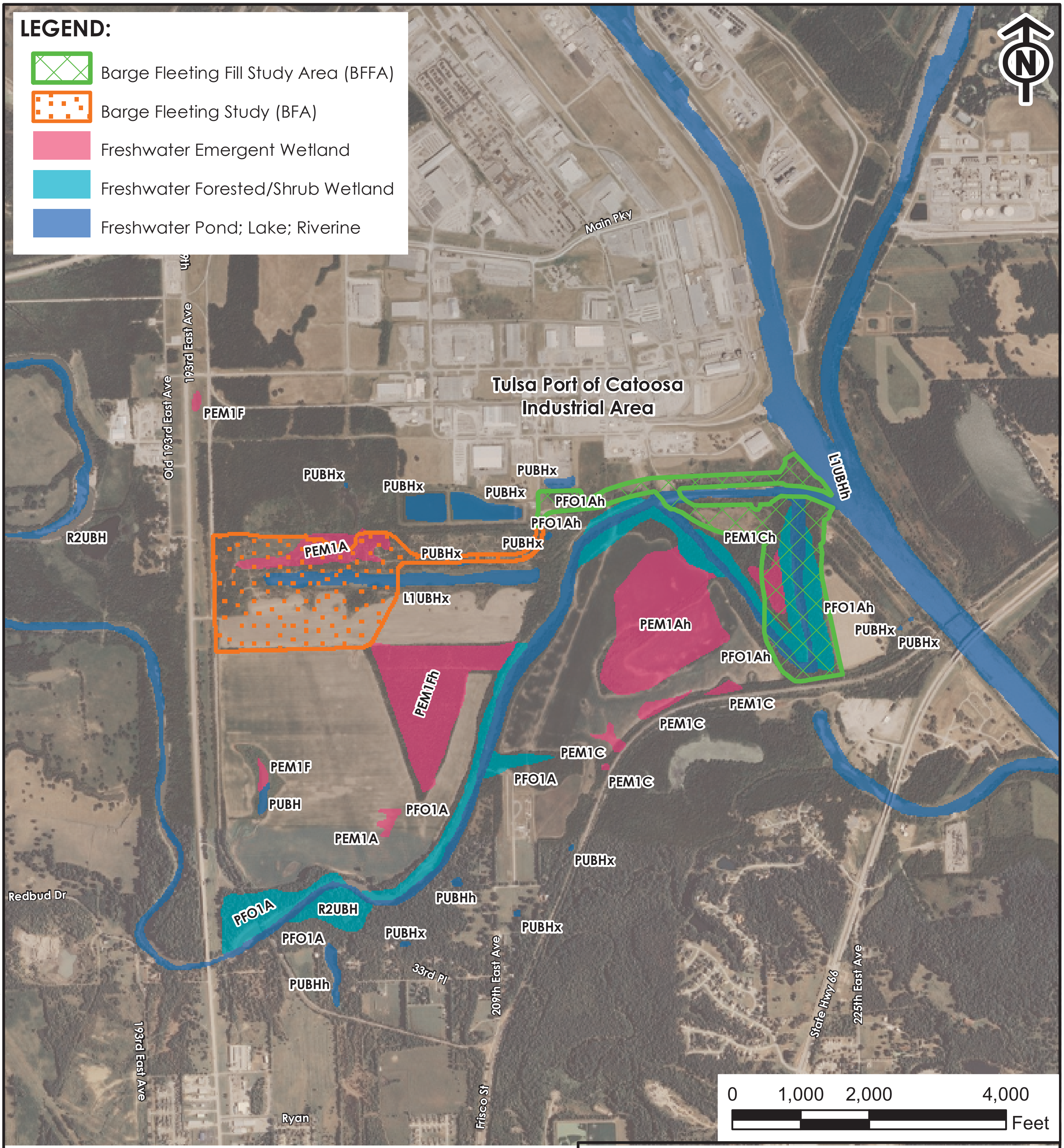
DATE: February 2013

**Dewberry**®

**FIGURE 3-2**

Source: FEMA, 1987

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Floodplain Map.mxd



Path: Q:\99601039\GIS\Mxd\Environmental Assessment\NWI Map.mxd

## Wetland Classifications

L1UBHx – Lacustrine Limnetic Unconsolidated Permanent Excavated
PEM1A – Palustrine Emergent Persistent, Temporary
PEM1Ah – Palustrine Emergent Persistent, Temporary Diked/Impounded
PEM1C – Palustrine Emergent Persistent Seasonal
PEM1Ch – Palustrine Emergent Persistent Seasonal Diked/Impounded
PEM1F – Palustrine Emergent Persistent, Semipermanent
PEM1Fh – Palustrine Emergent Persistent Semipermanent Diked/Impounded
PFO1A – Palustrine Forested Broad-Leaved Deciduous, Temporary
PFO1Ah – Palustrine Forested Broad-Leaved Deciduous Temporary Diked/Impounded
PUBH - Palustrine Unconsolidated Permanent
PUBHh – Palustrine Unconsolidated Bottom Permanent Diked/Impounded
PUBHx - Palustrine Unconsolidated Permanent Excavated
R2UBH – Riverine Lower Perennial Unconsolidated Bottom Permanent

Source: National Wetlands Inventory

TULSA PORT OF CATOOSA
ENVIRONMENTAL ASSESSMENT

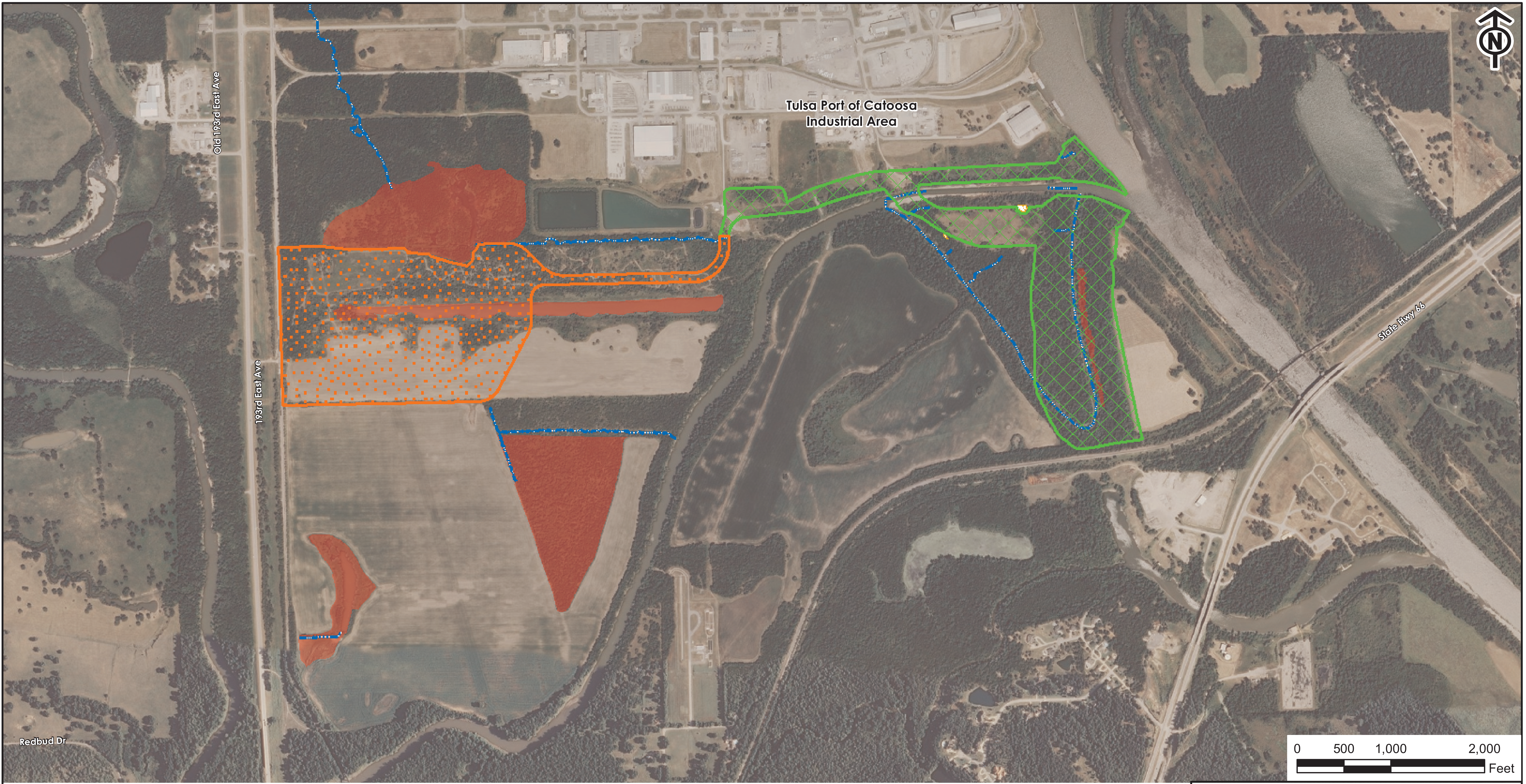
# NATIONAL WETLAND INVENTORY MAP

Tulsa Port of Catoosa
Rogers County, Oklahoma

SCALE: 1" = 2000'
DATE: February 2013

Dewberry®

**FIGURE 3-3**



**LEGEND:**

- ▨ Barge Fleeting Fill Study Area (BFFA)
- ▨ Barge Fleeting Study Area (BFA)
- ▨ Wetland Area
- ‑·‑·‑ Existing Stream
- 🟥 Wetlands

Source: Kleinfelder Jan. 2012

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\PJ Waters Map.mxd

TULSA PORT OF CATOOSA
ENVIRONMENTAL ASSESSMENT

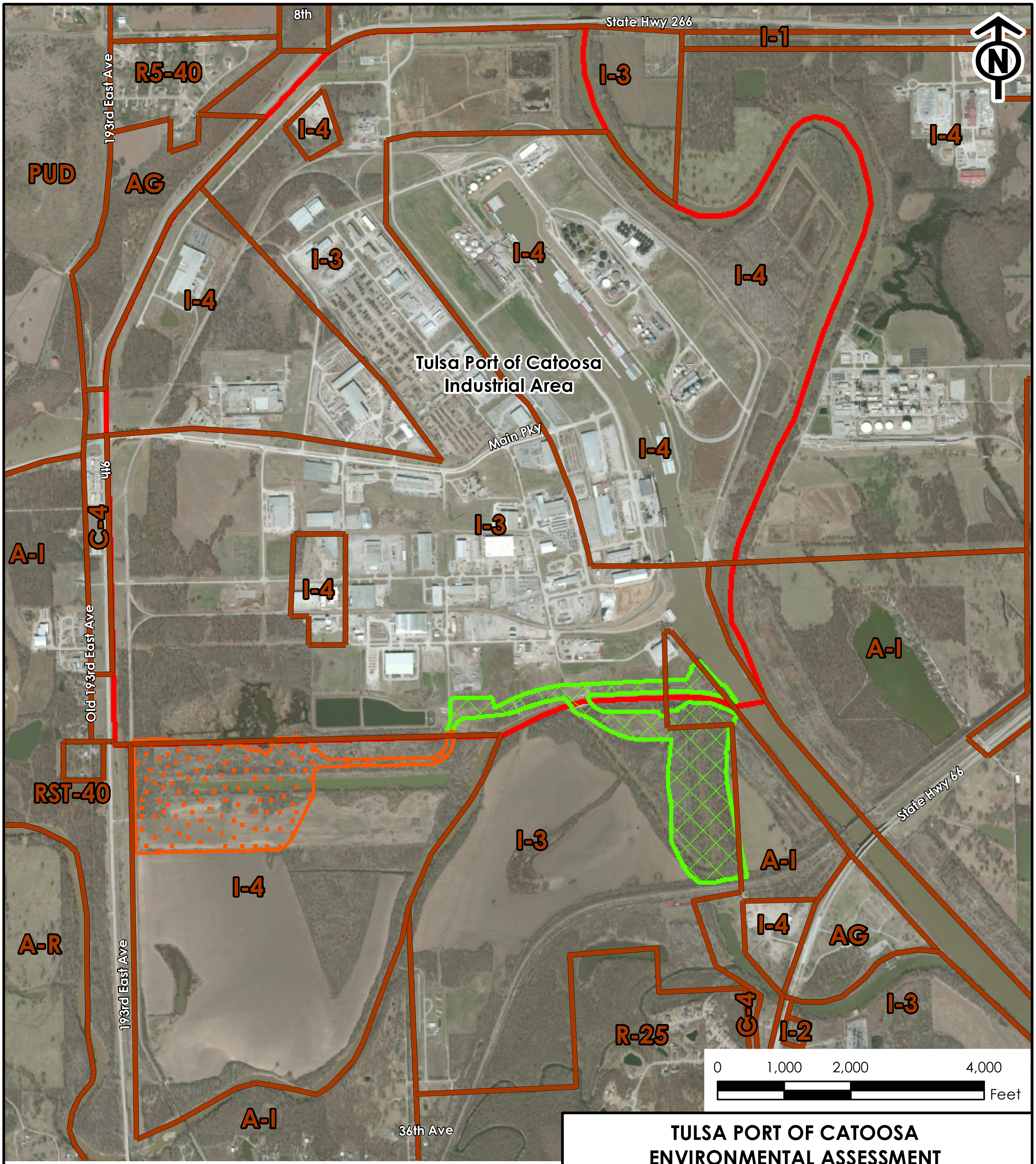
## POTENTIALLY JURISDICTIONAL WATERS MAP

Tulsa Port of Catoosa
Rogers County, Oklahoma

SCALE: 1" = 1000'
DATE: February 2013

Dewberry®

FIGURE 3-4



**LEGEND:**

- 🟧 Barge Fleeting Fill Study Area (BFFA)
- ▨ Barge Fleeting Study Area (BFA)
- 🟥 Port Industrial Area
- ☐ Zone Designation

Source: World Imagery Online Service, ESRI

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Zoning Map.mxd

**TULSA PORT OF CATOOSA**
**ENVIRONMENTAL ASSESSMENT**

## ZONING MAP

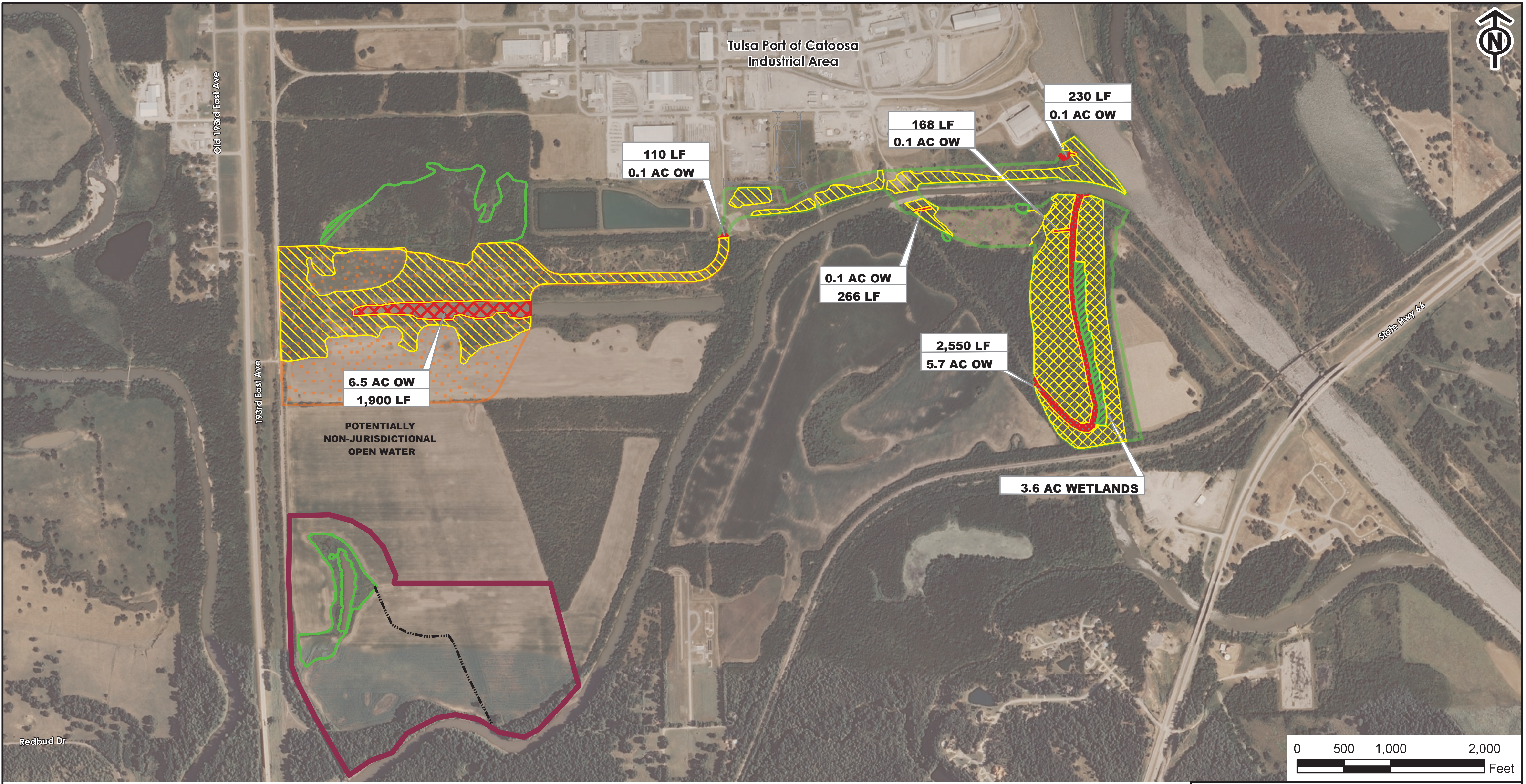
Tulsa Port of Catoosa
Rogers County, Oklahoma

SCALE: 1" = 2000'

DATE: February 2013

Dewberry®

**FIGURE 3-5**



LEGEND:

| | |
|---|---|
| ▨ | TREE CLEARING (SCRUB) (66 Ac) |
| ▩ | TREE CLEARING (MATURE) (37 Ac) |
| ▭ | BARGE FLEETING FILL STUDY AREA (BFFA) |
| ▩ | BARGE FLEETING STUDY AREA (BFA) |
| ▩ | PROPOSED OPEN WATERS IMPACTS (6.1 Ac) |
| ▭ | WETLAND LIMITS |
| ▨ | PROPOSED WETLAND IMPACTS (3.6 Ac) |
| ▭ | POTENTIAL MITIGATION SITE |
| -··- | POTENTIAL CHANNEL CONNECTOR |

Source: Kleinfelder Jan. 2012

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Wetland Impacts Map.mxd

TULSA PORT OF CATOOSA
ENVIRONMENTAL ASSESSMENT

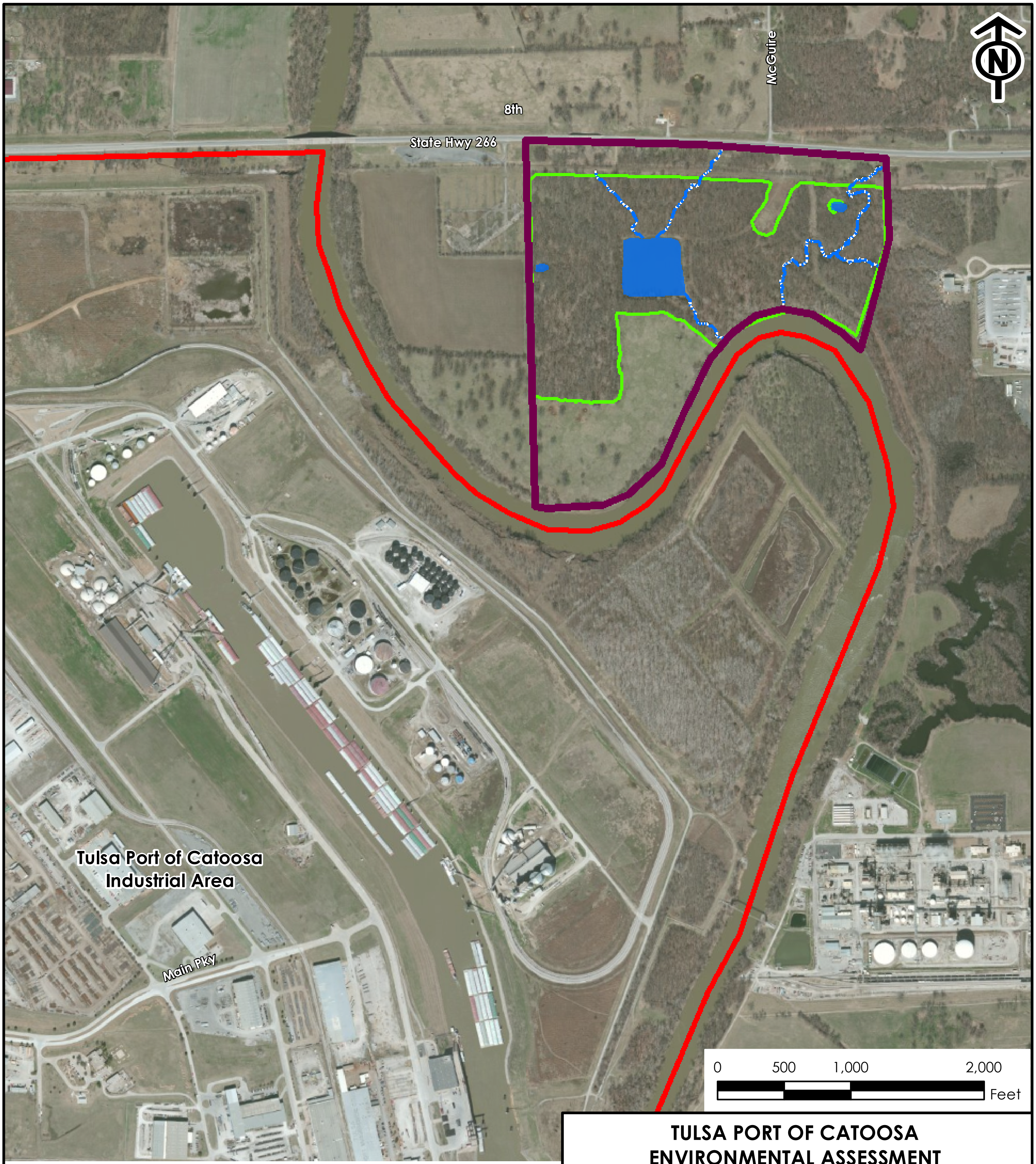
## PROJECT AREA IMPACTS TO WETLANDS AND OPEN WATER

Tulsa Port of Catoosa
Rogers County, Oklahoma

SCALE: 1" = 1000'
DATE: February 2013

Dewberry®

FIGURE 4-1



**LEGEND:**

- ┅ Existing Stream
- 🟦 Ponds
- ▭ Wetland Area
- ▭ Potential Mitigation Site
- ▭ Port Industrial Area

Source: World Imagery Online Service, ESRI

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Potential Mitigation Site Map.mxd

TULSA PORT OF CATOOSA
ENVIRONMENTAL ASSESSMENT

## POTENTIAL MITIGATION SITE

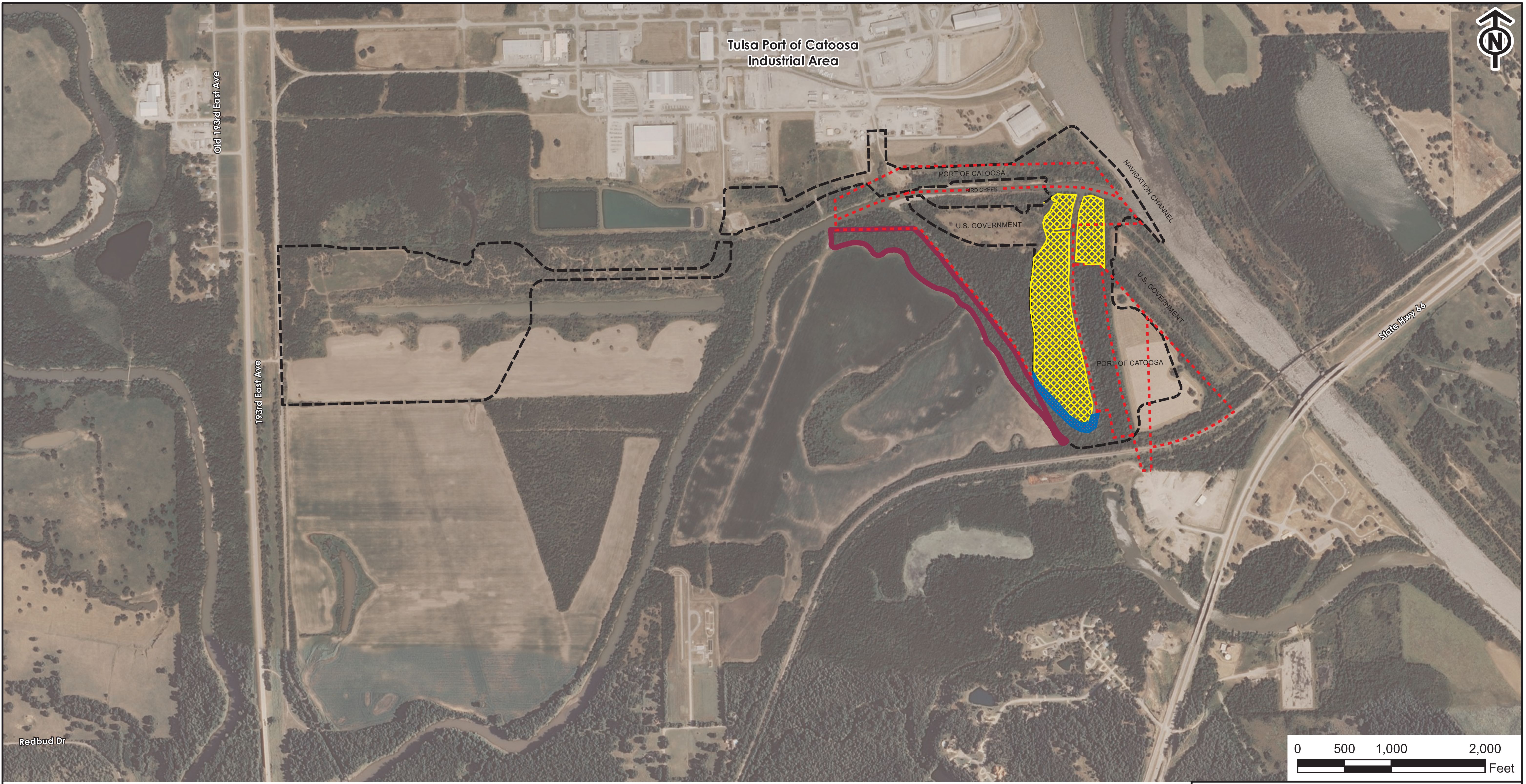
Tulsa Port of Catoosa
Rogers County, Oklahoma

SCALE: 1" = 1000'

DATE: February 2013

Dewberry®

FIGURE 4-2



**LEGEND:**

▨ 26 ACRES TREE CLEARING (MATURE) USACE PROPERTY

▭ 14 ACRES MITIGATION TREE (MATURE) PRESERVATION

▨ 1000 L.F. OPEN WATERS FILLED

- - - LIMITS OF DISTURBANCE

······ PROPERTY LINE

Source: Kleinfelder Jan. 2012

Path: Q:\99601039\GIS\Mxd\Environmental Assessment\Riparian Impacts_USACEMap.mxd

**TULSA PORT OF CATOOSA**
**ENVIRONMENTAL ASSESSMENT**

## RIPARIAN IMPACTS ON USACE PROPERTY

Tulsa Port of Catoosa
Rogers County, Oklahoma

SCALE: 1" = 1000'

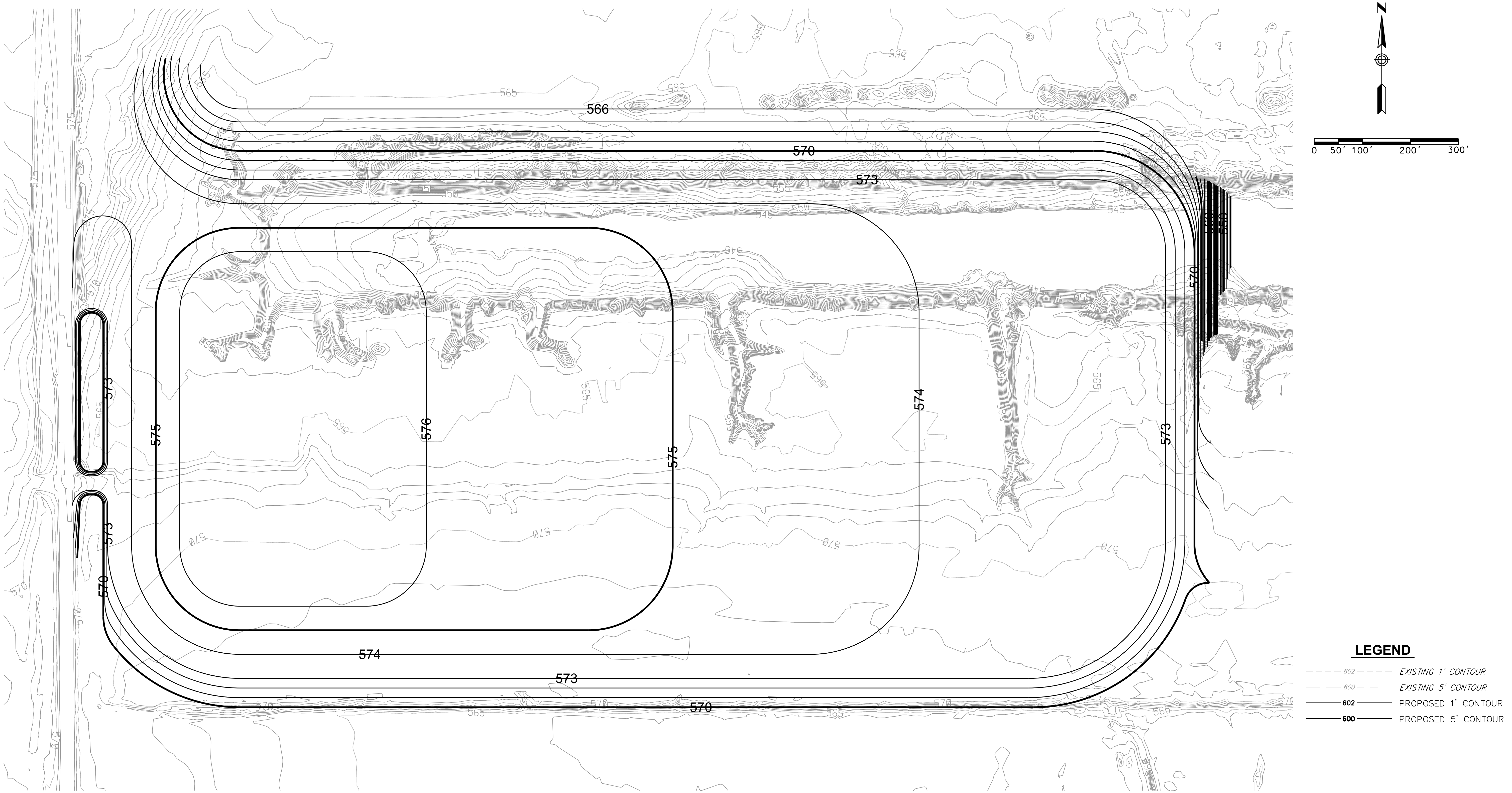
DATE: February 2013

Dewberry®

**FIGURE 4-3**

# APPENDIX A

# DEPARTMENT OF THE ARMY PERMIT INFORMATION



Q:\50021361\CAD\Civil\TPC BFA EA APPENDIX A 02-06-2013\BFFA GRADING PLAN.dgn

2/7/2013

NOT FOR CONSTRUCTION
FEBRUARY 2013

DEWBERRY PROJECT NO. 50042679

| REVISION | BY | DATE |
|---|---|---|
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**CITY OF TULSA - ROGERS COUNTY**
**PORT AUTHORITY**

**BFFA GRADING PLAN**

**PORT PROJECT NO. 2500-139**

PLANS AND ESTIMATES PREPARED BY:

Dewberry

Dewberry Engineers Inc.
1350 South Boulder - Suite 600
Tulsa, Oklahoma 74119 - 3216
918.587.7283 - fax 918.587.0071
C.A. NO. 4581 EXP. 6/30/2014

PLAN SCALE: 1"= 200'
PROFILE SCALE: HORIZ. VERT.

DESIGNED: CSS
DRAWN: WSL
APPROVED: CSS
DATE: FEBRUARY 05. 2013
SHEET OF SHEETS

Q:\50021361\CAD\Civil\TPC BFA EA APPENDIX A 02-06-2013\BFA PA SITE PLAN.dgn

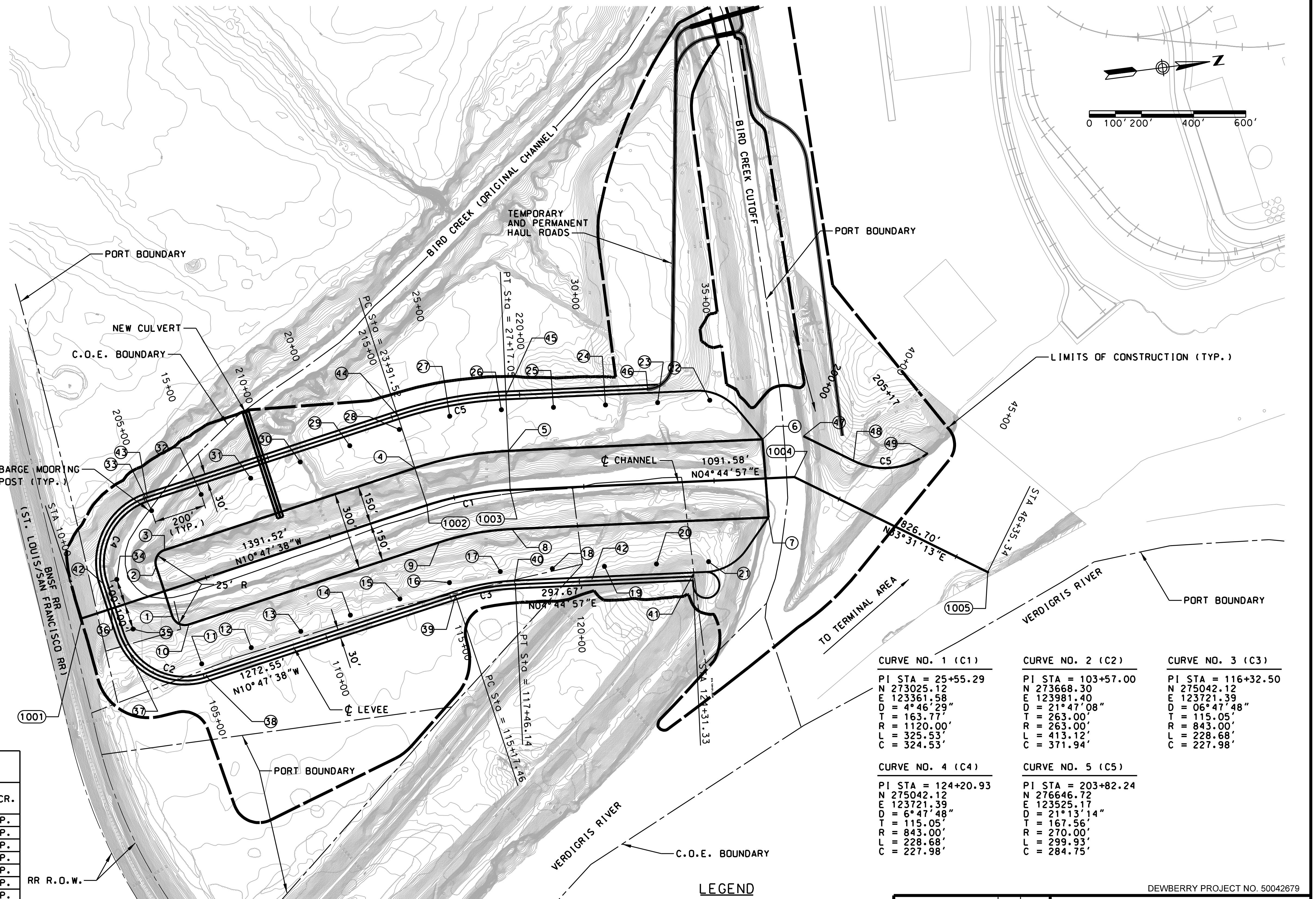
2/7/2013

## GEOMETRIC DATA

| POINT NO. | NORTHING | EASTING | DESCR. |
|---|---|---|---|
| 1001 | 273495.34 | 123652.85 | CHANNEL CL |
| 1002 | 274862.25 | 123392.25 | " " |
| 1003 | 275186.33 | 123375.14 | " " |
| 1004 | 276274.16 | 123465.51 | " " |
| 1005 | 276963.38 | 123922.04 | " " |
| 1 | 273839.40 | 123689.05 | CHANNEL TOE |
| 2 | 273801.94 | 123492.59 | " " |
| 3 | 273841.70 | 123434.11 | " " |
| 4 | 274834.16 | 123244.90 | " " |
| 5 | 275198.75 | 123225.65 | " " |
| 6 | 276171.31 | 123306.45 | " " |
| 7 | 276155.97 | 123606.21 | " " |
| 8 | 275173.91 | 123524.62 | " " |
| 9 | 274890.34 | 123539.60 | " " |
| 10 | 273897.88 | 123728.81 | " " |
| 11 | 273927.65 | 123884.99 | MOORING POST |
| 12 | 274124.12 | 123847.54 | " " |
| 13 | 274320.58 | 123810.08 | " " |
| 14 | 274517.04 | 123772.63 | " " |
| 15 | 274713.50 | 123735.17 | " " |
| 16 | 274909.96 | 123697.72 | " " |
| 17 | 275108.78 | 123680.29 | " " |
| 18 | 275308.20 | 123695.33 | " " |
| 19 | 275507.51 | 123711.89 | " " |
| 20 | 275706.82 | 123728.44 | " " |
| 21 | 275906.14 | 123745.00 | " " |
| 22 | 275989.54 | 123131.80 | " " |
| 23 | 275790.23 | 123115.24 | " " |
| 24 | 275590.91 | 123098.69 | " " |
| 25 | 275391.60 | 123082.13 | " " |
| 26 | 275192.28 | 123065.70 | " " |
| 27 | 274992.42 | 123064.98 | " " |
| 28 | 274794.23 | 123090.65 | " " |
| 29 | 274597.77 | 123128.11 | " " |
| 30 | 274401.30 | 123165.56 | " " |
| 31 | 274204.84 | 123203.02 | " " |
| 32 | 274008.38 | 123240.47 | " " |
| 33 | 273811.92 | 123277.93 | " " |
| 34 | 273645.76 | 123522.37 | " " |
| 35 | 273683.21 | 123718.83 | " " |
| 36 | 273611.44 | 123630.71 | LEVEE CL |
| 37 | 273629.04 | 123723.05 | " " |
| 38 | 273936.64 | 123932.14 | " " |
| 39 | 274929.10 | 123742.93 | " " |
| 40 | 275156.77 | 123730.91 | " " |
| 41 | 275839.61 | 123787.64 | " " |
| 42 | 273592.71 | 123532.48 | " " |
| 43 | 273801.81 | 123224.88 | " " |
| 44 | 274794.27 | 123035.67 | " " |
| 45 | 275216.38 | 123013.38 | " " |
| 46 | 275758.98 | 123058.46 | " " |
| 47 | 276328.05 | 123314.09 | PENINSULA TOE |
| 48 | 276507.03 | 123432.64 | " " |
| 49 | 276791.65 | 123441.07 | " " |

## ADS CONTROL DATA

| POINT NO. | NORTHING | EASTING | ELEVATION | DESCR. |
|---|---|---|---|---|
| 1 | 276443.86 | 114588.72 | 581.52 | P.P. |
| 2 | 274137.62 | 114596.12 | 584.16 | P.P. |
| 3 | 272321.81 | 114628.15 | 584.39 | P.P. |
| 4 | 278117.00 | 119279.96 | 591.76 | P.P. |
| 5 | 276200.77 | 119642.89 | 573.60 | P.P. |
| 6 | 274635.25 | 118751.70 | 568.69 | P.P. |
| 7 | 272229.36 | 119035.31 | 572.69 | P.P. |
| 8 | 278491.06 | 122800.34 | 571.41 | P.P. |
| 9 | 274930.90 | 122272.11 | 568.14 | P.P. |
| 10 | 272909.75 | 122927.38 | 565.01 | P.P. |
| 11 | 277014.59 | 124478.62 | 599.68 | P.P. |
| 12 | 274307.88 | 126381.07 | 612.37 | P.P. |
| 13 | 272355.79 | 126064.79 | 564.69 | P.P. |
| A | 280385.01 | 114597.68 | 607.21 | P.P. |
| BASE | 277140.00 | 119670.00 | 579.28 | |
| C | 270195.95 | 114665.12 | 590.73 | P.P. |
| D | 270436.18 | 124275.89 | 624.20 | P.P. |
| PORT1 | 283463.16 | 118059.18 | 593.47 | |
| PORT2 | 278138.05 | 118150.09 | 595.44 | |
| PORT3 | 277795.11 | 121151.27 | 579.22 | |



**CURVE NO. 1 (C1)**

PI STA = 25+55.29
N 273025.12
E 123361.58
D = 4°46'29"
T = 163.77'
R = 1120.00'
L = 325.53'
C = 324.53'

**CURVE NO. 2 (C2)**

PI STA = 103+57.00
N 273668.30
E 123981.40
D = 21°47'08"
T = 263.00'
R = 263.00'
L = 413.12'
C = 371.94'

**CURVE NO. 3 (C3)**

PI STA = 116+32.50
N 275042.12
E 123721.39
D = 06°47'48"
T = 115.05'
R = 843.00'
L = 228.68'
C = 227.98'

**CURVE NO. 4 (C4)**

PI STA = 124+20.93
N 275042.12
E 123721.39
D = 6°47'48"
T = 115.05'
R = 843.00'
L = 228.68'
C = 227.98'

**CURVE NO. 5 (C5)**

PI STA = 203+82.24
N 276646.72
E 123525.17
D = 21°13'14"
T = 167.56'
R = 270.00'
L = 299.93'
C = 284.75'

### LEGEND

— — — LIMITS OF CONSTRUCTION
● BARGE MOORING POST

NOT FOR CONSTRUCTION
FEBRUARY 2013

DEWBERRY PROJECT NO. 50042679

| REVISION | BY | DATE |
|---|---|---|
| | | |

**CITY OF TULSA - ROGERS COUNTY**
**PORT AUTHORITY**

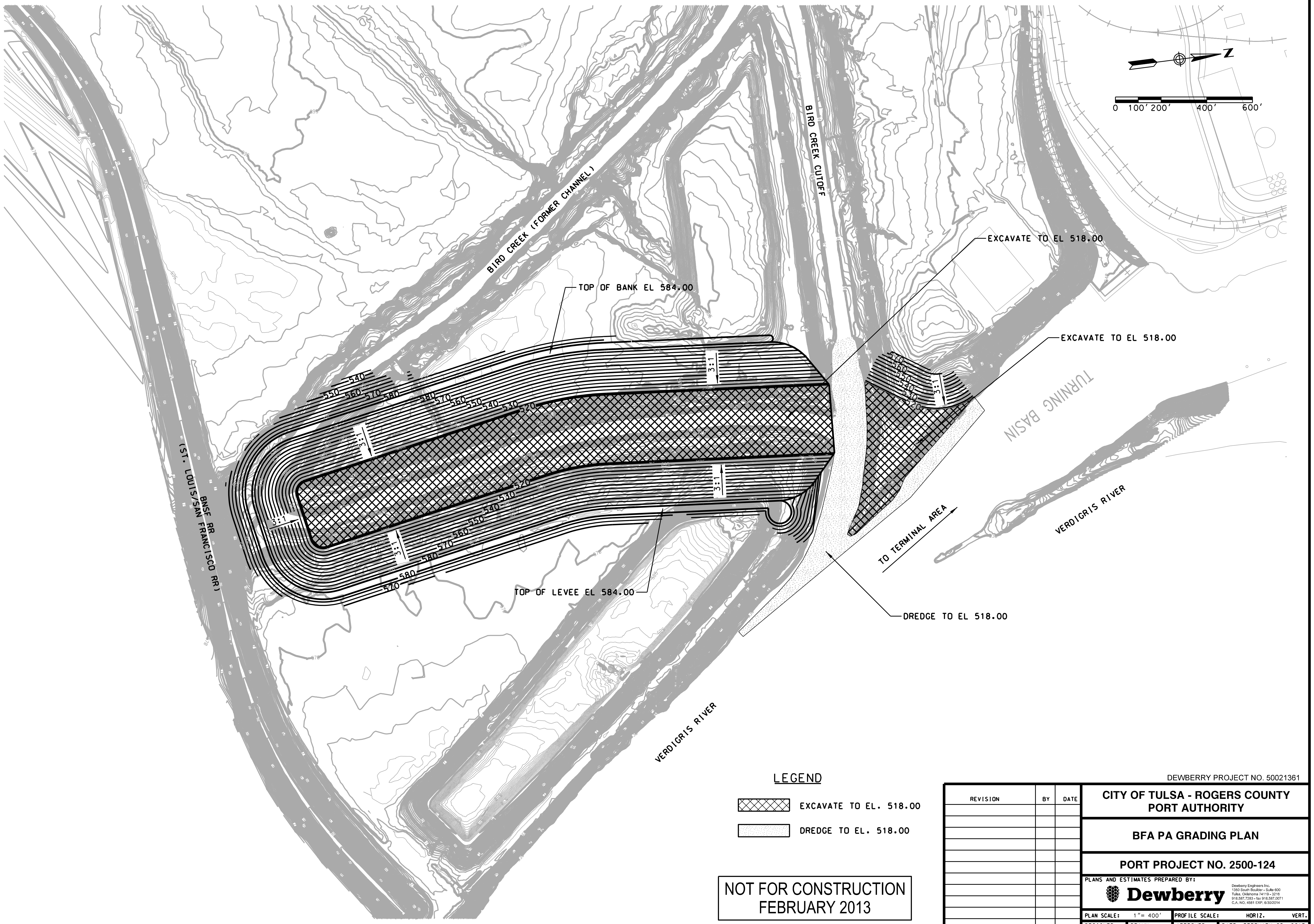
**BFA PA SITE PLAN**

**PORT PROJECT NO. 2500-139**

PLANS AND ESTIMATES PREPARED BY:
Dewberry

Dewberry Engineers Inc.
1350 South Boulder - Suite 600
Tulsa, Oklahoma 74119 - 3216
918.587.7283 - fax 918.587.0071
C.A. NO. 4581 EXP. 6/30/2014

PLAN SCALE: 1"= 400'
PROFILE SCALE: HORIZ. VERT.
DESIGNED: CSS
DRAWN: WSL
APPROVED: CSS
DATE: FEBRUARY 05, 2013
SHEET OF SHEETS



## LEGEND

▨ EXCAVATE TO EL. 518.00

░ DREDGE TO EL. 518.00

NOT FOR CONSTRUCTION
FEBRUARY 2013

DEWBERRY PROJECT NO. 50021361

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**CITY OF TULSA - ROGERS COUNTY**
**PORT AUTHORITY**

**BFA PA GRADING PLAN**

**PORT PROJECT NO. 2500-124**

PLANS AND ESTIMATES PREPARED BY:

**Dewberry**

Dewberry Engineers Inc.
1350 South Boulder - Suite 600
Tulsa, Oklahoma 74119 - 3216
918.587.7283 - fax 918.587.0071
C.A. NO. 4581 EXP. 6/30/2014

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| PLAN SCALE: 1"= 400' | | PROFILE SCALE: HORIZ. VERT. | |
| DESIGNED: CSS | DRAWN: WSL | APPROVED: CSS | DATE: FEBRUARY 05. 2013<br>SHEET OF SHEETS |

2/7/2013

Q:\50021361\CAD\Civil\TPC BFA EA APPENDIX A 02-06-2013\BFA PA GRADING PLAN.dgn

# DELINEATION OF POTENTIALLY JURISDICTIONAL WATERBODIES REPORT, EVALUATION OF HISTORIC WETLANDS and THREATENED AND ENDANGERED SPECIES POTENTIAL HABITAT

## TULSA PORT OF CATOOSA PROJECT
## ROGERS COUNTY, OKLAHOMA

**Portions of Sections 7, 17, and 18 of Township 20 North, Range 15 East**
**Rogers County, Oklahoma**

January 19, 2011
Revised February 25, 2011

A Report Prepared for:

Dewberry
600 Parsippany Road, Suite 301
Parsippany, NJ 07054-3715

# DELINEATION OF POTENTIALLY JURISDICTIONAL WATERBODIES REPORT, EVALUATION OF HISTORIC WETLANDS and THREATENED AND ENDANGERED SPECIES POTENTIAL HABITAT

## TULSA PORT OF CATOOSA PROJECT
## ROGERS COUNTY, OKLAHOMA

**Portions of Sections 7, 17, and 18 of Township 20 North, Range 15 East**
**Indian Meridian, Rogers County, Oklahoma**

Kleinfelder Project # 114800

Prepared by:

Kimberly A. Shannon
Kim Shannon
Environmental Scientist

Jason Caskey
Jason Caskey
Environmental Professional

Reviewed by:

Blair Baker
Blair Baker
Senior Environmental Professional

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Tulsa, Oklahoma 74116
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# TABLE OF CONTENTS

## 1.0 INTRODUCTION

Kleinfelder was contracted by Dewberry to conduct an assessment of United States Army Corps of Engineers (USACE) waters of the United States (Waters), including wetlands, and historic wetlands. An assessment was also conducted for the presence of potential habitat for federally threatened or endangered (listed) and protected species within the property of the Tulsa Port of Catoosa, in Rogers County, Oklahoma (Figure 1). The project covers two sites with an approximate 595-acre total environmental study area (study areas). The western study area extends from approximately 1000 feet north of Keystone Avenue (36.228668° N, -95.756277° W) south to a leased agricultural field located on the north side of Bird Creek (36.204703° N, -95.756289° W) and the eastern study area extends from (36.219604° N, -95.728736° W) on the northern end to (36.215102° N, -95.728012° W) at the southern extent (Figure 2). This report documents the results of the delineations for the benefit of Dewberry and the Tulsa Port of Catoosa and may be relied upon by their successors and/or assignees associated with the transaction for which this report was commissioned.

The project is located within portions of: the S 1/2 of Section 7, all but the SE ¼ of Section 18, and the E 1/2 of the NE ¼ of Section 17 of Township 20 North, Range 15 East, Indian Meridian, Rogers County, Oklahoma. The proposed project is mapped on the 1982 photorevised Mingo, OK and the 1980 photorevised Catoosa, OK quadrangles, United States Geological Survey (USGS) 7.5-Minute Series Topographic Maps (Figure 3).

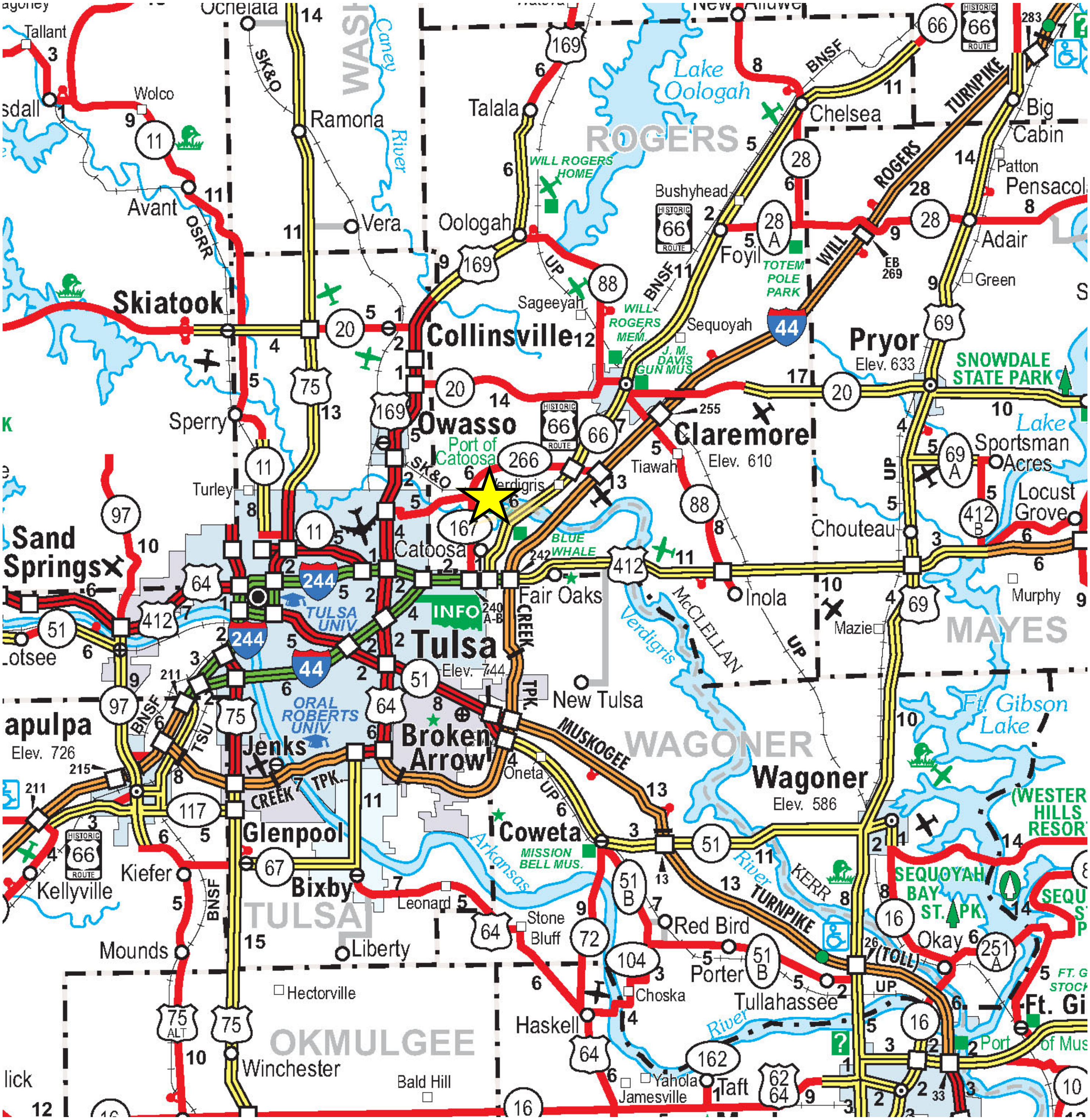
Kleinfelder environmental scientists (Ms. Kim Shannon and Mr. Jason Caskey) conducted the delineations to characterize and map potentially jurisdictional Waters within the study areas. Potentially jurisdictional Waters, including wetlands, were found within the study areas. The survey was conducted on December 8, 9, 14, and 15, 2010 and consisted of a focused pedestrian field survey within the study areas. The study areas were also evaluated for historic wetlands and for the presence of potential habitat for federally threatened or endangered (listed) and protected species for Rogers County, OK. Prior to conducting the field surveys, Kleinfelder reviewed site maps, historic aerial photographs, natural resource database accounts, National Wetlands Inventory (NWI) maps (Figure 4), the U.S. Fish and Wildlife Service (USFWS) list of federally listed species and designated critical habitat areas in Rogers County, Oklahoma, and other relevant scientific literature to determine the potential existence of known wetland features and listed and protected species in the study areas.

This report is based on knowledge of the special-status resources in the region, a review of relevant background literature, and a focused field survey of the study areas. A discussion of plant and animal species observed on site is included in this report. Information in this report is intended to provide the biological information that is necessary to avoid or minimize impacts to Waters that are potentially jurisdictional. This information may also be used in support of permit applications associated with impacts to these Waters.

## 2.0 REGULATORY FRAMEWORK

### 2.1 WATERS OF THE U.S.

The following section provides an overview of the regulatory framework involved with impacts to Waters (including wetlands) associated with the proposed project. Wetlands and riparian communities are considered to have special ecological status and are also considered a declining resource by several regulatory agencies, including the USACE. Wetlands serve significant biological functions by providing nesting, breeding, foraging, and spawning habitat for



**Legend**

★ = General Project Site

N

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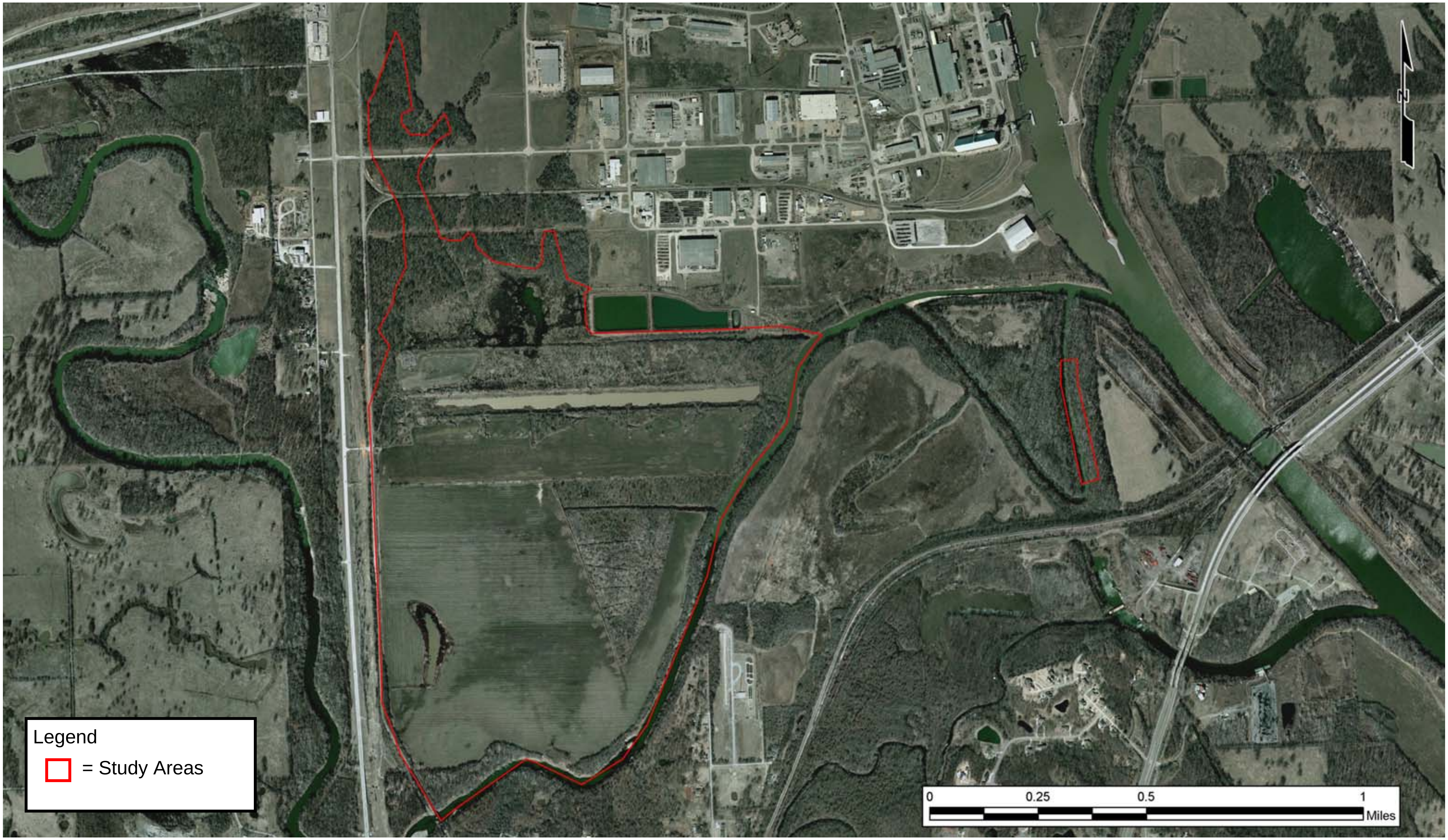
DRAWN: Dec 2010
DRAWN BY: KAS
CHECKED BY: BHN
SOURCE: ODOT highway map

## General Vicinity Map

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
1



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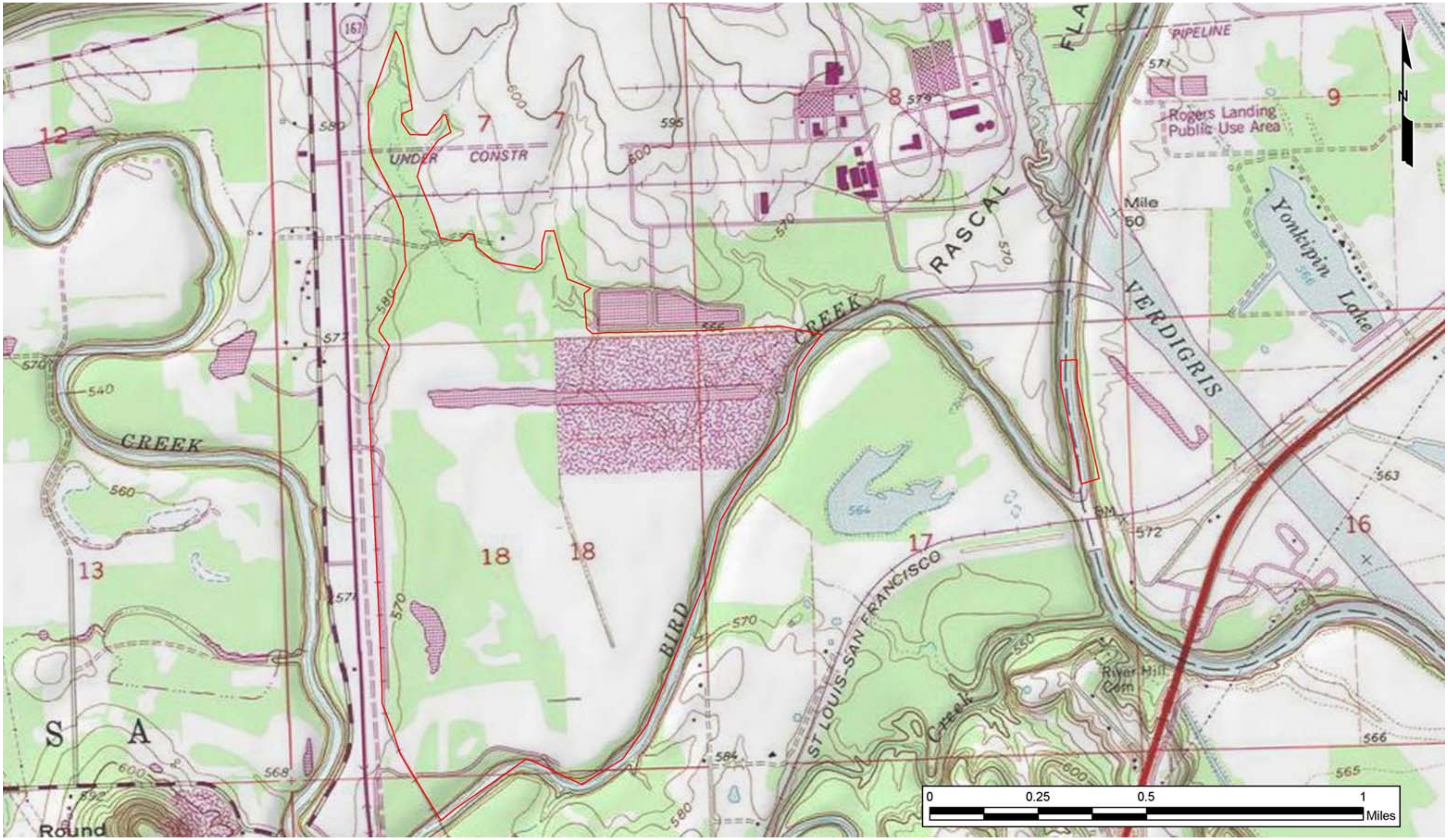
FILE NAME:

# Aerial Photo Map

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
2



Legend

☐ = Study Areas

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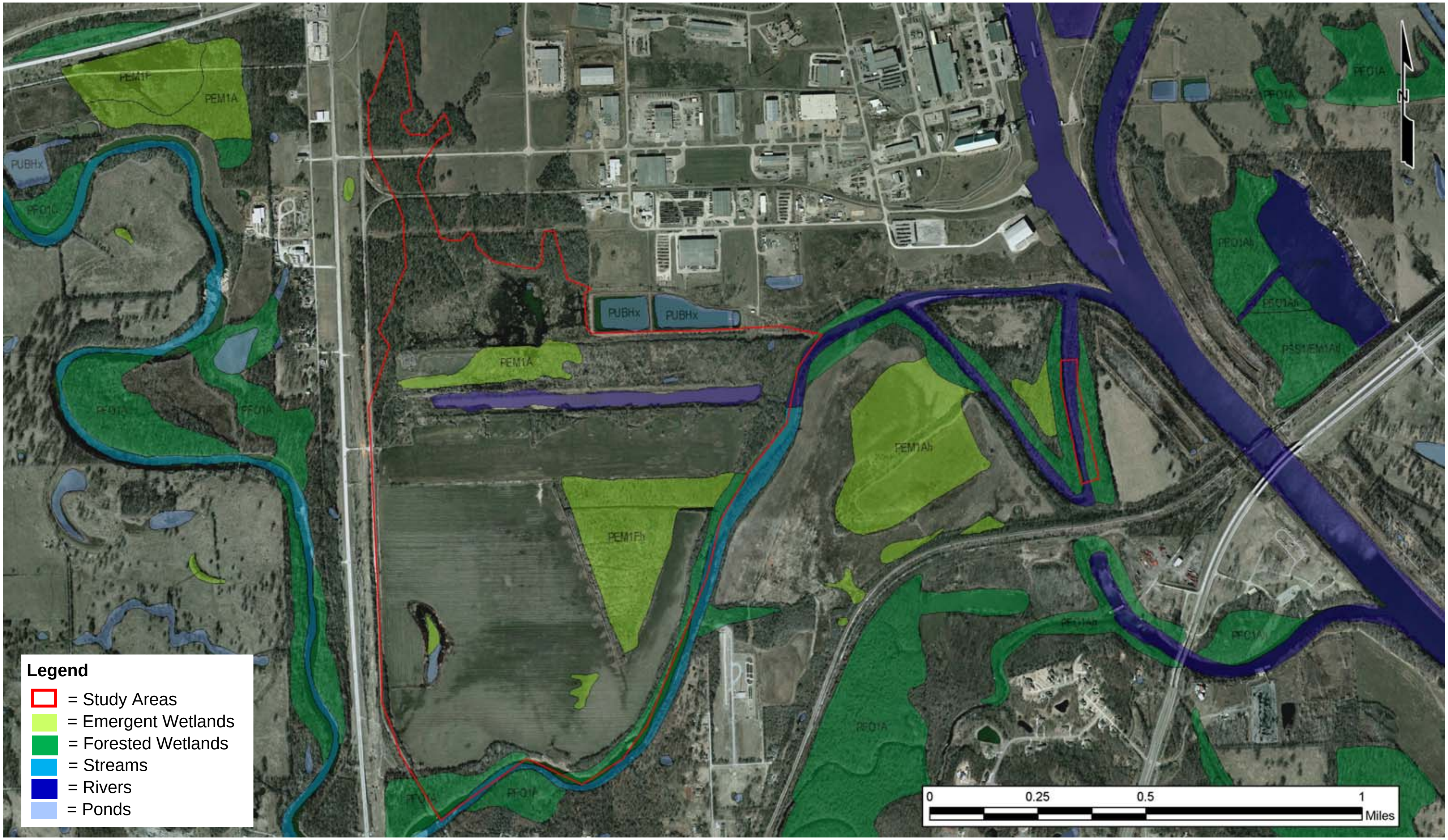
| CHECKED BY: | KAS |
| FILE NAME: | |

USGS Topographic Map

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
3



**Legend**

- 🟥 = Study Areas
- 🟩 = Emergent Wetlands
- 🟩 = Forested Wetlands
- 🟦 = Streams
- 🟦 = Rivers
- 🟦 = Ponds

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SOURCE: Geospatial wetlands mapper

National Wetlands Inventory Map

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
4

a wide variety of resident and migratory animal species. Wetlands also provide for the movement of water and sediments, nutrient cycling, groundwater recharge, water purification, storage of storm water runoff, recreation and transportation.

According to Section 404 of the Clean Water Act (CWA) of 1977, work (dredging) within navigable waters and the placement of fill material into Waters, including intermittent streams and wetlands, requires authorization by the USACE (EPA, 1972). The type of authorization (e.g., individual permit, nationwide permit, regional permit, or letter of permission from the District Engineer) depends on the acreage, volume, linear distance along a stream course, and purpose of the activity.

Under Section 404 of the CWA, and Section 10 of the Rivers and Harbors Act of 1899, the Environmental Protection Agency (EPA) and the USACE share regulatory authority over Waters. Waters includes all waterbodies that are, have, or may be used for interstate and/or international commerce, including all water that is subject to the ebb and flow of tide; all waters that are rivers, streams, sloughs, lakes, mudflats, sand flats, wetlands, wet meadows, prairie potholes, playa lakes, or natural ponds and the use, degradation, or destruction, of the aforementioned, which could affect interstate and international commerce; all impoundments of above mentioned; all tributaries of above mentioned; territorial seas; and all wetlands adjacent to above mentioned Waters. The width of Waters is defined as that portion which falls within the limits of the ordinary high water mark (OHWM). Field indicators of OHWM are clear and natural lines on opposite sides of the banks, scouring, sedimentary deposits, drift lines, exposed roots, shelving, destruction of terrestrial vegetation, and the presence of litter debris. Typically, the OHWM corresponds to the two-year flood event.

The USACE retains jurisdiction over wetlands that are Waters, and definitions and regulations for the identification and delineation of wetlands were published in the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987). This 1987 manual is the current federal delineation manual used in the CWA Section 404 regulatory program for the identification and delineation of wetlands. The 1987 manual has been clarified and updated through a series of regional supplements, guidance documents and memoranda from the USACE. The Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region is used for southeastern Oklahoma (USAERDC, 2008). The USACE defines wetlands as:

*"Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."*

Thus, the interaction of hydrology, hydrophytic vegetation and hydric soil conditions results in the development of characteristics unique to wetlands. For a wetland to exist, it must have: 1) prevalent hydrophytic vegetation (plants that are adapted to grow, compete, reproduce and persist under anaerobic soil conditions); 2) hydric soils (those that possess characteristics associated with reducing soil conditions); and 3) a source of hydrology (frequently inundated or saturated during the biological growing season). The USACE clearly states, "Except in certain situations defined in this manual, evidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination."

## 2.2 THREATENED, ENDANGERED, AND PROTECTED SPECIES

Where activity would require federal authorization or be contingent upon some other federal action, consultation under the Endangered Species Act (ESA) of 1973 is necessary. The ESA prohibits any person from taking, which includes harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, relocating, collecting, or attempting to engage in any such conduct, of any federally listed threatened or endangered species. Significant habitat modification or degradation that results in death or injury to federally protected species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering is also prohibited. Federal agencies are required to comply with the provisions and use their authorities to conserve species. Section 7 of the ESA states that every federal agency taking an action that may affect listed species must consult with the U.S. Department of the Interior, USFWS, or the National Marine Fisheries Service (NMFS). Consultation allows the USFWS to provide their expertise to ensure that the agency is making effective choices to conserve listed species, and that the proposed action would not jeopardize the continued existence of listed species.

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb (USFWS, 1940)."

The Migratory Bird Treaty Act of 1918 decreed that all migratory birds and their parts (including eggs, nests, and feathers) were fully protected. The Migratory Bird Treaty Act (MBTA) is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protect selected species of birds that are common to both countries (i.e., they occur in both countries at some point during their annual life cycle). A List of Migratory Birds protected by the MBTA is available.

## 3.0 SETTING

Within the study areas, Kleinfelder understands that current plans involve potentially placing fill from the dredging operations along portions of the Verdigris River/Arkansas River Navigation System. The study areas are primarily rural and forested with agricultural areas dominating the southern half of the western study area.

The western study area has an elevation range of approximately 580 feet above Mean Sea Level (MSL) at the northern end and 561 feet above MSL at the southern end. The eastern study area has an elevation range of approximately 530 feet above MSL at the northern end to 556 feet above MSL at the southern end, as shown on the 1982 photorevised Mingo, OK and the 1980 photorevised Catoosa, OK quadrangles, USGS 7.5-Minute Series Topographic Maps. The average annual precipitation for Rogers County is 43.45 inches, the average annual temperature is 60 degrees Fahrenheit, and the annual growing season is 208 days (OCS, 2010). During 2010 the annual rainfall amount recorded at the Tulsa International Airport (approximately 7 miles west of the study area) was only 34.47 inches while the annual average for the city of Tulsa, OK is 42 inches (NWS, 2010).

The study areas consist primarily of agricultural, forested, grassland, and developed areas including roads, railroads, and associated right-of-ways (ROW). Cover types within the study areas are comprised of approximately 42.6% forest, 42.3% agricultural, 14.4% grassland, and 0.7% developed (Figure 5).

Habitats within the study areas included mixed-age bottomland forest, mixed-age upland forest, dissected upland dominated by grasses, developed areas, and waterbodies. Within the bottomland forest dominant plant species included Pecan (*Carya illinoensis*), Boxelder (*Acer negundo*), American elm (*Ulmus americana*), Sycamore (*Platanus occidentalis*), Hackberry (*Celtis occidentalis*), Black willow (*Salix nigra*), Deciduous holly (*Ilex decidua*), and Northern red oak (*Quercus rubra*). The forested wetlands are included in this habitat type. Upland forest sites were dominated by Post oak (*Quercus stellata*), Blackjack oak (*Quercus marilandica*), Gum Bully (*Sideroxylon lanuginosum*), Buckbrush (*Symphoricarpos orbiculatus*), Frost flower (*Verbesina virginica*), and Saw Greenbrier (*Smilax bona-nox*). The waterbodies did not have plants specifically associated with them. Introduced and invasive plant species were common in disturbed areas and were observed predominantly within mowed or maintained ROWs. These species included Sericea Lespedeza (*Lespedeza cuneata*), Bermudagrass (*Cynodon dactylon*), and Johnsongrass (*Sorghum halepense*).

Due to headcutting, as a result of the construction of the Arkansas River Navigation System, the bed level of Bird Creek has dropped. This drop has essentially disconnected Bird Creek from the forested areas along its banks (Weins, 2003). While there are still some bottomland forest species present, the banks of Bird Creek are currently dominated by more upland plant species.

## 3.1 ECOREGIONS

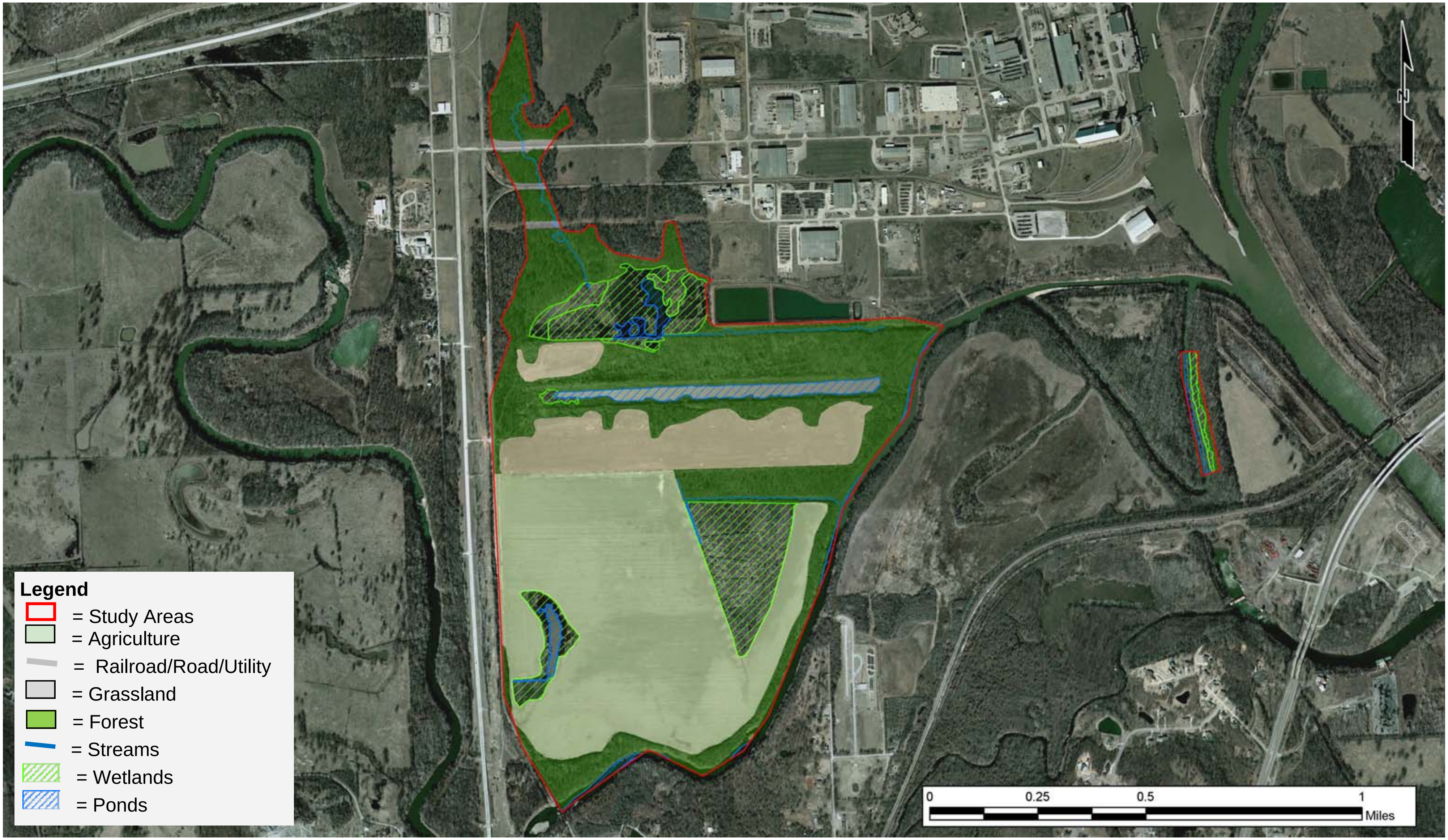
### Level 4 Ecoregions of Oklahoma Information

The subject site is located within the Osage Cuestas, a subregion of the Central Irregular Plains ecoregion (#40) of Oklahoma (Figure 6).

40b. Osage Cuestas

The Osage Cuestas ecoregion is an irregular to undulating plain that is underlain by interbedded, westward-dipping sandstone, shale, and limestone. East-facing cuestas and low hills occur. Topography is distinct from the nearby Flint Hills, Ozark Highlands, and Cherokee Plains ecoregions. Natural vegetation is mostly tall grass prairie, but a mix of tall grass prairie and oak–hickory forest is native to eastern areas. Overall, the mosaic of natural vegetation is unlike the neighboring Cross Timbers and Ozark Highlands ecoregions. Today, rangeland, cropland, riparian forests, and on rocky hills, oak woodland or oak forest occur; cropland is not as common as in the neighboring Cherokee Plains Ecoregion. (Woods et al, 2005).

Potential natural vegetation for this ecoregion consists mostly of tallgrass prairie (dominants: big bluestem, little bluestem, switchgrass, and Indiangrass), grading eastward into a mosaic of tall grass prairie and oak–hickory forest; on rocky hilltops, cross timbers (dominants: blackjack oak, post oak, and little bluestem). Tallgrass prairie is native on deep loams derived from shale or



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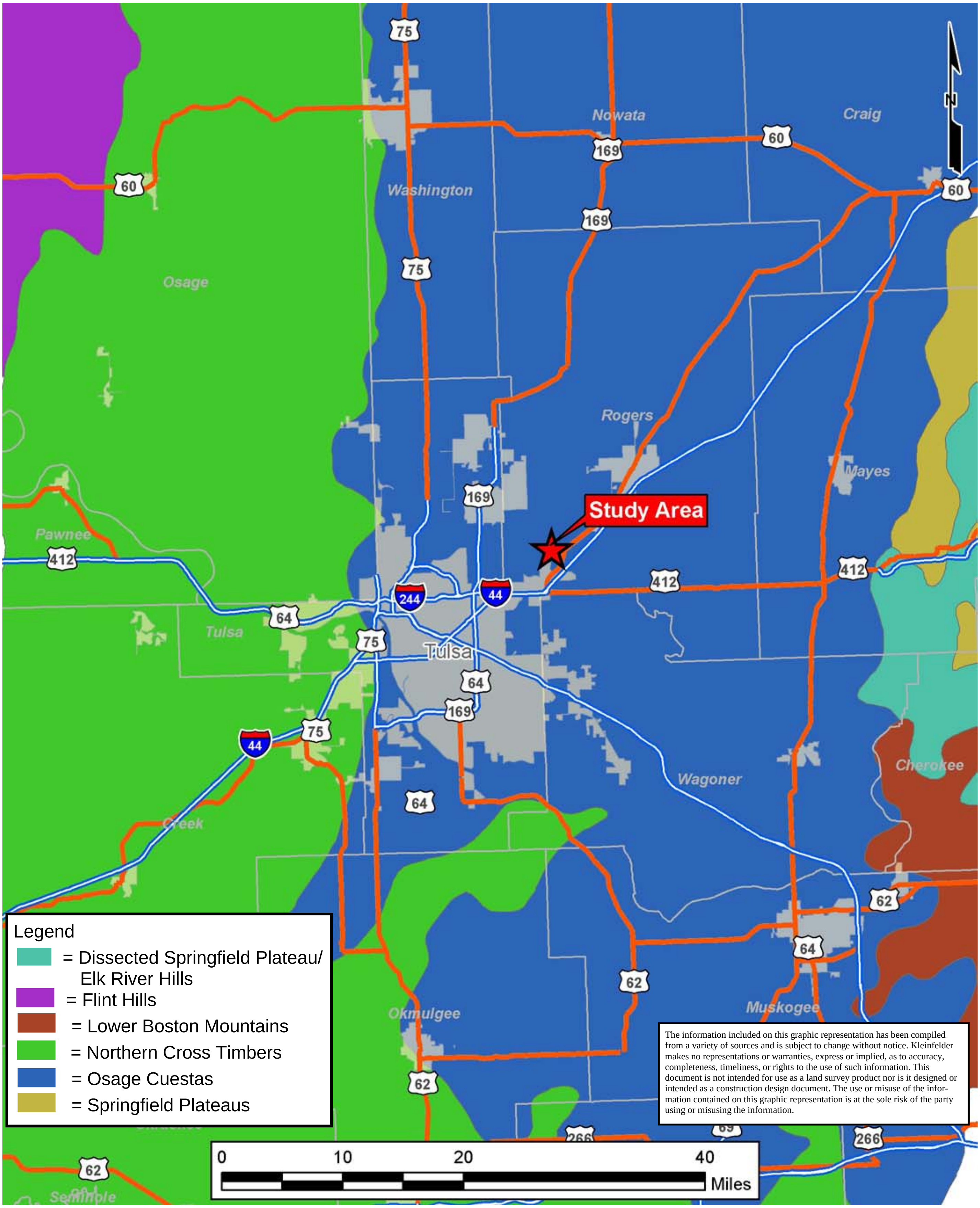
## Cover Type Map

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
5



Legend
🟦 = Dissected Springfield Plateau/ Elk River Hills
🟪 = Flint Hills
🟫 = Lower Boston Mountains
🟩 = Northern Cross Timbers
🟦 = Osage Cuestas
🟨 = Springfield Plateaus

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Level IV Ecoregion Map

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
6

limestone. Bottomland forests are native on floodplains and low terraces. Currently, on rocky hills, dry upland forest and woodland is found. Dry prairie composed of short and tall grasses occurs on shallow, gravelly soils of limestone scarps. In riparian areas are forests containing boxelder, silver maple, bur oak, Shumard oak, American elm, hackberry, pecan, walnut, sycamore, and eastern cottonwood.

Land cover and land use for this ecoregion is a mosaic of rangeland, grassland, cropland, and especially in more rugged areas, woodland. Wooded riparian corridors occur on wettest bottomlands. Wheat, soybeans, grain sorghum, and alfalfa hay are major crops. Livestock (especially cattle) farming is important. Strip mining for coal and oil production have degraded water quality in some streams (Woods et al., 2005).

## 4.0 METHODS AND LIMITATIONS

The USACE has prescribed methodologies for delineating “waters of the United States” and wetlands pursuant to the CWA of 1977 (EPA, 1972). Determination of Waters is based on definitions and descriptions found in the Code of Federal Regulation (CFR) at 33 CFR 328. Methods for delineating wetlands are detailed in the USACE Wetland Delineation Manual (Environmental Laboratory, 1987) and require that, under normal circumstances, an area possess three technical criteria to be designated as a jurisdictional wetland. Those criteria are: 1) the prevalence of hydrophytic vegetation, 2) the presence of hydric soils, and 3) the presence of wetland hydrology.

The evaluation of any on-site stream features for the jurisdictional determination was conducted in accordance with the policy, practice, and procedures set forth in 33 CFR 328, which determines the extent of jurisdiction of the USACE over Waters. The definitions for jurisdictional determination consist of the following:

A. The term *"waters of the United States"* means:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

    - Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    - From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    - Which are used or could be used for industrial purpose by industries in interstate commerce;

4. All impoundments of waters otherwise defined as waters of the United States under the definition;
5. Tributaries of Waters identified in paragraphs (a)(1)-(4) of this section;

6. The territorial seas;
7. Wetlands adjacent to Waters (other than Waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section.
8. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not Waters of the United States.
9. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA.

Limits of jurisdictional authority are as follows:

A. *Territorial Seas* - The limit of jurisdiction in the territorial seas is measured from the baseline in a seaward direction a distance of three nautical miles. (See 33 CFR 329.12)

B. *Tidal Waters of the United States* - The landward limits of jurisdiction in tidal waters:

   - Extends to the high tide line, or
   - When adjacent non-tidal waters of the United States are present, the jurisdiction extends to the limits identified in paragraph (c) of this section.

C. *Non-Tidal Waters of the United States* **-** The limits of jurisdiction in non-tidal waters:

   - In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or
   - When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands.
   - When the water of the United States consists only of wetlands the jurisdiction extends to the limit of the wetland.

The wetland assessment and delineation was conducted in accordance with the Corps of Engineers Wetlands Delineation Manual and the Midwest Region supplement (USAERDC, 2008). The delineation form for the Midwest region was used and the wetland assessment consisted of the following:

- A desktop review was undertaken to identify areas that were previously mapped as wetlands, streams, or other waterbodies. A pedestrian survey was conducted at the project site to locate potential jurisdictional waterbodies. When these areas were encountered the routine determination method described in the 1987 USACE Wetland Delineation Manual and Midwest Region supplement was employed, and sample plots were used to determine wetland or non-wetland status. Visual observations were used to identify vegetation, soil, and hydrological characteristics within the vicinity of the sample plots.

- Plant community types in proximity to potential wetland boundaries were identified. Dominant plant species were identified within the visually perceived wetland boundary or until the nearest significant vegetative community change. The biologist selected a representative observation area for each plant community, visually selected the dominant species from each stratum of the community, evaluated the percent cover of plant species in each stratum, and recorded the wetland indicator status of the dominant species. A determination was then made as to whether the vegetation was hydrophytic based on the plant's indicator status and a minimum of two evaluation methods. If no potential jurisdictional waterbodies were observed, upland plant communities were mapped and characterized.

- Hydrophytic vegetation dominates areas where the frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species were assigned wetland indicator status according to the probability of species occurring in wetlands (USFWS, 1988). More than fifty percent of the dominant species must have been hydrophytic to have met the wetland vegetation criterion. Hydrophytic plant indicator status designations conform to the following:

    - OBL – Plants that occur almost always (estimated probability >99 percent) in wetlands under natural conditions, but may also occur rarely (estimated probability <1) in non-wetlands.
    - FACW – Plants that occur usually (estimated probability >67 percent to 99 percent) in wetlands under natural conditions, but also occur (estimated probability 1 percent to 33 percent) in non-wetlands.
    - FAC – Plants with a similar likelihood (estimated probability 33 to 67 percent) of occurring in both wetlands and non-wetlands.
    - FACU – Plants that occur sometimes (estimated probability 1 percent to <33 percent) in wetlands, but occur more often (estimated probability >67 percent to 99 percent) in non-wetlands.
    - UPL - Plants that occur rarely (estimated probability <1 percent) in wetlands, but almost always occur (estimated probability >99 percent) in non-wetlands under natural conditions.

- Soil pits were dug at sample plots for the potential wetlands being investigated. Munsell Soil Color Charts (MacBeth, 1994) used to evaluate the color, hue, and chroma of representative soils and associated redox features. The redox features were also characterized by their size, distinction, and frequency of occurrence. Soil indicators from the samples were then recorded and it was determined if the soils are hydric. Reducing conditions on site were indicated by the presence of oxidized root channels, positive reaction from Alpha-Alpha Dipyradil, sulfidic odor, or gleyed soils. Also noted were other hydrological indicators, such as soil saturation within the upper 12 inches of the soil, standing water existing within the soil pits, and the depth to inundated or saturated soil. If no hydric soils or potential jurisdictional waterbodies were observed within the project site, no soil pits were dug.

If potential jurisdictional waterbodies are observed, appropriate jurisdictional wetland boundaries would be derived from wetland sampling plot analysis and subsequently recorded using a Trimble GeoXT$^{TM}$ global positioning system (GPS). When satellites cannot be detected by GPS or when there is poor satellite geometry, the boundaries of Waters are marked on aerial photography and field measurements are taken for reference. For areas between sample points, the wetland/upland boundary would be determined by interpolation of the position of vegetation, soil, and hydrologic indicators. This geospatially corrected information would then be digitally overlaid onto a representative aerial photograph and a topographic map using ArcGIS software to display the cumulative, on-site jurisdictional area. Wetland feature polygons, wetland soil pits, and upland soil pits would be identified on the maps and identified with a corresponding label. Digital photographs were taken to document on-site conditions and are provided in Appendix A.

A variety of data sources were reviewed with regard to the location of historic wetlands within the study areas. These data sources included:

- NRCS historic aerial photographs
- NRCS Web Soil Survey data including:
    - hydric ratings
    - soil physical features
    - flooding frequency
    - depth to water table
- NRCS 2009 Hydric Soils List for Oklahoma
- Google Earth Pro
- USFWS NWI maps
- USGS Topographic maps

The historic aerial photographs acquired from the NRCS were taken in 1971, 1979, and 1991 and are included in Appendix C. Aerial photos taken prior to 1971 were not available from the NRCS office.

## 5.0 SITE CHARACTERIZATION

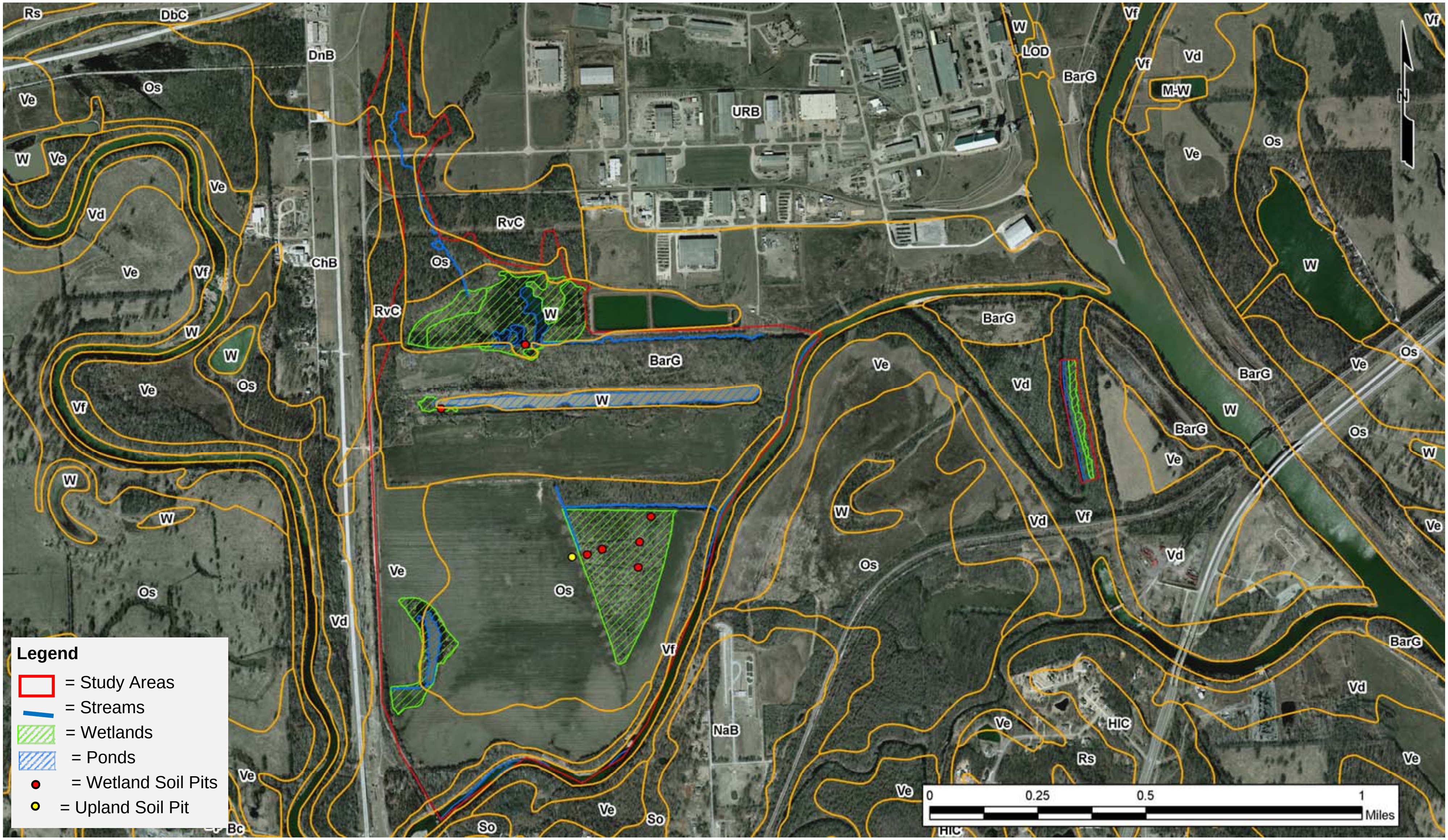
The two study areas can be generally characterized as rural, wooded, agricultural, with small maintained/mowed areas surrounding roads or utility ROWs, with streams, ponded water, and wetlands interspersed throughout. The large site is bordered to the south and east by Bird Creek, by Hwy 167 to the west, and commercial development to the north. The southern half of the large site is dominated by a leased agricultural field including a pond and an associated wetland, while the northern half of the large site is dominated by areas of bottomland forest, wetlands and intermittent streams, limited upland areas, and mowed/maintained ROWs. The smaller site directly to the east is bordered by a former channel of the Verdigris River on the west, an agricultural field to the east, and similar wooded areas to the north and south.

## 5.1 SOILS AND DRAINAGE

Soils within the two study areas consist mainly of clayey and loamy soils derived from sandstone, shale, or limestone parent material with silty, alluvial soils found along or near waterbodies. The specific soil types for each project area are listed in Table 1 below. Of these soil types, Osage clay and Verdigris clay loam are Oklahoma hydric soils (USDA, 2009) (Figure 7). Portion of the study areas occur within the FEMA-mapped 100-year floodplain of Bird Creek. FEMA Flood Insurance Rate Maps are included (Figure 8). Flood zones are described in Table 2.

**Table 1: Soil Map Units within Study Areas**

| Map Unit Symbol | Map Unit Name | Slope | Drainage / Hydric |
|---|---|---|---|
| BarG | Barge silty clay loam | 0 to 30 percent | Well drained/not hydric |
| ChB | Choteau silt loam | 1 to 3 percent | Somewhat poorly drained/not hydric |
| DnB | Dennis silt loam | 1 to 3 percent | Somewhat poorly drained/not hydric |



See Table One for Soil Types Data (p. 8)

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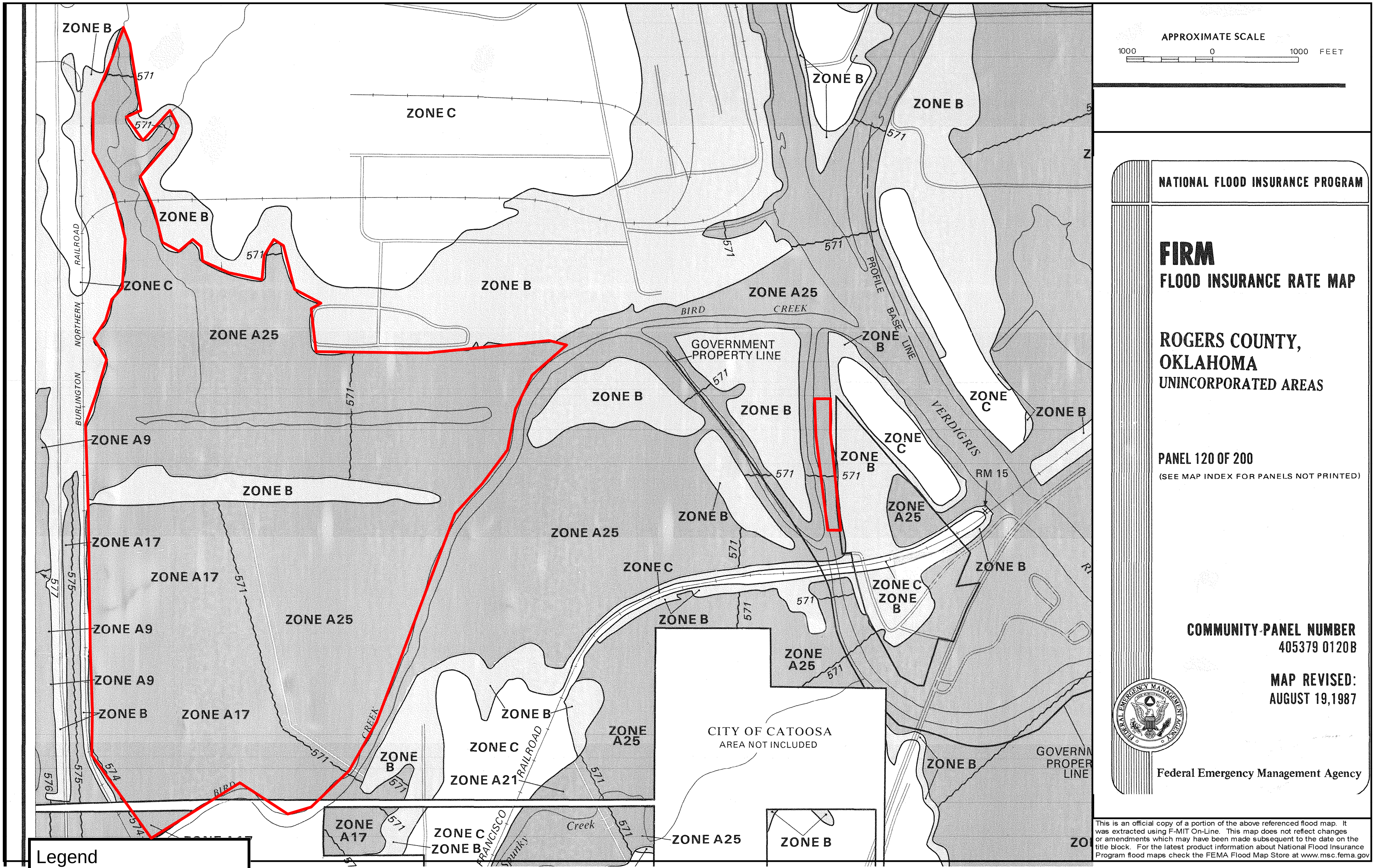
PROJECT NO. 114800
DRAWN: Jan 2011
DRAWN BY: LM
CHECKED BY: KAS
SOURCE: Web Soil Survey

NRCS Soils Map

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
7



This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Legend

🟥 = Study Areas

See Table 2 for Flood Zones Types (p. 9)

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| | |
|---|---|
| PROJECT NO. | 114800 |
| DRAWN: | Jan 2011 |
| DRAWN BY: | LM |
| CHECKED BY: | KAS |
| SOURCE: | FEMA |

FEMA Flood Insurance Rate Map

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
8

| Table 1: Soil Map Units within Study Areas | | | |
|---|---|---|---|
| Os | Osage clay | 0 to 1 percent | Poorly drained/hydric |
| RvC | Riverton gravelly loam | 3 to 5 percent | Well drained/not hydric |
| Ve | Verdigris clay loam | 0 to 1 percent | Occasionally flooded/hydric |
| Vf | Verdigris silty clay loam | 0 to 2 percent | Well drained/not hydric |

| Table 2: Flood Zones within Study Areas | | |
|---|---|---|
| **Zone Symbol** | **Risk Level** | **Description** |
| Zone A17 | High | Numbered A Zone; base floodplain where FIRM shows an old BFE format. |
| Zone A25 | High | Numbered A Zone; base floodplain where FIRM shows an old BFE format. |
| Zone B | Moderate to Low | Areas usually between limits of 100-yr and 500-yr floods; areas protected by levees from 100-yr floods, or shallow flooding areas with average depths of less than one foot or drainage areas of less than one square mile. |

## 5.2 VEGETATION ASSESSMENT (PLANT COMMUNITIES)

The dominant plant communities within the study areas include bottomland forest, forested wetland, upland forest, emergent wetland, upland grasslands, and mowed or maintained areas within ROWs and along roads. The table below summarizes the plant species observed within the two study areas.

| Table 3: Plant Species Observed within Study Areas | | | |
|---|---|---|---|
| **Common Name** | **Scientific Name** | **Vegetation Type** | **NWI Status** |
| Amaranth | *Amaranthus* sp. | h | FAC |
| American Elm | *Ulmus americana* | t | FAC |
| American Pokeweed | *Phytolacca americana* | h | FAC |
| American Sycamore | *Platanus occidentalis* | t | FAC |
| Barnyard Grass | *Echinochloa crus-galli* | h | FACW |
| Bermuda Grass | *Cynodon dactylon* | h | FACU |
| Big Bluestem | *Andropogon gerardii* | h | FACU |
| Blackberry | *Rubus* sp. | h | NI |
| Black Oak | *Quercus velutina* | t | - |
| Blackjack Oak | *Quercus marilandica* | t | - |
| Black Willow | *Salix nigra* | t | FACW |
| Boxelder | *Acer negundo* | t | FACW |
| Bristlegrass | *Setaria* sp. | h | FAC |
| Buckbrush | *Symphoricarpos orbiculatus* | h | FACU |
| Buttonbush | *Cephalanthus occidentalis* | s | OBL |
| Carolina Elephantsfoot | *Elephantopus carolinianus* | h | FAC |
| Curly Top Knotweed | *Polygonum lapathifolium* | h | FACW |
| Eastern Redbud | *Cercis canadensis* | t | UPL |
| Elderberry | *Sambucus canadensis* | t | FAC |

| Table 3: Plant Species Observed within Study Areas | | | |
|---|---|---|---|
| **Common Name** | **Scientific Name** | **Vegetation Type** | **NWI Status** |
| Frost Flower | *Verbesina virginica* | h | FACU |
| Grape | *Vitis* sp. | v | FAC |
| Giant Goldenrod | *Solidago gigantea* | h | FAC |
| Green Ash | *Fraxinus pennsylvanica* | t | FACW- |
| Gum Bully | *Sideroxylon lanuginosum* | s | FACU |
| Hackberry | *Celtis occidentalis* | t | FAC |
| Hop Sedge | *Carex lupulina* | h | OBL |
| Indianhemp | *Apocynum cannabinum* | h | FAC |
| Indian Woodoats | *Chasmanthium latifolium* | h | FAC |
| Japanese Honeysuckle | *Lonicera japonica* | v | FAC |
| Johnsongrass | *Sorghum halepense* | h | FACU |
| Little Bluestem | *Schizachyrium scoparium* | h | FACU |
| Mulitflora Rose | *Rosa multiflora* | h | UPL |
| Northern Red Oak | *Quercus rubra* | t | FACU |
| Osage Orange | *Maclura pomifera* | t | UPL |
| Pecan | *Carya illinoensis* | t | FAC |
| Plum | *Prunus americana* | t | NI |
| Poison Ivy | *Toxicodendron radicans* | v | FAC |
| Possumhaw | *Ilex decidua* | t | FACW |
| Post Oak | *Quercus stellata* | t | NA |
| Purpletop | *Tridens flavus* | h | UPL |
| Saw Greenbrier | *Smilax bona-nox* | v | FAC |
| Sericea Lespedeza | *Lespedeza cuneata* | s | NI |
| Shumard Oak | *Quercus shumardii* | t | FAC |
| Silver Maple | *Acer saccharinum* | t | FAC |
| Sugarberry | *Celtis laevigata* | t | FAC |
| Switchgrass | *Panicum virgatum* | h | FACW |
| Virginia Wildrye | *Elymus virginicus* | h | FAC |
| t = tree, s = shrub, h=herbaceous, v=vine, NI=no indicator, “-“ = not listed<br>(Taylor et al., 1994; USDA, 2009) | | | |

## 5.3 WILDLIFE ASSESSMENT

Wildlife species observed during field surveys within the two study areas are summarized in Table 3 below.

| Table 4: Animal Species Observed within Study Areas | |
|---|---|
| **Common Name** | **Scientific Name** |
| **Birds** (Sibley, 2000) | |
| American Crow | *Corvus brachyrhynchos* |
| American Goldfinch | *Spinus tristis* |
| Belted Kingfisher | *Ceryle alcyon* |
| Bewick’s Wren | *Thryomanes bewickii* |
| Blue Jay | *Cyanocitta cristata* |

| Table 4: Animal Species Observed within Study Areas | |
|---|---|
| **Common Name** | **Scientific Name** |
| Canada Goose | *Branta canadensis* |
| Carolina Chickadee | *Poecile carolinensis* |
| Cedar Waxwing | *Bombycilla cedrorum* |
| Great Blue Heron | *Ardea herodias* |
| Mallard | *Anas platyrhynchos* |
| Northern Cardinal | *Cardinalis cardinalis* |
| Pileated Woodpecker | *Dryocopus pileatus* |
| Red-tailed Hawk | *Buteo jamaicensis* |
| Tufted Titmouse | *Baeolophus bicolor* |
| White Breasted Nuthatch | *Sitta carolinensis* |
| Unidentified Ducks | --- |
| Unidentified Geese | --- |
| **Mammals** (Caire et al., 1989) | |
| American Beaver | *Castor canadensis* |
| Eastern Cottontail | *Sylvilagus floridanus* |
| Eastern Gray Squirrel | *Sciurus carolinensis* |
| Nine-banded Armadillo | *Dasyppus novemcinctus* |
| White-tailed Deer | *Odocoileus virginianus* |
| **Invertebrates** | |
| Unidentified Crayfish | --- |

## 6.0 FINDINGS

### 6.1 Threatened, Endangered and Protected Species

In order to evaluate the subject site for the potential presence of protected species, the USFWS list of federally listed species and designated critical habitat areas in Rogers County, Oklahoma was reviewed (USFWS, 2009). These sources were reviewed to determine if the proposed project has the potential for adverse impacts to listed species or their habitat. Based upon the habitat descriptions of those species that were indicated to occur in Rogers County, a qualitative comparison to the habitat present within the subject site that could increase the potential for listed species to be present or adjacent to the proposed project was made during field reconnaissance efforts. The qualitative comparison was based upon regional and local ecological characteristics including soils, terrain, hydrology, and vegetation. The USFWS was not directly contacted.

Notes were also taken on livestock grazing, development, pollution and other disturbances that could decrease the potential for listed species to be present. Table 4 includes listed and candidate species that are either present, have the potential to be present, or have been observed in the past in Rogers County.

| Table 5: Rogers County, Oklahoma Listed and Protected Species | | | |
|---|---|---|---|
| **Common Name** | **Scientific Name** | **Federal Listing** | **Critical Habitat** |
| American Burying Beetle | *Nicrophorus americanus* | E | No |
| Interior Least Tern | *Sterna antillarum* | E | No |
| Piping Plover | *Charadrius melodus* | T | No |

| Table 5: Rogers County, Oklahoma Listed and Protected Species | | | |
|---|---|---|---|
| **Common Name** | **Scientific Name** | **Federal Listing** | **Critical Habitat** |
| Whooping Crane | *Grus americana* | E | No |
| Western Prairie Fringed Orchid | *Platanthera praeclara* | T | No |
| Arkansas Darter | *Etheostoma cragini* | C | No |
| Neosho Mucket Mussel | *Lampsilis rafinesaqueana* | C | No |
| Bald Eagle | *Haliaeetus leucocephalus* | DL* | No |
| T = threatened, E = endangered, C = candidate, DL = delisted<br>*Bald Eagle is protected under the Bald and Golden Eagle Protection Act | | | |

No critical habitat has been designated for the eight species listed above in Rogers County, Oklahoma (USFWS Critical Habitat Mapper).

**American Burying Beetle:** The American Burying Beetle (ABB) is federally listed as endangered. This species is found in 22 counties in eastern Oklahoma. An additional six Oklahoma counties lie within the historic range of the ABB and two others have had unconfirmed sightings since 1992. This insect species is present on less than 10% of its original range. Mature forest is its preferred natural habitat, but it can be found in hedgerows, grasslands, and shrublands. This scavenger needs small vertebrates (from 50-200 grams in size) to feed upon. Habitat requirements for the ABB include areas with loose, well-drained soils with a well-formed litter layer from oak-hickory and oak-pine forests, as well as open native grassland and open native fields along forest edges. According to the USFWS, pastures where native grasses have been displaced by cultivation of Bermuda grass (*Cynodon dactylon*) are not expected to support the ABB. There is no Critical Habitat designated for the ABB in Rogers County (USFWS, 1991).

**Findings of Survey Results for ABB:** The study areas have potentially suitable habitat for the ABB, excluding the developed urban areas and gravel areas of the existing BNSF ROW. There are approximately **49** acres of forested and upland grassland plant communities that provide potentially suitable ABB habitat within the study areas.

**Interior Least Tern:** The Interior Least Tern is federally listed as endangered (USFWS, 1985a). The Interior Least Tern is a frequent summer resident that occurs along sand bars within the braided channels of the Canadian, Red, Cimarron, and Arkansas rivers (USFW, 1990). In Oklahoma, the largest populations occur at the Salt Plains National Wildlife Refuge in Alfalfa County. Nesting colonies occur on sparsely vegetated sandbars on large rivers or salt flats with some natural debris. Most nesting occurs in May-June.

**Findings of Survey Results for Interior Least Tern:** The study areas do not contain sparsely vegetated sandbars on large rivers or salt flats with the natural debris required by the Interior Least Tern for both nesting and feeding. Suitable habitat for the Interior Least Tern was not observed to be present on or in the immediate vicinity of the environmental study areas. Due to the lack of appropriate habitat within the study areas, the project is expected to have no effect on the Interior least tern.

**Piping Plover:** The Piping Plover is federally listed as endangered within the Great Lakes Region, and threatened in the remainder of its range, including Oklahoma. Preferred habitats include sandy beaches along the ocean or lakes, and bare areas of islands or sandbars along large rivers. They also nest on the pebbly mud of interior alkali lakes and ponds. This shorebird migrates through Oklahoma each spring and fall. Sight records of migratory Piping Plovers exist for many central and eastern Oklahoma counties. Rogers County is not located in the probable migratory pathway between breeding and winter habitats (USFWS, 1985b).

**Findings of Survey Results for Piping Plover:** The study areas do not contain sparsely vegetated sandbars on large rivers with the natural debris required by the Piping Plover for both nesting and feeding. No suitable habitat for the Piping Plover was observed to be present on or in the immediate vicinity of the environmental study areas. Nesting Piping Plovers are only known pre-1997, from the Oklahoma panhandle and do not nest in Rogers County (GMSARC, 2009). Due to the limited size of the project, rarity of occurrence, and the lack of foraging habitat in eastern Oklahoma, the project is expected to have no effect on the Piping Plover.

**Whooping Crane:** The Whooping Crane is federally listed as endangered (USFWS, 1967). Critical Habitat has been designated for this species in Oklahoma at the Salt Plains National Wildlife Refuge (NWR) in northwestern Oklahoma. This wading bird uses marshes and prairie potholes in the summer and in winter they are found in coastal marshes and prairies. The Whooping Crane migrates through western and central Oklahoma in the spring and fall. During migration, Whooping Cranes are sometimes found in Oklahoma outside of the Salt Plains NWR along rivers, grain fields, or in shallow wetlands. There are no records of whooping crane sightings in Rogers County, OK within the last 15 years (ODWC, 2011). There is no critical habitat for the whooping crane in Rogers County, OK.

**Findings of Survey Results for Whooping Crane:** While the study areas are not located in western Oklahoma, they are located along large streams with associated forested and emergent wetlands and within an agricultural/grain field. The large emergent and open-canopy forested wetlands located within the subject site do provide potentially appropriate habitat for the Whooping Crane. Areas of suitable habitat for the Whooping Crane were present on or in the immediate vicinity of the western study area based on observations. This project may affect but is not likely to adversely affect the Whooping Crane or its associated habitat.

**Neosho Mucket Mussel:** The Neosho Mucket is federally listed as a candidate species. In Oklahoma, living Neosho muckets were found along 55 miles of the Illinois River from the Oklahoma/Arkansas state line, downstream to the headwaters of Tenkiller Lake, Cherokee County, Oklahoma (Mather, 1990). Vaughn (1997) estimated the population within the Oklahoma portion of the Illinois River (the same reach surveyed by Mather in 1990) at between 500 and 1,000 Neosho muckets. Reproduction and recruitment rates of this species are low and the Neosho muckets is relatively rare in the Fall, Verdigris, Neosho, and North Fork Spring Rivers, and Shoal Creek, in northeastern Oklahoma. There is no critical habitat designated for the Neosho mucket in Rogers County.

**Findings of Survey Results for Neosho Mucket Mussel:** The subject site does not contain medium-sized or large rivers required by the Neosho mucket mussel. Suitable habitat for the Neosho mucket was not observed to be present on or in the immediate vicinity of the subject site. This project is expected to have no effect on the Neosho mucket mussel or its associated habitat.

**Arkansas Darter**: The Arkansas Darter is federally listed as a candidate species. It occurs in the Arkansas River drainage from Arkansas to Colorado; numerous viable populations exist, but recent declines have occurred and many populations are threatened by continuing loss of habitat, especially through dewatering. Historically this fish was never very common. Preferred habitat includes spring-fed creeks with cool, clear water with herbaceous aquatic vegetation, or pools with sand, fine gravel, or organic detritus substrate. Surveys in 1994-1997 in south-central Kansas and adjacent Oklahoma recorded this species from 67 of the 108 localities that were sampled within the general historical range of the species (Eberle and Stark 2000).

**Findings of Survey Results for Arkansas Darter:** The subject site does not contain spring-fed creeks with cool clear water, aquatic herbaceous vegetation, and gravel bottoms, as required by the Arkansas Darter. Suitable habitat for the Arkansas Darter was not observed to be present on or in the immediate vicinity of the subject site. This project is expected to have no effect on the Arkansas Darter or its associated habitat.

**Western Prairie Fringed Orchid:** The Western Prairie Fringed Orchid was federally listed as threatened in 1989. No Critical Habitat has been designated for this species. This perennial plant was most often found in high-quality, moist tallgrass prairie or sedge meadow habitats. Historically this orchid was found west of the Mississippi River from extreme southern Canada to northeast Oklahoma. In Oklahoma there are historic records of this plant occurring in Rogers and Craig counties. Currently, it is considered extirpated in Oklahoma (Audubon, 2008).

**Findings of Survey Results for Western Prairie Fringed Orchid:** The study areas are not within a high quality moist tallgrass prairie or sedge meadow. No suitable habitat for the Western Prairie Fringed Orchid was present on or in the immediate vicinity of the study areas based on observations. This project is expected to have no effect on the Western Prairie Fringed Orchid or its associated habitat.

**Bald Eagle:** The Bald Eagle is a large predatory bird that occupies large trees along major rivers and streams during their winter distribution (December through March) in Oklahoma. In August 2007, the Bald Eagle was delisted by the USFWS from the Federal List of Endangered and Threatened Wildlife (USFWS, 2007). Since delisting, the Bald Eagle continues to be protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (USFWS, 1940). Bald Eagles nest in tall trees usually within one or two miles of large rivers, streams and lakes where fish are abundant. Although nesting eagles are concentrated in eastern Oklahoma, their nesting range appears to be expanding. Bald Eagles were not observed during this survey.

**Findings of Survey Results for Bald Eagle:** There is one perennial stream (Bird Creek) with tall trees within the environmental study areas. Based on information from the G.M. Sutton Avian Research Center, the closest occupied Bald Eagle nest is located approximately four miles northeast of the study areas along the Verdigris River (GMSARC, 2011). No Bald Eagle nests were observed within or adjacent to the study areas. Suitable nesting, roosting, and foraging habitat for the Bald Eagle were observed in the study areas. While suitable nesting, roosting, and foraging habitat is present within the study areas, disturbance would only be associated with temporary construction activities. This project is expected to have no effect on the Bald Eagle or its associated habitat.

## 6.2 Potentially Jurisdictional Waterbodies

Based on Kleinfelder's assessment, specific locations within the environmental study areas met the technical criteria for jurisdictional wetlands. Following the U.S. Supreme Court's decision in Rapanos v. United States and Carabell v. United States (2006), technical standards have been implemented for determining the limit of Waters. The current technical standards have: 1) rejected the argument that the term "waters of the United States" is limited to only those waters that are navigable in the traditional sense and their abutting wetlands, and 2) asserted that regulatory authority should extend only to "relatively permanent, standing or continuously flowing bodies of water" connected to traditional navigable waters, and to "wetlands with a continuous surface connection to" such relatively permanent waters (USACE, 2007).

The study areas contain 18 waterbodies. Two (2) mapped, blue-line intermittent streams; three (3) unmapped intermittent streams; three (3) mapped wetlands; seven (7) unmapped wetlands; two (2) mapped ponds, and one (1) unmapped pond were observed during field investigations within the environmental study areas (Figures 9a and 9b). Wetland delineation data forms for the wetland features and their coinciding upland features are located in Appendix B. Of these 18 waterbodies, **13 are potentially jurisdictional**. A summary of all Waters for the study areas is shown in Table 6.

**Table 6: Potentially Jurisdictional Waterbodies within the Study Areas**

| Water-body | USGS Topo or NWI Classification | Length / Area | Field Observa-tions | Jurisdic-tional | Cowardin Classifi-cation | OHWM / Avg. Width Observed | Comments |
|---|---|---|---|---|---|---|---|
| Waters 1 (Fig 9a) | Intermittent, mapped, unnamed, blue-line stream | 3,533 ft./0.92 acres | Intermittent stream | Yes | R4UB3 | 11.3 feet | Slow flow, un-consolidated mud bottom, vegetated banks, 0-6" deep |
| Waters 2 (Fig 9a) | Unmapped | 3,056 ft./0.61 acres | Intermittent stream | Yes | R4UB3 | 8.75 feet | Slow flow, un-consolidated mud bottom, steep, vegetated banks, 0-3" deep |
| Waters 3 (Fig 9a) | Unmapped | 3,309 ft./0.42 acres | Intermittent stream | Yes | R4UB3 | 5.5 feet | Slow flow, un-consolidated mud bottom, vegetated banks, pooled water 0-3" deep; |
| Waters 4 (Fig 9a) | Intermittent, mapped, unnamed, blue-line stream | 387 ft./0.04 acres | Intermittent stream | Yes | R4UB3 | 4.5 feet | Slow flow, un-consolidated mud bottom, vegetated banks, pooled water 0-4" deep |

**Table 6: Potentially Jurisdictional Waterbodies within the Study Areas**

| Water-body | USGS Topo or NWI Classification | Length / Area | Field Observa-tions | Jurisdic-tional | Cowardin Classifi-cation | OHWM / Avg. Width Observed | Comments |
|---|---|---|---|---|---|---|---|
| Waters 5 (Fig 9a) | Unmapped | 462 ft./0.02 acres | Intermittent stream | **No** | R4UB3 | 2 feet | Isolated, slow flow, un-consolidated mud bottom, vegetated banks, 0-3” deep |
| Wetland 1 (Fig 9a) | PFO1Ah | 2.52 acres | Forested Wetland | Yes | PF01Ah | NA | East study area; forested, borders Bird Creek at western edge |
| Wetland 2 (Fig 9a) | PEM1FH | 33.75 acres | Forested/ Shrub Wetland | Yes | PFOSS1A | NA | Triangular forested/ shrub wetland within Ag field |
| Wetland 3 (Fig 9a) | PEM1F | 7.94 acres | Emergent Wetland | **No** | PEM1A | NA | Isolated wetland surrounding Pond 1 |
| Wetland 4 (Fig 9a) | None | 0.99 acres | Emergent Wetland | **No** | PEM1Ab | | Isolated wetland at western boundary of Pond 3 |
| Wetland 5 (Fig 9b) | None | 5.74 acres | Forested Wetland | Yes | PF01Ab | NA | Forested, created and maintained by beavers |
| Wetland 6 (Fig 9b) | None | 3.03 acres | Emergent Wetland | Yes | PEM1Ab | NA | Emergent, created and maintained by beavers |
| Wetland 7 (Fig 9b) | None | 15.49 acres | Forested Wetland | Yes | PFO1Ab | NA | Forested, created and maintained by beavers |
| Wetland 8 (Fig 9b) | None | 4.85 acres | Emergent Wetland | Yes | PEM1Ab | NA | Emergent, created and maintained by beavers |
| Wetland 9 (Fig 9b) | None | 1.36 acres | Emergent Wetland | Yes | PEM1Ab | NA | Emergent, created and maintained by beavers |
| Wetland 10 (Fig 9b) | None | 0.34 acres | Forested Wetland | Yes | PFO1Ab | NA | Forested, created and maintained by beavers |
| Pond 1 | PUBH | 2.30 acres | Freshwater Pond | **No** | PUB3H | NA | Isolated pond within Ag field |

| Table 6: Potentially Jurisdictional Waterbodies within the Study Areas | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Water-body** | **USGS Topo or NWI Classification** | **Length / Area** | **Field Observa-tions** | **Jurisdic-tional** | **Cowardin Classifi-cation** | **OHWM / Avg. Width Observed** | **Comments** |
| Pond 2 | None | 3.83 acres | Freshwater Pond | Yes | PUB3Hb | | Pond maintained by beavers |
| Pond 3 | L1UBhx | 12.4 acres | Freshwater Pond | **No** | PUB3Hh | | Abandoned private project |
| **Approx. Totals** | | **10,747 Linear Feet / 76.01 Acres of Wetland; 18.53 Acres Ponds** | | **13** jurisdic-tional | | | |

Three wetlands and two ponds were identified on current NWI maps. Approximately **96.55 acres** of potentially jurisdictional Waters (**2.01 acres** of Waters, **76.01 acres** of forested/emergent wetland, and **18.53 acres** of pond) were identified and are located within the study areas and may potentially be impacted by the construction of the proposed project (Figures 9a and 9b).

**Waters 1** – (3,533 linear feet) This waterbody is located within the west study area and begins at the north end of the study area. It is a mapped intermittent, blue-line stream that flows from the northwest to the southeast and is a secondary tributary to a mapped perennial stream (Bird Creek). This waterbody has an unconsolidated mud bottom with bare or vegetated banks. At the time of the survey, the stream was dry with a few pooled areas of water that were up to six (6) inches deep. Dominant vegetation associated with this waterbody included Hackberry, American elm, Northern red oak, Post oak, Cottonwood, Pecan, and Buckbrush (Figure 9a).

This intermittent blue-line stream may be subject to jurisdiction of the USACE due to its hydrologic connection to Bird Creek. Impacts to Waters 1 associated with the dredge project may require mitigation pursuant to USACE guidelines.

**Waters 2** – (3,056 linear feet) This waterbody is centrally located within the west study area. It is an unmapped, unnamed intermittent stream that flows from west to east and is a primary tributary to a mapped perennial stream (Bird Creek). This waterbody has an unconsolidated mud bottom with steep, bare or vegetated banks. At the time of the survey the stream was mostly dry with a few pooled areas that measure up to three (3) inches deep. Dominant vegetation associated with this waterbody included Hackberry, Green ash, American elm, Greenbrier, Buckbrush, and Poison ivy (Figure 9a).

This intermittent blue-line stream may be subject to jurisdiction of the USACE due to its hydrologic connection to Bird Creek. Impacts to Waters 2 associated with the dredge project may require mitigation pursuant to USACE guidelines.

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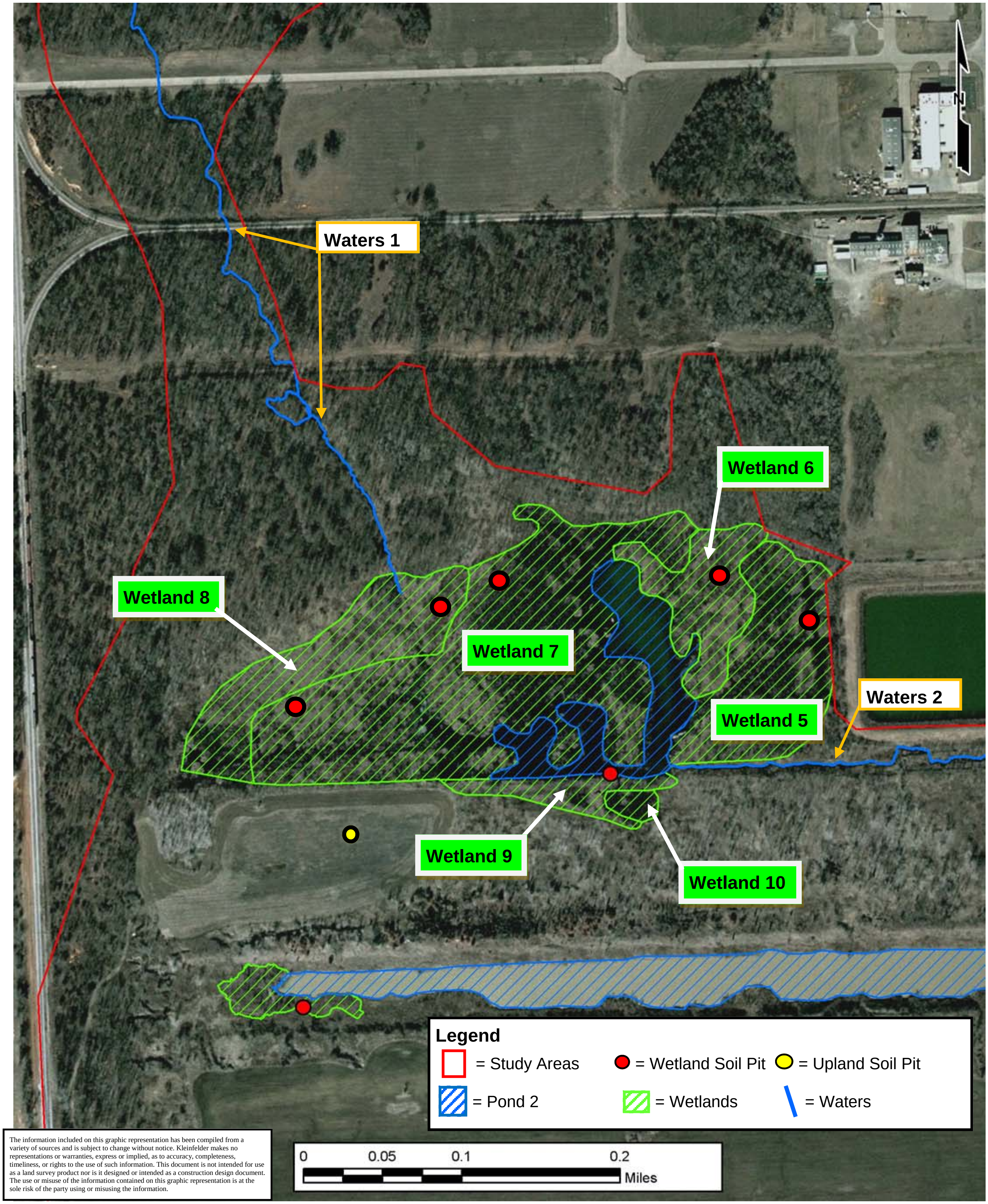
| DRAWN: | Dec 2010 |
| DRAWN BY: | KAS |
| CHECKED BY: | BHN |
| FILE NAME: | |

# Potentially Jurisdictional Waters Map

Tulsa Port of Catoosa
Rogers County, OK

FIGURE

9a



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DRAWN: Dec 2010
DRAWN BY: KAS
CHECKED BY: BHN
FILE NAME:

## Potentially Jurisdictional Waters Map

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
9b

**Waters 3** – (3,309 linear feet) This waterbody is located within the southern half of the west study area. It is an unmapped, unnamed intermittent stream that flows from west to east and is a primary tributary to a mapped perennial stream (Bird Creek). The waterbody has an unconsolidated mud bottom with bare or vegetated banks that are steep at the eastern extent. At the time of the survey the stream was mostly dry with a few pooled areas that were up to three (3) inches deep. Dominant vegetation associated with this waterbody included Black Willow, Boxelder, American Elm, and Greenbriar (Figure 9a).

This unnamed intermittent blue-line stream may be subject to jurisdiction of the USACE due to its hydrologic connection to Bird Creek. Impacts to Waters 3 associated with the dredge project may require mitigation pursuant to USACE guidelines.

**Waters 4** – (387 linear feet) This waterbody is located within the southern half of the west study area and is perpendicular to Waters 3. It is a mapped, unnamed intermittent, blue-line stream that flows from northwest to southeast and is a secondary tributary to a mapped perennial stream (Bird Creek). The waterbody has an unconsolidated mud bottom with vegetated banks. At the time of the survey the stream was mostly dry with scattered pooled areas that measured up to three (3) inches deep. Dominant vegetation associated with this waterbody included Pecan, Plum, Hackberry, American elm, Buckbrush, and Wildrye (Figure 9a).

This unnamed intermittent blue-line stream may be subject to jurisdiction of the USACE due to its hydrologic connection to Bird Creek. Impacts to Waters 4 associated with the dredge project may require mitigation pursuant to USACE guidelines.

**Waters 5** – (462 linear feet) This waterbody is located in the southern end of the west study area in an agricultural field. It is an unmapped, unnamed intermittent stream that flows from east to west and is associated with Pond 1. This waterbody has an unconsolidated mud bottom with vegetated banks. At the time of the survey, the stream was completely dry. Dominant vegetation associated with this waterbody included Hackberry, Honey locust, Indianhemp, Hop sedge, and Goldenrod (figure 9a).

This intermittent stream is potentially isolated and may not be subject to USACE jurisdiction because it has no direct hydrologic connection with Waters. Impacts to Waters 5 associated with the dredge project may not require mitigation pursuant to USACE guidelines.

**Wetland 1** – (2.52 acres) Wetland 1 is located within the east study area. Based on attributes seen during the field investigation, the wetland is classified as PFO1A (palustrine, forested, broad-leaved deciduous, temporarily flooded) wetland (Cowardin, 1979). Wetland 1 is mapped on the NWI map. The plant community was dominated by hydrophytic species that included Black willow, Boxelder, and American sycamore. Hydrologic indicators consisted of drift deposits and saturated soil beginning at zero inches. From 0-3 inches the soil matrix color was 10YR 3/4 with redox features of 10YR 2/1 and 10YR 4/4 in color when compared to Munsell color charts, and are classified as hydric. From 3-9 inches the soil matrix color was 10YR 5/4 with redox features of 10YR 3/2 and from 9-16 inches the soil matrix color was 10YR 5/4 with redox features of 10YR 4/1, 10YR 3/1, and 2.5YR 3/4 in color when compared to Munsell color charts, and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9a).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 1 associated with the dredge project may require mitigation pursuant to USACE guidelines.

**Wetland 2** – (33.75 acres) Wetland 2 is triangular shaped and is located within the west study area in the southeast portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PFOSS1A (palustrine, scrub-shrub, forested, broad-leaved deciduous, temporarily flooded) wetland (Cowardin, 1979). Wetland 2 is mapped on the NWI map. The plant community was dominated by hydrophytic species that included Pecan, Hackberry, Deciduous holly, Boxelder, American elm, and Giant goldenrod. Hydrologic indicators consisted of drift deposits and saturated soil beginning at zero inches. From 0-16 inches, the soil matrix was 7.5YR 4/1 with a redox feature of 7.5YR 4/6 in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9a).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 2 associated with the dredge project may require mitigation pursuant to USACE guidelines.

**Wetland 3** – (7.94 acres) Wetland 3 is located within the west study area in the southwest portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PEM1A (palustrine, emergent, broad-leaved deciduous, temporarily flooded) wetland (Cowardin, 1979). Wetland 3 is mapped on the NWI map. The plant community was dominated by hydrophytic species that included Hop Sedge, Indianhemp, and Knotweed. Hydrologic indicators consisted of drift deposits, water-stained leaves and saturated soil beginning at three inches. From 0-16 inches, the soil matrix was 7.5YR 4/1 with a redox feature of 7.5YR 4/6 in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a wetland. At this wetland the depth to the water table ranges between 15cm to more than 200cm, it is isolated from hydrologic connections with Waters and may not be jurisdictional (Figure 9a).

This wetland is potentially isolated and may not be subject to USACE jurisdiction because it has no direct hydrologic connection with Waters. Impacts to Wetland 3 associated with the dredge project may not require mitigation pursuant to USACE guidelines.

**Wetland 4** – (0.99 acres) Wetland 4 is centrally located within the west study area and is associated with Pond 3. Based on attributes seen during the field investigation, the wetland is classified as a PEM1Ab (palustrine, emergent, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 4 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Wildrye, and Poison ivy. Hydrologic indicators consisted of surface water, inundation visible on aerial imagery, water-stained leaves, and saturated soil beginning at zero inches. From 0-16 inches, the soil matrix was 7.5YR 4/1 with a redox feature of 7.5YR 4/6 in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland. At this wetland the depth to the water table is greater than 200cm, it is isolated from hydrologic connections with Waters and may not be jurisdictional (Figure 9a).

This wetland is potentially isolated and may not be subject to USACE jurisdiction because it has no direct hydrologic connection with Waters. Impacts to Wetland 4 associated with the dredge project may not require mitigation pursuant to USACE guidelines.

**Wetland 5** – (5.74 acres) Wetland 5 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PFO1Ab (palustrine, forested, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 5 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Hackberry, and Hop Sedge. Hydrologic indicators consisted of drift deposits, surface water, aquatic fauna (including beaver, fish, crayfish, and waterfowl), drift deposits, inundation visible on aerial imagery, water-stained leaves, drainage patterns and saturated soil beginning at zero inches. From 0-3 inches, the soil matrix was 7.5YR 4/6 with a redox feature of GLEY1 410Y and from 3-16 inches the soil matrix was GLEY1 410Y in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9b).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 5 associated with the dredge project may require mitigation pursuant to USACE guidelines.

**Wetland 6** – (3.03 acres) Wetland 6 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PEM1Ab (palustrine, emergent, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 6 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Knotweed, and Hop sedge. Hydrologic indicators consisted of drift deposits, surface water, aquatic fauna, drift deposits, inundation visible on aerial imagery, water-stained leaves, drainage patterns and saturated soil beginning at zero inches. From 0-3 inches, the soil matrix was 7.5YR 4/6 with a redox feature of GLEY1 410Y and from 3-16 inches the soil matrix was GLEY1 410Y in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9b).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 6 associated with the dredge project may require mitigation pursuant to USACE guidelines.

**Wetland 7** – (15.49 acres) Wetland 7 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PFO1Ab (palustrine, forested, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 7 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Hackberry, and Hop sedge. Hydrologic indicators consisted of drift deposits, surface water, aquatic fauna, drift deposits, inundation visible on aerial imagery, water-stained leaves, drainage patterns and saturated soil beginning at zero inches. From 0-3 inches, the soil matrix was 7.5YR 4/6 with a redox feature of GLEY1 410Y and from 3-16 inches the soil matrix was GLEY1 410Y in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9b).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 7 associated with the dredge project may require mitigation pursuant to USACE guidelines.

**Wetland 8** – (4.85 acres) Wetland 8 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PEM1Ab (palustrine, emergent, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 8 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Knotweed, and Hop sedge. Hydrologic indicators consisted of drift deposits, surface water, aquatic fauna, drift deposits, inundation visible on aerial imagery, water-stained leaves, drainage patterns and saturated soil beginning at zero inches. From 0-3 inches, the soil matrix was 7.5YR 4/6 with a redox feature of GLEY1 410Y and from 3-16 inches the soil matrix was GLEY1 410Y in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9b).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 8 associated with the dredge project may require mitigation pursuant to USACE guidelines.

**Wetland 9** – (1.36 acres) Wetland 9 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PEM1Ab (palustrine, forested, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 9 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Knotweed, and Hop sedge. Hydrologic indicators consisted of drift deposits, surface water, aquatic fauna, drift deposits, inundation visible on aerial imagery, water-stained leaves, drainage patterns and saturated soil beginning at zero inches. From 0-3 inches, the soil matrix was 7.5YR 4/6 with a redox feature of GLEY1 410Y and from 3-16 inches the soil matrix was GLEY1 410Y in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9b).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 9 associated with the dredge project may require mitigation pursuant to USACE guidelines.

**Wetland 10** – (0.34 acres) Wetland 10 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PFO1Ab (palustrine, forested, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 10 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Hackberry, and Hop sedge. Hydrologic indicators consisted of drift deposits, surface water, aquatic fauna, drift deposits, inundation visible on aerial imagery, water-stained leaves, drainage patterns and saturated soil beginning at zero inches. From 0-3 inches, the soil matrix was 7.5YR 4/6 with a redox feature of GLEY1 410Y and from 3-16 inches the soil matrix was GLEY1 410Y in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9b).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 10 associated with the dredge project may require mitigation pursuant to USACE guidelines.

**Pond 1** – (2.30 acres) Pond 1 is located within the west study area in the southwestern portion of the site. Based on attributes seen during the field investigation, the pond is classified as a PUB3H (palustrine, unconsolidated bottom, mud, permanently flooded) pond (Cowardin, 1979). Pond 1 is mapped on the NWI map.

This pond collects localized water flow and is potentially isolated and may not be subject to USACE jurisdiction because it has no direct hydrologic connection with Waters. Impacts to Pond 1 associated with the dredge project may not require mitigation pursuant to USACE guidelines.

**Pond 2** – (3.83 acres) Pond 2 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the pond is classified as a PUB3Hb (palustrine, unconsolidated bottom, mud, permanently flooded, beaver) pond (Cowardin, 1979). Pond 2 is unmapped on the NWI map.

The pond is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Pond 2 associated with the dredge project may require mitigation pursuant to USACE guidelines.

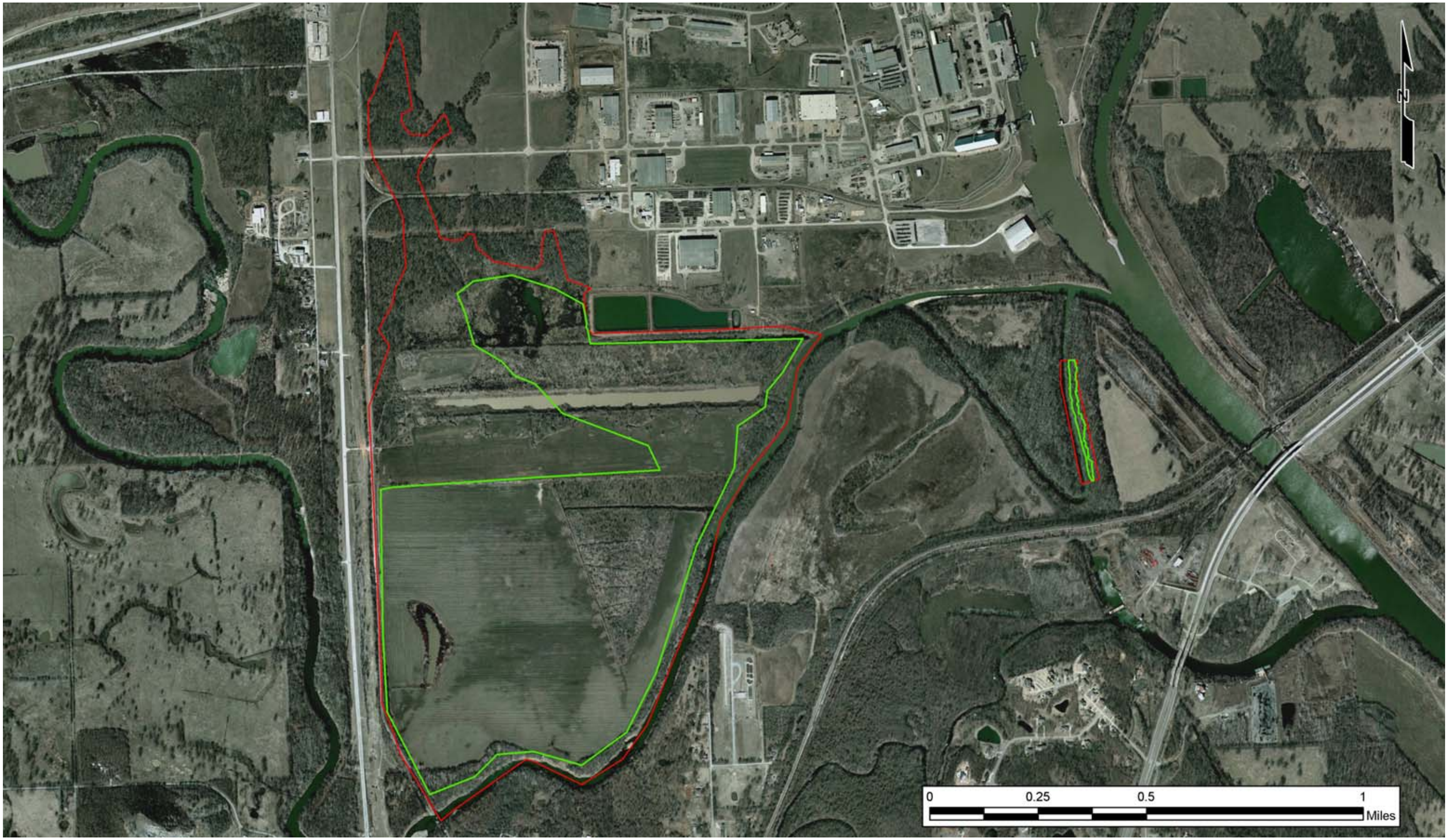
**Pond 3** – (12.4 acres) Pond 3 is centrally located within the west study area. It was created originally as a private project as an extension to the Port, but was not completed or connected to Waters. Based on attributes seen during the field investigation, the pond is classified as a PUB3Hh (palustrine, unconsolidated bottom, mud, permanently flooded, diked/impounded) pond (Cowardin, 1979). Pond 3 is mapped on the NWI map.

The pond collects localized water flow, is potentially isolated, and may not be subject to USACE jurisdiction because it has no direct hydrologic connection with Waters. Impacts to Pond 3 associated with the dredge project may not require mitigation pursuant to USACE guidelines.

### 6.3 Historic Wetlands

The approximate extent of historic wetlands was based on the review of NRCS historic aerial photographs, NRCS Web Soil Survey data, Oklahoma counties hydric soils list, Google Earth Pro, NWI maps, USGS Topographic maps, and field reconnaissance. Along with the previously stated factors, a key feature in determining the approximate extent of the historic wetlands was the 1971 NRCS aerial photograph. This photo shows a primary tributary to Bird Creek that has since been filled. The presence of this former waterbody, in combination with currently existing streams and the presence of hydric soils over large portions of the west study area were used to determine that a majority of the west study area could have been historically classified as either forested or emergent wetlands (see Figure 10 and Appendix C).

Historically the southern Ag field would have been subject to flooding from two different sources; via the former streams/creeks that were located at the northeast portion of the Ag field and via Bird Creek. The relocation and channelization of the former streams minimizes the portions of the site that are subject to routine flooding, as does the drop of the bed level of Bird Creek.



Legend

🟥 = Study Areas

🟩 = Approx. Extent of Historic Wetlands

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PROJECT NO. 114800
DRAWN: Jan 2011
DRAWN BY: LM
CHECKED BY: KAS
SOURCE: Google Earth Pro

## Historic Wetland Map
March 2010 Aerial Photo

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
10

## 7.0 IMPACTS AND MITIGATION

Based on Kleinfelder observations and analysis of preliminary development plans, Kleinfelder concludes that the proposed project will impact Waters, including wetlands, within the environmental study areas that may be subject to the jurisdiction of the USACE.

The USACE requires that discharged dredged or fill material into Waters be minimized or avoided to the maximum extent practicable. The USACE also requires consideration of feasible alternatives to avoid or minimize potential impacts to Waters. If impacts can be avoided, under the guidance of Best Management Practices (BMPs), then no formal action or permitting is required. If impacts can be minimized and conform to certain requirements then the proposed development activities may qualify for a General Permit such as a Nationwide Permit (NWP). NWP's are designed to apply to categories of discharge activities that are similar in nature and will cause only minimal adverse environmental effects. A pre-construction notification (PCN) may also be required by the USACE. The NWP program streamlines the permitting process, usually affording a significant reduction in time and costs. If the proposed development activities cannot feasibly meet the conditions for a NWP, the project will require an Individual Permit from the USACE to authorize the project.

USACE guidelines require that a permit applicant justify project-related impacts to Waters, including wetlands, and provide mitigation for unavoidable impacts. In order of preference, these include avoidance, minimization, and compensation. Three types of compensatory mitigation exist, including wetland enhancement, wetland restoration, and wetland creation. Generally, with the incorporation of a sensitive project design and the adherence of BMPs, potential impacts to Waters can be avoided or minimized.

### 7.1 BEST MANAGEMENT PRACTICES (BMPs)

A brief discussion of proposed BMPs for the proposed development activities is presented in the following section. Inspections of the BMPs and storm water control practices should take place before and after storm events to ensure that each BMP or control is functioning properly. Project BMPs should be constructed such that sediment and other pollutants are contained within the project site.

- Install and maintain silt fences, sediment traps, or straw bale dikes around all areas with disturbed or exposed soil. A silt fence sediment barrier is required at a distance of 30 feet around the perimeter of all jurisdictional wetlands, in order to create an impact buffer zone. Hay bales may be used where continuous relocation of the silt fence would otherwise be necessary.

- Store construction equipment at the off-site staging areas at the end of each work period. Divert concentrated runoff around equipment, vehicle, and materials storage areas. Diversion of concentrated runoff should be accomplished through shallow earthen swales and methods described above.

- Minimize the amount of construction materials stored on-site.

- Designate areas of the site for the delivery and removal of construction materials. Construction materials should not be stored beyond the silt fence.

- Store materials in a manner that limits exposure to precipitation and controls stormwater runoff.

- Handle construction materials (e.g., concrete) in a manner that minimizes direct discharges into jurisdictional wetlands and drainage channels. The discharge or creation of potential discharge of any soil material including concrete, cement, silts, clay, sand, or any other materials to the Waters of the United States is prohibited.

- Provide pallets or secondary containment areas for chemicals, drums, or bagged materials. Should material spills occur, materials and/or contaminants should be cleaned from the project site and recycled or disposed to the satisfaction of the Oklahoma Department of Environmental Quality.

- Cover waste dumpsters with plastic sheeting at the end of each workday and during storm events. All sheeting should be carefully secured to withstand weather conditions.

- Train or instruct on-site personnel in spill prevention practices, and provide spill containment materials near all storage areas. All contractors are responsible for familiarizing their personnel with the information contained in the Storm Water Pollution Prevention Plan (SWPPP).

- Separate wastes and recycle or dispose of them in compliance with regulations.

- Spray water on earth fill and disturbed ground surfaces as necessary to minimize wind-blown dust.

The following controls or BMP's should also be implemented to minimize the potential for releases or spills of pollutants into Waters of the United States during the operation of construction equipment:

- Maintain all construction equipment to prevent oil or fluid leaks.

- Use drip pans or other secondary containment measures beneath vehicles during storage.

- Regularly inspect all equipment and vehicles for fluid leaks.

- Place wastes (e.g., grease, oil or oil filters, antifreeze, cleaning solutions, batteries, and hydraulic or transmission fluid) in proper containers, store the containers in designated storage areas, and ultimately recycle the materials.

- Fuel and wash vehicles and equipment at an off-site location.

Spill prevention and control practices should be implemented throughout construction activities. Workers should be trained in techniques to reduce the chance for spills, contain and clean-up spills, and properly dispose of spill materials for the potential pollutants that are relevant to each contractor or subcontractor activity. Where applicable, materials should be stored in covered containers to minimize the chance for spills. Cleanup materials should be readily available to the employees of each contractor or subcontractor for immediate response, should a spill occur on the site.

Equipment used to make and pour concrete should be washed at an off-site location. Concrete fine material or aggregate should not be allowed to wash into the jurisdictional wetlands or other associated drainage channels. Concrete application equipment must be parked over drip pans or absorbent material at all times. Any bare ground created by materials storage should be restored following construction.

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# APPENDIX A
# PHOTOGRAPHIC RECORD

**Photo 1** – *View north; south end of Wetland 1.*

**Photo 2** – *View east; Bird Creek from south end of Wetland 1.*

**Photo 3** – *Soil sample from the Wetland 1.*

**Photo 4**– *View north, central region of Wetland 1.*

KLEINFELDER
Bright People. Right Solutions.

Project Number: 114800

Photos Taken December 2010

Tulsa Port of Catoosa
Rogers County, Oklahoma

**Site Photographs**

**Appendix A**

**Photo 5** – *View east, Bird Creek from Waters 1.*

**Photo 6** – *View west, east end of Waters 1.*

**Photo 7** – *View west, central region of Waters 1.*

**Photo 8** – *View south, central region of Waters 2..*

**Photo 9** – *View east, west central edge of Wetland 2.*

**Photo 10** – *View east, central region of Wetland 2.*

**Photo 11** – *Buttressed tree trunk within Wetland 2 .*

**Photo 12** – *Soil sample from Wetland 2.*

| KLEINFELDER Bright People. Right Solutions.<br>Project Number: 114800<br>Photos Taken December 2010 | Tulsa Port of Catoosa<br>Rogers County, Oklahoma | **Site Photographs** | **Appendix A** |
|---|---|---|---|

**Photo 13** – *View west, agriculture field west of Wetland 1.*

**Photo 14** – *View north, edge of Wetland 1 and agriculture field on west side.*

**Photo 15** – *View west; central region of Wetland 1.*

**Photo 16** – *View west, central region of Wetland 1.*

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Project Number: 114800
Photos Taken December 2010

Tulsa Port of Catoosa
Rogers County, Oklahoma

**Site Photographs**

**Appendix A**

**Photo 17** – *View north, northern region of Waters 4.*

**Photo 18** – *View south, northern region of Waters 4.*

**Photo 19** – *View north, northern region of Waters 4.*

**Photo 20** – *View east, northern region of Waters 4.*

**Photo 21** – *View south, south region of Waters 4.*

**Photo 22** – *View south, northwest edge of Wetland 8.*

**Photo 23** – *View southeast; central region of Wetland 8.*

**Photo 24** – *View northwest, south region of Wetland 9.*

**Photo 25** – *View northeast, southeast side of Pond 2.*

**Photo 26** – *Soil sample taken from Wetland 9.*

**Photo 27** – *View north, southwest side of Pond 2.*

**Photo 28** – *View west, beaver dam on east side of Pond 2.*

**Photo 29** – *View south, central region of Wetland 6.*

**Photo 30** – *View south, east edge of Wetland 5.*

**Photo 31** – *View west; central region of Wetland 7.*

**Photo 32** – *View east, west side Pond 3.*

KLEINFELDER
Bright People. Right Solutions.

Project Number: 114800

Photos Taken December 2010

Tulsa Port of Catoosa
Rogers County, Oklahoma

**Site Photographs**

**Appendix A**

**Photo 33** – *View south, north side of Wetland 10.*

**Photo 34** – *View north, south side of Wetland 10.*

**Photo 35** – *View northeast; open field between Wetland 9 and 10.*

**Photo 36** – *View south, north bank of Pond 3.*

**Photo 37** – *View east, central region of isolated emergent Wetland 3.*

**Photo 38** – *View north, south bank of isolated Pond 1 within Wetland 3.*

**Photo 39** – *View south; north side of Wetland 3.*

**Photo 40** – *View southeast, north side of Wetland 3*

# APPENDIX B
# WETLAND DELINEATION FORMS

Wet 1

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: POC East City/County: Rogers Co Sampling Date: 12/8
Applicant/Owner: POC State: ______ Sampling Point: East 2
Investigator(s): KAS, JC Section, Township, Range: 17, T20N R15E
Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): concave
Slope (%): 0-3 Lat: ______ Long: ______ Datum: NAD83
Soil Map Unit Name: VF Verdigris silty clay loam NWI classification: PFO1A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ✓ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes ✓ No ______
Hydric Soil Present? Yes ✓ No ______
Wetland Hydrology Present? Yes ✓ No ______

**Is the Sampled Area within a Wetland?** Yes ✓ No ______

Remarks:
Behind on annual rainfall

**VEGETATION** – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: ______ ) | | | |
| 1. Salix nigra | 30 | | FACW |
| 2. Platanus occidentalis | 20 | | FAC |
| 3. Acer Saccharum | 5 | | FAC |
| 4. Acer negundo | 25 | | FACW |
| 5. Ulmus american | 3 | | FAC |
| | 83 = Total Cover | | |
| Sapling/Shrub Stratum (Plot size: ______ ) | | | |
| 1. Acer negundo | 5 | | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 5 = Total Cover | | |
| Herb Stratum (Plot size: ______ ) | | | |
| 1. Chasmanthyum latafolium | 40 | | Fac |
| 2. Chasmathyum sp. | 15 | | FAC |
| 3. Elymus virginicus | 5 | | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | 60 = Total Cover | | |
| Woody Vine Stratum (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| | ______ = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 55 | x 2 = 110 |
| FAC species | 88, | x 3 = 264, |
| FACU species | 0 | x 4 = 0 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 143 (A) | 374 (B) |

Prevalence Index = B/A = 26

**Hydrophytic Vegetation Indicators:**

✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ______

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: ____________

**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 % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-3 | 10YR 3/4 | 65 | 10YR 2/1 | 1 | | M | loamy Sand | |
| | | | 10YR 4/4 | 34 | | M | | |
| 3-9 | 10YR 5/4 | 80 | 10YR 3/2 | 20 | | M | | |
| 9-16 | 10YR 5/4 | 93 | 2.5YR 3/4 | 2 | | PL | | organic material |
| | | | 10YR 4/1 | 4 | | M | | |
| | | | 10YR 3/1 | 1 | | M | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ 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 ______

Remarks:

dark organic layer at bottom of sample

## 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ 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)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ______ No ______ Depth (inches): ____________

Water Table Present? Yes ______ No ______ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ____________

**Wetland Hydrology Present?** Yes ✓ No ______

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

Remarks:

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Co Sampling Date: 12/8

Applicant/Owner: POC/ Dewberry State: OK Sampling Point: UPL east

Investigator(s): J Caskey K. Shadmon Section, Township, Range: Sec 17 T20N R15E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______

Slope (%): ______ Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ______ No ✓

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ______ No ✓ | Is the Sampled Area within a Wetland? | Yes ______ No ✓ |
| Hydric Soil Present? | Yes ______ No ✓ | | |
| Wetland Hydrology Present? | Yes ______ No ✓ | | |

Remarks:
ag field

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | ______ = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | ______ = Total Cover | | |
| **Herb Stratum** (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | ______ = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| | ______ = Total Cover | | |

**Dominance Test worksheet:**

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

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

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

**Prevalence Index worksheet:**

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

Prevalence Index = B/A = ______

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ______ No ______

Remarks: (Include photo numbers here or on a separate sheet.)
plowed ag field

## SOIL

Sampling Point: UPL east

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

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16 | 7.5YR4/3 | 100 | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ 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 ✓

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ 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)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ___ No ___ Depth (inches): ___
Water Table Present? Yes ___ No ___ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

**Wetland Hydrology Present?** Yes ___ No ___

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

Remarks:

None

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: POC City/County: Catoosa, Rogers Sampling Date: East 1
Applicant/Owner: POC / Dewberry State: OK Sampling Point: 12/8
Investigator(s): K. Shannon J Caskey Section, Township, Range: Sec 18 T20N R15E
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave
Slope (%): 0-2 Lat: ______ Long: ______ Datum: NAD 83
Soil Map Unit Name: VF Verdigris silty clay loam NWI classification: PFO1A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ✓ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes ✓ No ______
Hydric Soil Present? Yes ✓ No ______
Wetland Hydrology Present? Yes ______ No ______

**Is the Sampled Area within a Wetland?** **Yes** ______ **No** ______

Remarks: hydrology questionable ; behind on annual rainfall

**VEGETATION** – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: 30m) | | | |
| 1. Acer negundo | 10 | | FACW |
| 2. Celtis | 45 | | FAC |
| 3. Ulmus americana | 35 | | FAC |
| 4. | | | |
| 5. | | | |
| | 90 = Total Cover | | |
| Sapling/Shrub Stratum (Plot size: 30m) | | | |
| 1. Acer negundo | 80 | | FACW |
| 2. Chinese privet | 1 | | UPL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 81 = Total Cover | | |
| Herb Stratum (Plot size: 10m) | | | |
| 1. Elymus virginicus | 95 | | FAC |
| 2. ~~Schedonorus phoenix~~ | | | ~~FAC~~ |
| 3. Solidago ~~sp.~~ gigantea | 1 | | FAC |
| 4. Rosa ~~sp.~~ multiflora | 1 | | UPL |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | 97 = Total Cover | | |
| Woody Vine Stratum (Plot size: 10m) | | | |
| 1. Smilax bona nox | 5 | | FAC |
| 2. grape / Vitis sp | 15 | | FAC |
| | 20 = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 90 | x 2 = 180 |
| FAC species | 196 | x 3 = 588 |
| FACU species | 0 | x 4 = 0 |
| UPL species | 2 | x 5 = 10 |
| Column Totals: | 288 (A) | 778 (B) |

Prevalence Index = B/A = 2.7

**Hydrophytic Vegetation Indicators:**

✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ______

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: E 1

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

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16 | 10YR8/2 | 99 | | | | | | |
| 0-16 | | | 7.5YR5/1 | 1 | RM | M | Clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ 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 ______

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ 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)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes _____ No _____ Depth (inches): ___________
Water Table Present? Yes _____ No _____ Depth (inches): ___________
Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): ___________

**Wetland Hydrology Present?** Yes ______ No ______

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

Remarks:

2nd terrace, hydrology questionable

Wet 2

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Co Sampling Date: 12/9/2010
Applicant/Owner: POC / Dewberry State: ______ Sampling Point: A wetland
Investigator(s): K Shannon Jraskey Section, Township, Range: Sec 18 T20N R15E
Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): ______
Slope (%): 0-3 Lat: ______ Long: ______ Datum: NAD 83
Soil Map Unit Name: 05 Osage Clay hydric NWI classification: PEM1Fh
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ✓ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes ✓ No ______
Hydric Soil Present? Yes ✓ No ______
Wetland Hydrology Present? Yes ✓ No ______

**Is the Sampled Area within a Wetland?** Yes ✓ No ______

Remarks:
behind on annual rainfall

**VEGETATION –** Use scientific names of plants.

| Tree Stratum (Plot size: 30m) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Carya illinoensis | 20 | Y | FAC |
| 2. Celtis occidentalis | 30 | Y | FAC |
| 3. Ulmus americana | 25 | Y | FAC |
| 4. Fraxinus pennsylvanica | 10 | N | FACW |
| 5. Ilex decidua | 2 | N | FACW |
| | 97 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. Toxicodendron radicans | 40 | Y | FAC |
| 2. Cephalanthus occidentalis | 7 | N | OBL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 47 = Total Cover | | |
| **Herb Stratum** (Plot size: ______) | | | |
| 1. Carex lupulina | 90 | Y | FAC |
| 2. Solidago gigantea | 40 | Y | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | 130 = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. Tox rad | 10 | N | FAC |
| 2. | | | |
| | 10 = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 7 | x 1 = | 7 |
| FACW species | 12 | x 2 = | 24 |
| FAC species | 265 | x 3 = | 795 |
| FACU species | 0 | x 4 = | 0 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 284 (A) | | 826 (B) |

Prevalence Index = B/A = 2.9

**Hydrophytic Vegetation Indicators:**

- ✓ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ______

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: ___

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

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16 | 7.5YR 4/1 | 95 | 7.5YR 4/6 | 5 | RM | PL | clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ 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 ___

Remarks:

Os = hydric

## 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)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

**Wetland Hydrology Present?** Yes ✓ No ___

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

Remarks:

buttressed tree trunks

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Sampling Date: 12/9/10

Applicant/Owner: POC / Dewberry State: OK Sampling Point: UPL A

Investigator(s): K Shannon JCaskey Section, Township, Range: S17 T20N R15E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): –

Slope (%): ____ Lat: ____ Long: ____ Datum: NAD83

Soil Map Unit Name: Os Osoge Clay – hydric NWI classification: –

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ✓

Hydric Soil Present? Yes ____ No ____

Wetland Hydrology Present? Yes ____ No ____

**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓

Remarks: behind on annual rainfall

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ____ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| **Sapling/Shrub Stratum** (Plot size: ____ ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| **Herb Stratum** (Plot size: ____ ) | | | |
| 1. Soy beans when | | | |
| 2. planted | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | | = Total Cover | |
| **Woody Vine Stratum** (Plot size: ____ ) | | | |
| 1. | | | |
| 2. | | | |
| | | = Total Cover | |

**Dominance Test worksheet:**

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

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

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

**Prevalence Index worksheet:**

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

Prevalence Index = B/A = ____

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** **Yes** ____ **No** ✓

Remarks: (Include photo numbers here or on a separate sheet.)

Ag field – no plants, recently disked

## SOIL

Sampling Point: UPL 4

**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 % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-16 | 7.5YR4/1 | 90 | | | | | clay | tilled |
| 0-16 | | | 7.5YR4/6 | 10 | RM | M | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ 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 ______

Remarks:

tilled soil

## 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ 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)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

**Wetland Hydrology Present?** Yes ✓ No ______

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

Remarks:

seasonal flooding

Wet 3

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: POC / Dewberry City/County: Catoosa / Rogers Sampling Date: 12/14
Applicant/Owner: POC State: OK Sampling Point: Sag Pond
Investigator(s): K. Shannon, J. Caskey Section, Township, Range: Sec 18 T20N R15E
Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): concave
Slope (%): 0-1 Lat: ______ Long: ______ Datum: NAD83
Soil Map Unit Name: OS Osage Clay Hydric NWI classification: PEM1
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ✓ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes ✓ No ______
Hydric Soil Present? Yes ✓ No ______
Wetland Hydrology Present? Yes ✓ No ______

**Is the Sampled Area within a Wetland?** Yes ✓ No ______

Remarks: dry; behind on rainfall for previous month / year

**VEGETATION** – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: 30m) | | | |
| 1. Salix nigra | 3 | | FACW |
| 2. ~~Oak~~ Quercus ~~[illegible]~~ shumardii | 1 | | FACW |
| 3. Ulmus americana | 1 | | FAC |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| Sapling/Shrub Stratum (Plot size: 30m) | | | |
| 1. Buttonbush - Cephalanthus occidentalis | 5 | | obl |
| 2. Salix nigra | 3 | | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| Herb Stratum (Plot size: 15m) | | | |
| 1. ~~[illegible]~~ ~~[illegible]~~ Carex lupalina | 25 | | Obl |
| 2. Solidago gigantea | 7 | | FAC |
| 3. Panicum virgatum | 10 | | FACW |
| 4. Apocynum cannibinum | 25 | | FAC |
| 5. Polygonum lapathifolium | 25 | | FACW |
| 6. ~~Eleusine indica~~ | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | | = Total Cover | |
| Woody Vine Stratum (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| | | = Total Cover | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 30 | x 1 = 30 |
| FACW species | 49 | x 2 = 98 |
| FAC species | 33 | x 3 = 99 |
| FACU species | – | x 4 = |
| UPL species | – | x 5 = |
| Column Totals: | 112 (A) | 227 (B) |

Prevalence Index = B/A = 2.02

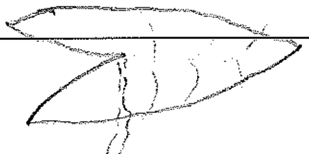
**Hydrophytic Vegetation Indicators:**

- ✓ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ______

Remarks: (Include photo numbers here or on a separate sheet.)



## SOIL

Sampling Point: ___________

**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 |
|---|---|---|---|---|---|---|---|---|
| 0-16 | 7.5YR 4/1 | 95 | 7.5YR 4/6 | 5 | RM | M | clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ 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 ______

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
✓ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
✓ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ 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)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

✓ Surface Soil Cracks (B6)
✓ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes _____ No ✓ Depth (inches): ___________
Water Table Present? Yes _____ No ✓ Depth (inches): ___________
Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 16+"

**Wetland Hydrology Present?** Yes ✓ No ______

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

pond in center; open $H_2O$

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Sampling Date: 12/14
Applicant/Owner: POC / Dewberry State: OK Sampling Point: S pond UPL
Investigator(s): K Shannon J Cackey Section, Township, Range: 18 T20N, R15E
Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): concave.
Slope (%): ______ Lat: ______ Long: ______ Datum: ______
Soil Map Unit Name: Os NWI classification: —
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ✓ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No ✓
Hydric Soil Present? Yes ✓ No ______
Wetland Hydrology Present? Yes ______ No ✓

**Is the Sampled Area within a Wetland?** Yes ______ No ✓

Remarks: behind on annual rainfall

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| **Herb Stratum** (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| | = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)
Total Number of Dominant Species Across All Strata: ______ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ______ (A/B)

**Prevalence Index worksheet:**

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

Prevalence Index = B/A = ______

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ______ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)
no plants - disked field

## SOIL

Sampling Point: S Pond UP

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

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16 | 7.5YR4/1 | 85 | 7.5YR4/6 | 15 | RM | M | Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ 5 cm Mucky Peat or Peat (S3)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

☐ Coast Prairie Redox (A16)
☐ Iron-Manganese Masses (F12)
☐ 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 ______

Remarks:

DS

## 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)
☐ Sparsely Vegetated Concave Surface (B8)
☐ Water-Stained Leaves (B9)
☐ Aquatic Fauna (B13)
☐ True Aquatic Plants (B14)
☐ 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)
☐ Gauge or Well Data (D9)
☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

☐ Surface Soil Cracks (B6)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Stunted or Stressed Plants (D1)
☐ Geomorphic Position (D2)
☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ______ No ______ Depth (inches): ______
Water Table Present? Yes ______ No ______ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______

**Wetland Hydrology Present?** Yes ______ No ✓

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

Remarks:

Seasonal flooding

Wet 4

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: POC / Dewberry City/County: Rogers Sampling Date: 12.15
Applicant/Owner: POC State: OK Sampling Point: Fake 2
Investigator(s): KAS JMC Section, Township, Range: Sec 18 T20N R15E
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): ____
Slope (%): 3-10 Lat: ____ Long: ____ Datum: NAD83
Soil Map Unit Name: Bar G NWI classification: —
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ____

Remarks: rainfall behind for year

## VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: ____ ) | | | |
| 1. Salix nigra | 10 | N | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| Sapling/Shrub Stratum (Plot size: ____ ) | | | |
| 1. Salix nigra | 25 | Y | FACW |
| 2. Cephalanthus occidentalis | 25 | Y | OBL |
| 3. Tox rad | 20 | Y | FAC |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| Herb Stratum (Plot size: ____ ) | | | |
| 1. Elymus canadensis | 35 | Y | FAC |
| 2. Setaria | 10 | | FAC |
| 3. Carex lupalina | 5 | N | OBL |
| 4. Apocynum cannibinum | 2 | | FAC |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| = Total Cover | | | |
| Woody Vine Stratum (Plot size: ____ ) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 30 | x 1 = | 30 |
| FACW species | 35 | x 2 = | 70 |
| FAC species | 67 | x 3 = | 201 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 132 (A) | | 301 (B) |

Prevalence Index = B/A = 2.28

**Hydrophytic Vegetation Indicators:**

- ✓ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- __ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- __ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: ___________

**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 |
|---|---|---|---|---|---|---|---|---|
| | 7.5YR4/1 | | | | | | | |
| | 7.5YR 4/6 | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ 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 ___

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ✓ No ___ Depth (inches): ___________

Water Table Present? Yes ___ No ✓ Depth (inches): ___________

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___________

**Wetland Hydrology Present?** Yes ___ No ___

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

Remarks:

isolated, not connected to Waters

Wet6

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Co Sampling Date: 12/15
Applicant/Owner: POC / Dewberry State: OK Sampling Point: beaver emerge
Investigator(s): J Cackey K Shannon Section, Township, Range: Sec 7 T20N R15E
Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): concave
Slope (%): 0-2 Lat: ______ Long: ______ Datum: NAD83
Soil Map Unit Name: W water NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ✓ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ______
Hydric Soil Present? Yes ✓ No ______
Wetland Hydrology Present? Yes ✓ No ______

**Is the Sampled Area within a Wetland?** Yes ✓ No ______

Remarks:
behind on annual rainfall

## VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| Sapling/Shrub Stratum (Plot size: ______ ) | | | |
| 1. Cephalanthus occidentalis | 5 | N | OBL |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 5 = Total Cover | | |
| Herb Stratum (Plot size: ______ ) | | | |
| 1. Typha latifolia | 60 | Y | OBL |
| 2. Echinochloa crus-galli | 10 | N | FACW |
| 3. Carex lupulina | 35 | Y | OBL |
| 4. Polygonum lapathifolium | 30 | Y | FACW |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | 135 = Total Cover | | |
| Woody Vine Stratum (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| | = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ______ (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 100 | x 1 = | 100 |
| FACW species | 40 | x 2 = | 80 |
| FAC species | 0 | x 3 = | 0 |
| FACU species | 0 | x 4 = | 0 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 140 (A) | | 180 (B) |

Prevalence Index = B/A = 1.28

**Hydrophytic Vegetation Indicators:**

- ✓ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ______

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: ____________

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

| Depth (inches) | Matrix |  | Redox Features |  |  |  | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
|  | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] |  |  |
| 0-16 | 7.5YR 4/1 | 90 | 7.5YR 4/6 | 10 | PM | M | clay |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ 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 ______

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
✓ Saturation (A3)
✓ Water Marks (B1)
___ Sediment Deposits (B2)
✓ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ 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)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________
Water Table Present? Yes ______ No ______ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 6+

**Wetland Hydrology Present?** Yes ✓ No ______

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

Remarks:

Wet 7

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Co Sampling Date: 12/15
Applicant/Owner: POC / Dewberry State: OK Sampling Point: Wet-Leave
Investigator(s): J Caskey K Shannon Section, Township, Range: Sec 7 T20N R15E
Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): Concave
Slope (%): 0-2 Lat: ______ Long: ______ Datum: NAD83
Soil Map Unit Name: W water NWI classification: —
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ✓ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes ✓ No ______
Hydric Soil Present? Yes ✓ No ______
Wetland Hydrology Present? Yes ✓ No ______

**Is the Sampled Area within a Wetland?** Yes ✓ No ______

Remarks:
behind on annual rainfall

**VEGETATION –** Use scientific names of plants.

| Tree Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Salix nigra | 30 | Y | FACW |
| 2. Acer negundo | 30 | Y | FACW |
| 3. Fraxinus pennsylvanica | 15 | N | FACW |
| 4. Celtis occidentalis | 10 | N | FAC |
| 5. | | | |
| | 85 | = Total Cover | |

| Sapling/Shrub Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Cephalanthus occidentalis | 15 | N | OBL |
| 2. Salix nigra | 5 | N | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 20 | = Total Cover | |

| Herb Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Carex lupulina | 60 | Y | OBL |
| 2. Polygonum lapathifolium | 10 | N | FACW |
| 3. Polygonum pensylvanicum | 5 | N | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | 75 | = Total Cover | |

| Woody Vine Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. — | | | |
| 2. | | | |
| | | = Total Cover | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 75 | x 1 = 75 |
| FACW species | 95 | x 2 = 190 |
| FAC species | 70 | x 3 = 210 |
| FACU species | 0 | x 4 = 0 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 240 (A) | 475 (B) |

Prevalence Index = B/A = 1.97

**Hydrophytic Vegetation Indicators:**

✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ______

Remarks: (Include photo numbers here or on a separate sheet.)

Wet 7

## SOIL

Sampling Point: ___________

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

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16 | 7.5YR4/1 | 90 | 7.5YR4/6 | 10 | RM | M | clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ 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 ______

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

✓ Surface Water (A1)
___ High Water Table (A2)
✓ Saturation (A3)
✓ Water Marks (B1)
___ Sediment Deposits (B2)
✓ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
✓ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ 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)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ✓ No ______ Depth (inches): 0
Water Table Present? Yes ______ No ______ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0

**Wetland Hydrology Present?** Yes ✓ No ______

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

Remarks:

wet 8

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: POC / Dewberry City/County: Rogers Co Sampling Date: 12/15

Applicant/Owner: POC State: OK Sampling Point: S. Port

Investigator(s): F. Shannon J. Caskey Section, Township, Range: Sec 7 T20N R15E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave

Slope (%): 0-1 Lat: ______ Long: ______ Datum: NAD 83

Soil Map Unit Name: W water NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ✓ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ______

Hydric Soil Present? Yes ✓ No ______

Wetland Hydrology Present? Yes ✓ No ______

Is the Sampled Area within a Wetland? Yes ✓ No ______

Remarks:

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. ~~Salix nigra~~ | ~~15~~ | ~~N~~ | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| **Sapling/Shrub Stratum** (Plot size: ______ ) | | | |
| 1. Cephalanthus occidentalis | 5 | N | OBL |
| 2. Salix nigra | 15 | N | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| **Herb Stratum** (Plot size: ______ ) | | | |
| 1. Carex lupulina | 90 | Y | ~~FAC~~ OBL |
| 2. Solidago gigantea | 10 | N | FAC |
| 3. Aster sp. Symphyotrichum novae-angliae | 40 | Y | FACW |
| 4. Echinochloa crus-galli | 10 | N | FACW |
| 5. Iva annua | 15 | N | FAC |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | | = Total Cover | |
| **Woody Vine Stratum** (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| | | = Total Cover | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 95 | x 1 = | 95 |
| FACW species | 65 | x 2 = | 130 |
| FAC species | 115 | x 3 = | 345 |
| FACU species | 0 | x 4 = | 0 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | ~~185~~ 275 (A) | | ~~480~~ 570 (B) |

Prevalence Index = B/A = ~~2.59~~ 2.07

**Hydrophytic Vegetation Indicators:**

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ______

Remarks: (Include photo numbers here or on a separate sheet.)

Sump weed ??

## SOIL

Sampling Point: ____________

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

| Depth (inches) | Matrix |  | Redox Features |  |  |  | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
|  | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] |  |  |
| 0-16 | 7.5YR 4/1 | 95 | 7.5YR 4/6 | 5 | RM | M | Clay |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ 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 ______

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

✓ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
✓ Water Marks (B1)
___ Sediment Deposits (B2)
✓ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
✓ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ 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)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes _____ No _____ Depth (inches): ____________
Water Table Present? Yes _____ No _____ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): ____________

**Wetland Hydrology Present?** Yes ✓ No ______

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

Remarks:

Wet 9

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: POC / Dewberry City/County: Rogers Co Sampling Date: 12/15
Applicant/Owner: POC State: OK Sampling Point: Beaver Wet 1
Investigator(s): K Shannon S Coskey Section, Township, Range: Sec. 7 T20N R15E
Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): concave
Slope (%): 0-1 Lat: ______ Long: ______ Datum: NAD83
Soil Map Unit Name: W water hydric NWI classification: —
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No ✓ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___
Hydric Soil Present? Yes ✓ No ___
Wetland Hydrology Present? Yes ✓ No ___

**Is the Sampled Area within a Wetland?** Yes ✓ No ___

Remarks:
Beaver maintained ; rainfall behind for year

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30m) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Salix nigra | 20 | | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: 30m) | | | |
| 1. Salix nigra | 1 | | FACW |
| 2. Cephalanthus occidentalis | 5 | | OBL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: 15m) | | | |
| 1. Carex lupulina | 30 | Y | OBL |
| 2. Polygonum lapathifolium | 70 | Y | FACW |
| 3. Solidago gigantea | 1 | | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| = Total Cover | | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 35 | x 1 = 35 |
| FACW species | 91 | x 2 = 182 |
| FAC species | 1 | x 3 = 3 |
| FACU species | | x 4 = |
| UPL species | | x 5 = |
| Column Totals: | 127 (A) | 220 (B) |

Prevalence Index = B/A = 1.73

**Hydrophytic Vegetation Indicators:**

✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: beaver!

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

| Depth (inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | | |
| 0-3 | 7.5YR 4/6 | 90 | gley1 4/10Y | 10 | | | | organics in clay |
| 3-16 | gley1 4/10Y | 100 | | | | | | CLAY |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
✓ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ 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 ______

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

✓ Surface Water (A1)
___ High Water Table (A2)
✓ Saturation (A3)
✓ Water Marks (B1)
___ Sediment Deposits (B2)
✓ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
✓ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
✓ Water-Stained Leaves (B9)
✓ Aquatic Fauna (B13) Beaver!
___ True Aquatic Plants (B14)
___ 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)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
✓ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
✓ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ✓ No ______ Depth (inches): ______

Water Table Present? Yes ______ No ______ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0-16

**Wetland Hydrology Present?** Yes ✓ No ______

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

Remarks:

DPL 5-10

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: POC / Dewberry City/County: Rogers Co Sampling Date: 12/15

Applicant/Owner: POC State: ______ Sampling Point: Bvr upland

Investigator(s): K Sharman J Casey Section, Township, Range: Sec 8 T20N R15E

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______

Slope (%): 1-3 Lat: ______ Long: ______ Datum: NAD83

Soil Map Unit Name: ______ NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ [✓ No] (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? [✓ Yes] No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ [✓ No]

Hydric Soil Present? [✓ Yes] No ___

Wetland Hydrology Present? Yes ___ [✓ No]

**Is the Sampled Area within a Wetland?** Yes ___ [✓ No]

Remarks: behind on rainfall for year

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |

| Sapling/Shrub Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |

| Herb Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Solidago gigantea | 40 | | FAC |
| 2. Schizachyrium scoparium | 8 | | FACU |
| 3. Setaria | 10 | | |
| 4. Aster | | | |
| 5. Carex lupulina | 62 | | OBL |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | = Total Cover | | |

| Woody Vine Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| | = Total Cover | | |

**Dominance Test worksheet:**

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

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

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

**Prevalence Index worksheet:**

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

Prevalence Index = B/A = ______

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ___ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: ____________

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

| Depth (inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | | |
| 0-16 | 7.5YR 4/2 | 98 | 7.5YR 4/6 | 2 | RM | M | Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ 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 ______

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ 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)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes _____ No _____ Depth (inches): ____________
Water Table Present? Yes _____ No _____ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): ____________

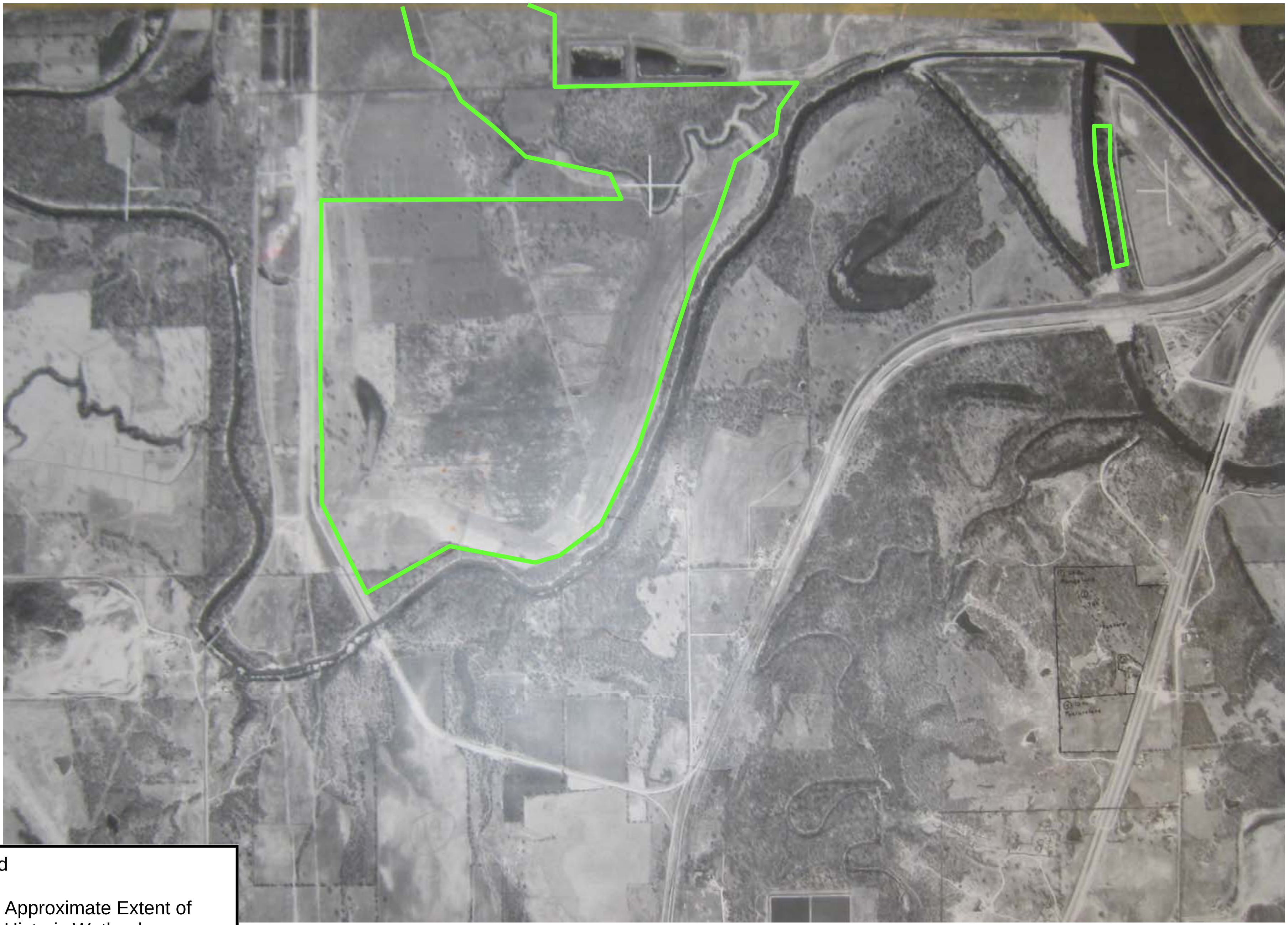
**Wetland Hydrology Present?** Yes ______ No X

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

Remarks:

No hydrology

# APPENDIX C
# HISTORIC AERIAL PHOTOGRAPHS



Legend

🟩 = Approximate Extent of Historic Wetlands

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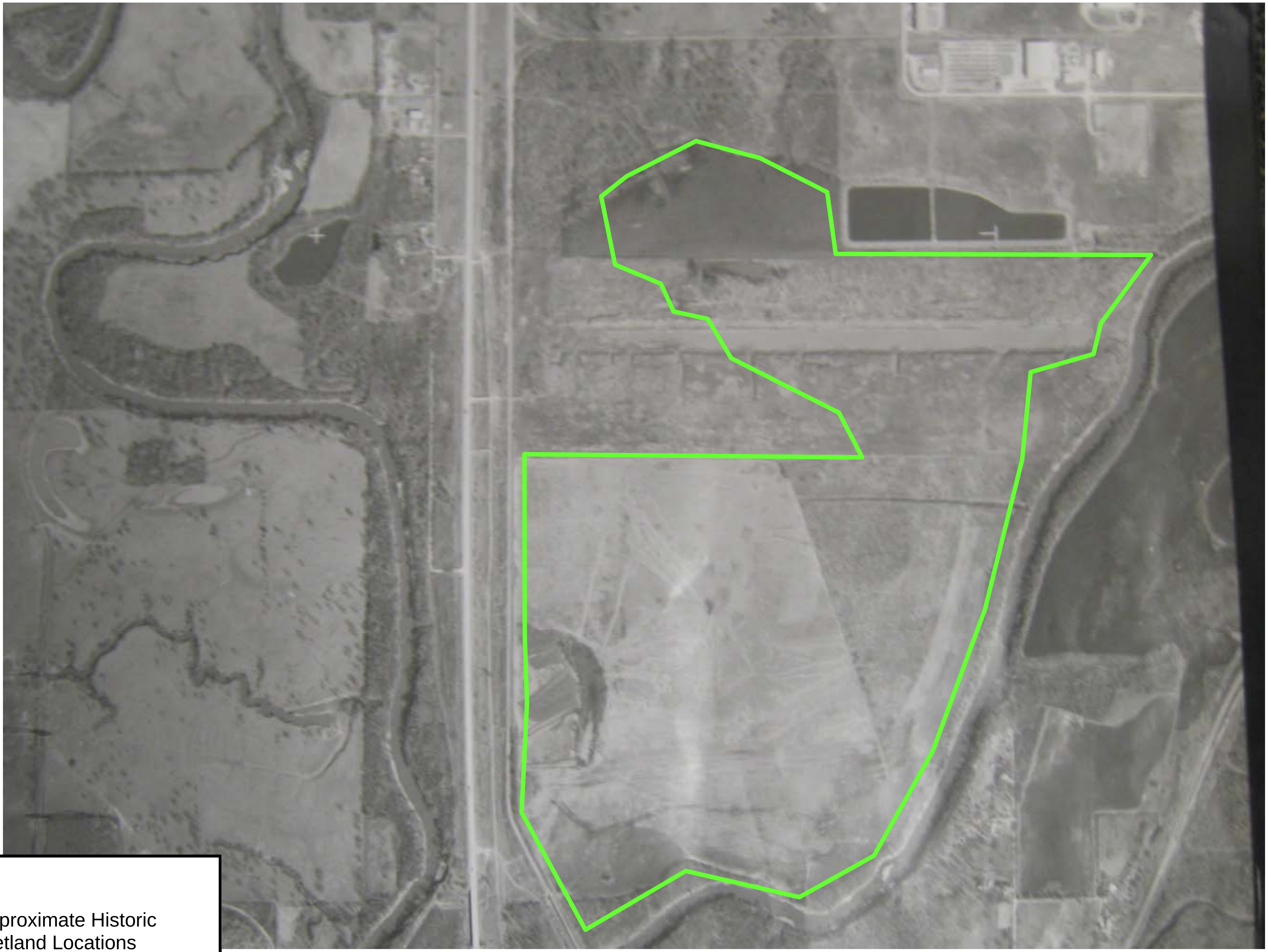
www.kleinfelder.com

PROJECT NO. 114800
DRAWN: Jan 2011
DRAWN BY: KAs
CHECKED BY: BHN
SOURCE: NRCS, Rogers Co.

## NRCS 1971 Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

Appendix
C-1



Legend

☐ = Approximate Historic Wetland Locations (includes east study area)

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| | |
|---|---|
| PROJECT NO. | 114800 |
| DRAWN: | Jan 2011 |
| DRAWN BY: | KAS |
| CHECKED BY: | BHN |
| SOURCE: | NRCS, Rogers Co. |

NRCS 1979 Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

Appendix

C-2

Legend

🟩 = Approximate Extent of Historic Wetlands

KLEINFELDER
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www.kleinfelder.com

| | |
|---|---|
| PROJECT NO. | 114800 |
| DRAWN: | Jan 2011 |
| DRAWN BY: | KAS |
| CHECKED BY: | BHN |
| SOURCE: | NRCS, Rogers Co. |

## NRCS 1991 Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

Appendix

C-3

# DELINEATION OF POTENTIALLY JURISDICTIONAL WATERBODIES REPORT, EVALUATION OF HISTORIC WETLANDS, and THREATENED, ENDANGERED and PROTECTED SPECIES POTENTIAL HABITAT

## BARGE FLEETING AREA
## TULSA PORT OF CATOOSA
## ROGERS COUNTY, OKLAHOMA

**Portions of Sections 8, 16 and 17 of Township 20 North, Range 15 East**
**Rogers County, Oklahoma**

February 3, 2012
Revised March 19, 2012

A Report Prepared for:

Dewberry
600 Parsippany Road, Suite 301
Parsippany, NJ 07054-3715

# DELINEATION OF POTENTIALLY JURISDICTIONAL WATERBODIES REPORT, EVALUATION OF HISTORIC WETLANDS and THREATENED, ENDANGERED and PROTECTED SPECIES POTENTIAL HABITAT

## BARGE FLEETING AREA
## PORT OF CATOOSA
## ROGERS COUNTY, OKLAHOMA

**Portions of Sections 8, 16, and 17 of Township 20 North, Range 15 East**
**of the Indian Meridian, Rogers County, Oklahoma**

Kleinfelder Project # 114800

Prepared by:

Polly Ready

Polly Ready
Environmental Scientist

Reviewed by:

Blair Baker

Blair Baker
Senior Environmental Professional

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## 1.0 INTRODUCTION

Kleinfelder was contracted by Dewberry to conduct an assessment of United States Army Corps of Engineers (USACE) waters of the United States (Waters), including wetlands; historic wetlands; the presence of potential habitat for federally threatened or endangered (listed) and protected species within this property of the Tulsa Port of Catoosa, in Rogers County, Oklahoma (Figure 1). The environmental study area (study area) is approximately 130 acres. The center of the study area is located at 36.131109° N, -95.435457° W (Figure 2). This report documents the results of the delineation for the benefit of Dewberry and the Tulsa Port of Catoosa and may be relied upon by their successors and/or assignees associated with the transaction for which this report was commissioned.

The study area is located within portions of: the S 1/2 of Section 8, the NW 1/4 of Section 16, and the NE 1/4 of Section 17 of Township 20 North, Range 15 East, of the Indian Meridian, Rogers County, Oklahoma. The study area is mapped on the 1980 photorevised Catoosa, OK quadrangle United States Geological Survey (USGS) 7.5-Minute Series Topographic Map (Figure 3).

Kleinfelder biologists (Ms. Polly Ready and Mr. Jason Caskey) conducted a delineation to characterize and map potentially jurisdictional Waters within the study area. Potentially jurisdictional Waters, including wetlands, were found within the study area. The survey was conducted on November 29, 2011 and consisted of a focused pedestrian field survey within the study area. The study area was also evaluated for historic wetlands and for the presence of potential habitat for federally threatened or endangered (listed) and protected species for Rogers County, OK. Prior to conducting the field survey, Kleinfelder reviewed site maps, historic aerial photographs, natural resource database accounts, National Wetlands Inventory (NWI) maps (Figure 4), the U.S. Fish and Wildlife Service (USFWS) Project Review of federally listed species and designated critical habitat areas in Rogers County, Oklahoma, and other relevant scientific literature to determine the potential existence of known wetland features and listed and protected species in the study area.

This report is based on knowledge of the special-status resources in the region, a review of relevant background literature, and a focused field survey of the study area. A discussion of plant and animal species observed on site is included in this report. Information in this report is intended to provide the biological information that is necessary to avoid or minimize impacts to Waters that are potentially jurisdictional. This information may also be used in support of permit applications associated with impacts to these Waters.

## 2.0 REGULATORY FRAMEWORK

### 2.1 WATERS OF THE U.S.

The following section provides an overview of the regulatory framework involved with impacts to Waters (including wetlands) associated with the study area. Wetlands and riparian communities are considered to have special ecological status and are also considered a declining resource by several regulatory agencies, including the USACE. Wetlands serve significant biological functions by providing nesting, breeding, foraging, and spawning habitat for a wide variety of resident and migratory animal species. Wetlands also provide for the movement of water and sediments, nutrient cycling, groundwater recharge, water purification, storage of storm water runoff, recreation and transportation.

According to Section 404 of the Clean Water Act (CWA) of 1977, work (dredging) within navigable waters and the placement of fill material into Waters, including intermittent streams and wetlands, requires authorization by the USACE (EPA, 1972). The type of authorization (e.g., individual permit, nationwide permit, regional permit, or letter of permission from the District Engineer) depends on the acreage, volume, linear distance along a stream course, and purpose of the activity.

Under Section 404 of the CWA, and Section 10 of the Rivers and Harbors Act of 1899, the Environmental Protection Agency (EPA) and the USACE share regulatory authority over Waters. Waters includes all waterbodies that are, have, or may be used for interstate and/or international commerce, including all water that is subject to the ebb and flow of tide; all waters that are rivers, streams, sloughs, lakes, mudflats, sandflats, wetlands, wet meadows, prairie potholes, playa lakes, or natural ponds and the use, degradation, or destruction, of the aforementioned, which could affect interstate and international commerce; all impoundments of above mentioned; all tributaries of above mentioned; territorial seas; and all wetlands adjacent to above mentioned Waters. The width of Waters is defined as that portion which falls within the limits of the ordinary high water mark (OHWM). Field indicators of OHWM are clear and natural lines on opposite sides of the banks, scouring, sedimentary deposits, drift lines, exposed roots, shelving, destruction of terrestrial vegetation, and the presence of litter debris. Typically, the OHWM corresponds to the two-year flood event.

The USACE retains jurisdiction over wetlands that are Waters, and definitions and regulations for the identification and delineation of wetlands were published in the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987). This 1987 manual is the current federal delineation manual used in the CWA Section 404 regulatory program for the identification and delineation of wetlands. The 1987 manual has been clarified and updated through a series of regional supplements, guidance documents and memoranda from the USACE. The Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region is used for southeastern Oklahoma (USAERDC, 2008). The USACE defines wetlands as:

*"Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."*

Thus, the interaction of hydrology, hydrophytic vegetation and hydric soil conditions results in the development of characteristics unique to wetlands. For a wetland to exist, it must have: 1) prevalent hydrophytic vegetation (plants that are adapted to grow, compete, reproduce and persist under anaerobic soil conditions); 2) hydric soils (those that possess characteristics associated with reducing soil conditions); and 3) a source of hydrology (frequently inundated or saturated during the biological growing season). The USACE clearly states, "Except in certain situations defined in this manual, evidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination."

## 2.2 THREATENED, ENDANGERED, AND PROTECTED SPECIES

Where activity would require federal authorization or be contingent upon some other federal action, consultation under the Endangered Species Act (ESA) of 1973 is necessary. The ESA prohibits any person from taking, which includes harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, relocating, collecting, or attempting to engage in any such conduct, of any federally listed threatened or endangered species. Significant habitat modification or degradation that results in death or injury to federally protected species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering is also prohibited. Federal agencies are required to comply with the provisions and use their authorities to conserve species. Section 7 of the ESA states that every federal agency taking an action that may affect listed species must consult with the U.S. Department of the Interior, USFWS, or the National Marine Fisheries Service (NMFS). Consultation allows the USFWS to provide their expertise to ensure that the agency is making effective choices to conserve listed species, and that the proposed action would not jeopardize the continued existence of listed species.

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb (USFWS, 1940)."

The Migratory Bird Treaty Act of 1918 decreed that all migratory birds and their parts (including eggs, nests, and feathers) were fully protected. The Migratory Bird Treaty Act (MBTA) is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protect selected species of birds that are common to both countries (i.e., they occur in both countries at some point during their annual life cycle). A List of Migratory Birds protected by the MBTA is available.

## 3.0 SETTING

The general setting of the study area is within the floodplain of Bird Creek and the Verdigris River. The study area is rural and wooded consisting primarily of bottomland forest, improved grasslands, agricultural fields and developed areas including road and associated right-of-ways (ROW). There are large areas that have been excavated to create ponds, and other areas that have received fill on the north half of the island.

The study area has an elevation range of approximately 530 feet above MSL at the northern end and 556 feet above MSL at the southern end, as shown on the 1980 photorevised Catoosa, OK quadrangle, USGS 7.5-Minute Series Topographic Map. The climate in this area is primarily influenced by movement of moist air from the Gulf of Mexico, hot and dry air from the desert southwest and cold air from the Arctic. The region undergoes seasonal variations in temperature and precipitation and typically experiences long, humid summers and short mild winters. The average annual precipitation for Rogers County is 43.45 inches, the average annual temperature is 60 degrees Fahrenheit, and the annual growing season is 208 days (OCS, 2010).

Habitats within the study area included mixed-age bottomland forest, mixed-age upland forest, dissected upland dominated by grasses, developed areas, and waterbodies. Within the bottomland forest dominant plant species included Pecan (*Carya illinoensis*), Boxelder (*Acer negundo*), American elm (*Ulmus americana*), Sycamore (*Platanus occidentalis*), Hackberry (*Celtis occidentalis*), Black willow (*Salix nigra*), Deciduous holly (*Ilex decidua*), and Northern red oak (*Quercus rubra*). The forested wetland is included in this habitat type. The upland forest site was dominated by Post oak (*Quercus stellata*), Blackjack oak (*Quercus marilandica*), Gum Bully (*Sideroxylon lanuginosum*), Buckbrush (*Symphoricarpos orbiculatus*), Frost flower (*Verbesina virginica*), and Saw Greenbrier (*Smilax bona-nox*). The waterbodies did not have plants specifically associated with them. Introduced and invasive plant species were common in disturbed areas and were observed predominantly within mowed or maintained ROWs. These species included Sericea Lespedeza (*Lespedeza cuneata*), Bermudagrass (*Cynodon dactylon*), and Johnsongrass (*Sorghum halepense*).

## 3.1 ECOREGIONS

### Level 4 Ecoregions of Oklahoma Information

The study area is located within the Osage Cuestas, a subregion of the Central Irregular Plains ecoregion (#40) of Oklahoma (Figure 5).

### 40b. Osage Cuestas

The Osage Cuestas ecoregion is an irregular to undulating plain that is underlain by interbedded, westward-dipping sandstone, shale, and limestone. East-facing cuestas and low hills occur. Topography is distinct from the nearby Flint Hills, Ozark Highlands, and Cherokee Plains ecoregions. Natural vegetation is mostly tall grass prairie, but a mix of tall grass prairie and oak–hickory forest is native to eastern areas. Overall, the mosaic of natural vegetation is unlike the neighboring Cross Timbers and Ozark Highlands ecoregions. Today, rangeland, cropland, riparian forests, and on rocky hills, oak woodland or oak forest occur; cropland is not as common as in the neighboring Cherokee Plains Ecoregion. (Woods et al, 2005).

Potential natural vegetation for this ecoregion consists mostly of tallgrass prairie (dominants: big bluestem, little bluestem, switchgrass, and Indiangrass), grading eastward into a mosaic of tall grass prairie and oak–hickory forest; on rocky hilltops, cross timbers (dominants: blackjack oak, post oak, and little bluestem). Tallgrass prairie is native on deep loams derived from shale or limestone. Bottomland forests are native on floodplains and low terraces. Currently, on rocky hills, dry upland forest and woodland is found. Dry prairie composed of short and tall grasses occurs on shallow, gravelly soils of limestone scarps. In riparian areas are forests containing boxelder, silver maple, bur oak, Shumard oak, American elm, hackberry, pecan, walnut, sycamore, and eastern cottonwood.

Land cover and land use for this ecoregion is a mosaic of rangeland, grassland, cropland, and especially in more rugged areas, woodland. Wooded riparian corridors occur on wettest bottomlands. Wheat, soybeans, grain sorghum, and alfalfa hay are major crops. Livestock (especially cattle) farming is important. Strip mining for coal and oil production have degraded water quality in some streams (Woods et al., 2005).

## 4.0 METHODS AND LIMITATIONS

The USACE has prescribed methodologies for delineating “waters of the United States” and wetlands pursuant to the CWA of 1977 (EPA, 1972). Determination of Waters is based on definitions and descriptions found in the Code of Federal Regulation (CFR) at 33 CFR 328. Methods for delineating wetlands are detailed in the USACE Wetland Delineation Manual (Environmental Laboratory, 1987) and require that, under normal circumstances, an area possess three technical criteria to be designated as a jurisdictional wetland. Those criteria are:

1) the prevalence of hydrophytic vegetation, 2) the presence of hydric soils, and 3) the presence of wetland hydrology.

The evaluation of any on-site stream features for the jurisdictional determination was conducted in accordance with the policy, practice, and procedures set forth in 33 CFR 328, which determines the extent of jurisdiction of the USACE over Waters. The definitions for jurisdictional determination consist of the following:

A. The term *"waters of the United States"* means:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
    - Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    - From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    - Which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under the definition;
5. Tributaries of Waters identified in paragraphs (a)(1)-(4) of this section;
6. The territorial seas;
7. Wetlands adjacent to Waters (other than Waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section.
8. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not Waters of the United States.
9. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA.

Limits of jurisdictional authority are as follows:

A. *Territorial Seas* - The limit of jurisdiction in the territorial seas is measured from the baseline in a seaward direction a distance of three nautical miles. (See 33 CFR 329.12)

B. *Tidal Waters of the United States* - The landward limits of jurisdiction in tidal waters:

- Extends to the high tide line, or
- When adjacent non-tidal waters of the United States are present, the jurisdiction extends to the limits identified in paragraph (c) of this section.

C. *Non-Tidal Waters of the United States* **-** The limits of jurisdiction in non-tidal waters:

- In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or
- When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands.
- When the water of the United States consists only of wetlands, the jurisdiction extends to the limit of the wetland.

The wetland assessment and delineation was conducted in accordance with the Corps of Engineers Wetlands Delineation Manual and the Midwest Region supplement (USAERDC, 2008). The delineation form for the Midwest region was used and the wetland assessment consisted of the following:

- A desktop review was undertaken to identify areas that were previously mapped as wetlands, streams, or other waterbodies. A pedestrian survey was conducted within the study area to locate potential jurisdictional waterbodies. When these areas were encountered, the routine determination method described in the 1987 USACE Wetland Delineation Manual and Midwest Region supplement was employed, and sample plots were used to determine wetland or non-wetland status. Visual observations were used to identify vegetation, soil, and hydrological characteristics within the vicinity of the sample plots.

- Plant community types in proximity to potential wetland boundaries were identified. Dominant plant species were identified within the visually perceived wetland boundary or until the nearest significant vegetative community change. The biologist selected a representative observation area for each plant community, visually selected the dominant species from each stratum of the community, evaluated the percent cover of plant species in each stratum, and recorded the wetland indicator status of the dominant species. A determination was then made as to whether the vegetation was hydrophytic based on the plant's indicator status and a minimum of two evaluation methods. If no potential jurisdictional waterbodies were observed, upland plant communities were mapped and characterized.

- Hydrophytic vegetation dominates areas where the frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species were assigned wetland indicator status according to the probability of species occurring in wetlands (USFWS, 1988). More than fifty percent of the dominant species must have been hydrophytic to have met the wetland vegetation criterion. Hydrophytic plant indicator status designations conform to the following:

    - OBL – Plants that occur almost always (estimated probability >99 percent) in wetlands under natural conditions, but may also occur rarely (estimated probability <1) in non-wetlands.

  - FACW – Plants that occur usually (estimated probability >67 percent to 99 percent) in wetlands under natural conditions, but also occur (estimated probability 1 percent to 33 percent) in non-wetlands.
  - FAC – Plants with a similar likelihood (estimated probability 33 to 67 percent) of occurring in both wetlands and non-wetlands.
  - FACU – Plants that occur sometimes (estimated probability 1 percent to <33 percent) in wetlands, but occur more often (estimated probability >67 percent to 99 percent) in non-wetlands.
  - UPL - Plants that occur rarely (estimated probability <1 percent) in wetlands, but almost always occur (estimated probability >99 percent) in non-wetlands under natural conditions.

- Soil pits were dug at sample plots for the potential wetlands being investigated. Munsell Soil Color Charts (MacBeth, 1994) were used to evaluate the color, hue, and chroma of representative soils and associated redox features. The redox features were also characterized by their size, distinction, and frequency of occurrence. Soil indicators from the samples were then recorded and it was determined if the soils are hydric. Reducing conditions on site were indicated by the presence of oxidized root channels, positive reaction from Alpha-Alpha Dipyradil, sulfidic odor, or gleyed soils. Also noted were other hydrological indicators, such as soil saturation within the upper 12 inches of the soil, standing water existing within the soil pits, and the depth to inundated or saturated soil. If no hydric soils or potential jurisdictional waterbodies were observed within the study area, no soil pits were dug.

If potential jurisdictional waterbodies are observed, appropriate jurisdictional wetland boundaries would be derived from wetland sampling plot analysis and subsequently recorded using a Trimble GeoXT$^{TM}$ global positioning system (GPS). When satellites cannot be detected by GPS or when there is poor satellite geometry, the boundaries of Waters are marked on aerial photography and field measurements are taken for reference. For areas between sample points, the wetland/upland boundary would be determined by interpolation of the position of vegetation, soil, and hydrologic indicators. This geospatially corrected information would then be digitally overlaid onto a representative aerial photograph and a topographic map using ArcGIS software to display the cumulative, on-site jurisdictional area. Wetland feature polygons, wetland soil pits, and upland soil pits would be identified on the maps and identified with a corresponding label. Digital photographs were taken to document on-site conditions and are provided in Appendix A.

A variety of data sources were reviewed with regard to the location of historic wetlands within the study areas. These data sources included:

- NRCS historic aerial photographs
- NRCS Web Soil Survey data including
  - hydric ratings
  - soil physical features
  - flooding frequency
- NRCS 2009 Hydric Soils List for Oklahoma
- Google Earth Pro
- USFWS NWI maps
- USGS Topographic maps

The historic aerial photographs acquired from the NRCS were taken in 1971, 1979, and 1993 and are included in Appendix B. Aerial photos taken prior to 1971 were not available from the NRCS office.

## 5.0 SITE CHARACTERIZATION

The study area can be generally characterized as rural, wooded, agricultural, with small maintained/mowed areas surrounding roads or utility ROWs, with streams and wetlands interspersed throughout. The large site is bordered to the south and east by Bird Creek, by Hwy 167 to the west, and commercial development to the north. The northern half of the large site is dominated by an area of fill deposit, small wetlands, ephemeral streams and bottomland forest, while the southern half site is dominated by areas of bottomland forest, upland areas, a wetland and an agricultural field.

### 5.1 SOILS AND DRAINAGE

Soils within the study area consist mainly of silt loams and silty clay loams. The parent material consists of silty alluvium and silty dredge spoils. These soils occur on floodplains on valleys and are occasionally or frequently flooded. The natural drainage class is well drained. The specific soil types for each project area are listed in Table 1 below. Of these soil types, Verdigris silt loam and Verdigris clay loam are considered to be partially hydric soils (USDA, 2009) (Figure 6). Portions of the study area occur within the 100-year floodplain of Bird Creek. FEMA Flood Insurance Rate Maps are included (Figure 7).

**Table 1: Soil Map Units within Study Area**

| Map Unit Symbol | Map Unit Name | Slope | Drainage / Hydric |
|---|---|---|---|
| BarG | Barge silty clay loam | 0 to 30 percent | Well drained / not hydric |
| Vd | Verdigris silt loam | 0 to 1 percent | Well drained / partially hydric |
| Ve | Verdigris clay loam | 0 to 1 percent | Well drained / partially hydric |
| Vf | Verdigris silty clay loam | 0 to 2 percent | Well drained / not hydric |

### 5.2 VEGETATION ASSESSMENT (PLANT COMMUNITIES)

The dominant plant communities within the study area include bottomland forest, a forested wetland, upland forest, emergent wetlands, improved grasslands, and mowed or maintained areas within ROWs. The table below summarizes the plant species observed within the study area.

**Table 2: Plant Species Observed within Study Area**

| Common Name | Scientific Name | Vegetation Type | NWI Status |
|---|---|---|---|
| American Elm | *Ulmus americana* | t | FAC |
| American Sycamore | *Platanus occidentalis* | t | FAC |
| Bermuda Grass | *Cynodon dactylon* | h | FACU |
| Blackberry | *Rubus* sp. | h | NI |
| Black Oak | *Quercus velutina* | t | - |
| Blackjack Oak | *Quercus marilandica* | t | - |
| Black Willow | *Salix nigra* | t | FACW |
| Boxelder | *Acer negundo* | t | FACW |
| Bristlegrass | *Setaria* sp. | h | FAC |

| Table 2: Plant Species Observed within Study Area | | | |
|---|---|---|---|
| **Common Name** | **Scientific Name** | **Vegetation Type** | **NWI Status** |
| Coralberry | *Symphoricarpos orbiculatus* | s | FACU |
| Buttonbush | *Cephalanthus occidentalis* | s | OBL |
| Elderberry | *Sambucus canadensis* | t | FAC |
| Grape | *Vitis* sp. | v | FAC |
| Giant Goldenrod | *Solidago gigantea* | h | FAC |
| Green Ash | *Fraxinus pennsylvanica* | t | FACW- |
| Hackberry | *Celtis occidentalis* | t | FAC |
| Hop Sedge | *Carex lupulina* | h | OBL |
| Johnsongrass | *Sorghum halepense* | h | FACU |
| Little Bluestem | *Schizachyrium scoparium* | h | FACU |
| Multiflora Rose | *Rosa multiflora* | h | UPL |
| Northern Red Oak | *Quercus rubra* | t | FACU |
| Osage Orange | *Maclura pomifera* | t | UPL |
| Pecan | *Carya illinoensis* | t | FAC |
| Plum | *Prunus americana* | t | NI |
| Poison Ivy | *Toxicodendron radicans* | v | FAC |
| Post Oak | *Quercus stellata* | t | NA |
| Saw Greenbrier | *Smilax bona-nox* | v | FAC |
| Sericea Lespedeza | *Lespedeza cuneata* | s | NI |
| Silver Maple | *Acer saccharinum* | t | FAC |
| Switchgrass | *Panicum virgatum* | h | FACW |
| Virginia Wildrye | *Elymus virginicus* | h | FAC |
| t = tree, s = shrub, h=herbaceous, v=vine, NI=no indicator, “-“ = not listed<br>(Taylor et al., 1994; USDA, 2009) | | | |

## 5.3 WILDLIFE ASSESSMENT

Wildlife species observed during field survey within the study area are summarized in Table 3 below.

| Table 3: Animal Species Observed within Study Area | |
|---|---|
| **Common Name** | **Scientific Name** |
| **Birds** (Sibley, 2000) | |
| American Crow | *Corvus brachyrhynchos* |
| American Goldfinch | *Spinus tristis* |
| Bewick’s Wren | *Thryomanes bewickii* |
| Blue Jay | *Cyanocitta cristata* |
| Canada Goose | *Branta canadensis* |
| Cedar Waxwing | *Bombycilla cedrorum* |
| Mallard | *Anas platyrhynchos* |
| Red-tailed Hawk | *Buteo jamaicensis* |
| Tufted Titmouse | *Baeolophus bicolor* |
| White Breasted Nuthatch | *Sitta carolinensis* |

| Table 3: Animal Species Observed within Study Area | |
|---|---|
| **Common Name** | **Scientific Name** |
| **Mammals** (Caire et al., 1989) | |
| American Beaver | *Castor canadensis* |
| Eastern Cottontail | *Sylvilagus floridanus* |
| Eastern Gray Squirrel | *Sciurus carolinensis* |
| Nine-banded Armadillo | *Dasyppus novemcinctus* |
| White-tailed Deer | *Odocoileus virginianus* |

## 6.0 FINDINGS

### 6.1 THREATENED, ENDANGERED AND PROTECTED SPECIES

In order to evaluate the study area for the potential presence of protected species, the USFWS list of federally listed species and designated critical habitat areas in Rogers County, Oklahoma was reviewed (USFWS, 2009). These sources were reviewed to determine if listed species and their associated habitat had the potential to occur within the study area or if adverse effects associated with the proposed construction may occur. Based upon the habitat descriptions of those species that were indicated to occur in Rogers County, a qualitative comparison to the habitat present within the subject site that could increase the potential for listed species to be present or adjacent to the study area was made during field reconnaissance efforts. The qualitative comparison was based upon regional and local ecological characteristics including soils, terrain, hydrology, and vegetation. The USFWS was not directly contacted.

Notes were also taken on livestock grazing, development, pollution and other disturbances that could decrease the potential for listed species to be present. Table 4 includes listed and candidate species that are either present, have the potential to be present, or have been observed in the past in Rogers County.

| Table 4: Rogers County, Oklahoma Listed and Protected Species | | | |
|---|---|---|---|
| **Common Name** | **Scientific Name** | **Federal Listing** | **Critical Habitat** |
| American Burying Beetle | *Nicrophorus americanus* | E | No |
| Interior Least Tern | *Sterna antillarum* | E | No |
| Piping Plover | *Charadrius melodus* | T | No |
| Whooping Crane | *Grus americana* | E | No |
| Neosho Mucket Mussel | *Lampsilis rafinesaqueana* | C | No |
| Rabbitsfoot Mussel | *Quadrula cylindrica* | C | No |
| Arkansas Darter | *Etheostoma cragini* | C | No |
| Bald Eagle | *Haliaeetus leucocephalus* | DL* | No |
| T = threatened, E = endangered, C = candidate, DL = delisted<br>*Bald Eagle is protected under the Bald and Golden Eagle Protection Act | | | |

No critical habitat has been designated for the eight species listed above in Rogers County, Oklahoma (USFWS Critical Habitat Mapper).

**American Burying Beetle:** The American Burying Beetle (ABB) is federally listed as endangered. This species is found in 22 counties in eastern Oklahoma. An additional six

Oklahoma counties lie within the historic range of the ABB and two others have had unconfirmed sightings since 1992. This insect species is present on less than 10% of its original range. Mature forest is its preferred natural habitat, but it can be found in hedgerows, grasslands, and shrublands. This scavenger needs small vertebrates (from 50-200 grams in size) to feed upon. Habitat requirements for the ABB include areas with loose, well-drained soils with a well-formed litter layer from oak-hickory and oak-pine forests, as well as open native grassland and open native fields along forest edges. According to the USFWS, pastures where native grasses have been displaced by cultivation of Bermuda grass (*Cynodon dactylon*) are not expected to support the ABB. There is no Critical Habitat designated for the ABB in Rogers County (USFWS, 1991).

**Findings of Survey Results for ABB:** The mature forest areas adjacent to open grass fields that could provide suitable reproductive and foraging habitat for the ABB occur within the study area. There are approximately 130 acres of forested and upland grassland plant communities that provide potentially suitable ABB habitat within the study area.

**Interior Least Tern:** The Interior Least Tern is federally listed as endangered (USFWS, 1985a). The Interior Least Tern is a frequent summer resident that occurs along sand bars within the braided channels of the Canadian, Red, Cimarron, and Arkansas rivers (USFW, 1990). In Oklahoma, the largest populations occur at the Salt Plains National Wildlife Refuge in Alfalfa County. Nesting colonies occur on sparsely vegetated sandbars on large rivers or salt flats with some natural debris. Most nesting occurs in May-June.

**Findings of Survey Results for Interior Least Tern:** The study area does not contain sparsely vegetated sandbars on large rivers or salt flats with the natural debris required by the Interior Least Tern for both nesting and feeding. Suitable habitat for the Interior Least Tern was not observed to be present on or in the immediate vicinity of the study area.

**Piping Plover:** The Piping Plover is federally listed as endangered within the Great Lakes Region, and threatened in the remainder of its range, including Oklahoma. Preferred habitats include sandy beaches along the ocean or lakes, and bare areas of islands or sandbars along large rivers. They also nest on the pebbly mud of interior alkali lakes and ponds. This shorebird migrates through Oklahoma each spring and fall. Sight records of migratory Piping Plovers exist for many central and eastern Oklahoma counties. Rogers County is not located in the probable migratory pathway between breeding and winter habitats (USFWS, 1985b).

**Findings of Survey Results for Piping Plover:** The study area does not contain sparsely vegetated sandbars on large rivers with the natural debris required by the Piping Plover for both nesting and feeding. No suitable habitat for the Piping Plover was observed to be present on or in the immediate vicinity of the study area. Nesting Piping Plovers are only known pre-1997, from the Oklahoma panhandle and do not nest in Rogers County (GMSARC, 2009).

**Whooping Crane:** The Whooping Crane is federally listed as endangered (USFWS, 1967). Critical Habitat has been designated for this species in Oklahoma at the Salt Plains National Wildlife Refuge (NWR) in northwestern Oklahoma. This wading bird is ecologically dependent on freshwater wetlands and, in the winter, on coastal brackish wetlands. The Whooping Crane migrates through western Oklahoma in the spring and fall (Austin, 2001). During migration, Whooping Cranes are sometimes found in Oklahoma outside of the Salt Plains NWR along rivers, grain fields, or in shallow wetlands. There is no critical habitat for the Whooping Crane in Rogers County, OK.

**Findings of Survey Results for Whooping Crane:** All areas within and adjacent to the study area were examined during field survey effort for the presence of suitable Whooping Crane foraging and roosting habitat. No preferred foraging or roosting habitat for this species was observed within or in areas adjacent to the study area.

**Neosho Mucket Mussel:** The Neosho Mucket is federally listed as a candidate species. It lives in freshwater and has an elongated, slightly rounded shell and I is approximately 4 inches across. In Oklahoma, living Neosho muckets were found along 55 miles of the Illinois River from the Oklahoma/Arkansas state line, downstream to the headwaters of Tenkiller Lake, Cherokee County, Oklahoma (Mather, 1990). Reproduction and recruitment rates of this species are low and the Neosho muckets is relatively rare in the Fall, Verdigris, Neosho, and North Fork Spring Rivers, and Shoal Creek, in northeastern Oklahoma. There is no critical habitat designated for the Neosho mucket in Rogers County.

**Findings of Survey Results for Neosho Mucket Mussel:** Surveys conducted at 32 sites on the Verdigris River found no live Neosho mucket mussels. The results of these surveys suggest the Neosho mucket has been extirpated from the Verdigris River in Oklahoma (Mathers, 1990). Researchers at Oklahoma State University have revisited these sites in the Verdigris River in the 1990's and confirmed that the species has been extirpated from this river in Oklahoma.

**Rabbitsfoot Mussel:** The Rabbitsfoot is federally listed as a candidate species. In Oklahoma, living Rabbitsfoot mussels are found within the Illinois and Verdigris River in the northeastern portion of the state, as well as in the Little, Glover, and Mountain Fork Rivers in the southeastern portion of the state. Rabbitsfoot mussels exhibit seasonal movement, migrating toward shallower water during brooding periods (Fobian, 2007). Threats to the species are primarily reduction of habitat due to impoundment, sedimentation, agricultural pollutants, and lead and zinc mining. There is no critical habitat designated for the Rabbitsfoot in Rogers County.

**Findings of Survey Results for Rabbitsfoot Mussel**: Surveys for the presence of the Rabbitsfoot mussel were conducted by Vaughn (1998) and Oklahoma Department of Wildlife Conservation (2006-2009). This species was previously thought to be extirpated from the Verdigris River. However, recent surveys found the lower Verdigris River (below Lake Oologah) supported the densest assemblages of the Rabbitsfoot mussel in Oklahoma, Missouri, and Kansas (ODWC, 2009).

**Arkansas Darter**: The Arkansas Darter is federally listed as a candidate species. It occurs in the Arkansas River drainage from Arkansas to Colorado; numerous viable populations exist, but recent declines have occurred and many populations are threatened by continuing loss of habitat, especially through dewatering. Historically, this fish was never very common. Preferred habitat includes spring-fed creeks with cool, clear water with herbaceous aquatic vegetation, or pools with sand, fine gravel, or organic detritus substrate. Surveys in 1994-1997 in south-central Kansas and adjacent Oklahoma recorded this species from 67 of the 108 localities that were sampled within the general historical range of the species (Eberle and Stark, 2000).

**Findings of Survey Results for Arkansas Darter:** The study area does not contain spring-fed creeks with cool clear water, aquatic herbaceous vegetation, and gravel bottoms, as required by the Arkansas Darter. Suitable habitat for the Arkansas Darter was not observed to be present on or in the immediate vicinity of the study area.

**Bald Eagle:** The Bald Eagle is a large predatory bird that occupies large trees along major rivers and streams during their winter distribution (December through March) in Oklahoma. In August 2007, the Bald Eagle was delisted by the USFWS from the Federal List of Endangered and Threatened Wildlife (USFWS, 2007). Since delisting, the Bald Eagle continues to be protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (USFWS, 1940). Bald Eagles nest in tall trees usually within one or two miles of large rivers, streams and lakes where fish are abundant. Although nesting eagles are concentrated in eastern Oklahoma, their nesting range appears to be expanding.

**Findings of Survey Results for Bald Eagle:** There are two perennial streams (Bird Creek and the Verdigris) with tall trees within the study area. Based on information from the G.M. Sutton Avian Research Center, the closest occupied Bald Eagle nest is located approximately four miles northeast of the study area along the Verdigris River (GMSARC, 2011). No Bald Eagle nests were observed within or adjacent to the study area. Suitable nesting, roosting, and foraging habitat for the Bald Eagle was observed in the study area. While suitable nesting, roosting, and foraging habitat is present within the study areas, disturbance would only be associated with temporary construction activities.

## 6.2 POTENTIALLY JURSIDICTIONAL WATERBODIES

Based on Kleinfelder's assessment, specific locations within the study area met the technical criteria for jurisdictional wetlands. Following the U.S. Supreme Court's decision in Rapanos v. United States and Carabell v. United States (2006), new technical standards have been implemented for determining the limit of Waters. The new technical standards have: 1) rejected the argument that the term "waters of the United States" is limited to only those waters that are navigable in the traditional sense and their abutting wetlands, and 2) asserted that regulatory authority should extend only to "relatively permanent, standing or continuously flowing bodies of water" connected to traditional navigable waters, and to "wetlands with a continuous surface connection to" such relatively permanent waters (USACE, 2007).

The study area contains nine (9) potentially jurisdictional waterbodies. One (1) mapped, blue-line, named perennial stream (Bird Creek), two (2) emergent wetlands, one (1) forested wetland, and five (5) ephemeral streams were observed during field investigations within the study area (Figure 8). Wetland delineation data forms for the wetland features and their adjacent upland features are located in Appendix C. A summary of all Waters within the study area is shown in Table 5.

**Table 5: Potentially Jurisdictional Waterbodies within the Study Area**

| Water-body | USGS Topo or NWI Classificati | Length /Area | Field Observa-tions | Potentially Jurisdic-tional | Cowardin Classifi-cation | OHWM / Avg. Width Observed | Comments |
|---|---|---|---|---|---|---|---|
| Stream 1 | Unmapped | 230 ft.<br>0.02 acres | Ephemeral stream | Yes | NA | 3 feet | Un-consolidated, mud bottom, vegetated banks, dry at time of survey |
| Stream 2 | Unmapped | 168 ft.<br>0.04 acres | Ephemeral stream | Yes | NA | 10 feet | Un-consolidated, vegetated banks, dry at time of survey |
| Stream 3 | Unmapped | 266 ft.<br>0.03 acres | Ephemeral stream | Yes | NA | 5 feet | Un-consolidated, mud bottom, steep, vegetated banks, dry at time of survey |
| Stream 4 | Unmapped | 87 ft.<br>0.02 acres | Ephemeral stream | Yes | NA | 10 feet | Un-consolidated, steep, vegetated banks, dry at time of survey |
| Stream 5 | Unmapped | 494 ft.<br>0.06 acres | Ephemeral stream | Yes | NA | 5 feet | Slow flow, un-consolidated mud bottom, vegetated banks, average 0-3 inches deep |
| Stream 6 | Perennial, named, blue-line stream (Bird Creek) | 6697 ft.<br>9.99 acres | Perennial stream | Yes | R3UB3 | 65 feet | Un-consolidated mud bottom, vegetated banks, average 7 feet deep |
| Wetland 1 | PFO1Ah | 0.02 acres | Emergent Wetland | Yes | PEM1A | NA | Emergent wetland in depression area |
| Wetland 2 | PEM1A | 0.12 acres | Emergent Wetland | Yes | PEM1A | NA | Emergent wetland in depression area |
| Wetland 3 | PFO1A | 2.51 acres | Forested Wetland | Yes | PFO1A | NA | Forested, borders Bird Creek at western edge |
| **Approx. Totals** | | **7,942 Linear Feet / 12.81 Acres of Waters** | | | | | |

One wetland is identified on current NWI maps. Approximately **12.81 acres** of potentially jurisdictional Waters (**10.16 acres** of streams and **2.65 acres** of forested/emergent wetland were identified and are located within the study area (Figures 8).

**Stream 1** – (230 linear feet) This waterbody is not mapped on the USGS topographic maps and is located within the northeastern part of the study area. It is an ephemeral stream that flows from the east to west. This waterbody has an unconsolidated mud bottom with bare or vegetated banks. At the time of the survey, the stream was mostly dry with a few pooled areas of water that were up to six (6) inches deep. Dominant vegetation associated with this waterbody included Hackberry, American elm, Post oak and Cottonwood (Figure 8).

This intermittent stream is likely to be subject to jurisdiction of the USACE because it has direct hydrologic connection with the straightened portion of Bird Creek.

**Stream 2** – (168 linear feet) This waterbody is not mapped on the USGS topographic maps and is located within the northeastern part of the study area. It is an ephemeral stream that flows from west to east. This waterbody has an unconsolidated mud bottom with steep vegetated banks and is connected to the former channel of the Verdigris River. At the time of the survey, the stream was dry. Dominant vegetation associated with this waterbody included Hackberry, Green ash, American elm, Greenbrier, Bermuda grass and Poison ivy (Figure 8).

This intermittent stream is likely to be subject to jurisdiction of the USACE because it has direct hydrologic connection with the former channel of the Verdigris River.

**Stream 3** – (266 linear feet) This waterbody is not mapped on the USGS topographic maps and is located within the northwestern part of the study area. It is an ephemeral stream that flows from east to west. The waterbody has an unconsolidated mud bottom with steep vegetated banks and flows into Bird Creek. At the time of the survey the stream was mostly dry with small runs that were up to three (3) inches deep. Dominant vegetation associated with this waterbody included Black willow, Post oak, Boxelder, American elm, and Greenbriar (Figure 8).

This intermittent stream is likely to be subject to jurisdiction of the USACE because it has direct hydrologic connection with Bird Creek.

**Stream 4** – (87 linear feet) This waterbody is not mapped on the USGS topographic maps and is located within the west central part of the study area. It is an ephemeral stream that flows from northeast to southwest and is connected to Bird Creek. The waterbody is wide and shallow with an unconsolidated mud bottom with vegetated banks. At the time of the survey, the stream was mostly dry. Dominant vegetation associated with this waterbody included Plum, Hackberry, Post oak, American elm and Buckbrush (Figure 8).

This intermittent stream is likely to be subject to jurisdiction of the USACE because it has direct hydrologic connection with Bird Creek.

**Stream 5** – (494 linear feet) This waterbody is not mapped on the USGS topographic maps and is located within the west central part of the study area. It is an ephemeral stream that flows from northeast to southwest into Bird Creek. This waterbody has an unconsolidated mud bottom with vegetated banks. At the time of the survey, the stream was slowly flowing with up to 3 inches of water. Dominant vegetation associated with this waterbody included Hackberry, American elm, Pecan, Post oak, Hackberry and Plum (Figure 8).

This intermittent stream is likely to be subject to jurisdiction of the USACE because it has direct hydrologic connection with Bird Creek.

**Stream 6** – (6,697 linear feet) This waterbody borders the “island” on all sides. It is mapped on the USGS topographic maps as a blue-lined, perennial stream and includes portions of Bird Creek, the straightened portion of Bird Creek and the former channel of the Verdigris River. This waterbody has an unconsolidated mud bottom. At the time of the survey, the stream had moderate flow, was approximately 65 feet wide and approximately 7 feet deep. Dominant vegetation associated with this waterbody included Hackberry, Honey locust, American elm, Pecan, Post oak, Black Willow, and Cottonwood (Figure 8).

This perennial stream is likely to be subject to USACE jurisdiction because it has direct hydrologic connection with the Verdigris River.

**Wetland 1** – (0.02 acres) Wetland 1 is located within the northwestern portion of the study area. Based on attributes seen during the field investigation, the wetland is classified as a PEM1A (palustrine, emergent, temporarily flooded) wetland (Cowardin, 1979). Wetland 1 is not mapped on the NWI map. The plant community was dominated by hydrophytic species that included Black willow, Hackberry, Cottonwood and Giant goldenrod. Hydrologic indicators consisted of drift deposits, surface water and saturated soil beginning at zero inches. However, this wetland does not have a connection to navigable water. From 0-16 inches, the soil matrix was 10YR 3/2 with redox features of 7.5YR 6/6 compared to Munsell color charts and is classified as hydric. Without the required significant nexus to a navigable waterway this wetland may be considered isolated. (Figure 8).

This wetland is not likely to be subject to USACE jurisdiction because it has no significant nexus to a navigable waterway.

**Wetland 2** – (0.12 acres) Wetland 2 is located within the north-central portion of the study area. Based on attributes seen during the field investigation, the wetland is classified as a PEM1A (palustrine, emergent, temporarily flooded) wetland (Cowardin, 1979). Wetland 2 is not mapped on the NWI map. The plant community was dominated by hydrophytic species that included Hickory, Boxelder and hop sedge. Hydrologic indicators consisted of drift deposits and saturated soil beginning at zero inches. However, this wetland does not have a connection to navigable water. From 0-16 inches, the soil matrix was 10YR 2/1 when compared to Munsell color charts and is classified as hydric. Without the required significant nexus to a navigable waterway this wetland may be considered isolated (Figure 8).

This wetland is not likely to be subject to USACE jurisdiction because it has no significant nexus to a navigable waterway.

**Wetland 3 –** (2.51 acres) Wetland 3 is located in the eastern part of the study area along the former channel of the Verdigris River. Based on attributes seen during the field investigation, the wetland is classified as PFO1A (palustrine, forested, broad-leaved deciduous, temporarily flooded) wetland (Cowardin, 1979). Wetland 3 is mapped on the NWI map. The plant community is dominated by hydrophytic species that included Black willow, Boxelder, and American sycamore. Hydrologic indicators consisted of drift deposits and saturated soil beginning at zero inches. From 0-3 inches the soil matrix color was 10YR 3/4 with redox features of 10YR 2/1 and 10YR 4/4 when compared to Munsell color charts, and is classified as hydric. From 3-9 inches the soil matrix color was 10YR 5/4 with redox features of 10YR 3/2 and from 9-16 inches the soil matrix color was 10YR 5/4 with redox features of 10YR 4/1, 10YR 3/1, and 2.5YR 3/4 when compared to Munsell color charts, and is classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 8).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (former channel of the Verdigris River).

## 6.3 HISTORIC WETLANDS

The approximate extent of historic wetlands was based on the review of NRCS historic aerial photographs, NRCS Web Soil Survey data, Oklahoma counties hydric soils list, Google Earth Pro, NWI maps, USGS Topographic maps, and the presence of hydric soils over portions of the study area. A key feature in determining the approximate extent of the historic wetlands was the 1971 NRCS aerial photograph (Appendix B). All the above factors were used to determine that large portions of the study area could have been historically classified as either forested or emergent wetlands (Figure 9). The channelization of Bird Creek minimizes the portions of the site that are currently subject to routine flooding, as does the drop of the bed level of Bird Creek.

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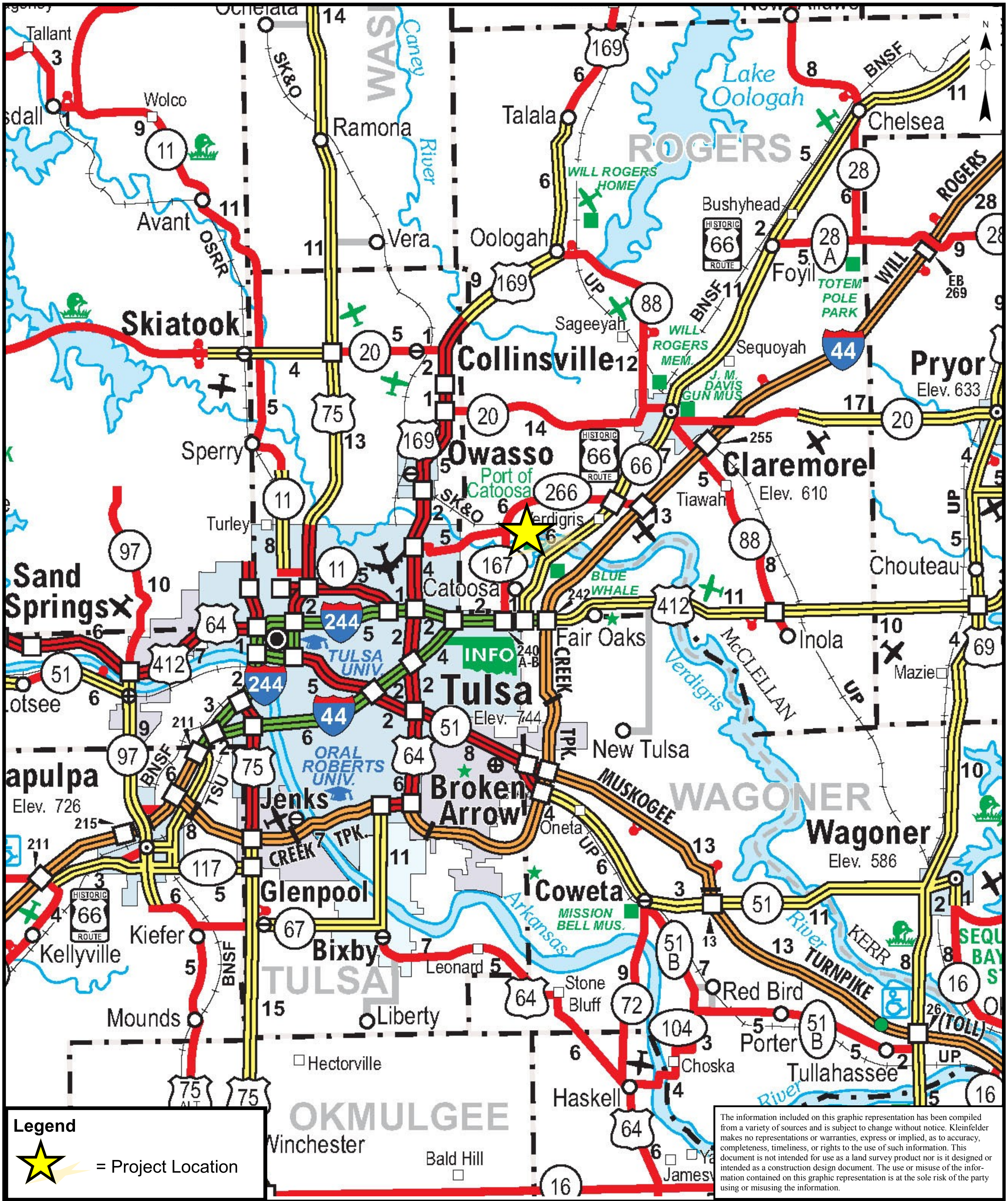
# FIGURES



**Legend**

★ = Project Location

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| CHECKED BY: | BHN |
| SOURCE: | ODOT |

**General Vicinity Map**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE

1

Legend

🟥 = Study Area

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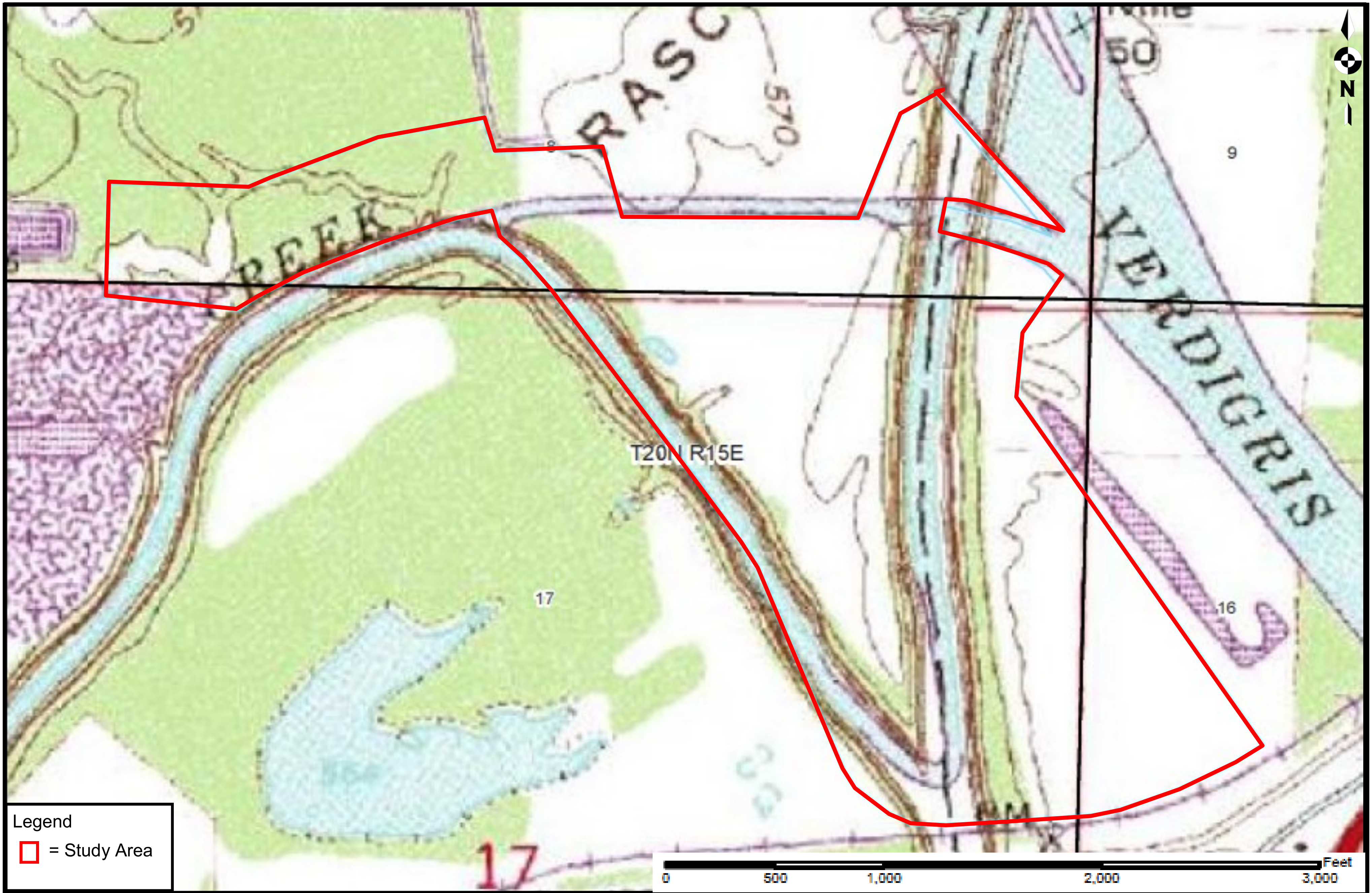
**Aerial Photography Map**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE

2



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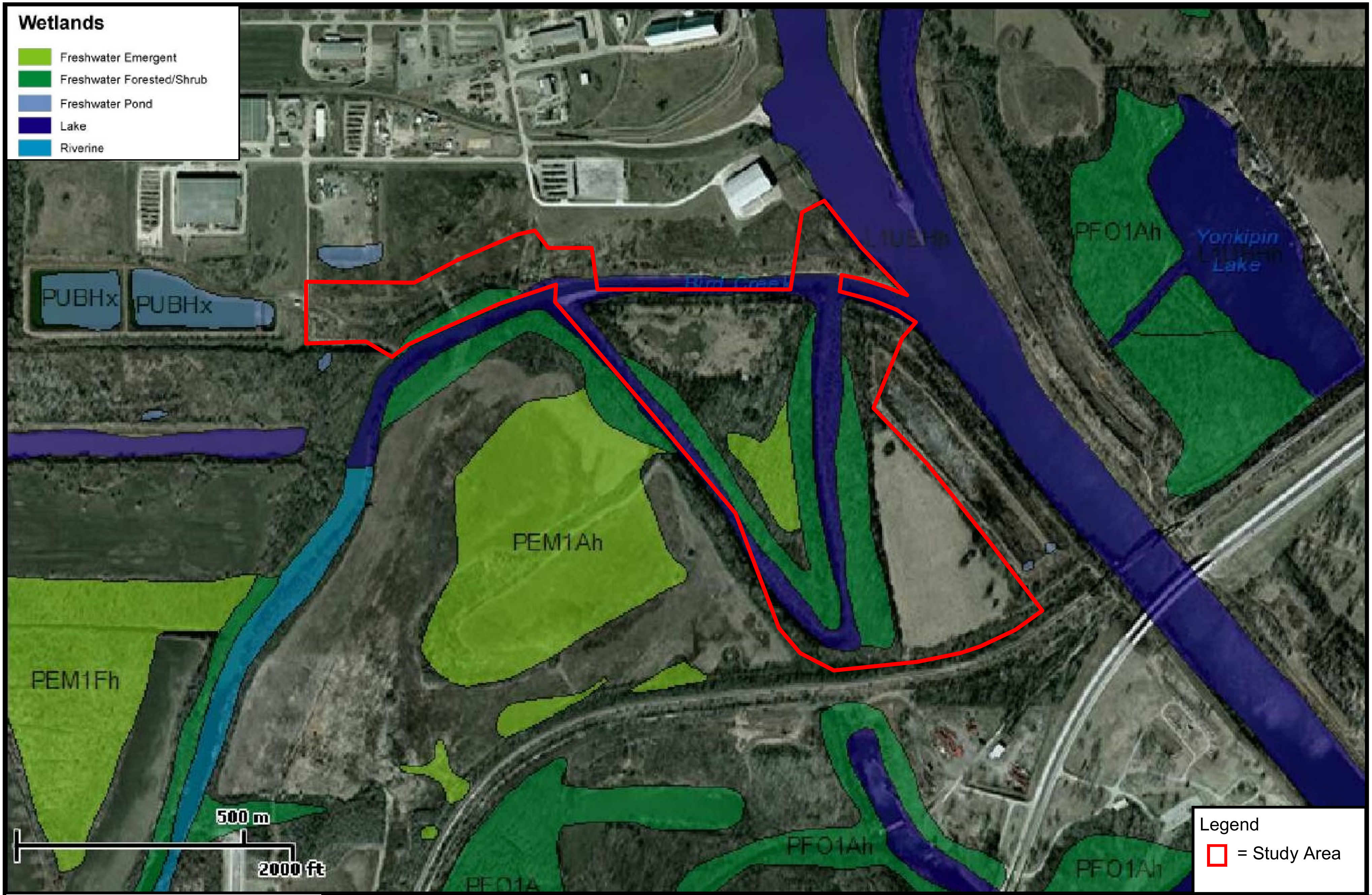
**USGS Topographic Map**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE

**3**



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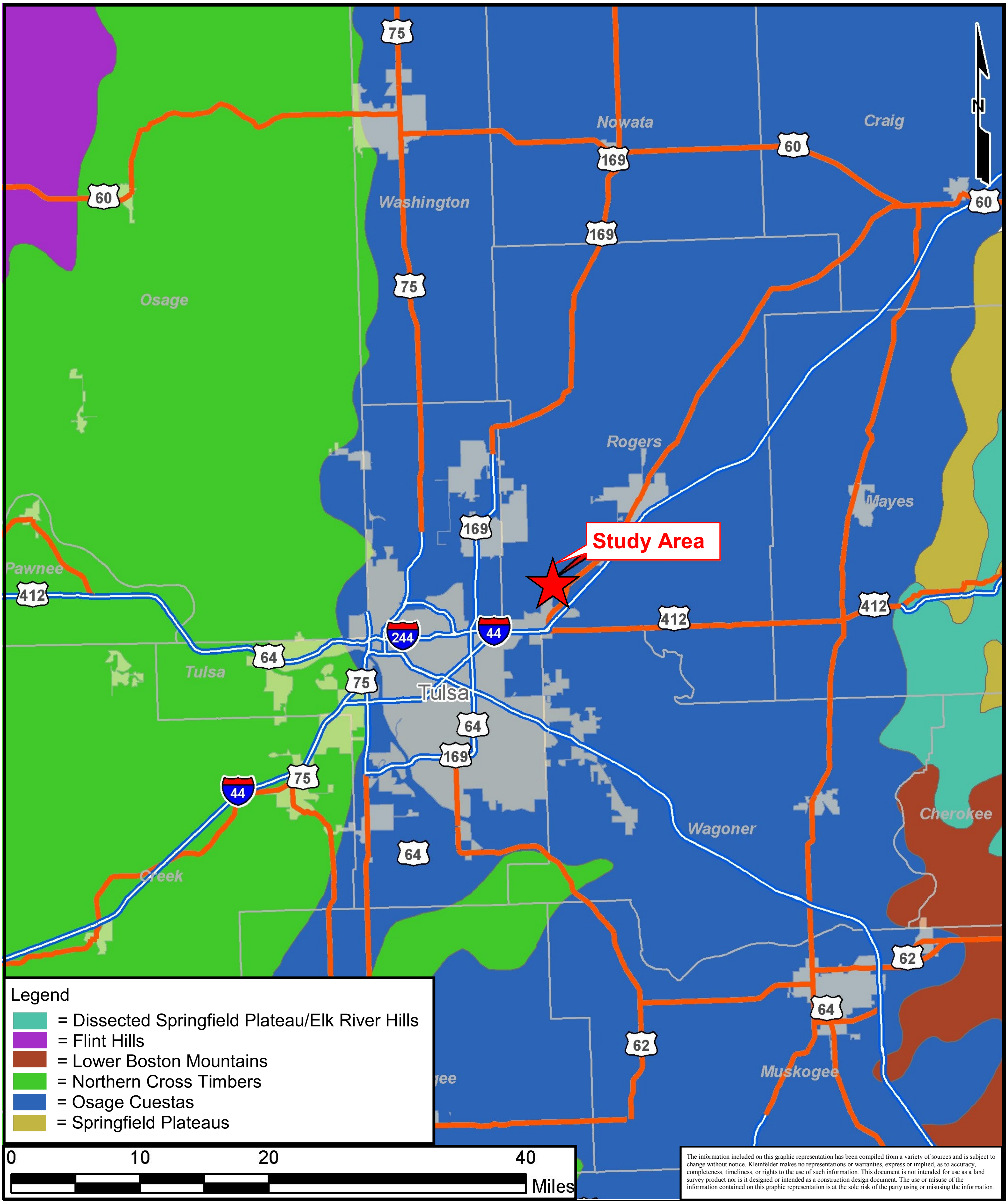
| CHECKED BY: | BHN |
| SOURCE: | USFWS National Wetland Inventory |

## National Wetlands Inventory Map

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
4



Legend
- 🟦 = Dissected Springfield Plateau/Elk River Hills
- 🟪 = Flint Hills
- 🟫 = Lower Boston Mountains
- 🟩 = Northern Cross Timbers
- 🟦 = Osage Cuestas
- 🟨 = Springfield Plateaus

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DRAWN: Jan 2012
DRAWN BY: PAR
CHECKED BY: BHN
SOURCE: EPA

**Level IV Ecoregion Map**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
5

## MAP LEGEND

**Soil Ratings**

🟩 Partially Hydric

🟦 Not Hydric

| Map unit symbol | Map unit name | Rating |
|---|---|---|
| BarG | Barge silty clay loam, 0 to 30 percent slopes | Not Hydric |
| Vd | Verdigris silt loam, 0 to 1 percent slopes, occasionally flooded | Partially Hydric |
| Ve | Verdigris clay loam, 0 to 1 percent slopes, occasionally flooded | Partially Hydric |
| Vf | Verdigris silty clay loam, 0 to 2 percent slopes, frequently flooded | Not Hydric |

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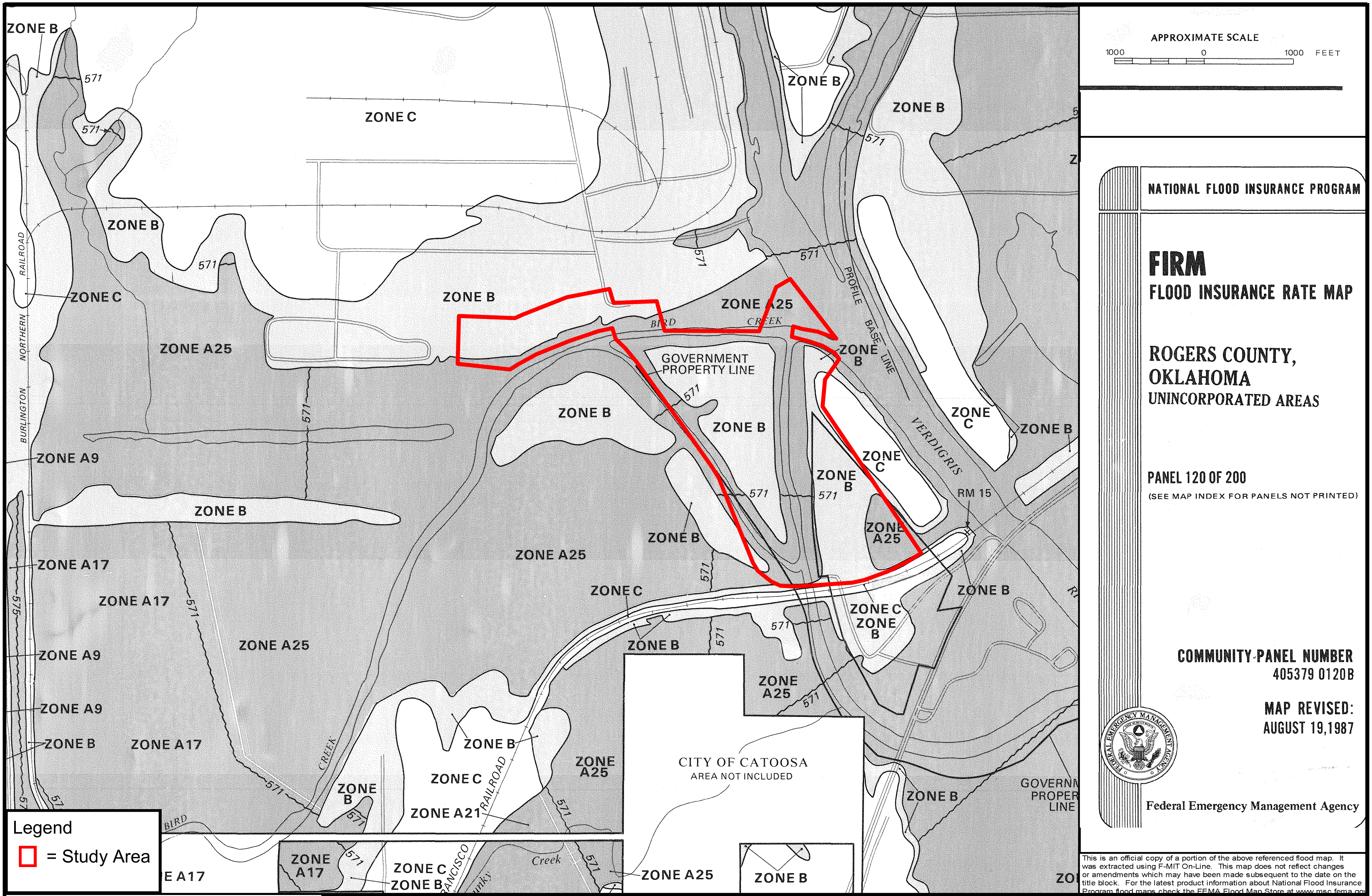
| DRAWN BY: | PAR |
| CHECKED BY: | BHN |
| SOURCE: | NRCS |

**NRCS Soils Map**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE

**6**



Legend

🟥 = Study Area

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

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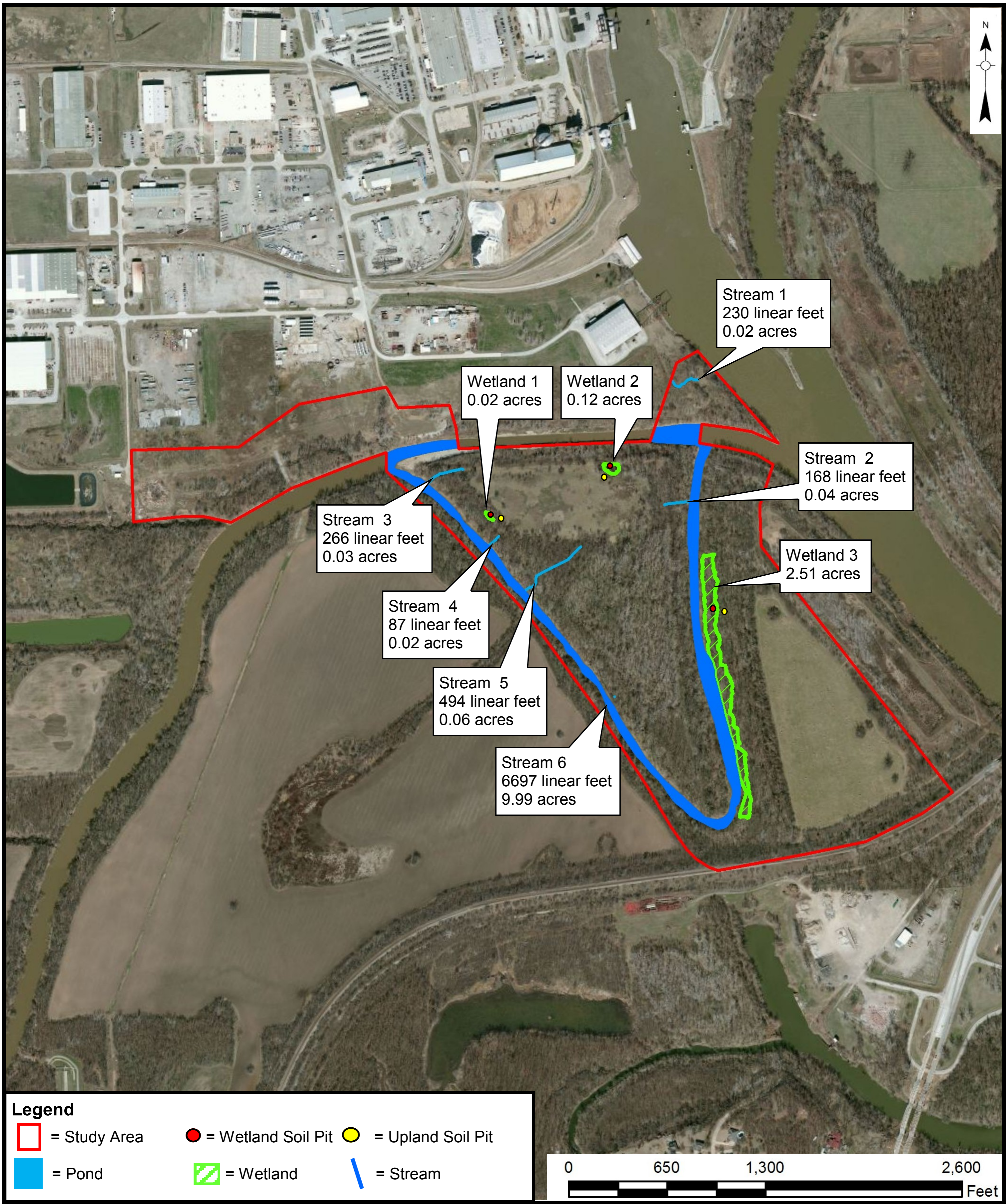
| DRAWN BY: | PAR |
| CHECKED BY: | BHN |
| SOURCE: | FEMA |

## FEMA Flood Insurance Rate Map

Tulsa Port of Catoosa
Rogers County, OK

FIGURE

7



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**Potentially Jurisdictional Waters**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE

**8**

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# Historic Wetland Map
March 1995 Aerial Photo

Tulsa Port of Catoosa
Rogers County, OK

FIGURE

9

# APPENDIX A
# PHOTOGRAPHIC RECORD

**Photo 1** – *View west; Perennial (Bird Creek), Stream 6.*

**Photo 2** – *View east; Perennial (Bird Creek), Stream 6.*

**Photo 3** – View west; Ephemeral, Stream 2*.*

**Photo 4** – *View east, Open area of fill on island.*

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Project Number: 114800
Photos Taken December 2010

Tulsa Port of Catoosa
Rogers County, Oklahoma

**Site Photographs**

**Appendix A**


11/29/2011


11/29/2011

**Photo 5** – *View west; Open area of fill on the island.*

**Photo 6** – *View northwest; Wetland 2.*


11/29/2011


11/29/2011

**Photo 7** – *View west, Upland 2.*

**Photo 8** – *View upstream; Ephemeral, Stream 3.*

**Photo 9** – *View north: Wetland 1.*

**Photo 10** – *View south; Wetland 3.*

**Photo 11** – View north; Wetland 3.

**Photo 12** – *View east, Ephemeral, Stream 4.*

**Photo 13** – *View west; Ephemeral, Stream 5.*

**Photo 14** – *View west: Ephemeral, Stream 1.*

# APPENDIX B
# HISTORIC AERIAL PHOTOGRAPHS

KLEINFELDER
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www.kleinfelder.com

| | |
|---|---|
| PROJECT NO. | 114800 |
| DRAWN: | Jan 2012 |
| DRAWN BY: | PAR |
| CHECKED BY: | BHN |
| SOURCE: | USDA NRCS |

# 1958 Historic Aerial Photography

Tulsa Port of Catoosa
Rogers County, OK

N

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| | |
|---|---|
| PROJECT NO. | 114800 |
| DRAWN: | Jan 2012 |
| DRAWN BY: | PAR |
| CHECKED BY: | BHN |
| SOURCE: | USDA NRCS |

**1972 Historic Aerial Photography**

Tulsa Port of Catoosa
Rogers County, OK

N

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| | |
|---|---|
| PROJECT NO. | 114800 |
| DRAWN: | Jan 2012 |
| DRAWN BY: | PAR |
| CHECKED BY: | BHN |
| SOURCE: | USDA NRCS |

# 1991 Historic Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

N

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| | |
|---|---|
| PROJECT NO. | 114800 |
| DRAWN: | Jan 2012 |
| DRAWN BY: | PAR |
| CHECKED BY: | BHN |
| SOURCE: | Google Earth Pro |

# 1995 Historic Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

N

## 2002 Historic Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

| | |
|---|---|
| PROJECT NO. | 114800 |
| DRAWN: | Jan 2012 |
| DRAWN BY: | PAR |
| CHECKED BY: | BHN |
| SOURCE: | Google Earth Pro |

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PROJECT NO. 114800
DRAWN: Jan 2012
DRAWN BY: PAR
CHECKED BY: BHN
SOURCE: Google Earth Pro

## 2008 Historic Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

N

# APPENDIX C
# WETLAND DELINEATION FORMS

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Sampling Date: 11/29/11

Applicant/Owner: Port of Catoosa State: OK Sampling Point: Wetland 1

Investigator(s): J. Caskey P Ready Section, Township, Range: —

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave

Slope (%): 3% Lat: — Long: — Datum: —

Soil Map Unit Name: — NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____

Hydric Soil Present? Yes ✓ No ____

Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ____ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Ulnus americana | 10 | | FAC |
| 2. ulnus alata | 10 | | FACU |
| 3. Acer negundo | 20 | Y | FACW |
| 4. | | | |
| 5. | | | |
| | 40 | = Total Cover | |
| **Sapling/Shrub Stratum** (Plot size: ____ ) | | | |
| 1. carya illinoinenis | 10 | | FAC+ |
| 2. Acernegungo | 10 | | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 20 | = Total Cover | |
| **Herb Stratum** (Plot size: ____ ) | | | |
| 1. Polygonum pennsylanicum | 10 | | FACW- |
| 2. juncus sp. | 20 | Y | FACW |
| 3. Chasmanthyum latefolium | 10 | | FAC |
| 4. Eylmus virginicus | 10 | | FAC |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | 50 | = Total Cover | |
| **Woody Vine Stratum** (Plot size: ____ ) | | | |
| 1. Smilax | 5 | | — |
| 2. bona nox | 5 | | — |
| | 120 | = Total Cover | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 60 | x 2 = 120 |
| FAC species | 40 | x 3 = 120 |
| FACU species | 10 | x 4 = 40 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 110 (A) | 280 (B) |

Prevalence Index = B/A = 2.5

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

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

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: wetland 1

**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 % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-16 | 10 YR 3/2 | 100 | | | | | silt loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ 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: none

Depth (inches): ___

**Hydric Soil Present?** Yes X No ___

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes X No ___ Depth (inches): 0 inches

Water Table Present? Yes X No ___ Depth (inches): 0 inches

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0 inches

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

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

Remarks:

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Portof Catoosa City/County: Rogers Sampling Date: 11/29/11
Applicant/Owner: Port of Catoosa State: OK Sampling Point: Wetland 2
Investigator(s): J. Caskey, P. Roady Section, Township, Range: —
Landform (hillslope, terrace, etc.): depression/hill toeslope Local relief (concave, convex, none): concave
Slope (%): 3% Lat: — Long: — Datum: —
Soil Map Unit Name: — NWI classification: PEM
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ______ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ______
Hydric Soil Present? Yes X No ______
Wetland Hydrology Present? Yes X No ______

Is the Sampled Area within a Wetland? Yes X No ______

Remarks:

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Salix nigra | 10 | N | FACW |
| 2. Ulmus americana | 20 | yes | FAC |
| 3. Acer saccharum | 20 | N | FAC |
| 4. Acer negunda | 20 | N | FACW |
| 5. | | | |
| | 55 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. Acer negunda | 5 | | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 5 = Total Cover | | |
| **Herb Stratum** (Plot size: ______) | | | |
| 1. Symphorocarpos orbiculatus | 10 | | FACU |
| 2. polygonum pennsylvanicum | 30 | Y | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | 40 = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. Smilax sp | 10 | N | — |
| 2. | | | |
| | 110 = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 65 | x 2 = 130 |
| FAC species | 40 | x 3 = 120 |
| FACU species | 10 | x 4 = 40 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 115 (A) | 290 (B) |

Prevalence Index = B/A = 2.5

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

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

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: wetland2

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

| Depth (inches) | Matrix |  | Redox Features |  |  |  | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
|  | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] |  |  |
| 0-16 | 10YR 3/2 | 80 | 25YR3/4 | 20 | C | PL | sandy loam |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

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

**Hydric Soil Indicators:**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ 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: none

Depth (inches): ______

**Hydric Soil Present?** Yes X No ______

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☑ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ 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)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ______ No ______ Depth (inches): ______

Water Table Present? Yes ______ No ______ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______

**Wetland Hydrology Present?** Yes ✓ No ______

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

Remarks:

Wet 3

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: POC East City/County: Rogers Co Sampling Date: 12/8
Applicant/Owner: POC State: ____ Sampling Point: ~~East 2~~ wet 3
Investigator(s): KAS, JC Section, Township, Range: 17, T20N R15E
Landform (hillslope, terrace, etc.): ____ Local relief (concave, convex, none): concave
Slope (%): 0-3 Lat: ____ Long: ____ Datum: NAD83
Soil Map Unit Name: VF Verdigris silty clay loam NWI classification: PFO1A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks:
Behind on annual rainfall

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ____) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Salix nigra | 30 | | FACW |
| 2. Platanus occidentalis | 20 | | FAC |
| 3. Acer saccharum | 5 | | FAC |
| 4. Acer negundo | 25 | | FACW |
| 5. Ulmus american | 3 | | FAC |
| | 83 = Total Cover | | |

| Sapling/Shrub Stratum (Plot size: ____) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Acer negundo | 5 | | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 5 = Total Cover | | |

| Herb Stratum (Plot size: ____) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Chasmanthium latafolium | 40 | | Fac |
| 2. Chasmathium sp. | 15 | | FAC |
| 3. Elymus virginicus | 5 | | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | 60 = Total Cover | | |

| Woody Vine Stratum (Plot size: ____) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| | = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 55 | x 2 = 110 |
| FAC species | 88 | x 3 = 264 |
| FACU species | 0 | x 4 = 0 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 143 (A) | 374 (B) |

Prevalence Index = B/A = 26

**Hydrophytic Vegetation Indicators:**

✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: wetland 3

**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 % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-3 | 10YR 3/4 | 65 | 10YR 2/1 | 1 | | M | loamy Sand | |
| | | | 10YR 4/4 | 34 | | M | | |
| 3-9 | 10YR 5/4 | 80 | 10YR 3/2 | 20 | | M | | |
| 9-16 | 10YR 5/4 | 93 | 2.5YR 3/4 | 2 | | PL | | organic material |
| | | | 10YR 4/1 | 4 | | M | | |
| | | | 10YR 3/1 | 1 | | M | | |
| | | | | | | | | |

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
✓ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ 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 ______

Remarks:

dark organic layer at bottom of sample

## 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)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ 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)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ______ No ______ Depth (inches): ______
Water Table Present? Yes ______ No ______ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______

**Wetland Hydrology Present?** Yes ✓ No ______

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

Remarks:

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Co Sampling Date: 12/8
Applicant/Owner: POC/ Dewberry State: OK Sampling Point: UPL east #3
Investigator(s): J Caskey K. Shadmon Section, Township, Range: Sec 17 T20N R15E
Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______
Slope (%): ______ Lat: ______ Long: ______ Datum: ______
Soil Map Unit Name: ______ NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ______ No ✓
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No ✓
Hydric Soil Present? Yes ______ No ✓
Wetland Hydrology Present? Yes ______ No ✓

Is the Sampled Area within a Wetland? Yes ______ No ✓

Remarks:
ag field

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| **Herb Stratum** (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| | = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)
Total Number of Dominant Species Across All Strata: ______ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ______ (A/B)

**Prevalence Index worksheet:**

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

Prevalence Index = B/A = ______

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ______ No ______

Remarks: (Include photo numbers here or on a separate sheet.)
plowed ag field

Wetland 1
(W1)

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Catoosa Sampling Date: 11/30/11
Applicant/Owner: State: OK Sampling Point: Wetland 1 (W1)
Investigator(s): J. Caskey, P. Ready Section, Township, Range: —
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave
Slope (%): 3% Lat: — Long: — Datum: —
Soil Map Unit Name: — NWI classification: —
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ● No ○ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? yes Are "Normal Circumstances" present? Yes ○ No ●
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ● No ○
Hydric Soil Present? Yes ● No ○
Wetland Hydrology Present? Yes ● No ○

Is the Sampled Area within a Wetland? Yes ● No ○

Remarks:

### VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| **Tree Stratum** (Plot size: ) | | | |
| 1. Black willow, Salix nigra | 15 | yes | FACW |
| 2. Cottonwood, populus deltoides | 2 | no | FAC |
| 3. Hackberry, Celtis occidentalis | 2 | no | FAC |
| 4. | | | |
| 5. | | | |
| | 0 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 0 = Total Cover | | |
| **Herb Stratum** (Plot size: ) | | | |
| 1. poison ivy, toxicodendron radicans | 20 | yes | FAC |
| 2. solidego gigantea | 20 | yes | FAC |
| 3. green briar, smilax spp. | 10 | no | — |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | 0 = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. green Tox Rad | 10 | no | FAC |
| 2. Vitis sp. | 1 | no | FAC |
| | 0 = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 15 | x 2 = 30 |
| FAC species | 61 | x 3 = 183 |
| FACU species | 0 | x 4 = 0 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 0 76 (A) | 213 (B) |

Prevalence Index = B/A = 2.8

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ● No ○

Remarks: (Include photo numbers here or on a separate sheet.)
Upland point – veg cedar, solidego, burmuda grass, guarda
on slope of fill pad, Soil homog. [illegible] brown

## SOIL

Sampling Point: W1

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

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16 | 10YR 3/2 | 75 | 7.5YR 4/6 | 25 | C | M | Silty loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

**Hydric Soil Indicators:**

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☒ Stratified Layers (A5)
☐ 2 cm Muck (A10)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ 5 cm Mucky Peat or Peat (S3)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

☐ Coast Prairie Redox (A16)
☐ Dark Surface (S7)
☐ Iron-Manganese Masses (F12)
☐ 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: none
Depth (inches): ____

**Hydric Soil Present?** Yes ● No ○

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)
☐ Water-Stained Leaves (B9)
☐ Aquatic Fauna (B13)
☐ True Aquatic Plants (B14)
☐ 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)
☐ Gauge or Well Data (D9)
☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

☐ Surface Soil Cracks (B6)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows (C8)
☒ Saturation Visible on Aerial Imagery (C9)
☒ Stunted or Stressed Plants (D1)
☒ Geomorphic Position (D2)
☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ○ No ● Depth (inches): ____
Water Table Present? Yes ○ No ● Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ○ No ● Depth (inches): ____

**Wetland Hydrology Present?** Yes ● No ○

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

Remarks:

Wetland 2
(W2)

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Catoosa Sampling Date: 11/30/11
Applicant/Owner: Port of Catoosa State: OK Sampling Point: Wetland 2 (W2)
Investigator(s): J. Caskey, P. Ready Section, Township, Range: —
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave
Slope (%): 5% Lat: — Long: — Datum: —
Soil Map Unit Name: NWI classification: —
Are climatic / hydrologic conditions on the site typical for this time of year? [✓ Yes] No ○ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes ○ [✓ No]
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? [✓ Yes] No ○
Hydric Soil Present? [✓ Yes] No ○
Wetland Hydrology Present? [✓ Yes] No ○
Is the Sampled Area within a Wetland? [✓ Yes] No ○

Remarks:

### VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| **Tree Stratum** (Plot size: ) | | | |
| 1. hickory, Carya ~~aquatica~~ 30, | 10 | | ~~OBL~~ |
| 2. Boxelder, acer negundo | 10 | yes | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 0 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ) | | | |
| 1. Boxelder, acernegundo | 10 | | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 0 = Total Cover | | |
| **Herb Stratum** (Plot size: ) | | | |
| 1. Soleacdo gigantea | 10 | | FAC |
| 2. Carex Lupalina | 30 | yes | OBL |
| 3. chickweed, Stallaria media | 30 | yes | FACU |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | 0 = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| | 0 = Total Cover | | |

**Dominance Test worksheet:**
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 20 | x 1 = 20 |
| FACW species | 20 | x 2 = 40 |
| FAC species | 10 | x 3 = 30 |
| FACU species | 30 | x 4 = 120 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 0 80 (A) | 210 (B) |

Prevalence Index = B/A = 2.6

**Hydrophytic Vegetation Indicators:**
- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? [✓ Yes] No ○

Remarks: (Include photo numbers here or on a separate sheet.)
upland 2 – oak, maple fron on apple, sali dego, grape
poison ivy burmuda grass

## SOIL

Sampling Point: ____________

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

| Depth (inches) | Matrix |  | Redox Features |  |  |  | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
|  | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] |  |  |
| 0-16 | 10.5 YR 2/1 | 100 |  |  |  |  | clay loam |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

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

**Hydric Soil Indicators:**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☒ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☒ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ 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: none

Depth (inches): —

**Hydric Soil Present?** Yes ☒ No ○

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☒ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ 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)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ☒ No ○ Depth (inches): 6 inches

Water Table Present? Yes ☒ No ○ Depth (inches): 10 inches

Saturation Present? (includes capillary fringe) Yes ☒ No ○ Depth (inches): 0

**Wetland Hydrology Present?** Yes ☒ No ○

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

Remarks:

Wetland3

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Catoosa Sampling Date: Wetland3

Applicant/Owner: Port of Catoosa State: OK Sampling Point: 11/30/11

Investigator(s): J. Caskey P. Roady Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): concave

Slope (%): 3% Lat: — Long: — Datum: —

Soil Map Unit Name: — NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? [✓ Yes] No (If no, explain in Remarks.)

Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes [✓ No]

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.) near road side

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? [✓ Yes] No

Hydric Soil Present? [✓ Yes] No

Wetland Hydrology Present? [✓ Yes] No

Is the Sampled Area within a Wetland? [✓ Yes] No

Remarks:

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. silver maple Acersaccharinum | 10 | yes | FAC |
| 2. black willow) , Salix nigra | 20 | yes | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 0 | = Total Cover | |

| Sapling/Shrub Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. maple, Acer saccharinum | 10 | yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 0 | = Total Cover | |

| Herb Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. na | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | 0 | = Total Cover | |

| Woody Vine Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. grape vitis sp | 5 | no | FAC |
| 2. green briar smilax sp | 8 | no | — |
| | 0 | = Total Cover | |

Remarks: (Include photo numbers here or on a separate sheet.)

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 20 | x 2 = 40 |
| FAC species | 25 | x 3 = 75 |
| FACU species | 0 | x 4 = 0 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 0 45 (A) | 115 (B) |

Prevalence Index = B/A = 2.6

**Hydrophytic Vegetation Indicators:**

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? [✓ Yes] No

## SOIL

Sampling Point: ____________

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

| Depth (inches) | Matrix |  | Redox Features |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
|  | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16 | 10.5 YR3/1 | 90% | 5YR 4/6 | 10 | C | M | silty loam |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
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[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ 5 cm Mucky Peat or Peat (S3)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

☐ Coast Prairie Redox (A16)
☐ Dark Surface (S7)
☐ Iron-Manganese Masses (F12)
☐ 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: none

Depth (inches): ____________

**Hydric Soil Present?** Yes [✓] No

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

☒ Surface Water (A1)
☐ High Water Table (A2)
☒ Saturation (A3)
☒ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)
☒ Water-Stained Leaves (B9)
☐ Aquatic Fauna (B13)
☐ True Aquatic Plants (B14)
☐ 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)
☐ Gauge or Well Data (D9)
☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

☐ Surface Soil Cracks (B6)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Stunted or Stressed Plants (D1)
☒ Geomorphic Position (D2)
☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes [✓] No Depth (inches): 12"
Water Table Present? Yes [✓] No Depth (inches): 10"
Saturation Present? (includes capillary fringe) Yes [✓] No Depth (inches): 0

**Wetland Hydrology Present?** Yes [✓] No

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

Remarks:

## STREAM CHARACTERIZATION

**GPS ID:** E1

**Date:** 11/30/11

**County:** *SW* *MD* BV HA WD MJ BL LO KF OK LI PO

**Investigators:** T. Caskey P. Riddey

**Circle Waterbody/Stream Type:** [✓ EPHEMERAL*] INTERMITTENT PERENNIAL

**Approximate depth of running water*:** ☒ N/A

**Approximate OHWM:** nA

**Approximate width of stream: (from top of bank to top of bank)** 6 ft

**Approximate height of banks (channel depth)*:** left 6 ft right 6 ft

**Approximate depth of pool(s):** ✓ N/A

**Stream Forms Present**

Pool(s) none

Run(s) none

Riffles(s) none

**Stream Bottom**

| | None | <50% | >50% |
|---|---|---|---|
| silt | | ✓ | |
| clay | | ✓ | |
| mud | | X | |
| sand | | ✓ | |
| gravel | ✓ | | |
| cobbles | X | | |
| boulders | ✓ | | |
| bedrock | ✓ | | |

**Dominant Plants Adjacent to Stream*** *(scientific names)*

**Trees:**
Hackberry
oak
cottonwood

**Shrubs/Vines:**
poison ivy
greenbriar

**Herbaceous:**
fish on a pole
burmuda grass

**Description that best fits the stream bank***

| left | | right |
|---|---|---|
| X | vertical/undercut | X |
| | steeply sloped (>30%) | |
| | gradual/no slope (<30%) | |

**Description that best fits the stream channel**

| | | | |
|---|---|---|---|
| | narrow, deep | wide, deep | ✓ |
| | narrow, shallow | wide, shallow | |

**Pick the category that best describes the extent to which vegetation shades the stream within ROW:**

| | | | | | |
|---|---|---|---|---|---|
| | 0% | ✓ | 50% | | 100% |
| | 25% | | 75% | | other |

**Comments** Connected to old bird creek

## STREAM CHARACTERIZATION

**GPS ID:** E2

**Date:** 11/30/11

**County:** *SW* *MD* BV HA WD MJ BL LO KF OK LI PO

**Investigators:** J. Caskey, P. Ready

**Circle Waterbody/Stream Type:** [✓ EPHEMERAL*] INTERMITTENT PERENNIAL

**Approximate depth of running water*:** ☒ N/A

**Approximate OHWM:** nA

**Approximate width of stream: (from top of bank to top of bank)** 3 ft

**Approximate height of banks (channel depth)*:** left 2 ft right 2 ft

**Approximate depth of pool(s):** ☒ N/A

**Stream Forms Present**

Pool(s) none

Run(s) none

Riffles(s) none

**Stream Bottom**

| | None | <50% | >50% |
|---|---|---|---|
| silt | | X | |
| clay | | X | |
| mud | | X | |
| sand | | X | |
| gravel | X | | |
| cobbles | ✓ | | |
| boulders | X | | |
| bedrock | X | | |

**Dominant Plants Adjacent to Stream*** *(scientific names)*

**Trees:** Hackberry

oak

**Shrubs/Vines:** green briar

**Herbaceous:** fish onapple

burmuda gras

**Description that best fits the stream bank***

| left | | right |
|---|---|---|
| ☐ | vertical/undercut | ☐ |
| ✓ | steeply sloped (>30%) | X |
| ☐ | gradual/no slope (<30%) | |

**Description that best fits the stream channel**

| | | | |
|---|---|---|---|
| ☐ | narrow, deep | wide, deep | X |
| ☐ | narrow, shallow | wide, shallow | ☐ |

**Pick the category that best describes the extent to which vegetation shades the stream within ROW:**

| | | | | | |
|---|---|---|---|---|---|
| ☐ | 0% | ✓ | 50% | ☐ | 100% |
| ☐ | 25% | ☐ | 75% | ☐ | other |

**Comments**

connected to old bird creek

## STREAM CHARACTERIZATION

**GPS ID:** E3

**Date:** 11/30/11

**County:** *SW* *MD* BV HA WD MJ
BL LO KF OK LI PO

**Investigators:** J. Caskey - P. Ready

**Circle Waterbody/Stream Type:** [✓ **EPHEMERAL***] **INTERMITTENT** **PERENNIAL**

**Approximate depth of running water*:** ☒ N/A

**Approximate OHWM:** N/A

**Approximate width of stream: (from top of bank to top of bank)** 10 ft

**Approximate height of banks (channel depth)*:**
left 10 ft
right 10 ft

**Approximate depth of pool(s):** ☒ N/A

**Stream Forms Present**
Pool(s) none
Run(s) none
Riffles(s) none

**Stream Bottom**

| | None | <50% | >50% |
|---|---|---|---|
| silt | | X | |
| clay | | X | |
| mud | | X | |
| sand | | X | |
| gravel | X | | |
| cobbles | X | | |
| boulders | X | | |
| bedrock | X | | |

**Dominant Plants Adjacent to Stream*** *(scientific names)*

**Trees:**
hackberry
oak
elm
ash

**Shrubs/Vines:**
poison ivy
grape greenbriar

**Herbaceous:**
fish on a pole
bermuda grass

**Description that best fits the stream bank***

| left | | right |
|---|---|---|
| | vertical/undercut | |
| X | steeply sloped (>30%) | V |
| | gradual/no slope (<30%) | |

**Description that best fits the stream channel**

| | | | |
|---|---|---|---|
| ☐ | narrow, deep | wide, deep | X |
| ☐ | narrow, shallow | wide, shallow | ☐ |

**Pick the category that best describes the extent to which vegetation shades the stream within ROW:**

| | | | | | |
|---|---|---|---|---|---|
| ☐ | 0% | X | 50% | ☐ | 100% |
| ☐ | 25% | ☐ | 75% | ☐ | other |

**Comments**
connects to old bird creek

## STREAM CHARACTERIZATION

**GPS ID:** E4

**Date:** 11/30/11

**County:** *SW* *MD* BV HA WD MJ
BL LO KF OK LI PO

**Investigators:** T. Oashey, P. Ready

**Circle Waterbody/Stream Type:** [✓ EPHEMERAL*] INTERMITTENT PERENNIAL

**Approximate depth of running water*:** X N/A

**Approximate OHWM:** nA

**Approximate width of stream: (from top of bank to top of bank)** 15 ft

**Approximate height of banks (channel depth)*:** left 6 ft right 6 ft

**Approximate depth of pool(s):** ☐ N/A 12 inches

**Stream Forms Present**

| | |
|---|---|
| Pool(s) | X |
| Run(s) | none |
| Riffles(s) | none. |

**Stream Bottom**

| | None | <50% | >50% |
|---|---|---|---|
| silt | | ✓ | |
| clay | | X | |
| mud | | X | |
| sand | | X | |
| gravel | X | | |
| cobbles | X | | |
| boulders | X | | |
| bedrock | X | | |

**Dominant Plants Adjacent to Stream*** *(scientific names)*

**Trees:** oak
hackberry
ash

**Shrubs/Vines:** green briar

**Herbaceous:** bermuda grass
poison ivy

**Description that best fits the stream bank***

| left | | right |
|---|---|---|
| | vertical/undercut | |
| X | steeply sloped (>30%) | X |
| | gradual/no slope (<30%) | |

**Description that best fits the stream channel**

| | | | |
|---|---|---|---|
| | narrow, deep | wide, deep | X |
| | narrow, shallow | wide, shallow | |

**Pick the category that best describes the extent to which vegetation shades the stream within ROW:**

| | | | | | |
|---|---|---|---|---|---|
| | 0% | | 50% | | 100% |
| X | 25% | | 75% | | other |

**Comments**
connects to old Bird Creek

## STREAM CHARACTERIZATION

**GPS ID:** E586

**Date:** 11/30/11

**County:** *SW* *MD* BV HA WD MJ BL LO KF OK LI PO

**Investigators:** J. Caskey P Ready

**Circle Waterbody/Stream Type:** [✓ EPHEMERAL*] INTERMITTENT PERENNIAL

**Approximate depth of running water*:** ☒ N/A

**Approximate OHWM:** NA

**Approximate width of stream: (from top of bank to top of bank)** 12 ft

**Approximate height of banks (channel depth)*:** left 12 ft right 12 ft

**Approximate depth of pool(s):** ☒ N/A

**Stream Forms Present**

Pool(s) none

Run(s) none

Riffles(s) none

**Stream Bottom**

| | None | <50% | >50% |
|---|---|---|---|
| silt | | X | |
| clay | | X | |
| mud | | X | |
| sand | | X | |
| gravel | X | | |
| cobbles | X | | |
| boulders | X | | |
| bedrock | X | | |

**Dominant Plants Adjacent to Stream*** *(scientific names)*

**Trees:**
oak
hackberry

**Shrubs/Vines:**
grape poison ivy
greenbriar

**Herbaceous:**
Fichona sell
bermuda grass

**Description that best fits the stream bank***

| left | | right |
|---|---|---|
| | vertical/undercut | |
| X | steeply sloped (>30%) | X |
| | gradual/no slope (<30%) | |

**Description that best fits the stream channel**

| | | | |
|---|---|---|---|
| | narrow, deep | wide, deep | X |
| | narrow, shallow | wide, shallow | |

**Pick the category that best describes the extent to which vegetation shades the stream within ROW:**

| | | | | | |
|---|---|---|---|---|---|
| | 0% | X | 50% | | 100% |
| | 25% | | 75% | | other |

**Comments**

## STREAM CHARACTERIZATION

**GPS ID:** E 7

**Date:** 11/30/11

**County:** *SW* *MD* BV HA WD MJ
BL LO KF OK LI PO

**Investigators:** J. Parkey, P. Ready

**Circle Waterbody/Stream Type:** [✓ EPHEMERAL]* INTERMITTENT PERENNIAL

**Approximate depth of running water*:** ☐ N/A 6in

**Approximate OHWM:** na

**Approximate width of stream: (from top of bank to top of bank)** 3 ft

**Approximate height of banks (channel depth)*:** left 6ft right 6 ft

**Approximate depth of pool(s):** ☐ N/A 6 in

**Stream Forms Present**

| | |
|---|---|
| Pool(s) | X |
| Run(s) | X |
| Riffles(s) | |

**Stream Bottom**

| | None | <50% | >50% |
|---|---|---|---|
| silt | | X | |
| clay | | X | |
| mud | | X | |
| sand | | X | |
| gravel | | X | |
| cobbles | | X | |
| boulders | | X | |
| bedrock | X | | |

**Dominant Plants Adjacent to Stream*** *(scientific names)*

**Trees:**
Sycamore &
silver maple

**Shrubs/Vines:**

**Herbaceous:**
johnson grass
Solidago
Big Blue Stem
Bermuda grass

**Description that best fits the stream bank***

| left | | right |
|---|---|---|
| X | vertical/undercut | X |
| | steeply sloped (>30%) | |
| | gradual/no slope (<30%) | |

**Description that best fits the stream channel**

| | | |
|---|---|---|
| X | narrow, deep | wide, deep |
| | narrow, shallow | wide, shallow |

**Pick the category that best describes the extent to which vegetation shades the stream within ROW:**

| | | | | | |
|---|---|---|---|---|---|
| ✓ | 0% | | 50% | | 100% |
| | 25% | | 75% | | other |

**Comments**

# DELINEATION OF POTENTIALLY JURISDICTIONAL WATERBODIES REPORT, EVALUATION OF HISTORIC WETLANDS, and THREATENED, ENDANGERED and PROTECTED SPECIES POTENTIAL HABITAT

## POTENTIAL MITIGATION SITE
## TULSA PORT OF CATOOSA
## ROGERS COUNTY, OKLAHOMA

**Portions of Sections 4 and 5 of Township 20 North, Range 15 East**
**Rogers County, Oklahoma**

February 3, 2012
Revised March 19, 2012

A Report Prepared for:

Dewberry
600 Parsippany Road, Suite 301
Parsippany, NJ 07054-3715

# DELINEATION OF POTENTIALLY JURISDICTIONAL WATERBODIES REPORT, EVALUATION OF HISTORIC WETLANDS, and THREATENED, ENDANGERED and PROTECTED SPECIES POTENTIAL HABITAT

## POTENTIAL MITIGATION SITE
## PORT OF CATOOSA
## ROGERS COUNTY, OKLAHOMA

**Portions of Sections 4 and 5 of Township 20 North, Range 15 East**
**of the Indian Meridian, Rogers County, Oklahoma**

Kleinfelder Project # 114800

Prepared by:

Polly Ready

Polly Ready
Environmental Scientist

Reviewed by:

Blair Baker

Blair Baker
Senior Environmental Professional

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## TABLE OF CONTENTS

## 1.0 INTRODUCTION

Kleinfelder was contracted by Dewberry to conduct an assessment of United States Army Corps of Engineers (USACE) waters of the United States (Waters), including wetlands; historic wetlands; and the presence of potential habitat for federally threatened or endangered (listed) and protected species. The environmental study area (study area) may be used as a mitigation site by the Tulsa Port of Catoosa, in Rogers County, Oklahoma (Figure 1). The study area is approximately 115 acres. The center of the study area is located at 36.145035 N, -95.432674° W (Figure 2). This report documents the results of the delineation for the benefit of Dewberry and the Tulsa Port of Catoosa and may be relied upon by their successors and/or assignees associated with the transaction for which this report was commissioned.

The study area is located within portions of: the N 1/2 of Sections 4 and 5 of Township 20 North, Range 15 East, Indian Meridian, Rogers County, Oklahoma. The study area is mapped on the 1980 photorevised Catoosa, OK quadrangle United States Geological Survey (USGS) 7.5-Minute Series Topographic Map (Figure 3).

Kleinfelder biologists (Mr. Blair Baker, Ms. Elisa Hotz, and Mr. Jason Caskey) conducted an assessment to characterize and map potentially jurisdictional Waters within the study area. Potentially jurisdictional Waters, including wetlands, were found within the study area. The survey was conducted on December 9, 10 and 12, 2011 and consisted of a focused pedestrian field survey within the study area. The study area was also evaluated for historic wetlands and for the presence of potential habitat for federally threatened or endangered (listed) and protected species for Rogers County, OK. Prior to conducting the field survey, Kleinfelder reviewed site maps, historic aerial photographs, natural resource database accounts, National Wetlands Inventory (NWI) maps (Figure 4), the U.S. Fish and Wildlife Service (USFWS) Project Review of federally listed species and designated critical habitat areas in Rogers County, Oklahoma, and other relevant scientific literature to determine the potential existence of known wetland features and listed and protected species in the study area.

This report is based on knowledge of the special-status resources in the region, a review of relevant background literature, and a focused field survey of the study area. A discussion of plant and animal species observed on site is included in this report. Information in this report is intended to provide the biological information that is necessary to avoid or minimize impacts to Waters that are potentially jurisdictional. This information may also be used in support of permit applications associated with impacts to these Waters.

## 2.0 REGULATORY FRAMEWORK

### 2.1 WATERS OF THE U.S.

The following section provides an overview of the regulatory framework involved with impacts to Waters (including wetlands) associated with the study area. Wetlands and riparian communities are considered to have special ecological status and are also considered a declining resource by several regulatory agencies, including the USACE. Wetlands serve significant biological functions by providing nesting, breeding, foraging, and spawning habitat for a wide variety of resident and migratory animal species. Wetlands also provide for the movement of water and sediments, nutrient cycling, groundwater recharge, water purification, storage of storm water runoff, recreation and transportation.

According to Section 404 of the Clean Water Act (CWA) of 1977, work (dredging) within navigable waters and the placement of fill material into Waters, including intermittent streams and wetlands, requires authorization by the USACE (EPA, 1972). The type of authorization (e.g., individual permit, nationwide permit, regional permit, or letter of permission from the District Engineer) depends on the acreage, volume, linear distance along a stream course, and purpose of the activity.

Under Section 404 of the CWA, and Section 10 of the Rivers and Harbors Act of 1899, the Environmental Protection Agency (EPA) and the USACE share regulatory authority over Waters. Waters includes all waterbodies that are, have, or may be used for interstate and/or international commerce, including all water that is subject to the ebb and flow of tide; all waters that are rivers, streams, sloughs, lakes, mudflats, sandflats, wetlands, wet meadows, prairie potholes, playa lakes, or natural ponds and the use, degradation, or destruction, of the aforementioned, which could affect interstate and international commerce; all impoundments of above mentioned; all tributaries of above mentioned; territorial seas; and all wetlands adjacent to above mentioned Waters. The width of Waters is defined as that portion which falls within the limits of the ordinary high water mark (OHWM). Field indicators of OHWM are clear and natural lines on opposite sides of the banks, scouring, sedimentary deposits, drift lines, exposed roots, shelving, destruction of terrestrial vegetation, and the presence of litter debris. Typically, the OHWM corresponds to the two-year flood event.

The USACE retains jurisdiction over wetlands that are Waters, and definitions and regulations for the identification and delineation of wetlands were published in the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987). This 1987 manual is the current federal delineation manual used in the CWA Section 404 regulatory program for the identification and delineation of wetlands. The 1987 manual has been clarified and updated through a series of regional supplements, guidance documents and memoranda from the USACE. The Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region is used for southeastern Oklahoma (USAERDC, 2008). The USACE defines wetlands as:

*“Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.”*

Thus, the interaction of hydrology, hydrophytic vegetation and hydric soil conditions results in the development of characteristics unique to wetlands. For a wetland to exist, it must have: 1) prevalent hydrophytic vegetation (plants that are adapted to grow, compete, reproduce and persist under anaerobic soil conditions); 2) hydric soils (those that possess characteristics associated with reducing soil conditions); and 3) a source of hydrology (frequently inundated or saturated during the biological growing season). The USACE clearly states, “Except in certain situations defined in this manual, evidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination.”

## 2.2 THREATENED, ENDANGERED, AND PROTECTED SPECIES

Where activity would require federal authorization or be contingent upon some other federal action, consultation under the Endangered Species Act (ESA) of 1973 is necessary. The ESA prohibits any person from taking, which includes harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, relocating, collecting, or attempting to engage in any such conduct, of any federally listed threatened or endangered species. Significant habitat modification or degradation that results in death or injury to federally protected species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering is also prohibited. Federal agencies are required to comply with the provisions and use their authorities to conserve species. Section 7 of the ESA states that every federal agency taking an action that may affect listed species must consult with the U.S. Department of the Interior, USFWS, or the National Marine Fisheries Service (NMFS). Consultation allows the USFWS to provide their expertise to ensure that the agency is making effective choices to conserve listed species, and that the proposed action would not jeopardize the continued existence of listed species.

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb (USFWS, 1940)."

The Migratory Bird Treaty Act of 1918 decreed that all migratory birds and their parts (including eggs, nests, and feathers) were fully protected. The Migratory Bird Treaty Act (MBTA) is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protect selected species of birds that are common to both countries (i.e., they occur in both countries at some point during their annual life cycle). A List of Migratory Birds protected by the MBTA is available.

## 3.0 SETTING

The general setting of the study area is within the floodplain of the Verdigris River. The study area is rural and consists primarily of forested, improved grassland, agricultural fields, excavated ponds, and developed areas including roads and associated right-of-ways (ROW).

The study area has an elevation range of approximately 568 feet above MSL at the northern end and 545 feet above MSL at the southern end, as shown on the 1980 photorevised Catoosa, OK quadrangle, USGS 7.5-Minute Series Topographic Map. The climate in this area is primarily influenced by movement of moist air from the Gulf of Mexico, hot and dry air from the desert southwest and cold air from the Arctic. The region undergoes seasonal variations in temperature and precipitation and typically experiences long, humid summers and short mild winters. The average annual precipitation for Rogers County is 43.45 inches, the average annual temperature is 60 degrees Fahrenheit, and the annual growing season is 208 days (OCS, 2010).

Habitats within the study area included mixed-age bottomland forest, mixed-age upland forest, dissected upland dominated by grasses, developed areas, and waterbodies. Within the bottomland forest dominant plant species included Pecan (*Carya illinoensis*), Boxelder (*Acer negundo*), American elm (*Ulmus americana*), Sycamore (*Platanus occidentalis*), Hackberry (*Celtis occidentalis*), Black willow (*Salix nigra*), Deciduous holly (*Ilex decidua*), and Northern red oak (*Quercus rubra*). The forested wetland is included in this habitat type. The upland forest site was dominated by Post oak (*Quercus stellata*), Blackjack oak (*Quercus marilandica*), Gum Bully

(*Sideroxylon lanuginosum*), Buckbrush (*Symphoricarpos orbiculatus*), Frost flower (*Verbesina virginica*), and Saw Greenbrier (*Smilax bona-nox*). The waterbodies did not have plants specifically associated with them. Introduced and invasive plant species were common in disturbed areas and were observed predominantly within mowed or maintained ROWs. These species included Sericea Lespedeza (*Lespedeza cuneata*), Bermudagrass (*Cynodon dactylon*), and Johnsongrass (*Sorghum halepense*).

## 3.1 ECOREGIONS

### Level 4 Ecoregions of Oklahoma Information

The study area is located within the Osage Cuestas, a subregion of the Central Irregular Plains ecoregion (#40) of Oklahoma (Figure 5).

### 40b. Osage Cuestas

The Osage Cuestas ecoregion is an irregular to undulating plain that is underlain by interbedded, westward-dipping sandstone, shale, and limestone. East-facing cuestas and low hills occur. Topography is distinct from the nearby Flint Hills, Ozark Highlands, and Cherokee Plains ecoregions. Natural vegetation is mostly tall grass prairie, but a mix of tall grass prairie and oak–hickory forest is native to eastern areas. Overall, the mosaic of natural vegetation is unlike the neighboring Cross Timbers and Ozark Highlands ecoregions. Today, rangeland, cropland, riparian forests, and on rocky hills, oak woodland or oak forest occur; cropland is not as common as in the neighboring Cherokee Plains Ecoregion. (Woods et al, 2005).

Potential natural vegetation for this ecoregion consists mostly of tallgrass prairie (dominants: big bluestem, little bluestem, switchgrass, and Indiangrass), grading eastward into a mosaic of tall grass prairie and oak–hickory forest; on rocky hilltops, cross timbers (dominants: blackjack oak, post oak, and little bluestem). Tallgrass prairie is native on deep loams derived from shale or limestone. Bottomland forests are native on floodplains and low terraces. Currently, on rocky hills, dry upland forest and woodland is found. Dry prairie composed of short and tall grasses occurs on shallow, gravelly soils of limestone scarps. In riparian areas are forests containing boxelder, silver maple, bur oak, Shumard oak, American elm, hackberry, pecan, walnut, sycamore, and eastern cottonwood.

Land cover and land use for this ecoregion is a mixture of rangeland, grassland, cropland, and especially in more rugged areas, woodland. Wooded riparian corridors occur on wettest bottomlands. Wheat, soybeans, grain sorghum, and alfalfa hay are major crops. Livestock (especially cattle) farming is important. Strip mining for coal and oil production have degraded water quality in some streams (Woods et al., 2005).

## 4.0 METHODS AND LIMITATIONS

The USACE has prescribed methodologies for delineating “waters of the United States” and wetlands pursuant to the CWA of 1977 (EPA, 1972). Determination of Waters is based on definitions and descriptions found in the Code of Federal Regulation (CFR) at 33 CFR 328. Methods for delineating wetlands are detailed in the USACE Wetland Delineation Manual (Environmental Laboratory, 1987) and require that, under normal circumstances, an area possess three technical criteria to be designated as a jurisdictional wetland. Those criteria are:

1) the prevalence of hydrophytic vegetation, 2) the presence of hydric soils, and 3) the presence of wetland hydrology.

The evaluation of any on-site stream features for the jurisdictional determination was conducted in accordance with the policy, practice, and procedures set forth in 33 CFR 328, which determines the extent of jurisdiction of the USACE over Waters. The definitions for jurisdictional determination consist of the following:

A. The term *"waters of the United States"* means:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
    - Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    - From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    - Which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under the definition;
5. Tributaries of Waters identified in paragraphs (a)(1)-(4) of this section;
6. The territorial seas;
7. Wetlands adjacent to Waters (other than Waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section.
8. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not Waters of the United States.
9. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA.

Limits of jurisdictional authority are as follows:

A. *Territorial Seas* - The limit of jurisdiction in the territorial seas is measured from the baseline in a seaward direction a distance of three nautical miles. (See 33 CFR 329.12)

B. *Tidal Waters of the United States* - The landward limits of jurisdiction in tidal waters:

- Extends to the high tide line, or
- When adjacent non-tidal waters of the United States are present, the jurisdiction extends to the limits identified in paragraph (c) of this section.

C. *Non-Tidal Waters of the United States* **-** The limits of jurisdiction in non-tidal waters:

- In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or
- When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands.
- When the water of the United States consists only of wetlands, the jurisdiction extends to the limit of the wetland.

The wetland assessment and delineation was conducted in accordance with the Corps of Engineers Wetlands Delineation Manual and the Midwest Region supplement (USAERDC, 2008). The delineation form for the Midwest region was used and the wetland assessment consisted of the following:

- A desktop review was undertaken to identify areas that were previously mapped as wetlands, streams, or other waterbodies. A pedestrian survey was conducted within the study area to locate potential jurisdictional waterbodies. When these areas were encountered, the routine determination method described in the 1987 USACE Wetland Delineation Manual and Midwest Region supplement was employed, and sample plots were used to determine wetland or non-wetland status. Visual observations were used to identify vegetation, soil, and hydrological characteristics within the vicinity of the sample plots.

- Plant community types in proximity to potential wetland boundaries were identified. Dominant plant species were identified within the visually perceived wetland boundary or until the nearest significant vegetative community change. The biologist selected a representative observation area for each plant community, visually selected the dominant species from each stratum of the community, evaluated the percent cover of plant species in each stratum, and recorded the wetland indicator status of the dominant species. A determination was then made as to whether the vegetation was hydrophytic based on the plant's indicator status and a minimum of two evaluation methods. If no potential jurisdictional waterbodies were observed, upland plant communities were mapped and characterized.

- Hydrophytic vegetation dominates areas where the frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species were assigned wetland indicator status according to the probability of species occurring in wetlands (USFWS, 1988). More than fifty percent of the dominant species must have been hydrophytic to have met the wetland vegetation criterion. Hydrophytic plant indicator status designations conform to the following:

    - OBL – Plants that occur almost always (estimated probability >99 percent) in wetlands under natural conditions, but may also occur rarely (estimated probability <1) in non-wetlands.

  - FACW – Plants that occur usually (estimated probability >67 percent to 99 percent) in wetlands under natural conditions, but also occur (estimated probability 1 percent to 33 percent) in non-wetlands.
  - FAC – Plants with a similar likelihood (estimated probability 33 to 67 percent) of occurring in both wetlands and non-wetlands.
  - FACU – Plants that occur sometimes (estimated probability 1 percent to <33 percent) in wetlands, but occur more often (estimated probability >67 percent to 99 percent) in non-wetlands.
  - UPL - Plants that occur rarely (estimated probability <1 percent) in wetlands, but almost always occur (estimated probability >99 percent) in non-wetlands under natural conditions.

- Soil pits were dug at sample plots for the potential wetlands being investigated. Munsell Soil Color Charts (MacBeth, 1994) were used to evaluate the color, hue, and chroma of representative soils and associated redox features. The redox features were also characterized by their size, distinction, and frequency of occurrence. Soil indicators from the samples were then recorded and it was determined if the soils are hydric. Reducing conditions on site were indicated by the presence of oxidized root channels, positive reaction from Alpha-Alpha Dipyradil, sulfidic odor, or gleyed soils. Also noted were other hydrological indicators, such as soil saturation within the upper 12 inches of the soil, standing water existing within the soil pits, and the depth to inundated or saturated soil. If no hydric soils or potential jurisdictional waterbodies were observed within the study area, no soil pits were dug.

If potential jurisdictional waterbodies are observed, appropriate jurisdictional wetland boundaries would be derived from wetland sampling plot analysis and subsequently recorded using a Trimble GeoXH$^{TM}$ global positioning system (GPS). When satellites cannot be detected by GPS or when there is poor satellite geometry, the boundaries of Waters are marked on aerial photography and field measurements are taken for reference. For areas between sample points, the wetland/upland boundary would be determined by interpolation of the position of vegetation, soil, and hydrologic indicators. This geospatially corrected information would then be digitally overlaid onto a representative aerial photograph and a topographic map using ArcGIS software to display the cumulative, on-site jurisdictional area. Wetland feature polygons, wetland soil pits, and upland soil pits would be identified on the maps and identified with a corresponding label. Digital photographs were taken to document on-site conditions and are provided in Appendix A.

A variety of data sources were reviewed with regard to the location of historic wetlands within the study areas. These data sources included:

- NRCS historic aerial photographs
- NRCS Web Soil Survey data including
  - hydric ratings
  - soil physical features
  - flooding frequency
- NRCS 2009 Hydric Soils List for Oklahoma
- Google Earth Pro
- USFWS NWI maps
- USGS Topographic maps

The historic aerial photographs acquired from the NRCS were taken in 1958, 1972, 1979, 1991, 1995, 2002, and 2005 and are included in Appendix B.

## 5.0 SITE CHARACTERIZATION

The study area can be generally characterized as rural, wooded, agricultural, with small maintained/mowed areas surrounding roads or utility ROWs, with streams, ponded water and wetlands interspersed throughout. The site is bordered by Highway 266 to the north, by a commercial development to the east, by the Verdigris River to the south, and by agricultural fields to the west. The southern half of the site is an improved pasture while the northern half of the site is characterized by areas of bottomland forest, intermittent streams, upland areas and constructed ponds.

### 5.1 SOILS AND DRAINAGE

Soils within the study area consist mainly of clay loams and silty clay loams. The parent material consists of clayey or silty alluvium and loamy residuum from weathered limestone. These soils occur on floodplains and are occasionally or frequently flooded. The natural drainage class is well drained and poorly or somewhat poorly drained. The specific soil types for the study area are listed in Table 1 below. Of these soil types, Osage clay and Verdigris clay loam are considered to be partially hydric soils (USDA, 2009) (Figure 6). Portions of the study area occur within the 100-year floodplain of the Verdigris River. FEMA Flood Insurance Rate Maps are included (Figure 7).

**Table 1: Soil Map Units within Study Area**

| Map Unit Symbol | Map Unit Name | Slope | Drainage / Hydric |
|---|---|---|---|
| Os | Osage clay | 0 to 1 percent | Poorly drained / partially hydric |
| SuC | Apperson and Summit | 3 to 5 percent | Somewhat poorly drained / not hydric |
| Ve | Verdigris clay loam | 0 to 1 percent | Well drained / partially hydric |
| Vf | Verdigris silty clay loam | 0 to 2 percent | Well drained / not hydric |
| WagB | Wagstaff silty clay loam | 1 to 0 percent | Moderately well drained / not hydric |

### 5.2 VEGETATION ASSESSMENT (PLANT COMMUNITIES)

The dominant plant communities within the study area include bottomland forest, a forested wetland, upland forest, ponds, improved grassland and mowed or maintained areas within ROWs and along roads. The table below summarizes the plant species observed within the study area.

**Table 2: Plant Species Observed within Study Area**

| Common Name | Scientific Name | Vegetation Type | NWI Status |
|---|---|---|---|
| American Elm | *Ulmus americana* | t | FAC |
| American Sycamore | *Platanus occidentalis* | t | FAC |
| Bermuda Grass | *Cynodon dactylon* | h | FACU |
| Blackberry | *Rubus* sp. | h | NI |
| Black Oak | *Quercus velutina* | t | - |
| Blackjack Oak | *Quercus marilandica* | t | - |
| Black Willow | *Salix nigra* | t | FACW |

| Table 2: Plant Species Observed within Study Area | | | |
|---|---|---|---|
| **Common Name** | **Scientific Name** | **Vegetation Type** | **NWI Status** |
| Boxelder | *Acer negundo* | t | FACW |
| Bristlegrass | *Setaria* sp. | h | FAC |
| Buckbrush | *Symphoricarpos orbiculatus* | s | FACU |
| Buttonbush | *Cephalanthus occidentalis* | s | OBL |
| Elderberry | *Sambucus canadensis* | t | FAC |
| Grape | *Vitis* sp. | v | FAC |
| Giant Goldenrod | *Solidago gigantea* | h | FAC |
| Giant Ragweed | *Ambrosia trifida* | h | FAC |
| Green Ash | *Fraxinus pennsylvanica* | t | FACW- |
| Hackberry | *Celtis occidentalis* | t | FAC |
| Hop Sedge | *Carex lupulina* | h | OBL |
| Johnsongrass | *Sorghum halepense* | h | FACU |
| Little Bluestem | *Schizachyrium scoparium* | h | FACU |
| Multiflora Rose | *Rosa multiflora* | h | UPL |
| Northern Red Oak | *Quercus rubra* | t | FACU |
| Osage Orange | *Maclura pomifera* | t | UPL |
| Pecan | *Carya illinoensis* | t | FAC |
| Pennsylvania Smartweed | *Polygonum pennsylvanicum* | h | FACW |
| Plum | *Prunus americana* | t | NI |
| Poison Ivy | *Toxicodendron radicans* | v | FAC |
| Post Oak | *Quercus stellata* | t | NA |
| Red Maple | *Acer rubrum* | t | FACW |
| Rush | *Juncus sp.* | H | - |
| Saw Greenbrier | *Smilax bona-nox* | v | FAC |
| Sericea Lespedeza | *Lespedeza cuneata* | s | NI |
| Silver Maple | *Acer saccharinum* | t | FAC |
| Switchgrass | *Panicum virgatum* | h | FACW |
| Tall Fescue | *Schedonorus phoenix* | H | FAC |
| Virginia Wildrye | *Elymus virginicus* | h | FAC |
| t = tree, s = shrub, h=herbaceous, v=vine, NI=no indicator, "-" = not listed<br>(Taylor et al., 1994; USDA, 2009) | | | |

## 5.3 WILDLIFE ASSESSMENT

Wildlife species observed during field survey within the study area are summarized in Table 3 below.

| Table 3: Animal Species Observed within Study Area | |
|---|---|
| **Common Name** | **Scientific Name** |
| **Birds** (Sibley, 2000) | |
| American Crow | *Corvus brachyrhynchos* |
| American Goldfinch | *Spinus tristis* |
| Blue Jay | *Cyanocitta cristata* |
| Cedar Waxwing | *Bombycilla cedrorum* |

| Table 3: Animal Species Observed within Study Area | |
|---|---|
| **Common Name** | **Scientific Name** |
| Red-tailed Hawk | *Buteo jamaicensis* |
| **Mammals** (Caire et al., 1989) | |
| American Beaver | *Castor canadensis* |
| Eastern Cottontail | *Sylvilagus floridanus* |
| Eastern Gray Squirrel | *Sciurus carolinensis* |
| Nine-banded Armadillo | *Dasyppus novemcinctus* |
| White-tailed Deer | *Odocoileus virginianus* |

## 6.0 FINDINGS

### 6.1 THREATENED, ENDANGERED, AND PROTECTED SPECIES

In order to evaluate the study area for the potential presence of protected species, the USFWS list of federally listed species and designated critical habitat areas in Rogers County, Oklahoma was reviewed (USFWS, 2009). These sources were reviewed to determine if listed species and their associated habitat had the potential to occur within the study area or if adverse effects associated with the potential mitigation activities may occur. Based upon the habitat descriptions of those species that were indicated to occur in Rogers County, a qualitative comparison to the habitat present within the subject site that could increase the potential for listed species to be present or adjacent to the study area was made during field reconnaissance efforts. The qualitative comparison was based upon regional and local ecological characteristics including soils, terrain, hydrology, and vegetation. The USFWS was not directly contacted.

Notes were also taken on livestock grazing, development, pollution and other disturbances that could decrease the potential for listed species to be present. Table 4 includes listed and candidate species that are either present, have the potential to be present, or have been observed in the past in Rogers County.

| Table 4: Rogers County, Oklahoma Listed and Protected Species | | | |
|---|---|---|---|
| **Common Name** | **Scientific Name** | **Federal Listing** | **Critical Habitat** |
| American Burying Beetle | *Nicrophorus americanus* | E | No |
| Interior Least Tern | *Sterna antillarum* | E | No |
| Piping Plover | *Charadrius melodus* | T | No |
| Whooping Crane | *Grus americana* | E | No |
| Neosho Mucket Mussel | *Lampsilis rafinesaqueana* | C | No |
| Rabbitsfoot Mussel | *Quadrula cylindrica* | C | No |
| Arkansas Darter | *Etheostoma cragini* | C | No |
| Bald Eagle | *Haliaeetus leucocephalus* | DL* | No |
| T = threatened, E = endangered, C = candidate, DL = delisted<br>*Bald Eagle is protected under the Bald and Golden Eagle Protection Act | | | |

No critical habitat has been designated for the eight species listed above in Rogers County, Oklahoma (USFWS Critical Habitat Mapper).

**American Burying Beetle:** The American Burying Beetle (ABB) is federally listed as endangered. This species is found in 22 counties in eastern Oklahoma. An additional six Oklahoma counties lie within the historic range of the ABB and two others have had unconfirmed sightings since 1992. This insect species is present on less than 10% of its original range. This scavenger needs small vertebrates (from 50-200 grams in size) to feed upon. Habitat requirements for the ABB include areas with loose, well-drained soils with a well-formed litter layer from oak-hickory and oak-pine forests, as well as open native grassland and open native fields along forest edges. According to the USFWS, pastures where native grasses have been displaced by cultivation of Bermuda grass (*Cynodon dactylon*) are not expected to support the ABB. There is no Critical Habitat designated for the ABB in Rogers County (USFWS, 1991).

**Findings of Survey Results for ABB:** Mature deciduous forest adjacent to open grass fields that could provide suitable reproductive and foraging habitat for the ABB occur within the study area. There are approximately 115 acres of forested and upland grassland plant communities that provide potentially suitable ABB habitat within the study area.

**Interior Least Tern:** The Interior Least Tern is federally listed as endangered (USFWS, 1985a). The Interior Least Tern is a frequent summer resident that occurs along sand bars within the braided channels of the Canadian, Red, Cimarron, and Arkansas rivers (USFW, 1990). In Oklahoma, the largest populations occur at the Salt Plains National Wildlife Refuge in Alfalfa County. Nesting colonies occur on sparsely vegetated sandbars on large rivers or salt flats with some natural debris. Most nesting occurs in May-June.

**Findings of Survey Results for Interior Least Tern:** The study area does not contain sparsely vegetated sandbars on large rivers or salt flats with the natural debris required by the Interior Least Tern for both nesting and feeding. Suitable habitat for the Interior Least Tern was not observed to be present on or in the immediate vicinity of the study area.

**Piping Plover:** The Piping Plover is federally listed as endangered within the Great Lakes Region, and threatened in the remainder of its range, including Oklahoma. Preferred habitats include sandy beaches along the ocean or lakes, and bare areas of islands or sandbars along large rivers. They also nest on the pebbly mud of interior alkali lakes and ponds. This shorebird migrates through Oklahoma each spring and fall. Sight records of migratory Piping Plovers exist for many central and eastern Oklahoma counties. Rogers County is not located in the probable migratory pathway between breeding and winter habitats (USFWS, 1985b).

**Findings of Survey Results for Piping Plover:** The study area does not contain sparsely vegetated sandbars on large rivers with the natural debris required by the Piping Plover for both nesting and feeding. No suitable habitat for the Piping Plover was observed to be present on or in the immediate vicinity of the study area. Nesting Piping Plovers are only known pre-1997, from the Oklahoma panhandle and do not nest in Rogers County (GMSARC, 2009).

**Whooping Crane:** The Whooping Crane is federally listed as endangered (USFWS, 1967). Critical Habitat has been designated for this species in Oklahoma at the Salt Plains National Wildlife Refuge (NWR) in northwestern Oklahoma. This wading bird is ecologically dependent on freshwater wetlands and, in the winter, on coastal brackish wetlands. The Whooping Crane migrates through western Oklahoma in the spring and fall (Austin, 2001). During migration, Whooping Cranes are sometimes found in Oklahoma outside of the Salt Plains NWR along rivers, grain fields, or in shallow wetlands. There is no critical habitat designated for the Whooping Crane in Rogers County, OK.

**Findings of Survey Results for Whooping Crane:** All areas within and adjacent to the study area were examined during field survey effort for the presence of suitable Whooping Crane foraging and roosting habitat. No preferred foraging or roosting habitat for this species was observed within or in areas adjacent to the study area.

**Neosho Mucket Mussel:** The Neosho Mucket is federally listed as a candidate species. It lives in freshwater and has an elongated, slightly rounded shell and is approximately 4 inches wide. In Oklahoma, living Neosho muckets were found along 55 miles of the Illinois River from the Oklahoma/Arkansas state line, downstream to the headwaters of Tenkiller Lake, Cherokee County, Oklahoma (Mather, 1990). Reproduction and recruitment rates of this species are low and the Neosho muckets is relatively rare in the Fall, Verdigris, Neosho, and North Fork Spring Rivers, and Shoal Creek, in northeastern Oklahoma. There is no critical habitat designated for the Neosho mucket in Rogers County.

**Findings of Survey Results for Neosho Mucket Mussel:** Surveys conducted at 32 sites on the Verdigris River found no live Neosho mucket mussels. The results of these surveys suggest the Neosho mucket has been extirpated from the Verdigris River in Oklahoma (Mathers 1990). Researchers at Oklahoma State University have revisited these sites in the Verdigris River in the 1990’s and confirmed that the species is now extirpated from this river in Oklahoma.

**Rabbitsfoot Mussel:** The Rabbitsfoot is federally listed as a candidate species. In Oklahoma, living Rabbitsfoot mussels are found within the Illinois and Verdigris Rivers in the northeastern portion of the state, as well as in the Little, Glover, and Mountain Fork Rivers in the southeastern portion of the state. Rabbitsfoot mussels exhibit seasonal movement, migrating toward shallower water during brooding periods (Fobian 2007). Threats to the species are primarily reduction of habitat due to impoundment, sedimentation, agricultural pollutants, and lead and zinc mining. There is no critical habitat designated for the Rabbitsfoot in Rogers County.

**Findings of Survey Results for Rabbitsfoot Mussel**: Surveys for the presence of the Rabbitsfoot mussel were conducted by Vaughn (1998) and the Oklahoma Department of Wildlife Conservation (2006-2009). This species was previously thought to be extirpated from the Verdigris River. However, the surveys found the lower Verdigris River (below Lake Oologah) supported the most dense assemblages of the Rabbitsfoot mussel in Oklahoma, Missouri, and Kansas (ODWC 2009).

**Arkansas Darter**: The Arkansas Darter is federally listed as a candidate species. It occurs in the Arkansas River drainage from Arkansas to Colorado; numerous viable populations exist, but recent declines have occurred and many populations are threatened by continuing loss of habitat, especially through dewatering. Historically this fish was never very common. Preferred habitat includes spring-fed creeks with cool, clear water with herbaceous aquatic vegetation, or pools with sand, fine gravel, or organic detritus substrate. Surveys in 1994-1997 in south-central Kansas and adjacent Oklahoma recorded this species from 67 of the 108 localities that were sampled within the general historical range of the species (Eberle and Stark 2000).

**Findings of Survey Results for Arkansas Darter:** The study area does not contain spring-fed creeks with cool clear water, aquatic herbaceous vegetation, and gravel bottoms, as required by the Arkansas Darter. Suitable habitat for the Arkansas Darter was not observed to be present on or in the immediate vicinity of the study area.

**Bald Eagle:** The Bald Eagle is a large predatory bird that occupies large trees along major rivers and streams during their winter distribution (December through March) in Oklahoma. In August 2007, the Bald Eagle was delisted by the USFWS from the Federal List of Endangered and Threatened Wildlife (USFWS, 2007). Since delisting, the Bald Eagle continues to be protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (USFWS, 1940). Bald Eagles nest in tall trees usually within one or two miles of large rivers, streams and lakes where fish are abundant. Although nesting eagles are concentrated in eastern Oklahoma, their nesting range appears to be expanding. Bald Eagles were not observed during this survey.

**Findings of Survey Results for Bald Eagle:** There is a perennial stream (Verdigris River) with tall trees within the study area. Based on information from the G.M. Sutton Avian Research Center, the closest occupied Bald Eagle nest is located approximately four miles northeast of the study area along the Verdigris River (GMSARC, 2011). No Bald Eagle nests were observed within or adjacent to the study area. Suitable nesting, roosting, and foraging habitat for the Bald Eagle was observed in the study area. While suitable nesting, roosting, and foraging habitat is present within the study area, disturbance would only be associated with temporary construction activities.

## 6.2 POTENTIALLY JURISDICTIONAL WATERBODIES

Based on Kleinfelder’s assessment, specific locations within the study area met the technical criteria for jurisdictional wetlands. Following the U.S. Supreme Court’s decision in Rapanos v. United States and Carabell v. United States (2006), new technical standards have been implemented for determining the limit of Waters. The new technical standards have: 1) rejected the argument that the term “waters of the United States” is limited to only those waters that are navigable in the traditional sense and their abutting wetlands, and 2) asserted that regulatory authority should extend only to “relatively permanent, standing or continuously flowing bodies of water” connected to traditional navigable waters, and to “wetlands with a continuous surface connection to” such relatively permanent waters (USACE, 2007).

The study area contains ten (10) potentially jurisdictional waterbodies. One (1) mapped, unnamed, blue-line perennial stream, three (3) mapped, blue-line intermittent streams, one (1) unmapped intermittent stream, two (2) wetlands and three (3) ponds; were observed during field investigations within the study area (Figure 8). Wetland delineation data forms for the wetland features and their adjacent upland features are located in Appendix C. A summary of all Waters within the study area is shown in Table 5.

| Table 5: Potentially Jurisdictional Waterbodies within the Study Area | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Water-body** | **USGS Topo or NWI Classification** | **Length /Area** | **Field Observations** | **Potentially Jurisdictional** | **Cowardin Classification** | **OHWM / Avg. Width Observed** | **Comments** |
| Stream 1 | Intermittent, blue-line stream | 904 ft.<br>0.06 acres | Intermittent stream | Yes | R4UB3 | 3 feet | Unconsolidated, mud bottom, vegetated banks, average 6 inches deep |
| Stream 2 | Intermittent, blue-line stream | 693 ft.<br>0.03 acres | Intermittent stream | Yes | R4UB3 | 2 feet | Unconsolidated, vegetated banks, dry at time of survey |
| Stream 3 | Intermittent, blue-line stream | 539 ft.<br>0.04 acres | Intermittent stream | Yes | R4UB3 | 3 feet | Unconsolidated, mud bottom, steep, vegetated banks, dry at time of survey |
| Stream 4 | Perennial, blue-line stream | 2261 ft.<br>0.21 acres | Perennial stream | Yes | R3UB3 | 4 feet | Unconsolidated, steep, vegetated banks, dry at time of survey |
| Stream 5 | Intermittent stream | 404 ft.<br>0.06 acres | Intermittent stream | Yes | R4UB3 | 6 feet | Slow flow, unconsolidated mud bottom, vegetated banks, average 1 ft. deep |
| Wetland 1 | PFO1A | 65.70 acres | Forested Wetland | Yes | PFO1A | NA | Forested wetland, bordered by the Verdigris River on south edge |
| Wetland 2 | Unmapped | 0.04 acres | Emergent Wetland | Yes | PEM1A | NA | Emergent (fringe) wetland around Pond 1 |
| Pond 1 | Unmapped | 0.20 acres | Freshwater Pond | Yes | - | Unknown (less than 3 feet) | Freshwater Pond associated with Wetland 2 and stream 4 |
| Pond 2 | Freshwater Pond | 4.47 acres | Freshwater Pond | Yes | - | Unknown (more than 3 feet) | Freshwater Pond associated with streams 1-3 |
| Pond 3 | Unmapped | 0.20 acres | Freshwater Pond | Yes | - | Unknown (less than 3 feet) | Freshwater Pond, western part of forested wetland |
| **Approx. Totals** | | **4,801 Linear Feet / 71.01 Acres of Waters** | | | | | |

Two forested wetlands and a pond are identified on current NWI maps. Approximately **71.01 acres** of potentially jurisdictional Waters (**0.40 acres** of streams, **4.87 acres** of ponds and **65.74 acres** of forested/emergent wetland were identified and are located within the study area (Figure 8).

**Stream 1 –** (904 linear feet) This waterbody is located within the north central part of the study area. It is a mapped, blue-line intermittent stream that flows from the northeast to southwest This waterbody has an unconsolidated mud bottom with vegetated banks. At the time of the survey, the stream was moderately flowing and the depth of the water was six (6) inches. Dominant vegetation associated with this waterbody included Pecan, Oak, Hackberry, and American elm (Figure 8).

This intermittent stream may be subject to USACE jurisdiction. This stream has direct hydrologic connection with the Verdigris River through Pond 2 and Stream 3.

**Stream 2 –** (693 linear feet) This waterbody is located within the northwest portion of the study area. It is a mapped, unnamed intermittent stream that flows from northwest to southeast. This waterbody has an unconsolidated bottom with vegetated banks. At the time of the survey, the stream was dry. Dominant vegetation associated with this waterbody included Hackberry, Green ash, American elm, Greenbrier, Bermuda grass and Poison ivy (Figure 8).

This intermittent stream may be subject to USACE jurisdiction. This stream has direct hydrologic connection with the Verdigris River through Pond 2 and Stream 3.

**Stream 3** – (539 linear feet) This waterbody is located within the south central part of the study area. It is a mapped, blue-line intermittent stream that flows from northwest to southeast into the Verdigris River. The waterbody has an unconsolidated mud bottom with steep vegetated banks. At the time of the survey, the stream was mostly dry. Dominant vegetation associated with this waterbody included Red maple, Pecan, American elm and blackberry (Figure 8).

This intermittent stream may be subject to USACE jurisdiction because it has direct hydrologic connection with the Verdigris River.

**Stream 4** – (2,261 linear feet) This waterbody is located within the eastern part of the study area. It is an unnamed blue-line perennial stream that flows from northeast to southwest and is connected to the Verdigris River. The waterbody has an unconsolidated bottom, with large rock rip-rap and steep vegetated banks. At the time of the survey the stream was mostly dry. Dominant vegetation associated with this waterbody included Red maple, Pecan, American elm and blackberry (Figure 8).

This perennial stream may be subject to USACE jurisdiction because it has direct hydrologic connection with the Verdigris River.

**Stream 5 –** (404 linear feet) This waterbody is located within the eastern part of the study area. It is an unmapped intermittent stream that flows from east to west and is connected to Stream 4. This waterbody has an unconsolidated mud bottom with steep vegetated banks. At the time of the survey, the stream was moderately flowing with a water depth of 1 foot. Dominant vegetation associated with this waterbody included Hackberry, American elm, Pecan, Post oak, Hackberry and Plum (Figure 8).

This intermittent stream may be subject to USACE jurisdiction because it has direct hydrologic connection with the Verdigris River through Stream 4.

**Wetland 1** – (65.70 acres) Wetland 1 is located within the northern half of the study area. Based on attributes seen during the field investigation, the wetland is classified as a PFO1A (palustrine, forested, broad-leaved deciduous, temporarily flooded) wetland (Cowardin, 1979). Wetland 1 is mapped on the NWI map. The plant community was dominated by hydrophytic species that included Black willow, American elm, Red maple, Pecan, Hackberry and Cottonwood. Hydrologic indicators consisted of drift deposits, surface water, water marks, stained leaves and saturated soil beginning at zero inches. From 0-16 inches, the soil matrix was 10YR 3/1 with redox features of 5YR 4/6 compared to Munsell color charts and is classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 8).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with the Verdigris River.

**Wetland 2** – (0.04 acres) Wetland 2 is located within the northeastern portion of the study area. Based on attributes seen during the field investigation, the wetland is classified as a PEM1A (palustrine, emergent, temporarily flooded) wetland (Cowardin, 1979). Wetland 2 is a fringe wetland to Pond 1 that is not mapped on the NWI map. The plant community was dominated by hydrophytic species that included Giant ragweed, Tall fescue, Pennsylvania smartweed, and an unknown rush species. Hydrologic indicators consisted of reduced iron and saturated soil beginning at zero inches. From 0-16 inches, the soil matrix was 2.5YR 2.5/1 with redox features of 2.5YR 2.5/4 when compared to Munsell color charts and is classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 8).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction due to its direct hydrologic connection with the Verdigris River.

**Pond 1** – (0.20 acres) Pond 1 is an excavated and artificially impounded freshwater pond located on the northeastern part of the study area. Based on attributes seen during the field investigation, this is a freshwater pond that is not mapped on the NWI map. The surrounding plant community is dominated by various oaks and sedges. This pond is associated with fringe Wetland 2 and is located within forested Wetland 1 (Figure 8).

This pond is potentially jurisdictional and may be subject to USACE jurisdiction due to its direct hydrologic connection with Wetland 1 and the Verdigris River through Stream 4.

**Pond 2** – (4.47 acres) Pond 2 is an excavated and artificially impounded freshwater pond located in the center of the study area and is connected to Stream 1, Stream 2 and Stream 3. Based on attributes seen during the field investigation, this is a freshwater pond and is mapped on the NWI map. The surrounding plant community is dominated by Pecan, Oak, American elm and American sycamore (Figure 8). This pond is within forested Wetland 1.

This pond is potentially jurisdictional and may be subject to USACE jurisdiction due to its direct hydrologic connection with the Verdigris River through Streams 1, 2 and 3.

**Pond 3 –** (0.20 acres) Pond 3 is an excavated and artificially impounded freshwater pond located on the western edge of the study area. Based on attributes seen during the field investigation, this is a freshwater pond that is located within forested Wetland 1. Pond 3 is not mapped on the NWI map. The surrounding plant community is dominated by Pecan, Oak, American elm, American sycamore and grape vines (Figure 8).

This pond is potentially jurisdictional and may be subject to USACE jurisdiction because it is hydrologically connected to Wetland 1. In this area, sheet flow appears to collect in the pond. Overflow from the pond contributes to the hydrology of the wetland. The pond and wetland are also in close proximity to the Verdigris River.

## 6.3 HISTORIC WETLANDS

Based on the review of NRCS aerial photographs (Appendix B); NRCS Web Soil Survey data, Oklahoma counties hydric soils list; Google Earth Pro; NWI maps, and USGS Topographic maps in combination with the presence of hydric soils over large portions of the study area, a majority of the area could historically be classified as either forested or emergent wetlands (see Figure 9).

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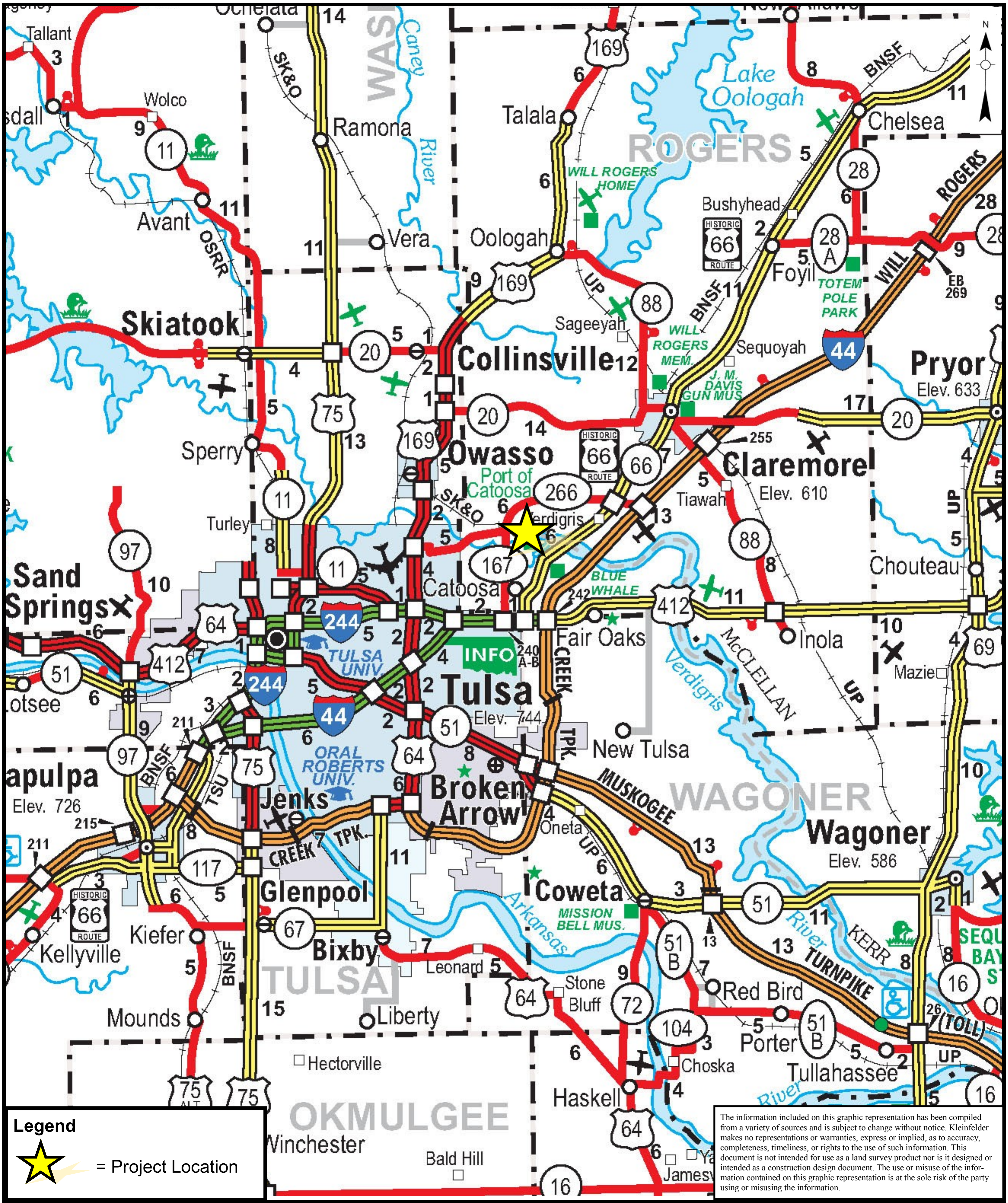
# FIGURES



**Legend**

★ = Project Location

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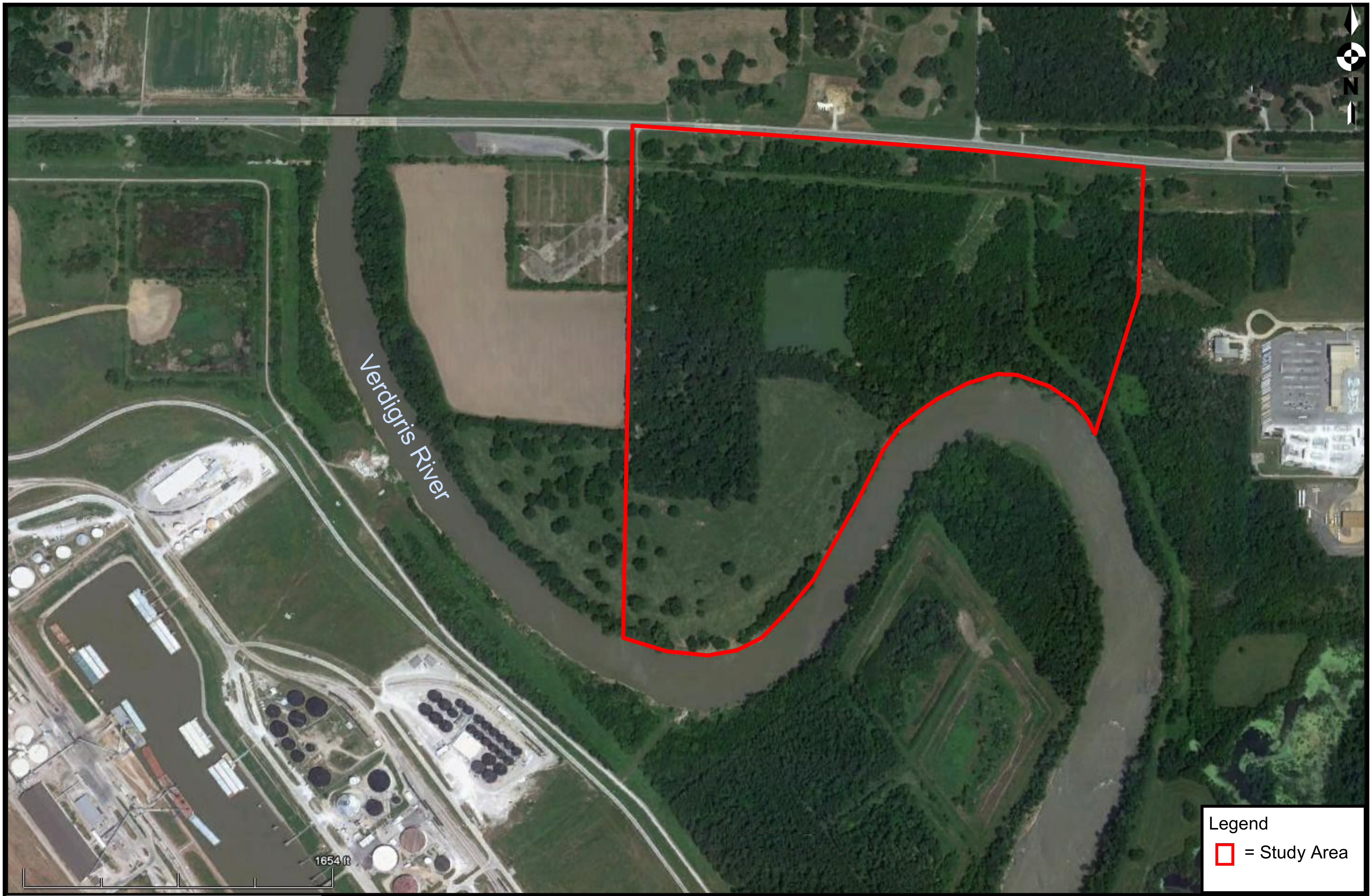
| CHECKED BY: | BHN |
| SOURCE: | ODOT |

**General Vicinity Map**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
1



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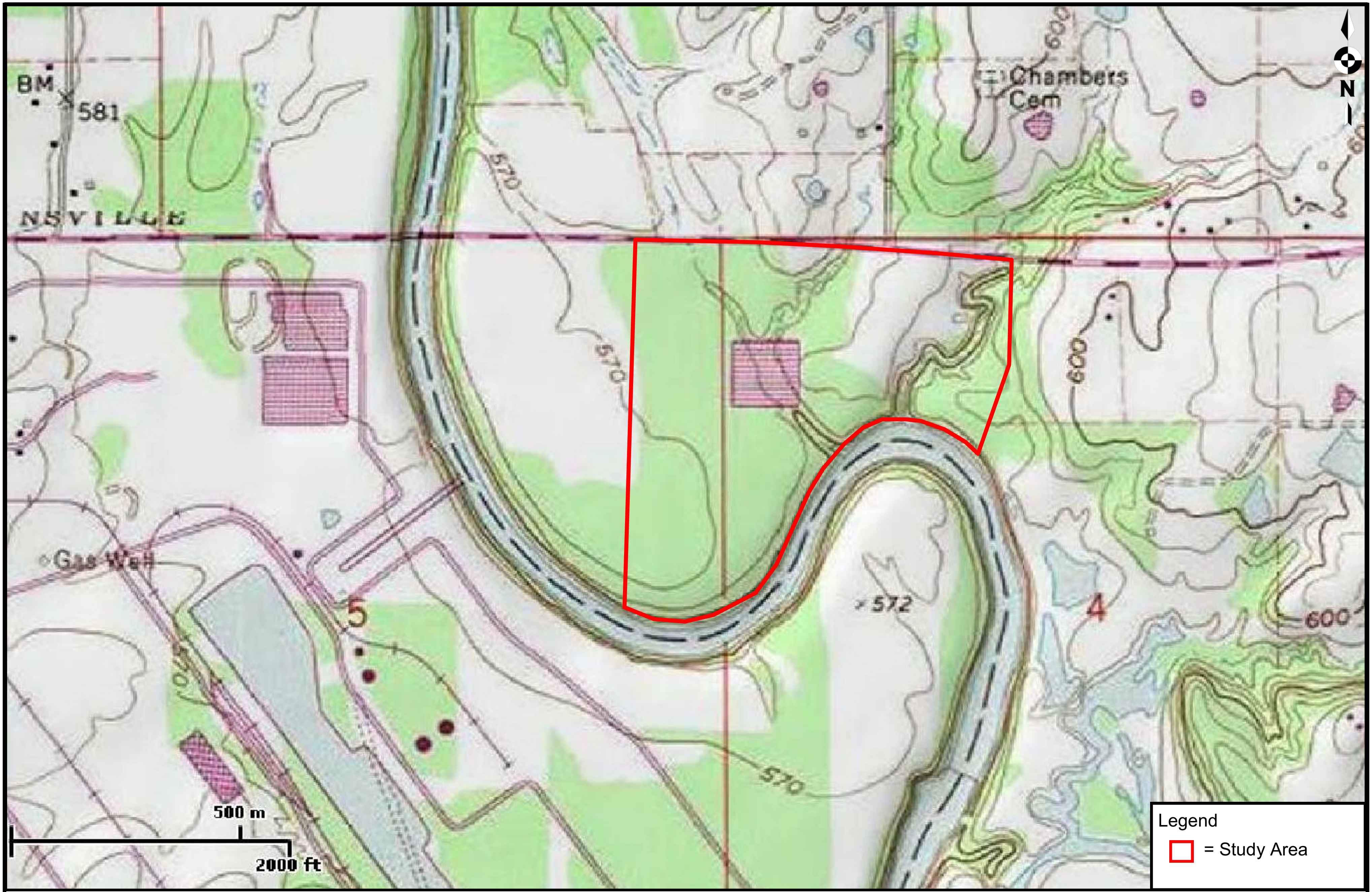
| FILE NAME: | Google Earth Pro |

**Aerial Photography**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
2



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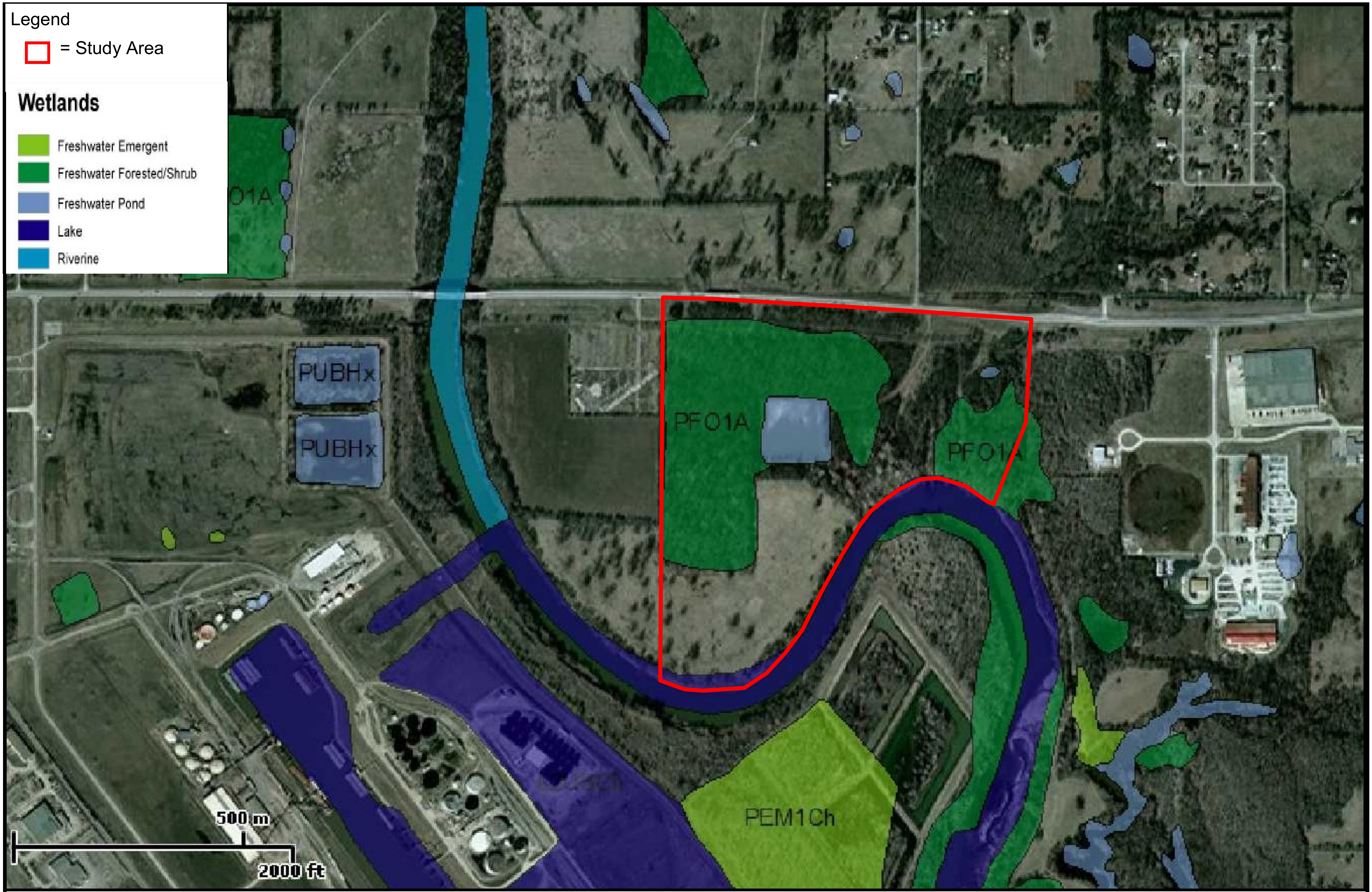
| FILE NAME: | USGS |

**USGS Topographic Map**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
**3**



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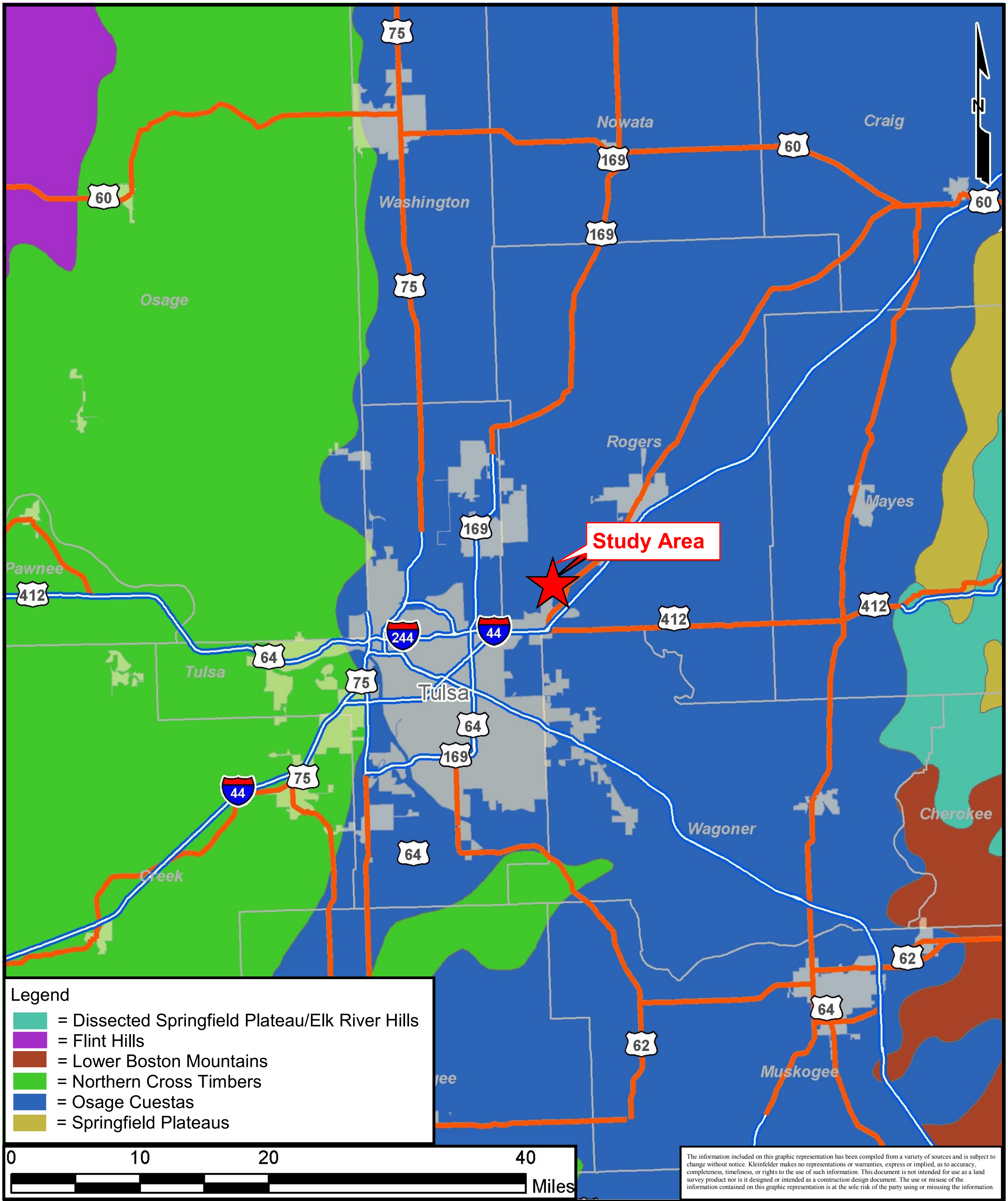
| SOURCE: | USFWS National Wetland Inventory |

**National Wetlands Inventory Map**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE

4



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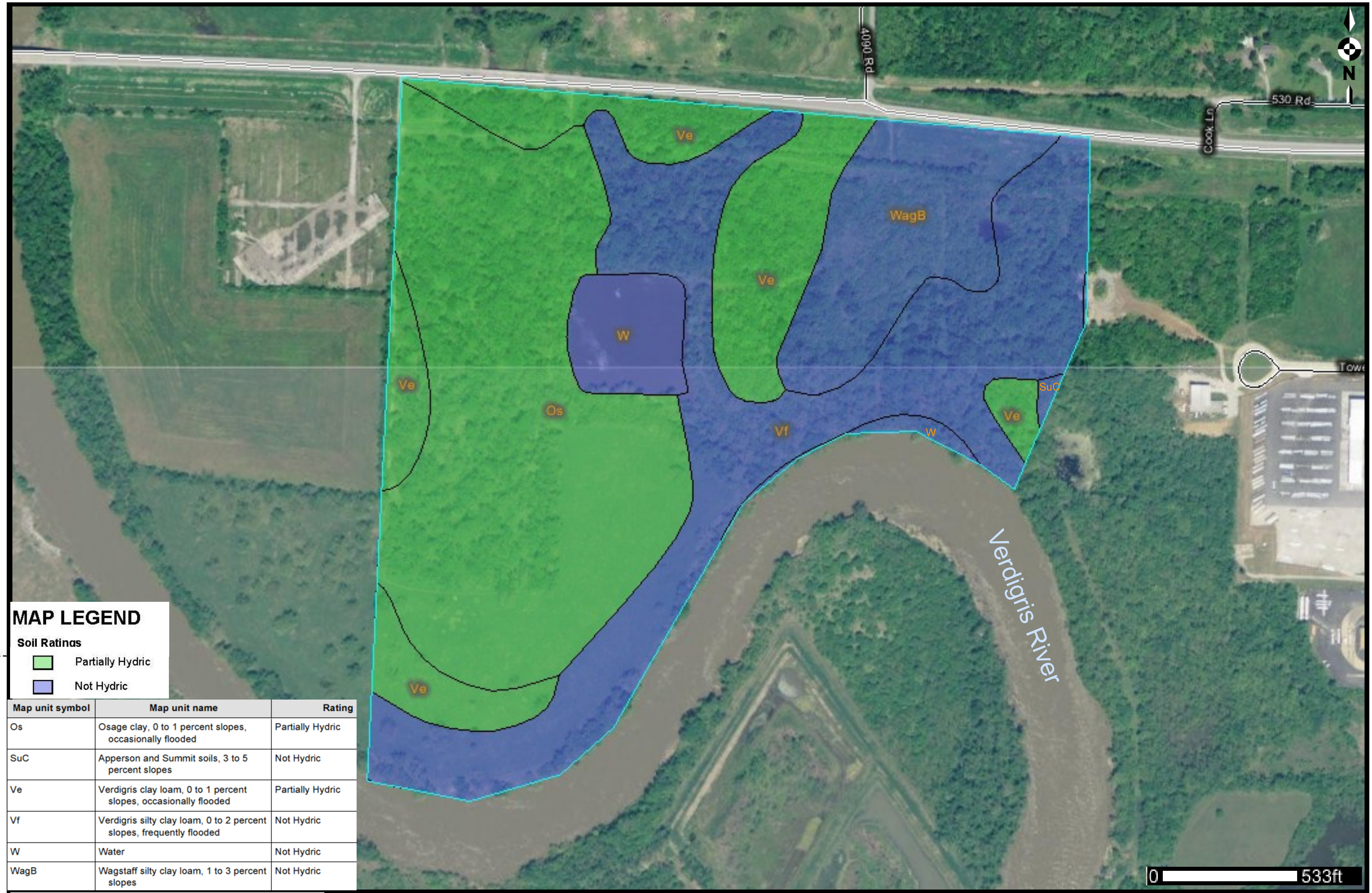
| SOURCE: | EPA |

**Level IV Ecoregion Map**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
**5**



## MAP LEGEND

**Soil Ratings**

🟩 Partially Hydric

🟦 Not Hydric

| Map unit symbol | Map unit name | Rating |
|---|---|---|
| Os | Osage clay, 0 to 1 percent slopes, occasionally flooded | Partially Hydric |
| SuC | Apperson and Summit soils, 3 to 5 percent slopes | Not Hydric |
| Ve | Verdigris clay loam, 0 to 1 percent slopes, occasionally flooded | Partially Hydric |
| Vf | Verdigris silty clay loam, 0 to 2 percent slopes, frequently flooded | Not Hydric |
| W | Water | Not Hydric |
| WagB | Wagstaff silty clay loam, 1 to 3 percent slopes | Not Hydric |

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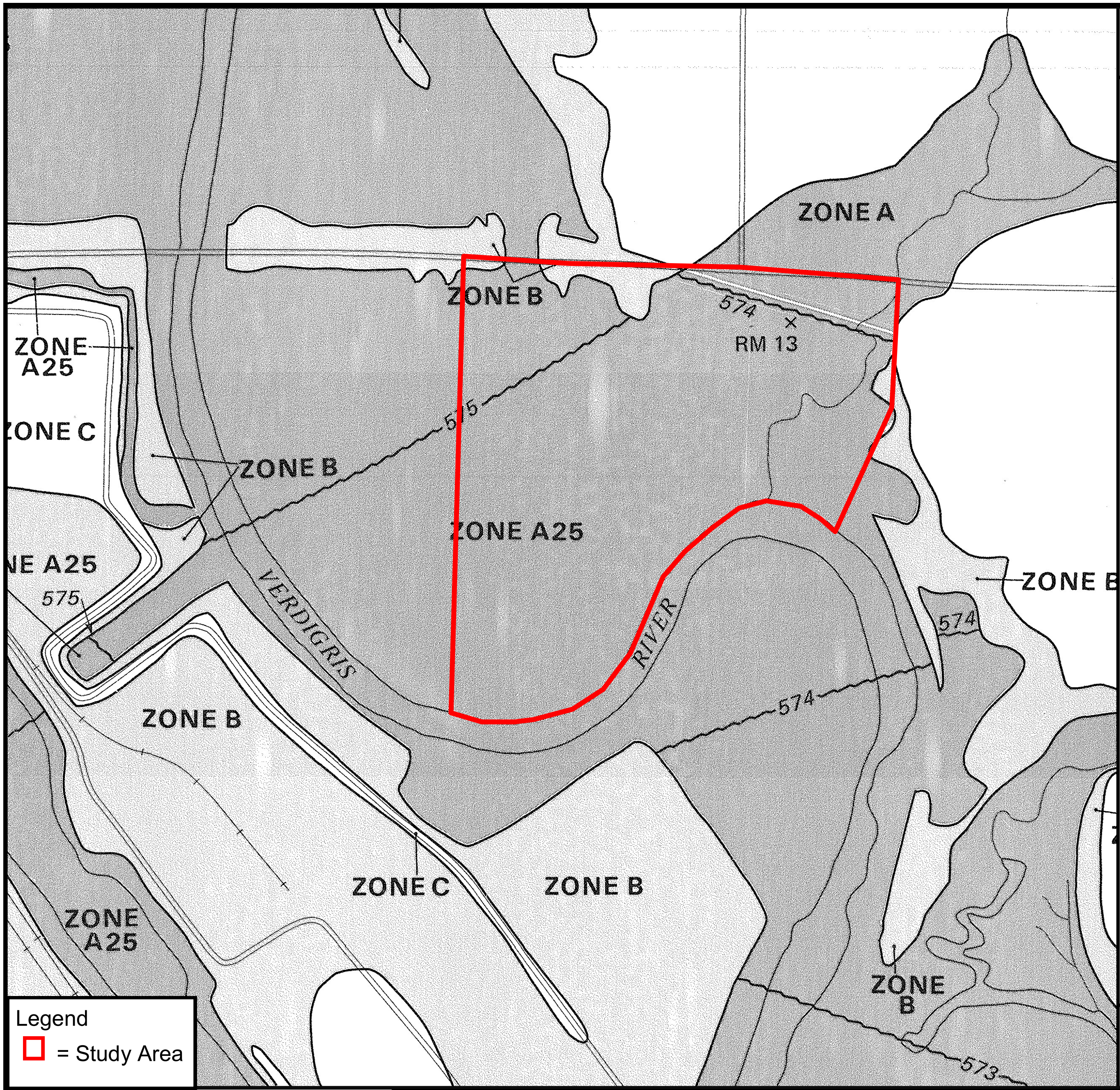
| SOURCE: | NRCS |

**NRCS Soils Map**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE
**6**



APPROXIMATE SCALE

1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

# FIRM

## FLOOD INSURANCE RATE MAP

ROGERS COUNTY,
OKLAHOMA
UNINCORPORATED AREAS

PANEL 120 OF 200

(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
405379 0120B

MAP REVISED:
AUGUST 19,1987

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

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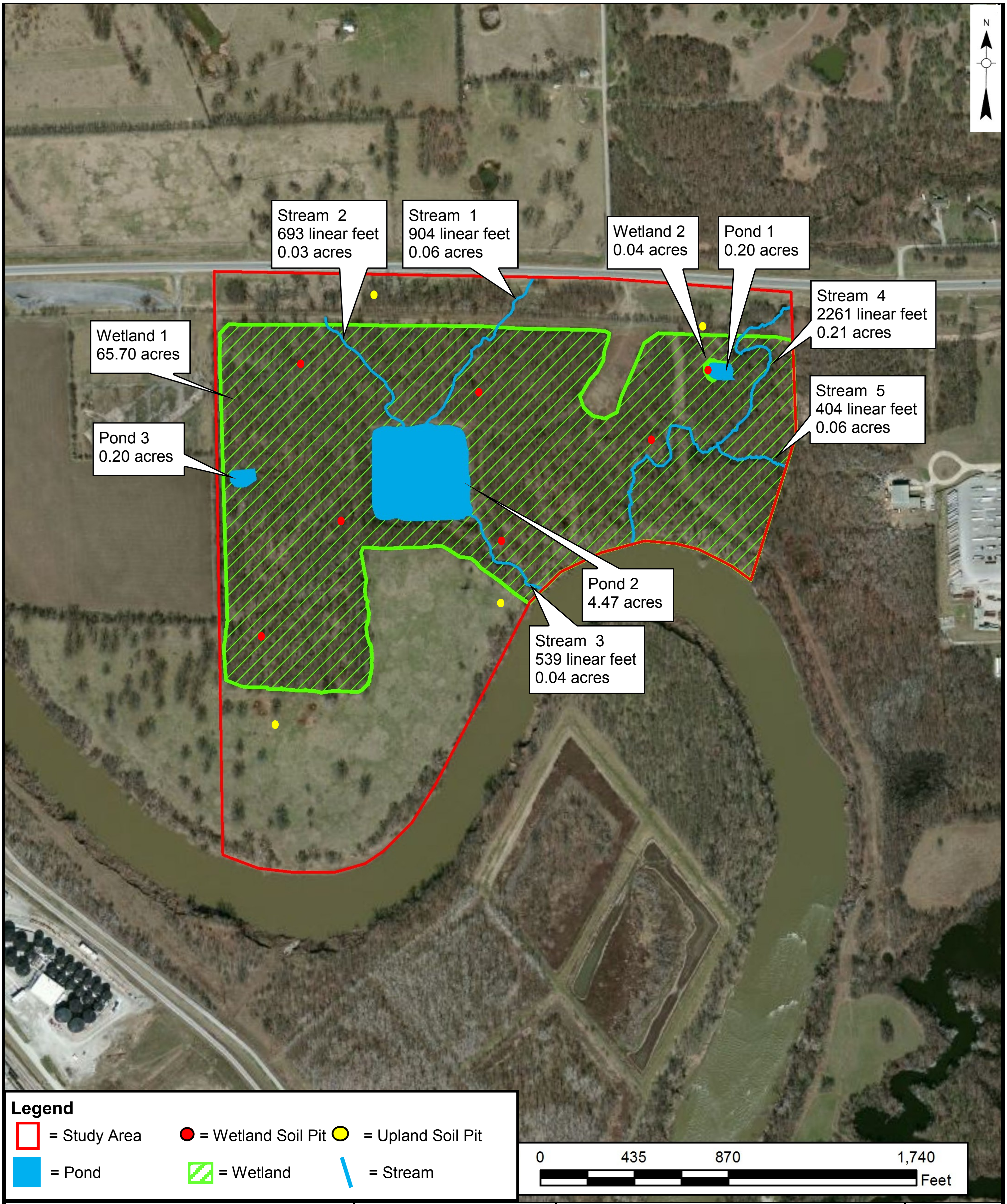
| SOURCE: | FEMA |

**FEMA Flood Insurance Rate Map**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE

7



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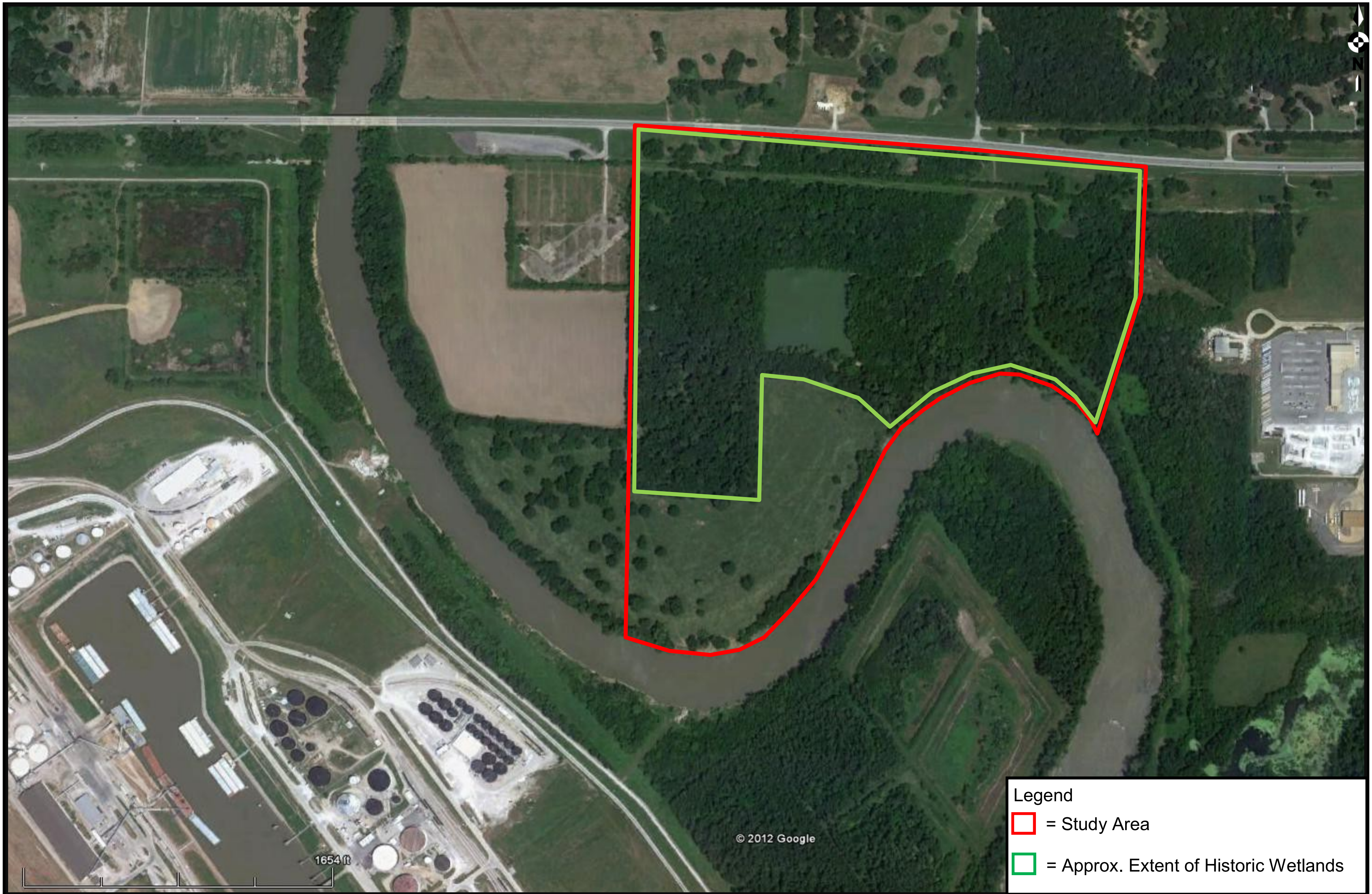
**Potentially Jurisdictional Waters**

Tulsa Port of Catoosa
Rogers County, OK

FIGURE

**8**



Legend

🟥 = Study Area

🟩 = Approx. Extent of Historic Wetlands

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| SOURCE: | Google Earth Pro |

**Historic Wetland Map**
March 1995 Aerial Photo

Tulsa Port of Catoosa
Rogers County, OK

FIGURE

9

# APPENDIX A
# PHOTOGRAPHIC RECORD

**Photo 1** – *View south; Pond 3.*

**Photo 2** – *View north; Pond 3.*

**Photo 3** – View north; Wetland 1 from north of Pond 2.

**Photo 4** – *View south, Wetland 1 from northwest corner of site.*

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Project Number: 114800

Photos: December 2011

Tulsa Port of Catoosa
Rogers County, Oklahoma

**Site Photographs**

**Appendix A**

**Photo 5** – *Wetland 1: soil sample*

**Photo 6** – *Upland adjacent to Wetland 1: soil sample.*

**Photo 7** – *Stream 1, Downstream from culvert at north property boundary.*

**Photo 8** – *Stream 1, Facing north, view upstream.*

**Photo 9** – *View east; Pond 1.*

**Photo 10** – *View south, Wetland 2.*

**Photo 11** – *Stream 5, Upstream*.

**Photo 12** – *Stream 5, Downstream*

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Project Number: 114800
Photos: December 12, 2011

Tulsa Port of Catoosa
Rogers County, Oklahoma

**Site Photographs**

**Appendix A**

**Photo 13** – *Stream 4, Upstream.*

**Photo 14** – *Stream 4, Downstream.*

**Photo 15** – *Stream 2, Upstream*.

**Photo 16** – *Stream 2, Downstream, and Pond 2.*


12/09/2011

**Photo 17** – *Stream 3, Downstream to Verdigris River.*


12/09/2011

**Photo 18** – *Stream 3, Upstream.*


12/09/2011

**Photo 19** – *View north, Pond 2.*

# APPENDIX B
# HISTORIC AERIAL PHOTOGRAPHS

# 1958 Historic Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

| | |
|---|---|
| PROJECT NO. | 114800 |
| DRAWN: | Jan 2012 |
| DRAWN BY: | PAR |
| CHECKED BY: | BHN |
| SOURCE: | USDA NRCS |

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| DRAWN BY: | PAR |
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| SOURCE: | USDA NRCS |

# 1972 Historic Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

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PROJECT NO. 114800
DRAWN: Jan 2012
DRAWN BY: PAR
CHECKED BY: BHN
SOURCE: USDA NRCS

# 1979 Historic Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

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| DRAWN BY: | PAR |
| CHECKED BY: | BHN |
| SOURCE: | USDA NRCS |

# 1991 Historic Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

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| DRAWN BY: | PAR |
| CHECKED BY: | BHN |
| SOURCE: | Google Earth Pro |

## 1995 Historic Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

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| DRAWN: | Jan 2012 |
| DRAWN BY: | PAR |
| CHECKED BY: | BHN |
| SOURCE: | Google Earth Pro |

## 2002 Historic Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

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| DRAWN BY: | PAR |
| CHECKED BY: | BHN |
| SOURCE: | Google Earth Pro |

## 2005 Historic Aerial Photograph

Tulsa Port of Catoosa
Rogers County, OK

N

# APPENDIX C
# WETLAND DELINEATION FORMS

File: R120813A
Feature: Soil Pit 2 upland

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa Site | Trib | Pit2 City/County: Rogers Sampling Date: 12/8/2011
Applicant/Owner: Corps State: OK Sampling Point: 2
Investigator(s): Blair Baker, Elisa Hotz Section, Township, Range: upland pit
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): Concave
Slope (%): 30 Lat: ______ Long: ______ Datum: ______
Soil Map Unit Name: ______ NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ______ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ~~X~~ | No ✓ | BEB |
| Hydric Soil Present? | Yes ~~X~~ | No ✓ | |
| Wetland Hydrology Present? | Yes ~~X~~ | No ✓ | |

**Is the Sampled Area within a Wetland?** Yes ~~X~~ No ✓

Remarks:

**VEGETATION** – Use scientific names of plants.

| Tree Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Quercus rubra | (EH) ~~20~~ 40% | | FACU |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | ______ = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ______ ) | | | |
| 1. ~~Smilax~~ (EH) | (EH) ~~20~~ | | |
| 2. Symphorocarpos orbiculatis | 20 | X | UPL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | ______ = Total Cover | | |
| **Herb Stratum** (Plot size: ______ ) | | | |
| 1. Smilax | 20 | X | |
| 2. Johnson Grass | 20 | X | FACU |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | ______ = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ______ ) | | | |
| 1. | | | |
| 2. | | | |
| | ______ = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)
Total Number of Dominant Species Across All Strata: ______ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ______ (A/B)

**Prevalence Index worksheet:**

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

Prevalence Index = B/A = ______

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

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

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: 2 upland

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

| Depth | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | | |
| 0-16" | 10YR2/1 | 100 | | | | | Clay Loam | upland pit |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):** NA

Type: ___

Depth (inches): ___

**Hydric Soil Present?** Yes ~~X~~ No X

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- X Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): ___

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

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

Remarks:

File: R120813A
Feature: Site 1 trib 1 soil pit 1

## WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Port Catoosa Site 1 Trib 1 Pit 1 City/County: Rogers Sampling Date: 12/8/11

Applicant/Owner: Corps State: OK Sampling Point: Wetland 1 Pit

Investigator(s): Blair Baker, Elise Hotz Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______ Slope (%): 5%

Subregion (LRR): ______ Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: 30 meters) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Salix nigra | 40 | y | FACW+ |
| 2. Ulmus americana | 45 | y | FAC |
| 3. Celtis sp. | 10 | | |
| 4. Fraxinus pennsylanica | 5 | | FACW- |
| Carya illinoensis 25 | = Total Cover | y | FAC+ |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. Ulmus americana | 10 | | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| **Herb Stratum** (Plot size: 15 meters) | | | |
| 1. Symphorocarpos orbiculatus | 5 | | FACU |
| 2. ~~ragweed~~ Ambrosia | 10 | | |
| 3. Sorghum halapense | 20 | y | FACU |
| 4. Passion vine Passiflora incarnata | >1 | | |
| 5. Poke Phytolacca americana | >1 | | |
| 6. Goldenrod Solidago sp | 10 | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | = Total Cover | | |
| **Woody Vine Stratum** (Plot size: 5 meters) | | | |
| 1. trumpetvine Campsis radicans | 1 | | FAC |
| 2. Toxicodendron radicans | 1 | | FAC |
| | = Total Cover | | |
| % Bare Ground in Herb Stratum 2% | | | |

Remarks:

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC–): 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 45 | x 2 = 90 |
| FAC species | 72 | x 3 = 216 |
| FACU species | 25 | x 4 = 100 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 142 (A) | 406 (B) |

Prevalence Index = B/A = 2.8

**Hydrophytic Vegetation Indicators:**

✓ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
✓ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

## SOIL

Sampling Point: Wetland/ 1 trib 1

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

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16" | 10YR3/1 | 100 | — | | | | clay loam | wetland pit |
| ~~0-16"~~ | ~~10YR2/1~~ | ~~100~~ | — | | | | ~~clay loam~~ | ~~upland pit~~ |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

CH

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ 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 present):** NA

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ☒ No ☐

Remarks: ~~upland pit ; Dominants Johnson grass / Quercus rubra dominant~~
~~Symphoricarpos orbiculatus~~ 20% 30% ~~FACU~~ 40%
~~Smilax~~

EH

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one 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)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ 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)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): ______

Water Table Present? Yes ☒ No ☐ Depth (inches): 4"

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): ______

**Wetland Hydrology Present?** Yes ☒ No ☐

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

Remarks: gentle slope, shallow stream ~ 18" across

File: K120708A
Feature: Sied1 trib1 pit4

# WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Sampling Date: 12/9/11
Applicant/Owner: ________ State: OK Sampling Point: Pit 4 up?
Investigator(s): Blair Baker, Elise Holz Section, Township, Range: ________
Landform (hillslope, terrace, etc.): ________ Local relief (concave, convex, none): ________
Slope (%): ________ Lat: ________ Long: ________ Datum: ________
Soil Map Unit Name: ________ NWI classification: ________
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)
Are Vegetation Y, Soil y, or Hydrology y significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ✓
Hydric Soil Present? Yes ____ No ✓
Wetland Hydrology Present? Yes ____ No ✓

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:

## VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: ________) | | | |
| 1. Carya illinoiensis | 30 | y | FAC |
| 2. Platanus occidentalis | 25 | y | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | ____ = Total Cover | | |
| Sapling/Shrub Stratum (Plot size: ________) | | | |
| 1. Carya | | | |
| 2. | | | |
| 3. " | | | |
| 4. | | | |
| 5. | | | |
| | ____ = Total Cover | | |
| Herb Stratum (Plot size: ________) | | | |
| 1. Cocculus carolinus | 1 | N | FACU |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | ____ = Total Cover | | |
| Woody Vine Stratum (Plot size: ________) | | | |
| 1. Vitis | 5 | | |
| 2. Smilax | 40 | | |
| | ____ = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: ________ (A)
Total Number of Dominant Species Across All Strata: ________ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ________ (A/B)

**Prevalence Index worksheet:**

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

Prevalence Index = B/A = ________

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

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

Remarks: (Include photo numbers here or on a separate sheet.)
Verdegris River channelized, pond dug; sample taken on berm from fill soil

## SOIL

Sampling Point: ____________

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

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16" | 10YR 2/2 | 100 | — | | | | clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ Coast Prairie Redox (A16)
- ☐ Iron-Manganese Masses (F12)
- ☐ 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:

## 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ 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)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________

Water Table Present? Yes ______ No ✓ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

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

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

Remarks:

File: R120708A
Feature: Site 1 pit 6 river bank

wetland

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Sampling Date: 12/9/11
Applicant/Owner: State: Sampling Point: 6
Investigator(s): Blair Baker, Elisa Hotz Section, Township, Range: –
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): –
Slope (%): >20% Lat: – Long: – Datum:
Soil Map Unit Name: – NWI classification: PFO
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes No X
Wetland Hydrology Present? Yes X No

**Is the Sampled Area within a Wetland?** Yes No X

Remarks:

**VEGETATION** – Use scientific names of plants.

| Tree Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Platanus occidentalis | 20 | y | FAC |
| 2. Salix nigra | 10 | | FACW+ |
| 3. Honey Locust gleditsia triacanthos | 5 | | FAC |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |

| Sapling/Shrub Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |

| Herb Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. Xanthium strumarium | 50 | y | FAC |
| 2. Polygonum pensylvanicum | 40 | y | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | | = Total Cover | |

| Woody Vine Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. none | | | |
| 2. | | | |
| | | = Total Cover | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 50 | x 2 = 100 |
| FAC species | 75 | x 3 = 225 |
| FACU species | 0 | x 4 = 0 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 125 (A) | 325 (B) |

Prevalence Index = B/A = 2.6

**Hydrophytic Vegetation Indicators:**

✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)
next to verdegris river

## SOIL

Sampling Point: Wetland 1

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

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16 | 10YR3/3 | 80 | 5YR 4/4 | 20 | c | M | Salt clay | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ 5 cm Mucky Peat or Peat (S3)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

☐ Coast Prairie Redox (A16)
☐ Iron-Manganese Masses (F12)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: none
Depth (inches): ______

**Hydric Soil Present?** Yes ______ No X

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☑ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)
☒ Water-Stained Leaves (B9)
☐ Aquatic Fauna (B13)
☐ True Aquatic Plants (B14)
☐ 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)
☐ Gauge or Well Data (D9)
☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

☐ Surface Soil Cracks (B6)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Stunted or Stressed Plants (D1)
☐ Geomorphic Position (D2)
☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

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

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

Remarks: adjacent to verdegris river

File: R120708A
Feature: Site 1 trib 3

## STREAM CHARACTERIZATION

GPS ID: Site 1 Trib 3

Date: 12/9/11

County: SW MD BV HA WD MJ [✓ RO]
BL LO KF OK LI PO

Investigators: Blair Baker

Circle Waterbody/Stream Type: EPHEMERAL* [✓ INTERMITTENT] PERENNIAL

Approximate depth of running water*: [✓ N/A]

Approximate OHWM: 2' – 3"

Approximate width of stream: (from top of bank to top of bank) 20'

Approximate height of banks (channel depth)*: left 3'–15' right 3'–15'

Approximate depth of pool(s): NA N/A

**Stream Forms Present**

| | |
|---|---|
| Pool(s) | NA |
| Run(s) | NA |
| Riffles(s) | NA |

**Stream Bottom**

| | None | <50% | >50% |
|---|---|---|---|
| silt | | | |
| clay | | | |
| mud | | | X |
| sand | | | |
| gravel | | | |
| cobbles | | | |
| boulders | | | |
| bedrock | | | |

**Dominant Plants Adjacent to Stream*** *(scientific names)*

Trees: Acer rubrum
Pecan

Shrubs/Vines:
Blackberry
Vitis

Herbaceous:

**Description that best fits the stream bank***

| left | | right |
|---|---|---|
| | vertical/undercut | |
| X | steeply sloped (>30%) | X |
| | gradual/no slope (<30%) | |

**Description that best fits the stream channel**

| | | | |
|---|---|---|---|
| | narrow, deep | wide, deep | X |
| | narrow, shallow | wide, shallow | |

**Pick the category that best describes the extent to which vegetation shades the stream within ROW:**

| | | | | | |
|---|---|---|---|---|---|
| | 0% | | 50% | | 100% |
| | 25% | | 75% | X | other 90% |

**Comments**

90% Vege Overstory

Braided Stream

File: R120708A
Feature: Site 1 trib2 incised bank

## STREAM CHARACTERIZATION

GPS ID: trib2 Site 1 South

Date: 12/9/11

County: SW MD BV HA WD MJ [✓ RO] BL LO KF OK LI PO

Investigators: Blair Baker

Circle Waterbody/Stream Type: EPHEMERAL* [✓ INTERMITTENT] PERENNIAL

Approximate depth of running water*: dry N/A

Approximate OHWM: 2'

Approximate width of stream: (from top of bank to top of bank) 15'–20'

Approximate height of banks (channel depth)*: left 6'–8' right 6'–8'

Approximate depth of pool(s): [✓ N/A]

**Stream Forms Present**

Pool(s) n
Run(s) n
Riffles(s) n

**Stream Bottom**

| | None | <50% | >50% |
|---|---|---|---|
| silt | | | |
| clay | | | ✓ |
| mud | | | |
| sand | | | |
| gravel | | | |
| cobbles | | | |
| boulders | | | |
| bedrock | | | |

**Dominant Plants Adjacent to Stream*** *(scientific names)*

**Trees:**
Celtis
Platanus
Carya

**Shrubs/Vines:**
Smilax
Symphoricarpos

**Herbaceous:**

**Description that best fits the stream bank***

| left | | right |
|---|---|---|
| ✓ | vertical/undercut | ✓ |
| | steeply sloped (>30%) | |
| | gradual/no slope (<30%) | |

**Description that best fits the stream channel**

| | | |
|---|---|---|
| ☐ | narrow, deep | wide, deep |
| ✓ | narrow, shallow | wide, shallow |

**Pick the category that best describes the extent to which vegetation shades the stream within ROW:**

| | | | | | |
|---|---|---|---|---|---|
| ☐ | 0% | ☐ | 50% | ☐ | 100% |
| ☐ | 25% | ✓ | 75% | ☐ | other |

**Comments**

~~Pomifera macula~~ Maclura pomifera fruit in channel

runs into pond

File: R120708A Feature: Site 1 trib 1 wide and shallow

## STREAM CHARACTERIZATION

**GPS ID:** Site 1 Trib 2 North

**Date:** 12/9/11

**County:** SW MD BV HA WD MJ BL LO KF OK LI PO RO

**Investigators:** Blair Baker Elise Holtz

**Circle Waterbody/Stream Type:** EPHEMERAL* [✓ INTERMITTENT] PERENNIAL

**Approximate depth of running water*:** dry [✓ N/A]

**Approximate OHWM:** 2'

**Approximate width of stream: (from top of bank to top of bank)** 15'

**Approximate height of banks (channel depth)*:**

left 4'

right 4'

**Approximate depth of pool(s):** [✓ N/A]

**Stream Forms Present**

| | |
|---|---|
| Pool(s) | n |
| Run(s) | n |
| Riffles(s) | n |

**Stream Bottom**

| | None | <50% | >50% |
|---|---|---|---|
| silt | | | |
| clay | | | ✓ |
| mud | | | ✓ |
| sand | | | |
| gravel | | | |
| cobbles | | | |
| boulders | | | |
| bedrock | | | |

**Dominant Plants Adjacent to Stream*** *(scientific names)*

**Trees:**

Celtis

Carya

**Shrubs/Vines:**

Symphoricarpus

Toxicodendron

**Herbaceous:**

**Description that best fits the stream bank***

| left | | right |
|---|---|---|
| | vertical/undercut | |
| | steeply sloped (>30%) | |
| ✓ | gradual/no slope (<30%) | ✓ |

**Description that best fits the stream channel**

| | | | |
|---|---|---|---|
| | narrow, deep | wide, deep | |
| | narrow, shallow | wide, shallow | ✓ |

**Pick the category that best describes the extent to which vegetation shades the stream within ROW:**

| | | | | | |
|---|---|---|---|---|---|
| | 0% | | 50% | | 100% |
| | 25% | | 75% | 85 | other |

**Comments**

File: R120708A Feature: site1 trib 1

## STREAM CHARACTERIZATION

**GPS ID:** trib 1 site 1

**Date:** 12/9/11

**County:** *SW* *MD* BV HA WD MJ [✓ RO] BL LO KF OK LI PO

**Investigators:** Blair Baker & Elisa Hotez

**Circle Waterbody/Stream Type:** EPHEMERAL* [✓ INTERMITTENT] PERENNIAL

**Approximate depth of running water*:** >2" N/A

**Approximate OHWM:** 18" - 3'

**Approximate width of stream: (from top of bank to top of bank)** 3' - 20'

**Approximate height of banks (channel depth)*:**

west left 0" - 10'

east right 12" - 10'

**Approximate depth of pool(s):** [✓ N/A]

**Stream Forms Present**

| | |
|---|---|
| Pool(s) | n |
| Run(s) | n |
| Riffles(s) | n |

**Stream Bottom**

| | None | <50% | >50% |
|---|---|---|---|
| silt | | | |
| clay | | | ✓ |
| mud | | | |
| sand | | | |
| gravel | | | |
| cobbles | | | |
| boulders | | | |
| bedrock | | | |

**Dominant Plants Adjacent to Stream*** *(scientific names)*

**Trees:** pecan, cedar elm, hackberry,

**Shrubs/Vines:** poison ivy, trumpet, vitis

**Herbaceous:** ragweed

**Description that best fits the stream bank***

| left | | right |
|---|---|---|
| ✓ | vertical/undercut | ✓ |
| | steeply sloped (>30%) | |
| | gradual/no slope (<30%) | |

**Description that best fits the stream channel**

| | | |
|---|---|---|
| | narrow, deep | wide, deep |
| ✓ | narrow, shallow | wide, shallow |

**Pick the category that best describes the extent to which vegetation shades the stream within ROW:**

| | | | | | |
|---|---|---|---|---|---|
| | 0% | | 50% | | 100% |
| | 25% | | 75% | 80 | other |

**Comments**

cut banks

originates at culvert S side of Hwy 266, runs south into pond

File: K120108A
Feature: point generic / pond SE Corner
" " " NE Corner

# Pond Field Data Form

**Location/Project:** Site #1 off Hwy 266 Port of Catoosa **Date:** 12-09-2011 **Client:** Port of Catoosa

**Pond Name:** Square pond **Investigator:** Blair Baker + Elisa Hotz

**County:** Rogers **UTM North (Lat):** ______ **UTM West (Long):** ______

**Compass Dir. to road:** N **Approx. Distance to road:** ______ **Approx. distance to project ROW:** ______

**Description (circle one):** Permanent lake/[✓ pond] Temporary lake/pond Marsh/Bog Swamp/forest Other

**Origin:** Natural [✓ Man-made] Unknown

**Perimeter GPS points taken:** yes [✓ no]

**Estimated pond depth:** Approx. ______ Ft. Unknown

**Primary Substrate:** [✓ Silt/Muck] Sand/Gravel Cobble Bedrock Other

**% of Pond Margin with Emergent Vegetation:** [✓ 0] 1-25 25-50 50-75 >75

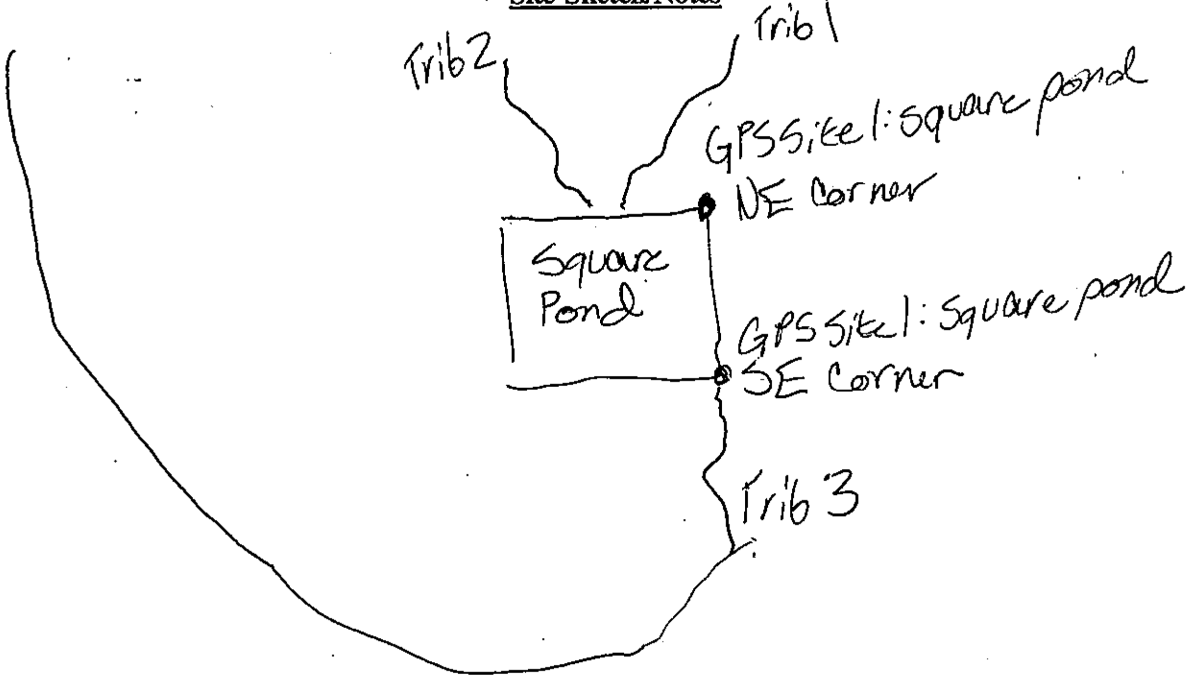
**Within Forest?** [✓ Yes] No

**Distance to Forest Edge:** 5 Ft.

**Surrounding landscape/Vegetation:** Pecan, Oaks, Sps. American Elm, Sycamore

**Dominant species observed:** ______

## Site Sketch/Notes



File: K1Z104A
Feature: Site 1 wetland pit 8 upland

# WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Port of Catoosa City/County: Rogers Sampling Date: 12/10/11
Applicant/Owner: ______ State: OK Sampling Point: pit 8 pond 2 Site 1 upland
Investigator(s): Bo/Baker, Elsasholtz Section, Township, Range: ______
Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______ Slope (%): ______
Subregion (LRR): ______ Lat: ______ Long: ______ Datum: ______
Soil Map Unit Name: ______ NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ______ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No X
Hydric Soil Present? Yes X No ~~X~~ BB
Wetland Hydrology Present? Yes ______ No X

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks:

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Carya illinoensis | 10 | | |
| 2. Maclura pomifera | 20 | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: ______) | | | |
| 1. ragweed giant | 90 | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| = Total Cover | | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum ______

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): ______ (A)
Total Number of Dominant Species Across All Strata: ______ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ______ (A/B)

**Prevalence Index worksheet:**

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

Prevalence Index = B/A = ______

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks:

upland pit

US Army Corps of Engineers Great Plains – Version 2.0

## SOIL

Sampling Point: ________

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

| Depth (inches) | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16in | 10YR 3/1 | | — | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16)
  **(MLRA 72 & 73 of LRR H)**

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16)
  **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ 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 present):**

Type: ________

Depth (inches): ________

BB

**Hydric Soil Present?** Yes X No ~~X~~

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one 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)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3)
  **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ 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)
- ___ Oxidized Rhizospheres on Living Roots (C3)
  **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ________

Water Table Present? Yes ___ No X Depth (inches): ________

Saturation Present? Yes ___ No X Depth (inches): ________
(includes capillary fringe)

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

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

Remarks:

File · K121011A
Feature1Site1 wetland pit 7

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Sampling Date: 12/10/11
Applicant/Owner: Corps State: OK Sampling Point: wetland 1 pond 2 Pit 7
Investigator(s): Blair Baker, Lisa Holz Section, Township, Range: ______
Landform (hillslope, terrace, etc.): Pond edge Local relief (concave, convex, none): none
Slope (%): 3 Lat: — Long: — Datum: —
Soil Map Unit Name: Barge silty clay loam NWI classification: NA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. ~~Carya illinoensis~~ None | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ______ ) | | | |
| 1. Carya illinoensis | 10 | N | FAC+ |
| 2. Ulmus americana | 5 | N | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| **Herb Stratum** (Plot size: ______ ) | | | |
| 1. Polygonum pensylvanicum | 20 | Y | FACW |
| 2. unknown grass | 30 | Y | — |
| 3. unknown juncus | 20 | | — |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ______ ) | | | |
| 1. — None | | | |
| 2. | | | |
| | = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)
Total Number of Dominant Species Across All Strata: ______ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ______ (A/B)

**Prevalence Index worksheet:**

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

Prevalence Index = B/A = ______

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (Include photo numbers here or on a separate sheet.)
constructed dam on East side
collects local runoff, adjacent to trib 4

## SOIL

Sampling Point: Wetland 1

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

| Depth | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | | |
| 0-16in. | 10YR3/2 | 80 | 2.5YR2.5/4 | 20 | C | M | clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✓ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: none

Depth (inches): NA

**Hydric Soil Present?** Yes X No ___

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? EH Yes ~~X~~ No X Depth (inches): EH ~~14 in.~~

Water Table Present? Yes X No ___ Depth (inches): 14 in.

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 16 in.

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

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

Remarks:

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Sampling Date: 12/19/11

Applicant/Owner: Dawberry State: ______ Sampling Point: Wetland 1

Investigator(s): B. Baker, E. Holtz Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______

Slope (%): ______ Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: ______ NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ______

Hydric Soil Present? Yes X No ______

Wetland Hydrology Present? Yes X No ______

Is the Sampled Area within a Wetland? Yes X No ______

Remarks:

### VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| **Tree Stratum** (Plot size: ______ ) | | | |
| 1. Carya illinoisis | 30 | y | FAC |
| 2. Platanus occidentalis | 20 | y | FAC+ |
| 3. Celtis occidentalis | 10 | | FAC |
| 4. | | | |
| 5. | | | |
| | ______ = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ______ ) | | | |
| 1. Carya illinoisis | 10 | | FAC |
| 2. Celtis occidentalis | 5 | | FAC |
| 3. Rosa sp | 5 | | — |
| 4. | | | |
| 5. | | | |
| | ______ = Total Cover | | |
| **Herb Stratum** (Plot size: ______ ) | | | |
| 1. Ragweed Ambrosia trifida | 35 | | FAC |
| 2. buck~~[illegible]~~ carex sp | 10 | | — |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | ______ = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ______ ) | | | |
| 1. Smilax | 40 | y | FAC |
| 2. tox rad | 15 | | FAC |
| | ______ = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 0 | x 2 = 0 |
| FAC species | 135 | x 3 = 405 |
| FACU species | 0 | x 4 = 0 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 135 (A) | 405 (B) |

Prevalence Index = B/A = 3.0

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ______

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: Wetland 1

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

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16 | 2.5YR 2.5/1 | 70 | 2.5YR 2.5/4 | 30 | c | M | clay loam | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ 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: none

Depth (inches): ______

**Hydric Soil Present?** Yes ☒ No ☐

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ 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)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ✓ No ___ Depth (inches): 0 inch
Water Table Present? Yes ___ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

**Wetland Hydrology Present?** Yes ✓ No ___

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

Remarks:

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Co Sampling Date: 12/10/11

Applicant/Owner: Port of Catoosa State: OK Sampling Point: Wetland 2

Investigator(s): Blair Baker, Elisa Holtz Section, Township, Range: Sec 4 T20 N, R15E

Landform (hillslope, terrace, etc.): Pond Edge Local relief (concave, convex, none): concave

Slope (%): 3 Lat: — Long: — Datum: —

Soil Map Unit Name: Barge silty clay loam NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ______

Hydric Soil Present? Yes X No ______

Wetland Hydrology Present? Yes X No ______

Is the Sampled Area within a Wetland? Yes X No ______

Remarks:
Fridge wetland around pond 2

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. None | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |

| Sapling/Shrub Stratum (Plot size: ______) | | | |
|---|---|---|---|
| 1. Ulmus americana | 5 | yes | FAC |
| 2. Carya illinoinensis | 10 | yes | FAC+ |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |

| Herb Stratum (Plot size: ______) | | | |
|---|---|---|---|
| 1. Polygonum pensylvanicum | 20 | no | FACW- ~~FACW~~ |
| 2. Schedonorus phoenix | 30 | yes | FAC- |
| 3. juncus sp. | 20 | no | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| = Total Cover | 85 | | |

| Woody Vine Stratum (Plot size: ______) | | | |
|---|---|---|---|
| 1. None | | | |
| 2. | | | |
| = Total Cover | 85 | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 20 | x 2 = 40 |
| FAC species | 55 | x 3 = 165 |
| FACU species | 0 | x 4 = 0 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 75 (A) | 205 (B) |

Prevalence Index = B/A = 2.7

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

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

Remarks: (Include photo numbers here or on a separate sheet.)
constructed dam on east side Steam
collects local runoff, adjacent to Trib 4

## SOIL

Sampling Point: Wetland J

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

| Depth (inches) | Matrix |  | Redox Features |  |  |  | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
|  | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] |  |  |
| 0-16 | 10YR 3/2 | 80 | 2.5YR 2.5/4 | 20 | C | M | clay |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

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

**Hydric Soil Indicators:**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
✓ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
✓ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

___ Coast Prairie Redox (A16)
___ Dark Surface (S7)
___ Iron-Manganese Masses (F12)
___ 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: none
Depth (inches): NA

**Hydric Soil Present?** Yes ✓ No ___

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
✓ Water Marks (B1)
✓ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
✓ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ 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)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

**Field Observations:**
Surface Water Present? Yes ___ No ✓ Depth (inches): —
Water Table Present? Yes ✓ No ___ Depth (inches): 0-14 in
Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0-16 in

**Wetland Hydrology Present?** Yes ✓ No ___

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

Remarks:

(EH) File: ~~R120708A~~ R121011A
Features: Area Gen. Site1 Pond2
Line Gen. Site1 Pond2 Wetland

# Pond Field Data Form

**Location/Project:** Port of Catoosa **Date:** 12/10/11 **Client:** Dewberry

**Pond Name:** Pond 2 **Investigator:** Blair Baker, Elisa Hutc

**County:** Rogers **UTM North (Lat):** ______ **UTM West (Long):** ______

**Compass Dir. to road:** ______ **Approx. Distance to road:** ______ **Approx. distance to project ROW:** ______

**Description (circle one):** Permanent lake/[✓ pond] Temporary lake/pond Marsh/Bog Swamp/forest Other

**Origin:** Natural [✓ Man-made] Unknown

**Perimeter GPS points taken:** [✓ yes] no

**Estimated pond depth:** Approx. 3 Ft.

**Primary Substrate:** [✓ Silt/Muck] Sand/Gravel Cobble Bedrock Other

**% of Pond Margin with Emergent Vegetation:** 0 [✓ <25] 25-50 50-75 >75

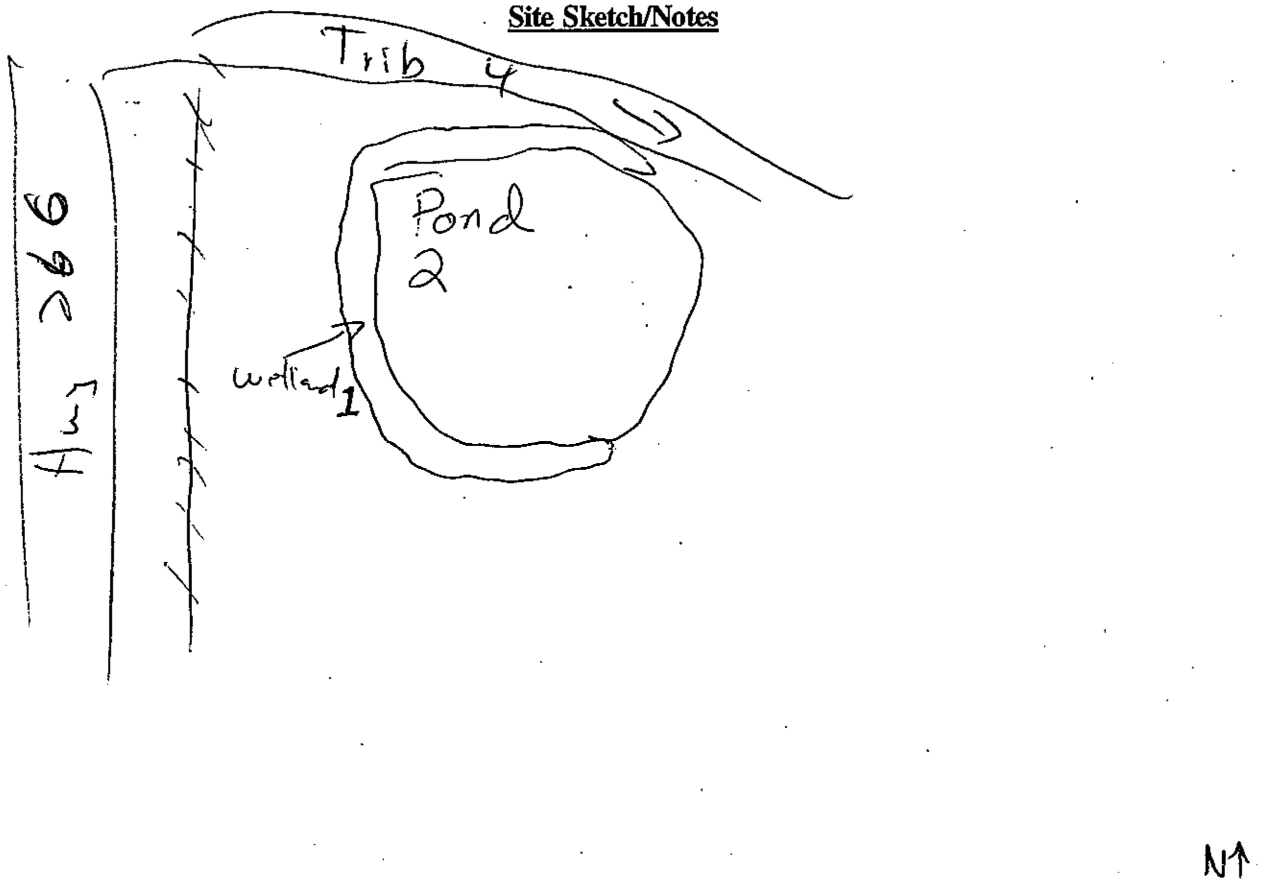
**Within Forest?** [✓ Yes] No

**Distance to Forest Edge:** 5 Ft.

**Surrounding landscape/Vegetation:** Forested

**Dominant species observed:** pecan, Amer. elm Quercus spp.

## Site Sketch/Notes



File: K121011A } Lt Bank File: K120708A } Right Bank

**STREAM CHARACTERIZATION**

Feature: Site 1 Trib 4 Feature: Site 1 trib 4

**GPS ID:** Trib 4 Site 1

**Date:** 12/10/11

**County:** SW MD BV HA WD MJ [✓ RO]
BL LO KF OK LI PO

**Investigators:** Blair Baker, Eliza Hertz

**Circle Waterbody/Stream Type:** EPHEMERAL* INTERMITTENT [✓ PERENNIAL] trib 4

**Approximate depth of running water*:** 1'-12" N/A

**Approximate OHWM:** 3'-5'

**Approximate width of stream: (from top of bank to top of bank)** 5'-30'

**Approximate height of banks (channel depth)*:**
left 2'-30' right 2'-30'

**Approximate depth of pool(s):** 1' N/A

**Stream Forms Present**

Pool(s) y
Run(s) y
Riffles(s) y

**Stream Bottom**

| | None | <50% | >50% |
|---|---|---|---|
| silt | | | |
| clay | | | |
| mud | | | |
| sand | | | |
| gravel | | | |
| cobbles | | | |
| boulders | | | |
| bedrock | | | ✓ |
| Shale | | | ✓ |

**Dominant Plants Adjacent to Stream*** *(scientific names)*

**Trees:**
Quercus
Carya
Ulmus

**Shrubs/Vines:**
Symphor

**Herbaceous:**

**Description that best fits the stream bank***

| left | | right |
|---|---|---|
| ✓ | vertical/undercut | ✓ |
| | steeply sloped (>30%) | |
| | gradual/no slope (<30%) | |

**Description that best fits the stream channel**

| | | | |
|---|---|---|---|
| ☐ | narrow, deep | wide, deep | |
| ☐ | narrow, shallow | wide, shallow | ✓ |

**Pick the category that best describes the extent to which vegetation shades the stream within ROW:**

| | | | | | |
|---|---|---|---|---|---|
| ☐ | 0% | ☐ | 50% | ☐ | 100% |
| ☐ | 25% | ✓ | 75% | ☐ | other |

**Comments**

minnows in water, Frogs,

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Sampling Date: 12/12/11
Applicant/Owner: Port of Catoosa Dewberry State: OK Sampling Point: Wetland 1
Investigator(s): E. Holtz, T. Caskey Section, Township, Range: —
Landform (hillslope, terrace, etc.): bottomland forest Local relief (concave, convex, none): —
Slope (%): 3% Lat: — Long: — Datum: —
Soil Map Unit Name: — NWI classification: PFO
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ____ ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Celtis occidentalis | 40 | X | FAC |
| 2. Carya illinoinsis | 20 | X | FAC |
| 3. Ulmus americana | 5 | | FAC |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| **Sapling/Shrub Stratum** (Plot size: ____ ) | | | |
| 1. none | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| **Herb Stratum** (Plot size: ____ ) | | | |
| 1. Cynodon dactylon | 5 | | FACU |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | | = Total Cover | |
| **Woody Vine Stratum** (Plot size: ____ ) | | | |
| 1. Tox rad | 2 | | FAC |
| 2. Vitis sp | 2 | | — |
| | | = Total Cover | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 67 | x 3 = | 201 |
| FACU species | 5 | x 4 = | 20 |
| UPL species | — | x 5 = | — |
| Column Totals: | 72 (A) | | 221 (B) |

Prevalence Index = B/A = 3.06

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
✓ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: Wetland 1

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

| Depth | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | | |
| 0-16 | 10YR 3/1 | 90 | 5YR 4/6 | 10 | C | PL | silty clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ 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: none

Depth (inches): ______

**Hydric Soil Present?** Yes ✓ No ______

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ 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)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ✓ No ______ Depth (inches): 0 in

Water Table Present? Yes ✓ No ______ Depth (inches): 0 in

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0 in

**Wetland Hydrology Present?** Yes ✓ No ______

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

Remarks:

Buttressed tree Roots

## WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Port of Catoosa City/County: Rogers Co. Sampling Date: 12/12/11
Applicant/Owner: Port of Catoosa State: OK Sampling Point: Wetland
Investigator(s): Elisa Holt, Jason Caskey Section, Township, Range: Sec 4, T20N, R15E
Landform (hillslope, terrace, etc.): / Local relief (concave, convex, none): concave
Slope (%): 3 Lat: — Long: — Datum: —
Soil Map Unit Name: ______ NWI classification: PFO
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ______
Hydric Soil Present? Yes X No ______
Wetland Hydrology Present? Yes X No ______

Is the Sampled Area within a Wetland? Yes X No ______

Remarks:

### VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| **Tree Stratum** (Plot size: ______) | | | |
| 1. ulnus americana | 20 | Y | FAC |
| 2. celtis occidentalis | 20 | Y | FAC |
| 3. ulnus alata | 10 | N | FACU |
| 4. | | | |
| 5. | | | |
| | 50 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. Ulnus Americana | 10 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 10 = Total Cover | | |
| **Herb Stratum** (Plot size: ______) | | | |
| 1. cynadon dactalon | 20 | N | FACU |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | 20 = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. tox | 5 | N | FAC |
| 2. vitis sp | 5 | N | — |
| | 90 = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 55 | x 3 = | 165 |
| FACU species | 30 | x 4 = | 120 |
| UPL species | 0 | x 5 = | |
| Column Totals: | 85 (A) | | 285 (B) |

Prevalence Index = B/A = 3.35

**Hydrophytic Vegetation Indicators:**

__ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
__ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ______

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: Wetland 1

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

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-16 | 10 YR3/1 | 80 | 2.5YR3/6 | 20 | C | M | clay/loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

**Hydric Soil Indicators:**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ 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: none

Depth (inches): ______

**Hydric Soil Present?** Yes ✓ No ______

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes _____ No _____ Depth (inches): ___________

Water Table Present? Yes _____ No _____ Depth (inches): ___________

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): ___________

**Wetland Hydrology Present?** Yes ✓ No ______

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

Remarks:

buttressed trees

Site 1 Wooded Wetland Pit 9

Wetland 1

## WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Port of Catoosa City/County: Rogers Sampling Date: 12/12/2011

Applicant/Owner: ______ State: OK Sampling Point: pnt 9

Investigator(s): Elisa Hotz & Jason Cooley Section, Township, Range: —

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): concone Slope (%): 3%

Subregion (LRR): ______ Lat: — Long: ______ Datum: —

Soil Map Unit Name: — NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes X No ______

Hydric Soil Present? Yes X No ______

Wetland Hydrology Present? Yes X No ______

Is the Sampled Area within a Wetland? Yes X No ______

Remarks: Butressed tree roots

**VEGETATION – Use scientific names of plants.**

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: ______) | | | |
| 1. Ulmus Americana | 30 | X | FAC |
| 2. Celtis Occidentalis | 30 | X | FAC |
| 3. Winged Elm Ulmus alata | 10 | | FACUP |
| 4. | | | |
| | | = Total Cover | |
| Sapling/Shrub Stratum (Plot size: ______) | | | |
| 1. Ulmus Americana | 10 | | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | = Total Cover | |
| Herb Stratum (Plot size: ______) | | | |
| 1. Burmuda | 20 | X | FACU |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| | | = Total Cover | |
| Woody Vine Stratum (Plot size: ______) | | | |
| 1. fox grape | 5 | | FAC |
| 2. Vitis sp | 5 | | — |
| | 110 | = Total Cover | |

% Bare Ground in Herb Stratum ______

Remarks:

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC–): 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: .66 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 75 | x 3 = | 225 |
| FACU species | 30 | x 4 = | 120 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 105 (A) | | 345 (B) |

Prevalence Index = B/A = 3.3

**Hydrophytic Vegetation Indicators:**

☑ 1 - Rapid Test for Hydrophytic Vegetation

☐ 2 - Dominance Test is >50%

☐ 3 - Prevalence Index is ≤3.0[1]

☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ______

## SOIL

Sampling Point: Wetland 1

**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 % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-16" | 10YR3/1 | 80 | 2.5YR3/6 | 20 | C | M | Clay/Silt/Loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) **(LRR F)**
___ 1 cm Muck (A9) **(LRR F, G, H)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**

___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
**(MLRA 72 & 73 of LRR H)**

**Indicators for Problematic Hydric Soils[3]:**

___ 1 cm Muck (A9) **(LRR I, J)**
___ Coast Prairie Redox (A16) **(LRR F, G, H)**
___ Dark Surface (S7) **(LRR G)**
___ High Plains Depressions (F16)
**(LRR H outside of MLRA 72 & 73)**
___ Reduced Vertic (F18)
___ 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 present):**
Type: none
Depth (inches): ______

**Hydric Soil Present?** Yes X No ___

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

X Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X 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)

___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
**(where not tilled)**
X Presence of Reduced Iron (C4)
___ 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)
___ Oxidized Rhizospheres on Living Roots (C3)
**(where tilled)**
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) **(LRR F)**

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes ___ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ______

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

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

Remarks: Buttressed tree Roots

Site1 Wooded Wetland Pit 10 Wetland 1

## WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Port of Catoosa site 1 City/County: Rogers Sampling Date: 12/12/2011
Applicant/Owner: ______ State: OK Sampling Point: Pit 10
Investigator(s): Eliza Hotz + Jason Cooley Section, Township, Range: ______
Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______ Slope (%): ______
Subregion (LRR): ______ Lat: ______ Long: ______ Datum: ______
Soil Map Unit Name: ______ NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ______ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes X No ______
Hydric Soil Present? Yes X No ______
Wetland Hydrology Present? Yes X No ______

Is the Sampled Area within a Wetland? Yes X No ______

Remarks: upland sampling point – improved pasture – 100% cynadon dactalon, Soil = 10YR 3/3 0-16"

**VEGETATION – Use scientific names of plants.**

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: ______) | | | |
| 1. Celtis occidentalis | 40 | X | FAC |
| 2. Carya illinoinensis | 20 | X | FAC |
| 3. Ulmus americana | 5 | | FAC |
| 4. | | | |
| = Total Cover | | | |
| Sapling/Shrub Stratum (Plot size: ______) | | | |
| 1. none | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| Herb Stratum (Plot size: ______) | | | |
| 1. Bermuda cynodon dactalon | 5 | | FACU |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| = Total Cover | | | |
| Woody Vine Stratum (Plot size: ______) | | | |
| 1. Tox Rad | 2 | | FAC |
| 2. Vitis sp. | 2 | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum ______

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC–): 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 67 | x 3 = | 201 |
| FACU species | 5 | x 4 = | 20 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 72 (A) | | 221 (B) |

Prevalence Index = B/A = 3.06

**Hydrophytic Vegetation Indicators:**

✓ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
✓ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ______

Remarks: Photos takin by Jason in his Phone
① Pit
② N/S ③ Directional Photos

**SOIL** Sampling Point: Wetland 1

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

| Depth (inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | | |
| 0-16in | 10YR 3/1 | ~~100~~ 90 | 5YR 4/6 | 10 | C | PL | Silty Clay Loam | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ 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 present):**
Type: none
Depth (inches): ______

**Hydric Soil Present?** Yes X No ______

Remarks:

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one 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)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ 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)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

**Field Observations:**

Surface Water Present? Yes X No ______ Depth (inches): 0in
Water Table Present? Yes X No ______ Depth (inches): 0 in
Saturation Present? (includes capillary fringe) Yes X No ______ Depth (inches): 0 in

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

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

Remarks: Buttressed tree roots

# Pond Field Data Form R121209A

Location/Project: Port of Catoosa Date: 12-12-11 Client: Dewberry

Feature: Pond Name: Site 1 Wooded Wetland Pond 3 Investigator: Elisa Hotz + Jason Tookey

County: Rogers UTM North (Lat): ______ UTM West (Long): ______

Compass Dir. to road: ______ Approx. Distance to road: ______ Approx. distance to project ROW: ______

Description (circle one): Permanent lake/pond Temporary lake/pond Marsh/Bog Swamp/forest Other

Origin: Natural Man-made [✓ Unknown]

Perimeter GPS points taken: [✓ yes] no

Estimated pond depth: Approx. 2 Ft.

Primary Substrate: [✓ Silt/Muck] Sand/Gravel Cobble Bedrock Other

% of Pond Margin with Emergent Vegetation: 0 1-25 [✓ 25-50] 50-75 >75

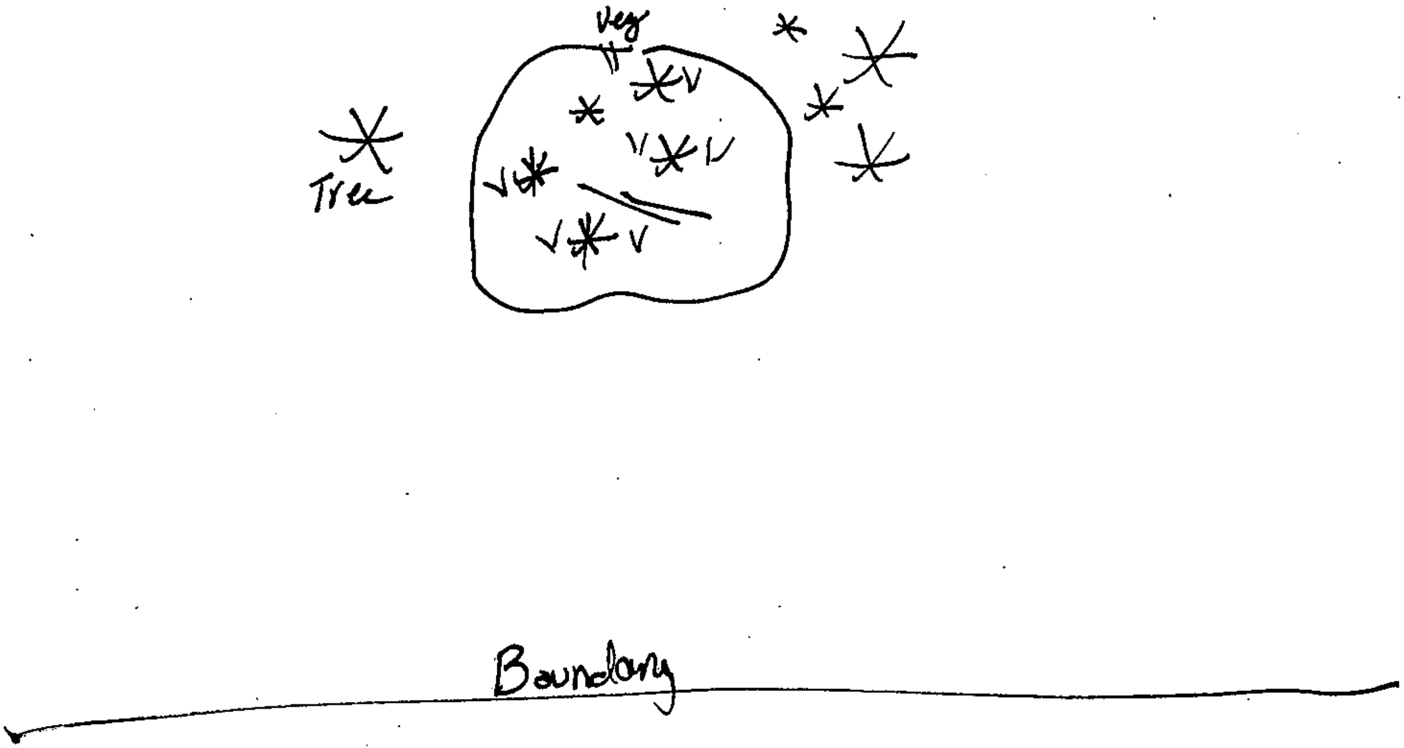
Within Forest? [✓ Yes] No

Distance to Forest Edge: 30 Ft.

Surrounding landscape/Vegetation: ______

Dominant species observed: Sedges Quercus Vitus

## Site Sketch/Notes



# APPENDIX B

# CULTURAL RESOURCES

***Christopher A. Cojeen***
**Principal Investigator**
**Cojeen Archaeological Services, LLC**

Archaeology
Research
History

# Report on the Archeological Site Assessment of the Tulsa Port of Catoosa 130-Acre Portion of the Barge Fleeting Area Project Rogers County, Oklahoma

With Appendix B, Soil Morphology and Stratigraphy
By Scott Fine

Land Administration: US Army Corps of Engineers, Tulsa District

Client: Dewberry
Representative: Andrea Burk, (973) 739-9400
Location: Portions of Sections 8, 16 and 17 T20N, R15E (approximately 130 acres)
USGS Catoosa, OKLA quadrangle, 7.5-minute series 1963 (photo revised 1980)

File Search: Amy Cojeen, November 24, 2011
Survey: Christopher Cojeen, Amy Cojeen, David Boling, Barker Fariss,
Aaron Judkins and Daniel Farrow, November 30 and December 1, 2011
Report: Christopher Cojeen and Amy Cojeen, March 5, 2012 (Revised May 22, 2012)

***P.O. Box 1186 | Norman, Oklahoma 73070 | (405) 360-9996 FAX: (405) 366-7020***

## Abstract:

On November 30 and December 1, 2011, Cojeen Archaeological Services, LLC (CAS) conducted an archeological assessment of approximately 130 acres (project area), on US Army Corps of Engineers (USACE) and Tulsa Port of Catoosa (TPC) lands located in portions of Sections 8, 16 and 17 T20N, R15E, Rogers County, Oklahoma. This study was performed at the request of Dewberry Engineers, Inc. (Dewberry). A land exchange between the USACE and TPC has been proposed as part of the Barge Fleeting Area Project. The areas of the proposed action were divided into six study areas for the purposes of this report.

The purpose of this survey is to identify the surface expression of any cultural resources present in the project area, and possible disturbances to such resources caused by the proposed Barge Fleeting Area project. Survey methodology included pedestrian meandering transects of no more than 50 feet (15m) spacing augmented by shovel tests in lower visibility settings in an attempt to locate cultural resources. A total of approximately 130 acres of land area was studied for this report.

CAS previously conducted a preliminary archeological site assessment of a 30-acre portion of the proposed Barge Fleeting Area Project located in the E/2 of the E/2 of the NE/4 of Section 17 T20N, R15E (Cojeen and Cojeen 2010). This 30-acre area is owned by the TPC and is part of the proposed land exchange areas. One archeological site, 34RO343, was recorded in the 30-acre study area. This site is the remains of a 20th century homestead consisting of five features and associated artifacts. The site was recorded as an inventory site, not eligible for inclusion on the National Register of Historic Places (NRHP).

According to files at the Oklahoma Archeological Survey (OAS) no previously recorded sites are located within the 130-acre project area. One new archeological site was located in the project area. Site 34RO347 is the remains of a concrete block outbuilding noted in Study Area 3. Based on the poor condition of the outbuilding and lack of integrity of the artifacts, this site does not appear to be eligible under Criterion C or D of the NRHP. An initial records check of the NE/NE of Section 17 T20N, R15E revealed no association with significant events or persons, therefore this site does not appear to be eligible under Criterion A or B of the NRHP. No further archeological concern for 34RO347 is recommended.

Scott Fine, Oklahoma State University PhD candidate under Brian Carter, examined two soil cores. Both showed weak soil structure, accumulating from an alluvial setting. Because of the weak soil structures and alluvial nature of deposition (thin deposits), confidence in plant remains for C-14 dating was low and was not utilized as a field method.

No significant cultural resources were observed in the project area during the course of these investigations. The proposed Barge Fleeting Area Project as currently planned will have no effect on significant cultural resources.

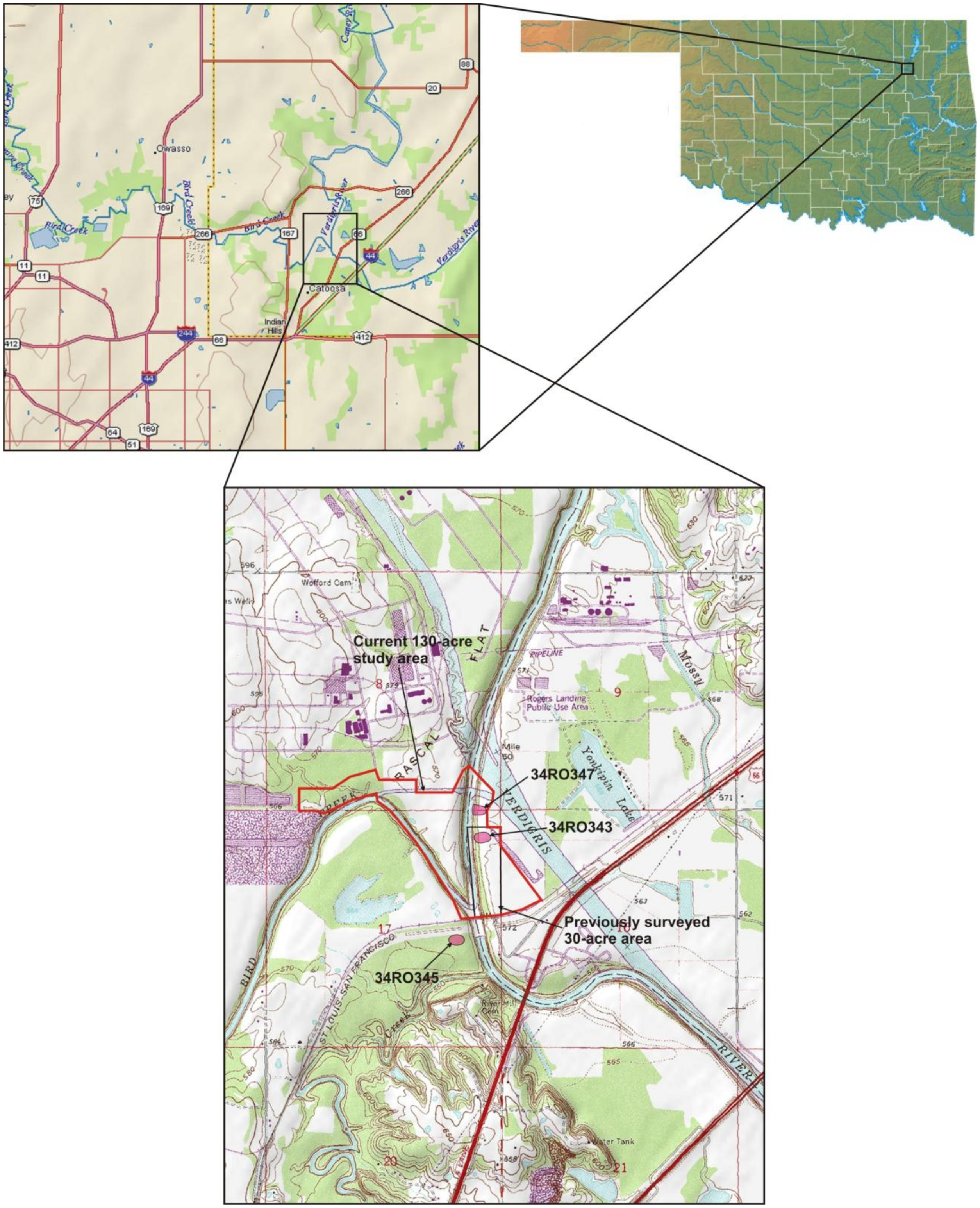


Figure 1. Project vicinity (study area outlined in red).

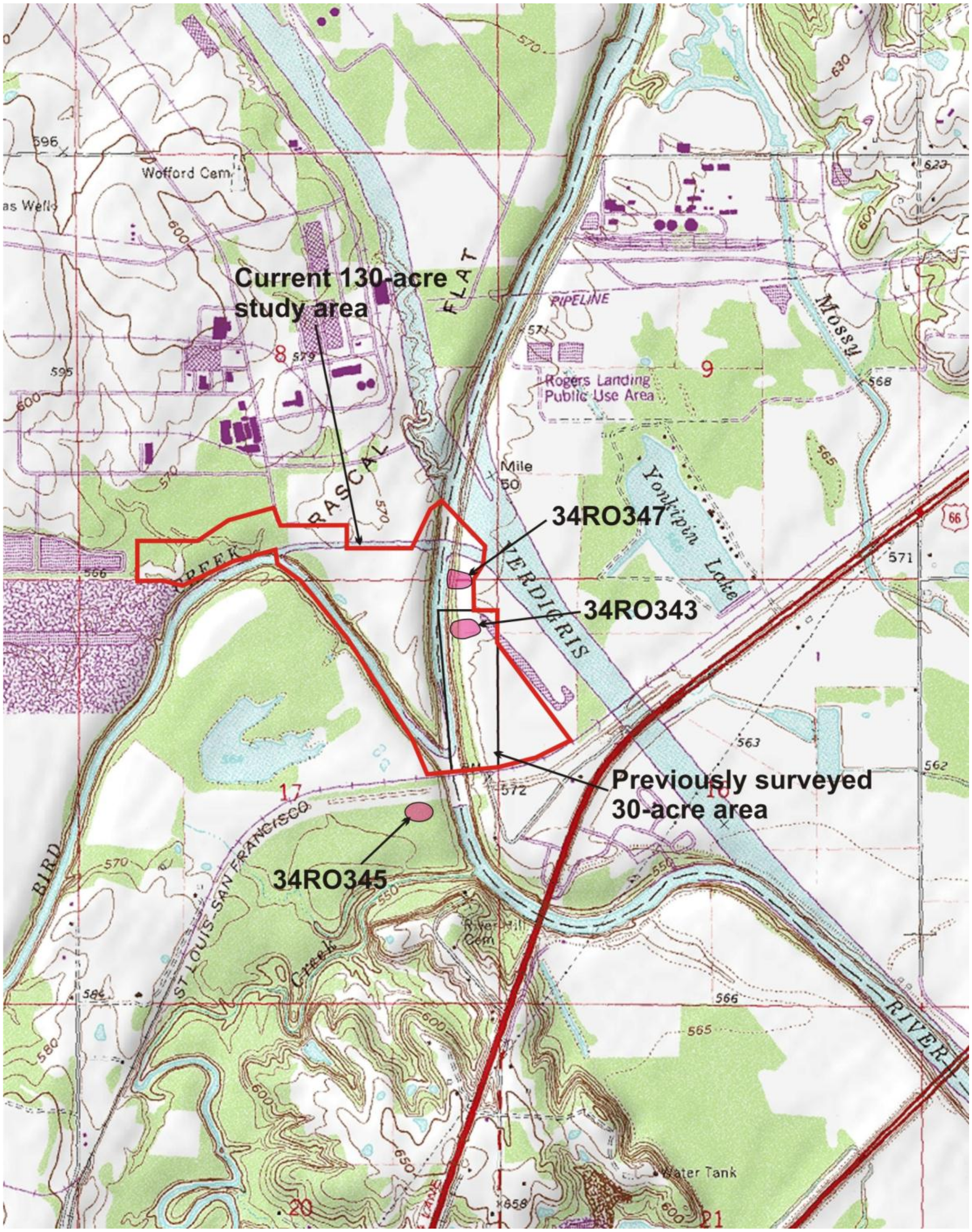


Figure 2. Topographic map of the proposed Barge Fleeting Area Project (outlined in red) and known archeological sites within the study areas and a ¼ of a mile from the project boundary. USGS Catoosa, OKLA quadrangle, 7.5-minute series 1963 (photo revised 1980).

Figure 3.Proposed Barge Fleeting Area Project (red diagonal lines), provided by client.

## Description of Project:

The TPC proposes to build a new barge fleeting area within the former Verdigris River channel (Figure 3). As part of this project, a land sale by the USACE to the TPC has been proposed (Figure 4). The island and northern peninsula portions owned by the USACE will be sold to the TPC.

The Barge Fleeting Project Scope is as follows (as provided by the TPC):

*The channel will be 300 feet in width measured at the bottom of the channel and will have 3:1 side slopes. The depth of the channel will be 14 feet. The channel will be approximately 2,200 feet long. The proposed dimensions of the fleeting area will allow berthing of 60 standard hopper barges.*

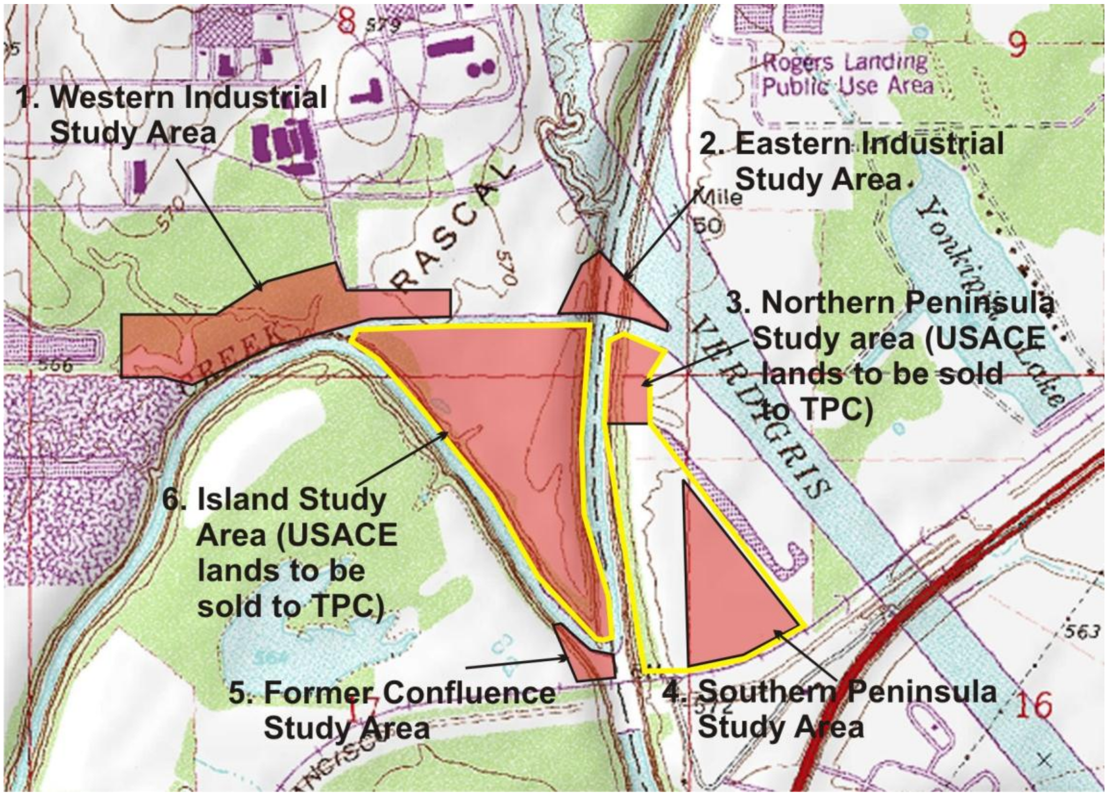


Figure 4. Topographic map showing the six archeological study areas and proposed land exchange areas (highlighted in yellow) of the Barge Fleeting Area Project.

## Location and Setting:

The Tulsa Port of Catoosa, Barge Fleeting Area Project is located in southwest Rogers County, Oklahoma (Figure 1). The study area is located approximately 2 miles north of Catoosa, Oklahoma adjacent to State Highway 66 in the S/2 of the S/2 of Section 8, the W/2 of the NW/4 of Section 16 and the NE/4 of Section 17 T20N, R15E (Figure 2). The Barge Fleeting Area Project was divided into six study areas for the purposes of this report (Figure 4). A total of 130 acres of land area was surveyed for this report.

**Study Area 1:** Western Industrial Study Area (approximately 27 acres)
This study area is located adjacent to the north of the Bird Creek channel and the Bird Creek cut-off within the TPC industrial complex and encompasses approximately 27 acres. Aerial photographs from 1942 to 1964 show the majority of the area as heavily wooded with a portion of the northeast extent cleared of timber. Currently Study Area 1 is cleared of timber with the exception of areas immediately adjacent to the Bird Creek cut-off. The western and eastern extents are currently utilized as a dumping ground with debris piles of asphalt, concrete, dimensional lumber, metal and soils (Photo 1). At the time of survey medium to tall height grasses covered the central portion of this study area with some standing water on the surface. Wooded areas adjacent to Bird Creek were covered in short grasses and leaf litter showing 0-30% visibility. Soils in shovel tests revealed 0-40cmbs of brown silty loam over darker brown silty loam to 50cmbs. Drainages observed in this area contained debris related to the industrial complex including large concrete slab fragments, metal drainage pipe and rebar. Elevation in Study Area 1 ranges from 560-570 feet above mean sea level (AMSL).

Photo 1. Facing west to debris piles in the western extent of Study Area 1.

**Study Area 2:** Eastern Industrial Study Area (approximately 6 acres)
This study area is also located within the TPC industrial area on a point of land comprised of soils dredged from construction of the original TPC Terminal channel. The original Verdigris River channel once trended roughly north/south through this area. The river was diverted to the east and the channel was filled in with soils. The Bird Creek cut-off forms the southern boundary of this study area. Aerial photographs show the Verdigris River channel with wooded areas on either side of the channel. Currently the area is in medium to tall height grasses showing 0-20% visibility with hardwoods lining the waterway.  Elevation in Study Area 2 ranges from 530-565 feet AMSL.

Photo 2. Facing northeast to Bird Creek cut-off and southern boundary of Study Area 2.

**Study Area 3:** Northern Peninsula Study Area (approximately 8 acres)
This study area is located on the northern portion of a peninsula formed by the former Verdigris River channel to the west, the Bird Creek cut-off to the north, and the diverted Verdigris River channel to the east. Aerial photographs show that prior to construction of the TPC, Study Area 3 was mostly open pasture overlooking the original Verdigris River channel to the west. Areas adjacent the river were heavily wooded. Currently Study Area 3 consists of moderately wooded rocky terraces with leaf litter and sparse understory showing 0-30% visibility. Two-track roads and areas of erosion showed higher visibility (up to 60%). Gently sloping terraces adjacent to the former Bird Creek and Verdigris River channels have been reinforced with dredged soils. Flotsam and modern debris such as plastic and glass bottles and styrofoam were noted along the terraces. Shovel tests revealed mottled brown silty loam with red brown clay. Pea-size gravels were noted throughout the shovel tests. The majority of the study area consists of soils dredged from the TPC Terminal channel. Elevation in Study Area 3 ranges from 525-565 feet AMSL.

Photo 3. Facing south to two-track road along the western extent of Study Area 3.

**Study Area 4:** Southern Peninsula Study Area (approximately 18 acres)
This study area is a triangular shaped portion bounded to the east by a large earthen levee formed from dredged soils, the Burlington Northern Santa Fe (BNSF) railroad grade to the south and the 30-acre area previously studied to the west. Aerial photographs show the study area as open pasture with scattered hardwoods. At the time of survey the area was in level, open hay pasture with medium to tall height grasses showing 0-20% visibility. The eastern boundary adjacent to the levee is moderately wooded. Shovel tests revealed compact brown silty loam 0-30cmbs, reddish brown silty loam 30-55cmbs over medium brown clay 55-70cmbs. Elevation in the Study Area 4 ranges from 565-570 feet AMSL.

Photo 4. Facing northeast to Study Area 4.

**Study Area 5:** Former Confluence Study Area (approximately 2 acres)
This study area is located on the west bank of the former Bird Creek channel and its confluence with the former Verdigris River channel. The confluence is now filled in with dredged sediments creating an oxbow. The BNSF railroad grade represents the southern boundary of this study area. Currently the study area consists of wooded gently to moderately sloping terraces reinforced with dredge sediments showing 40% visibility overall. Flotsam and modern debris were noted along the terraces. No intact soils were noted in this study area. Shovel tests revealed mottled compact gray brown silty loam with gray clay to 50cmbs. Elevation in Study Area 5 ranges from 530-575 feet AMSL.

Photo 5. Study Area 5 facing northeast from BNSF railroad grade to the former confluence of the Verdigris River and Bird Creek channels.

**Study Area 6:** Island Study Area (approximately 54 acres)
This study area is a triangular-shaped island formed by the former Bird Creek channel to the west, the Bird Creek cut-off to the north and the former Verdigris River channel to the east. This island area is owned by the USACE and is part of the proposed land sale to the TPC (Figure 4). Prior to the closing of the confluence of the two water ways and construction of the Bird Creek cut-off, aerial photographs show the area as a peninsula that was both heavily wooded and open pasture. The former Verdigris River and Bird Creek channel areas were lined by heavily wooded areas with mostly post oak and blackjack oak with a moderate scrub understory. Surface visibility along the creek channels ranged from 0-30% with leaf litter and mixed grasses covering the surface. Areas offering higher visibility (up to 60%) including areas of erosion, game trails and the river bank were noted. Currently the area is heavily wooded with some open areas at the northern extent. Gently sloping terraces adjacent to the former Bird Creek and Verdigris River channels have been reinforced with dredged sediments. Flotsam and modern debris such as plastic and glass bottles and styrofoam were noted along the terraces. The majority of the northern extent of this study area is comprised of dredged soils. Shovel tests in the southern portions showed compact brown silty loam 0-30cmbs, gray brown silty loam 30-55cmbs. Sparse pea-size gravels were noted throughout the shovel tests. Elevation in Study Area 6 ranges from 525-540 feet AMSL.

Photo 6. Facing west to a terrace reinforced with dredge sediments adjacent the former Verdigris River along the eastern boundary of Study Area 6.

The project is located within Claremore Cuesta Plains Geomorphic province (within the Prairie Plains Physiographic Region [Bruner 1976]), an area generally described as "resistant Pennsylvanian sandstones and limestones dipping gently westward, forming cuestas between broad shale plains" (Curtis Jr., Ham and Johnson 2008). The study area is considered within the Tallgrass Prairie Vegetation type (Hoagland 2008), characterized by "prominent grass species buffalograss, gramas (blue, black, hairy, and sideoats), and silver bluestem".

At present, the project area has a temperate, subhumid climate, typical of the north-central part of Oklahoma. Seasonal changes vary in intensity, but the changes between seasons are gradual. Summer is usually the wettest season. Average annual precipitation varies from 36 cm to 40 cm.

Vegetation in the project area is associated with the Tallgrass Prairie Plains (Hoagland 2008). The Tallgrass Prairie Preserve managed by the Nature Conservancy has documented the native plant and animal communities in this region (Coppedge et. al 1999, Palmer et. al 2003, Palmer 2007). The dominant plants on the uplands are Indiangrass, big and little bluestem, sideoats grama, blue grama, and hairy grama. Recent invasive species such as the Eastern Red Cedar (*Juniperous virginiana*) are scattered over the prairie, creating a savanna-like vegetation community. Small groves of low broadleaf deciduous trees and shrubs occur along major drainages and valley bottoms as riparian woodlands and crosstimbers on some north-facing slopes. The dominant species in these groves are oaks (*Quecus stellata* and *Quercus marilandica*), hackberry (*Celtis occidentalis*), cottonwood, plum (*Prunus* sp.), and coralberry (*Symphoricarpos orbicultus*).

## Research Biases:

The purpose of this investigation was to locate any cultural resources within the defined impact area of the project, and to provide sufficient detail for the protection and management of such resources. Interpretation of any cultural resources found followed standard methodology practices. By strict definition, cultural resources are any evidence of human use or occupation without any age limitations, but for this project, the term was restricted to cultural remains that were at least 45 years in age.

Land management and modification activities including land clearing for use as pasture, plowing, contour terracing, roads, fences, and overhead utility corridors have all impacted the study areas. All six study areas exhibited disturbances related to the construction of the TPC and the McClellan-Kerr Arkansas River Navigation System. Study Areas 1, 2 and 5 and the northern portion of Study Areas 3 and 6 are comprised of dredge sediments. Modern trash dumping activity and flotsam was observed in all six study areas particularly along the wooded terraces adjacent the former Verdigris River and Bird Creek channels. Numerous large debris piles of concrete, asphalt, rock, wood and metal were observed in the Study Area 1. Deer stands and debris related to hunting activity was also observed. These items and modifications were discounted as cultural resources for the purposes of this report.

## Paleontological Resources:

No vertebrate paleontological resources or significant invertebrate resources were observed during the course of this archeological investigation.

## Previous Archeological Studies In or Near the Project Area:

Richard Drass (1985) discussed the archeological resources within the Bird Creek Basin including the study areas. One of the conclusions drawn from his studies was the presence of extensive alluviation of river and stream valleys in the area. The deep alluvium may have buried many Archaic time period occupations. With this in mind, Drass concludes only extensive subsurface explorations into bottom lands will add to the knowledge of Archaic site distributions and densities in these settings of alluvial deposition. For example, both the Oolagah and Copan reservoirs have deeply buried Archaic camps exposed by creek bank erosion.

Plains Woodland period sites are more abundant in the north-central Oklahoma region, with representative artifacts including Scallorn and Reed points. The abundance of Woodland period sites may be a reflection of greater population density during this period; or, Drass notes (1985) that it again may be the alluvium covering Archaic (and former) sites that alter our perception of the settlement activity adjacent to these waterways.

One consideration of the Bird Creek study was to examine the impact of Tulsa metroplex development on Bird Creek archeological resources. Much of Bird Creek has not been affected by urban growth, as development has favored the tributaries and avoided the flood-prone bottom lands. Drass indicates (as of 1984) that modern quarry and transportation development have reached a limit, and expects few additional concerns for impact to Bird Creek sites, with the exception to developments of railroads and port facilities (Drass 1985).

Drass states that future work should concentrate on impacts to potential buried habitation materials; summarizing that unless deep excavations occur with construction, little impact will occur to archeological sites (Drass 1985).

As Drass' comments relate to the current project in consideration, this port project does offer an opportunity to examine potential effects on deeper buried deposits, if they indeed exist and if they can be identified. However, the (potential) sites need to be extensive enough (containing enough cultural materials) to be found by soil coring or other deeper sampling methods.

Another large format study touching on the boundaries of the TPC project area was the Tulsa North Triangle, an archeological study of northern Tulsa and western Rogers counties, Oklahoma (Dickerson et. al 1991). The TPC itself was excluded from the study area. As in Drass' Bird Creek study, the concern for potential sites buried in the deep alluvial settings adjacent waterways was also expressed (Dickerson et. al 1991:107).

Efforts at identifying buried soils on USACE projects in the general region have previously been conducted, with limited results. In particular, the Candy Creek study in Osage County, Oklahoma (Tucker et. al 2008) identified two named buried pedostratigraphic units, both within a time period known for human occupation of the general area (determined through C-14 samples within soil core samples). Still, the Candy Creek study identified alluvium to a depth of 25 to 40 feet and, according to C-14 dates, from the early to late Pleistocene through the late Holocene in chronological age, lending to the possibility for buried human activity areas. No identifiable artifacts were recovered in the limited number of cores placed over a relatively large area. The authors note a concern that the coring sample was too small to locate artifacts, and they describe an artifact search in this method as a 'needle in a haystack' search; also, ephemeral prehistoric land use within time periods represented by the buried soils may contribute to a lack of ability to identify cultural materials.

Although well summarized, written and researched by geomorphologist Brian Carter, there remains a lack of consensus regarding investigating deeply buried soils for archeological materials. The report acknowledges that cost factors would inhibit a greater sampling capacity by increased coring, and the sparse and ephemeral nature of early occupations do not lend well to this method of detection, even when buried soils are known to exist.

Geophysical methods to compliment coring are suggested, such as ground penetrating radar (Tucker 2008:55), however if sites are deeply buried and sparse in nature one would question if this method would successfully identify physical cultural remains.

In personal communication with Leland Bement, who also utilized coring under the direction of Brian Carter at the Cooper site (a buried Folsom bone bed), Leland Bement suggests once deeper soils are identified, removal of soils (such as with a backhoe) and spreading the matrix out in search of larger artifacts or concentrations of artifacts represents a realistic research method.

Thus, relating the above discussions to the TPC, soil cores were examined by a geomorphologist (Appendix B) to identify possible buried soil. If identified, the buried soils may be "spread out" during monitoring of the disturbance activities.

## Soils Within the 130-Acre Project Area:

According to the United States Department of Agriculture, Natural Resources Conservation Service, soils in the project area are floodplain alluvial deposits associated with the Verdigris River and the Bird Creek basins (Figure 5). Four major soil units occur in the study areas including Barge silty clay loam (BarG), 0 to 30 percent slopes (Port industrial areas and northern portion of the island study area), Verdigris silt loam (Vd), 0 to 1 percent slopes, occasionally flooded (southern portion of the island study area), Verdigris silty clay loam (Vf), 0 to 2 percent slopes (former Bird Creek and Verdigris River channel) and Verdigris clay loam (Ve), 0 to 1 percent slopes, occasionally flooded (southern portion of peninsula study area). These soils are similar in composition, with slight variations in slope varying the properties and qualities. Barge silty clay loam represents silty dredge soil. These soils are described as linear, well-drained soils occupying floodplains and floodplain steps parented from silty alluvium (Natural Resources Conservation Service, 2009).

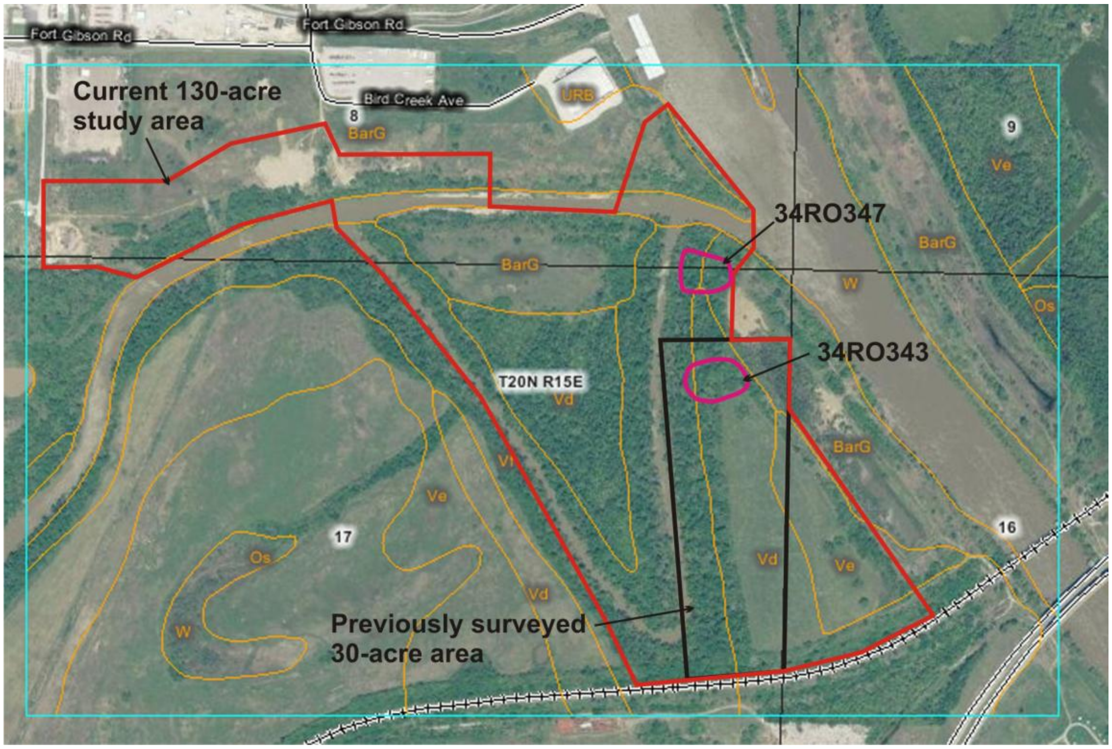


Figure 5. Mapped soil units of the proposed Barge Fleeting Area Project.

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## <u>File Search:</u>

CAS visited the OAS in Norman, Oklahoma, to examine maps and files pertaining to the study area in an effort to identify previously recorded cultural resources within the proposed project location. **OAS files indicate that no previously recorded archeological site are located within the six study areas of this project. Two archeological sites are located within a ¼ of the project area:**

**34RO343**
C E/2 NE/NE Section 17 T20N, R15E
This site is the remains of a mid-20th century homestead recorded by CAS on November 8, 2010. Features observed at the site include a concrete block house foundation (Feature 1), a poured cement cellar (Feature 2), two 12-inch (30 cm) cement circular casings (Feature 3), a possible water well represented by a metal pipe set in concrete (Feature 4), and two rectangular poured concrete stem wall foundations (Feature 5). The five features and associated artifacts were observed on the surface in a moderately wooded setting over a 360-foot by 215-foot (110x65 m) area with leaf litter and sparse understory showing 40-50% visibility. The 1942, 1958 and 1964 aerial photographs show three discernible standing structures. The farmstead is extant on the 1972 aerial photograph.

Site 34RO343 was recorded as not eligible under Criterion C or D of the NRHP based on the lack of integrity of the artifacts and the poor condition of the features. The site was also recorded as not eligible under Criterion A or B based on an initial records check of the NE/NE of Section 17 T20N, R15E and no further concern for 34RO343 was recommended. This site is located adjacent to Study Area 3 in the previously surveyed 30-acre area. No additional features or artifacts of 34RO343 were located in the current 130-acre project area.

**34RO345**
SE/NW/SW of Section 17 T20N, R15E
This site is an unassigned prehistoric camp recorded by Algonquin Consultants, Inc. on March 1, 2011 during a cultural resource survey of the 9-acre Spunky Creek Dredging Project. The materials were observed in shovel tests south of a railroad grade in an open field used to store heavy equipment. Artifacts collected from the site include small pieces of fired clay, four bifaces, three unifaces, two pieces of fire-cracked rock and six hundred and ninety one pieces of debitage. The recorder notes possibility for intact site stratigraphy is high. NRHP status of this site was not assessed. This site is located 350 feet south of Study Area 5. No artifacts were observed in Study Area 5 on the surface or in shovel tests.

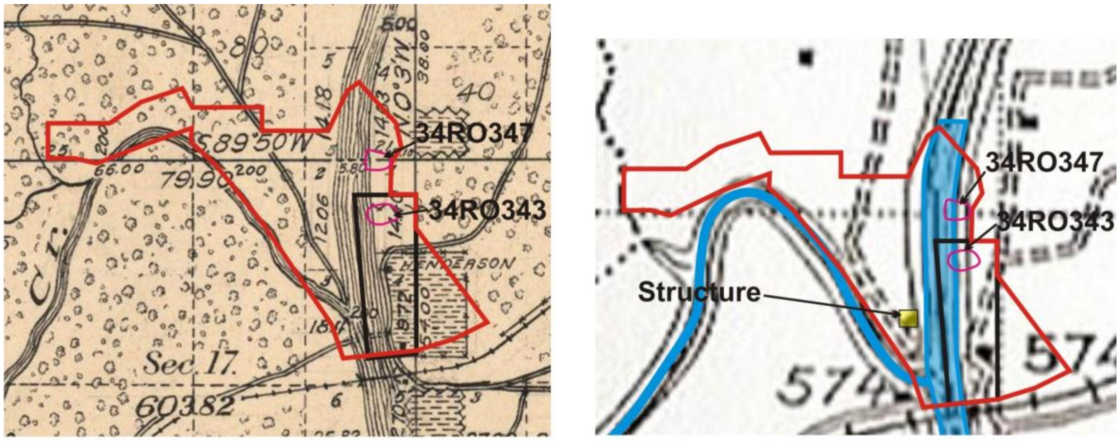
On December 2, 2010 an initial records search was performed at the Rogers County Courthouse in Claremore, Oklahoma. The earliest entries in the index book for T20N, R15E revealed NE/NE of Section 17:
- Bearl Deweese et ux granted an Amortization Mortgage to the Land Bank Commissioners on October 1, 1936
-L. O. Gravitt and Newton M. Foster granted an Affidavit to the Public on October 13, 1939.
-State of Oklahoma Corporation Commission granted a Certificate of non-Deed to the Public (Conservancy District #30) on March 29, 1962
-Public Service Company of Oklahoma granted a Quit Claim Deed to the United States of America on September 24, 1969.

According to the most recent listings, no properties listed on the NRHP are within the specific project area. No properties considered eligible for the NRHP but not yet nominated (Oklahoma SHPO Determinations of Eligibility listings, October 2011) are noted in the specific study areas.

Early and mid-20th century maps as well as mid to late-20th century and current aerial photographs were examined for structures, trails and roads in the study areas. General Land Office (GLO) plat maps of the study areas (Bureau of Land Management 2008) were examined including the Original Survey dated April 9, 1898 (survey completed July 3, 1896). The map shows the study areas as both plowed field and wooded with roads trending through Study Areas 1, 4, 5 and 6. No structures area plotted within the study areas (Figure 6a).

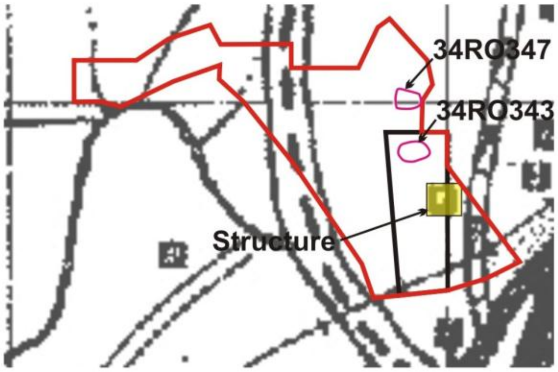
The USGS Claremore, OKLA quadrangle, 30-minute series, 1916 map (surveyed 1913-1914) was also examined (Figure 6b). This map shows one structure adjacent to a road trending through Study Area 6. No remains of this structure were noted on the surface or in shovel tests.

The 1936 Oklahoma State Highway Department's General Highway and Transportation Map of Rogers County was also examined (Figure 6c). One structure, indicated with a 'dwelling- other than farm' symbol, is plotted between the previously studied 30-acre area and the current 130-acre study area. No remains of this structure were noted on the surface or in shovel tests.



a. 1898 GLO Original Survey plat map.

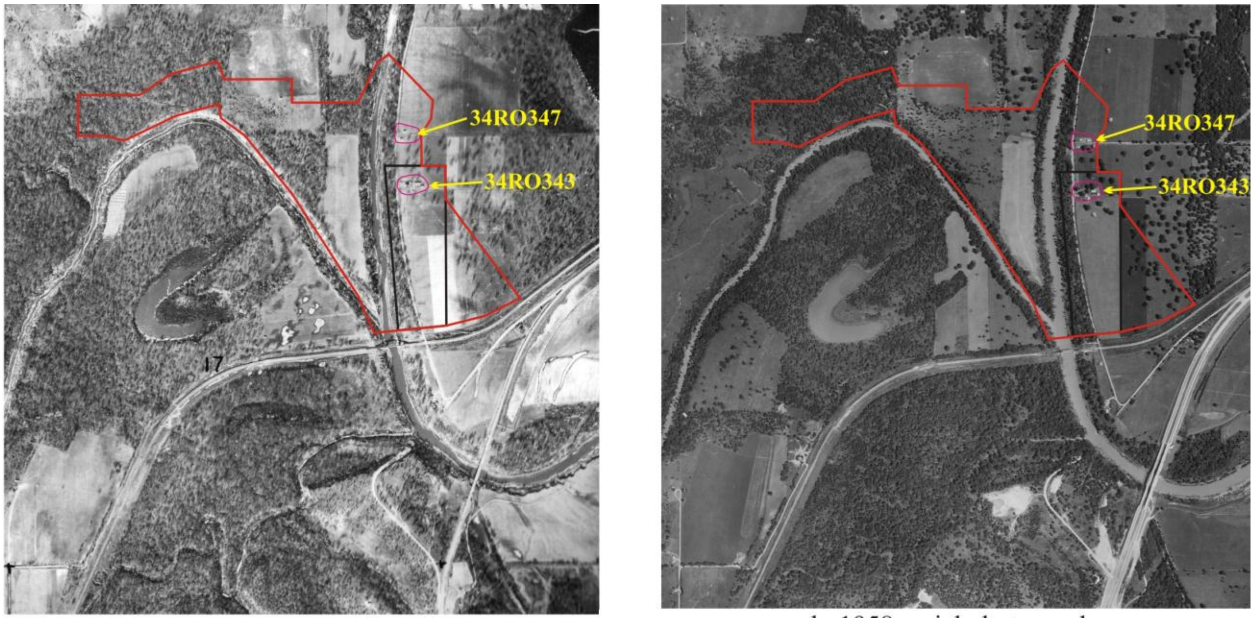
b. 1916 USGS Claremore, OKLA quadrangle, 30-minute series.



c. 1936 Rogers County General Highway and Transportation Map.

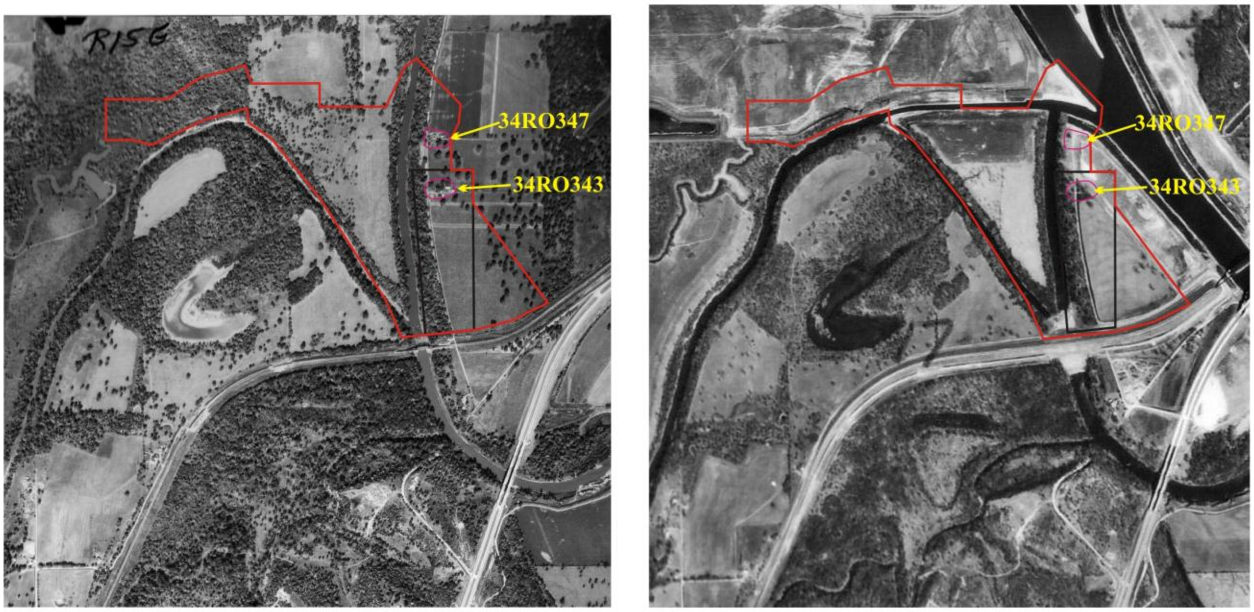
Figure 6. Early and mid-20th century maps of the proposed Barge Fleeting Area Project (red outline).

Aerial photographs at the Oklahoma Geological Survey (Norman, Oklahoma) were also examined. The 1942, 1958, 1964 and 1972 aerial images show the study areas as both open pasture and wooded areas particularly adjacent the waterways (Figure 7a-d). Two structures are visible on the 1942 aerial in the area of 34RO347. An additional third structure is shown on the 1958 and 1964 aerial photographs. The 1972 aerial photograph shows the study areas post construction of the TPC navigation system. This aerial also shows the area of site 34RO347 as cleared of vegetation with a two-track road trending from what appears to be a structure (Figure 8). The resolution of the photograph does not give sufficient detail to determine if the structure is still intact.



a. 1942 aerial photograph

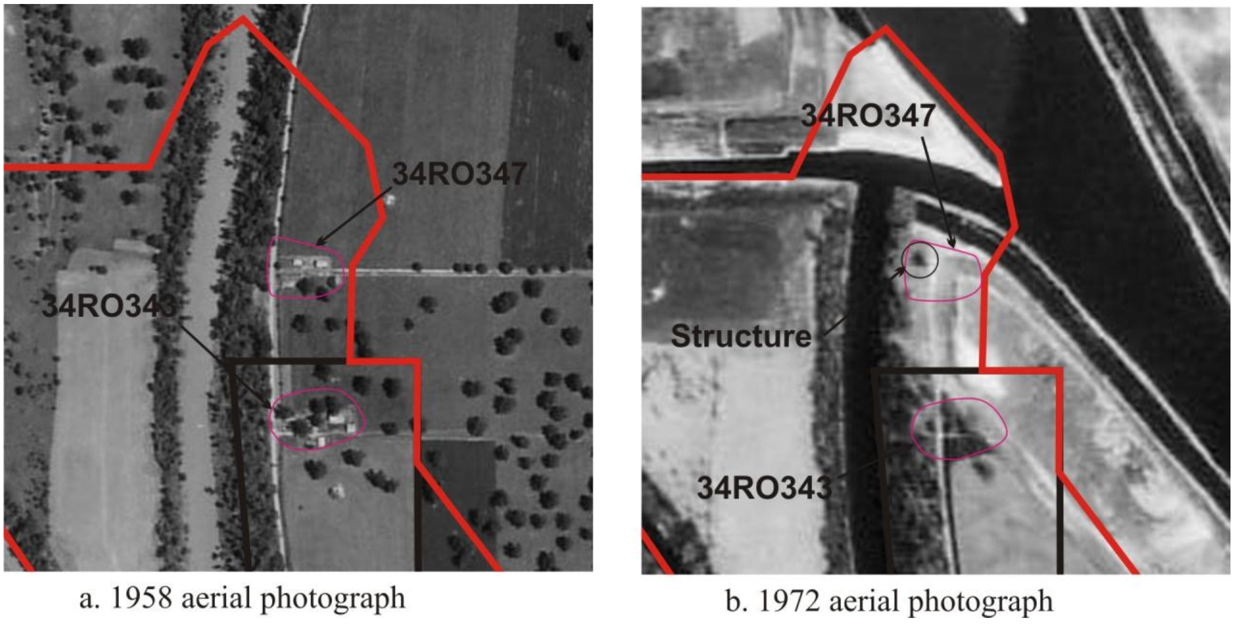
b. 1958 aerial photograph



c. 1964 aerial photograph

d. 1972 aerial photograph

Figure 7. Aerial photographs of project area (outlined in red), showing 34RO343 and 34RO347.



a. 1958 aerial photograph

b. 1972 aerial photograph

Figure 8. Aerial photographs showing site areas 34RO343 and 34RO347.

## Archeological Investigations:

On November 30 and December 1, 2011, CAS conducted an archeological site assessment of an approximate 130-acre area, on TPC and USACE lands located in portions of Sections 8, 16 and 17 T20N, R15E, Rogers County, Oklahoma.

Pedestrian transects of no more than 50 feet (15m) spacing augmented by hand dug shovel tests in low visibility settings were utilized as field methodology. Matrix was screened through ¼-inch screen mesh, excavated to between 30 and 70 cm. No deep testing methods were utilized during this preliminary reconnaissance (see shovel test log, Appendix A). All UTM coordinates were recorded in datum NAD27 CONUS, Zone 14S using WAAS-enabled, Delorme PN-60 handheld GPS devices, offering optimal accuracy of < 3m.

One new archeological site was recorded during the course of these investigations.

### 34RO347

SE/SE/SE of Section 8 and the NE/NE/NE Section 17 T20N, R15E
Site area: 360 feet by 215 feet (90x70 m)
UTM E0254760 N4011644
This site is the remains of a 10-foot by 7-foot by 5-foot concrete block outbuilding of unknown function. The roof and upper portions of the walls are missing leaving a rectangular stem wall approximately 5 feet tall (Photo 7). Two railroad ties intersect the center of the outbuilding and protrude from the east side. Approximately 10 feet west of the feature is a 6-inch metal pipe with a hook on top that appears to have held a pulley. Bull dozer push piles of cleared timber and

dirt are evident surrounding the structure and adjacent to the two-track road trending generally north-south through the site area. Sheet metal, steel cable and concrete fragments were noted in push piles north, south and west of the outbuilding. Modern debris including glass and aluminum food containers, aluminum beer and soda cans and plastic bottles were also observed on the surface and in the push piles surrounding the structure.

Aerial photographs from 1942, 1958 and 1964 show two to three structures in the approximate location of site 34RO347. The 1972 aerial photograph shows the terrace where the site area was once located transformed to a peninsula with the construction of the Bird Creek cut-off, cleared of all vegetation with dredge soil dumped on the surface. A single structure, what appears to be the concrete block outbuilding, is visible in the site area on the 1972 aerial photograph. However the resolution of the photograph is not sufficient to determine if the structure is intact.

This mid to late 20th century outbuilding has been heavily impacted by the construction of the McClellan-Kerr Arkansas River Navigation System. This site would not appear eligible for inclusion on the NRHP under Criterion C or D based on the poor condition of the feature and lack of integrity of the sparse artifacts. This site also appears not eligible under Criterion A or B based on an initial records check of the NE/NE of Section 17 T20N, R15E and no further archeological concern for 34RO347 is recommended.

Photo 7. Facing southeast to northwest corner of outbuilding remains at 34RO347.

Photo 8. Facing east to outbuilding remains at 34RO347.

Photo 9. Facing southeast to interior of outbuilding remains at 34RO347.

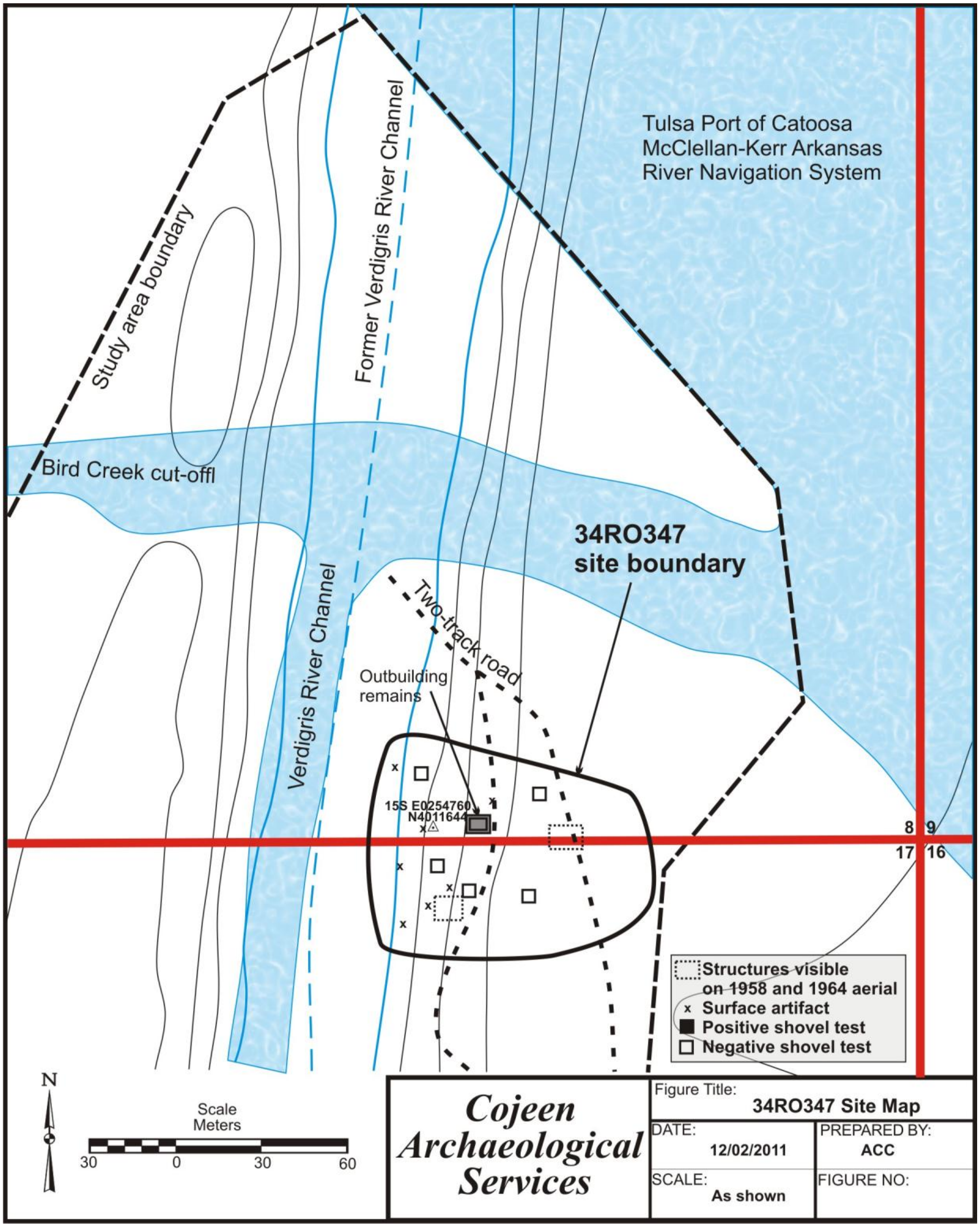


Figure 9. Site map of 34RO347.

## Catoosa Soil Core Review/Summary:

Investigations of two soil cores placed in relatively intact portions of the survey area yielded soils consistent with alluvial floodplain sedimentation. Core B-5 yielded shallow sediments with weak soil structure that accumulated in an alluvial setting, underlain by gleyed soils indicating poorly drained soils with a high water table and swamp-like conditions. Core B-6 showed alluvial soils with planar bedding and fine sediments with occasional flooding events depositing coarse sand. This is underlain by sequences of limited soil development punctuated by alluvial flooding events typical of a backwater floodplain setting. Interspersed in the cores were well-preserved plant remains indicating periods of seasonal stability or flood deposits. No artifacts or evidence of human occupation was observed in the cores.

Scott Fine, Oklahoma State University PhD candidate under Brian Carter, examined two soil cores. Both showed weak soil structure, accumulating from an alluvial setting. Because of the weak soil structures and alluvial nature of deposition (thin deposits) confidence in plant remains for C-14 dating was low and was not utilized as a field method.

## Recommendations:

One new archeological site was recorded during the course of these investigations. Site 34RO347 is considered not eligible for inclusion on the NRHP under Criterion C and D based on the poor condition of the feature and lack of integrity of the sparse artifacts. This site also does not appear to be eligible under Criterion A or B based on an initial records check of the NE/NE of Section 17 T20N, R15E and no further archeological concern for 34RO343 was recommended.

No significant cultural resources were observed in the six study areas during the course of these investigations. The TPC proposed Barge Fleeting Area Project as currently planned will have no effect on significant cultural resources.

Christopher Cojeen
Principal Investigator

copies:

Environmental Analysis and Compliance Branch
U.S. Army Corps of Engineers, Tulsa District
1645 South 101st East Avenue
Tulsa, Oklahoma 74128
attention: Michelle C. Horn

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# Appendix A:

Shovel Test Log of the Proposed Barge Fleeting Area in Catoosa, OK

| Shovel Test # | Easting | Northing | Setting/Soil Description |
|---|---|---|---|
| St1 | 0254673 | 4011709 | Upper terrace overlooking former Verdigris River channel, gently sloping, wooded, 20% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St2 | 0254649 | 4011690 | Upper terrace overlooking former Verdigris River channel, level, wooded, 20% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St3 | 0254655 | 4011642 | Upper terrace overlooking former Verdigris River channel, level, wooded, 20% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St4 | 0254618 | 4011631 | Northern portion of island, level, open pasture, 40% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St5 | 0254570 | 4011611 | Northern portion of island, level, open pasture, 75% visibility/ Brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St6 | 0254583 | 4011725 | Northern portion of island, level, open pasture, 75% visibility/ Brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St7 | 0254562 | 4011677 | Northern portion of island, level, open pasture, 75% visibility/ Brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St8 | 0254558 | 4011540 | Center of northern portion of island, level, wooded, 40% visibility/ Brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St9 | 0254657 | 4011500 | Upper terrace overlooking former Verdigris River channel, level, wooded, 20% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St10 | 0254642 | 4011591 | Center of northern portion of island, level, wooded, 40% visibility/ Brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St11 | 0254630 | 4011453 | Upper terrace overlooking former Verdigris River channel, level, wooded, 20% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St12 | 0254545 | 4011316 | Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St13 | 0254540 | 4011239 | Lower terrace overlooking former Bird Creek channel, gently sloping, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St14 | 0254486 | 4011393 | Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St15 | 0254550 | 4011448 | Center of island, level, wooded, 50% visibility/ Medium brown sandy clay to 50cmbs. **Negative** |

| | | | |
|---|---|---|---|
| St16 | 0254578 | 4011515 | Center of northern portion of island, level, wooded, 30% visibility/ Mottled red-brown clay over dense gravel lens at 15cmbs. **Negative** |
| St17 | 0254485 | 4011700 | Northern portion of island, level, open pasture, 75% visibility/ Brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St18 | 0254658 | 4011303 | Upper terrace overlooking former Verdigris River channel, level, wooded, 20% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St19 | 0254643 | 4011400 | Upper terrace overlooking former Verdigris River channel, level, wooded, 20% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St20 | 0254651 | 4011212 | Southern portion of island, level, wooded, 50% visibility/ Medium brown sandy clay to 50cmbs. **Negative** |
| St21 | 0254522 | 4011726 | Northern portion of island, level, open pasture, 75% visibility/ Brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St22 | 0254523 | 4011650 | Northern portion of island, level, open pasture, 75% visibility/ Brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St23 | 0254602 | 4011473 | Center of island, level, wooded, 50% visibility/ Medium brown sandy clay to 50cmbs. **Negative** |
| St24 | 0254474 | 4011477 | Center of island, level, wooded, 50% visibility/ Medium brown sandy clay to 50cmbs. **Negative** |
| St25 | 0254466 | 4011446 | Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St26 | 0254607 | 4011179 | Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St27 | 0254545 | 4011369 | Center of island, level, wooded, 50% visibility/ Medium brown sandy clay to 50cmbs. **Negative** |
| St28 | 0254502 | 4011527 | Center of northern portion of island, level, wooded, 30% visibility/ Mottled red-brown clay over dense gravel lens at 15cmbs. **Negative** |
| St29 | 0254437 | 4011575 | Center of northern portion of island, level, wooded, 30% visibility/ Mottled red-brown clay over dense gravel lens at 15cmbs. **Negative** |
| St30 | 0254344 | 4011738 | Northern portion of island, level, open pasture, 75% visibility/ Brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St31 | 0254497 | 4011762 | Northern portion of island, level, open pasture, 75% visibility/ Brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St32 | 0254588 | 4011376 | Center of island, level, wooded, 50% visibility/ Medium brown sandy clay to 50cmbs. **Negative** |
| St33 | 0254605 | 4011316 | Center of island, level, wooded, 50% visibility/ Medium brown sandy clay to 50cmbs. **Negative** |

| | | | |
|---|---|---|---|
| St34 | 0254576 | 4011260 | Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St35 | 0254409 | 4011537 | Center of northern portion of island, level, wooded, 30% visibility/ Mottled red-brown clay over dense gravel lens at 15cmbs. **Negative** |
| St36 | 0254465 | 4011547 | Center of northern portion of island, level, wooded, 30% visibility/ Mottled red-brown clay over dense gravel lens at 15cmbs. **Negative** |
| St37 | 0254388 | 4011607 | Center of northern portion of island, level, open pasture, 40% visibility/ Mottled red-brown clay over dense gravel lens at 15cmbs. **Negative** |
| St38 | 0254308 | 4011619 | Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St39 | 0254283 | 4011652 | Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St40 | 0254248 | 4011706 | Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St41 | 0254211 | 4011734 | Upper terrace overlooking former Bird Creek channel, gently sloping, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St42 | 0254402 | 4011504 | Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St43 | 0254499 | 4011433 | Center of island, level, wooded, 50% visibility/ Medium brown sandy clay to 50cmbs. **Negative** |
| St44 | 0254643 | 4011362 | Southern portion of island, level, wooded, 20% visibility/ Brown clay becoming more sandy with depth to 60cmbs. |
| St45 | 0254623 | 4011288 | Center of island, level, wooded, 50% visibility/ Medium brown sandy clay to 50cmbs. **Negative** |
| St46 | 0254640 | 4011182 | Southern portion of island, level, wooded, 50% visibility/ Medium brown sandy clay to 50cmbs. **Negative** |
| St47 | 0254645 | 4011155 | Southern portion of island, level, wooded, 50% visibility/ Medium brown sandy clay to 50cmbs. **Negative** |
| St48 | 0254695 | 4011115 | Upper terrace overlooking former Verdigris River channel, level, wooded, 20% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St49 | 0254705 | 4011076 | Upper terrace overlooking, level, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| | | | |

| | | | |
|---|---|---|---|
| St50 | 0254652 | 4011109 | Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs. **Negative** |
| St51 | 0254792 | 4011721 | Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay to 50cmbs. **Negative** |
| St52 | 0254765 | 4011673 | Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay to 50cmbs. **Negative** |
| St53 | 0254803 | 4011665 | Upper terrace, gently sloping, adjacent levee in moderately wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. **Negative** |
| St54 | 0254797 | 4011623 | Upper terrace, gently sloping, adjacent levee in moderately wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. **Negative** |
| St55 | 0254770 | 4011637 | Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay to 50cmbs. **Negative** |
| St56 | 0254778 | 4011624 | Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay ending at 30cmbs. **Negative** |
| St57 | 0254797 | 4011601 | Upper terrace, gently sloping, adjacent levee in moderately wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. **Negative** |
| St58 | 0254776 | 4011596 | Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay to 50cmbs. **Negative** |
| St59 | 0254790 | 4011594 | Upper terrace, gently sloping, adjacent levee in moderately wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. **Negative** |
| St60 | 0254795 | 4011571 | Upper terrace, gently sloping, adjacent levee in moderately wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. **Negative** |
| St61 | 0254775 | 4011568 | Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay to 50cmbs. **Negative** |
| St62 | 0254807 | 4011708 | Upper terrace, gently sloping, adjacent levee in moderately wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. **Negative** |
| St63 | 0254840 | 4011676 | Upper terrace, gently sloping, adjacent levee in moderately wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. **Negative** |

| | | | |
|---|---|---|---|
| St64 | 0254945 | 4011319 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St65 | 0254951 | 4011312 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St66 | 0254969 | 4011297 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St67 | 0254950 | 4011279 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St68 | 0254973 | 4011288 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St69 | 0254950 | 4011262 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St70 | 0254964 | 4011241 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St71 | 0254984 | 4011269 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St72 | 0254998 | 4011240 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St73 | 0254960 | 4011230 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St74 | 0255014 | 4011198 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St75 | 0254969 | 4011184 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St76 | 0254959 | 4011157 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St77 | 0254958 | 4011136 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| | | | |

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|---|---|---|---|
| St78 | 0254950 | 4011123 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St79 | 0254963 | 4011085 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St80 | 0254963 | 4011039 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St81 | 0255002 | 4011021 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St82 | 0255008 | 4011062 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St83 | 0254986 | 4011105 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St84 | 0255045 | 4011124 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St85 | 0255046 | 4011111 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St86 | 0255047 | 4011073 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| St87 | 0254313 | 4011850 | Industrial area overlooking the Bird Creek cut-off, level, open pasture, 75% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St88 | 0254372 | 4011863 | Industrial area overlooking the Bird Creek cut-off, level, open pasture, 75% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St89 | 0254673 | 4011848 | Industrial area overlooking the Bird Creek cut-off, level, open pasture, 60% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St90 | 0254724 | 4011854 | Industrial area point overlooking the Bird Creek cut-off and main channel, level, open pasture, 60% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St91 | 0254773 | 4011830 | Industrial area point overlooking the Bird Creek cut-off and main channel, level, open pasture, 60% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |
| | | | |

| | | | |
|---|---|---|---|
| St92 | 0254696 | 4011905 | Industrial area point overlooking the Bird Creek cut-off and main channel, level, open pasture, 60% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St93 | 0253977 | 4011771 | Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St94 | 0253954 | 4011761 | Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St95 | 0253851 | 4011723 | Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St96 | 0253805 | 4011708 | Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St97 | 0253794 | 4011791 | Industrial area, level, open pasture, 50% visibility, standing water on surface/ Gray brown clay with pea-size river gravels to 10cmbs. **Negative** |
| St98 | 0254689 | 4010935 | Upper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. **Negative** |
| St99 | 0254685 | 4010978 | Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St100 | 0254719 | 4010937 | Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |
| St101 | 0254701 | 4010918 | Upper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. **Negative** |
| St102 | 0254735 | 4010952 | Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. **Negative** |

Figure 10. Shovel test placement

# Supplemental Investigation of the Soil Morphology and Stratigraphy of the Proposed Barge Fleeting Area in Catoosa, OK

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## Introduction

Soil morphology and sediment stratigraphy investigations were accomplished on two cores from the Proposed Barge Fleeting Area in Catoosa, Oklahoma. Investigations were performed to determine the extent of buried soils and possibility of dating deposits in reference to possible human occupation at the study area (personal communication, Chris Cojeen). Cores B-5 and B-6 were the only cores investigated in this manner as instructed. Location of the cores can be seen in the attached map, which appears to be a floodplain of Bird Creek and the Verdigris River. Cores were obtained from Kleinfelder Central, Inc. (Tulsa, OK) and consisted of various random core sections from selected depth intervals in between the surface and 38.6 and 40 ft. (11.8 and 12.1 M), respectively. Majority of the cores were presented as 2 inch (5 cm) diameter cores from a split spoon (SS) corer placed in Ziploc bags (without vertical orientation) with a few larger intact cores (3 to 4 inches (7.6-10 cm) in diameter by 2 feet (5 cm) length) from a Shelby Tube (ST). Cores were described using standard soil morphology as outline in Schoeneberger et al. (2002) with identification of stratigraphic units in reference to geoarchaeology, as defined by Waters (1992). Soil boundaries were undistinguishable in most core sections due to the loss of orientation when bagged.

## Results and Discussion

### Core B-5

The first section investigated in Core B-5 was at 3.5 to 5 feet (1.1-1.5 m) described as a buried A horizon with weak soil structure, silt loam soil texture and few fine and medium roots throughout the core section (Table 1). All core sections examined from 5.0 to 20.0 feet (1.5-6.1 m) were interpreted as C horizons with little if any soil development and dominated by evidence of alluvial features and silt loam textures. The last three core sections (28.5 to 40 feet (8.7-12.2 m)) were interpreted as buried A horizons (Ab) with moderate structure indicating stability and gleyed color (Ag) indicating the presence of organic materials and reduction by anaerobic microbes established during a time of surface stability. Gley (dominantly gray) color also indicates poorly drained soils containing a high water table with swamp-like conditions. Within this core section four different buried A horizons and four C horizons were distinguished based on changes in texture, structure, color, consistence, redoximorphic, and other specialized features (Table 1).

## Core B-6

Core B-6 was comprised of significantly more observable soil units than core B-5 probably due to added core sections. The first section examined from Core B-6 (Table 2) at a depth of 3.5 to 5 feet (1.1-1.5 m) revealed a C horizon demonstrating little soil development dominated by bedded laminae implying landscape instability and alluvial deposition. At 5 to 5.2 feet (1.5-1.6 m) soil structure was strong enough to indicate a significant buried A horizon that transformed into a BC transition horizon with minor soil development to a depth 5.5 feet (1.7 m). The C horizon continued downward to depth of 7 feet (2.1 m) comprised of bedding (laminae) and inclusion of course sand dominated materials for the last 4 inches with lack of soil development (structure) indicating a prominent fluvial event. At 8.5 to 13.6 feet (2.6-4.1 m) another period of deposition and stability is present as a sequence of soil formation occurs with the change from a weakly developed BC to a structureless laminae dominated C horizon. This C included bedding of silt, sands, and well preserved organic (plant) debris that could be used for C14 dating and the interpretation of plant communities at that time. The remainder of the core sub-samples, until the contact with the bedrock material at 38.5 feet (11.7 m) were interpreted as buried A horizons exhibiting well developed structure and gleyed colors indicating landscape stability. Lack of depositional horizons and identification of a continuous A through this and other sequence is mostly likely the result of lack of continuous core and slow sediment accumulation in what would be assumed to be a backwater location in the floodplain.

## Summary

Both cores contained alluvial deposited sediments demonstrated by the presence of thin beds (laminae, <1 cm). Fine grained sediments dominated the cores (silt loam, clay loam, silty clay loam, silty clay, fine sandy loam, and fine loamy sand soil textures). These soil textures correlate to the source-sedimentary bedrock within the drainage area dominated by shales, limestones, and fine grained sandstone. Lack of translocated clays and intense oxidation with in the profiles supports the interpretation that particle-size distribution throughout the sequence is produced by fluvial deposition and not soil pedogenesis. Horizons suggesting stability were dominated by significant soil structure, lack of bedding, and soil organic matter accumulation. Soil horizons dominated by bedding and overall lack of significant pedogenesis were interpreted as times of instability. Bimodal sequences of landscape stability and instability as alternations of soil horizons suggesting stability (Ag,BCb) are intertwined with sedimentary horizons (C) demonstrating instability are typical for alluvial depositional environment that occurred throughout the Holocene. Wood fragments are present in multiple core sections and present the possibility of radiocarbon dating within these horizons (Table 1-2). Core sections designated as A horizon also possess the ability to produce radiocarbon ages through dating of soil carbon from the top of these A horizons. Multiple zones of surface landscape stability were interpreted through the core sequence, yet evidence of anthropogenic occupation was not observed in this investigation.

Based on prior work by Carter (2007) on the nearby Candy Creek Terrace, radiocarbon dates for the various sequences can be suggested. Based on the above work's dating of soils buried at similar depths, a date of around 8,000 rybp would be expected for the first buried A horizon with dates centering around 10,000 rybp for the deeper A horizons exhibiting stability.

## References

Carter, B.J. 2007. Final Report: Soil Geomorphology of the Candy Creek Terrace. Unpublished data.

Schoeneberger, P.J., D.A. Wysocki, E.C. Benham, W.D. Broderson. 2002. Field book for describing and sampling soils, Version 2.0. Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.

Waters, M.R. 1992. Principles of Geoarchaeology, A North American Perspective, The University of Arizona Press, Tucson.

## Table 1: Soil Profile Description for Core B-5 from the Proposed Barge Fleeting Area Catoosa, OK

Soil Profile Description: Proposed Barge Fleeting Area Catoosa, OK Describer: Scott T Fine

Date: 1-13-12 Core B-5 Project # 121181

| | Core Type§ | Horizon | Depth (ft.) | Color (moist) | Structure* | Texture | Consistence | Boundary ** | Effervesce *** | Special Features |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SS | Ab | 3.5-5.0 | 10YR 5/3 (10YR 3/1) | 1fSBK | Silt Loam | Firm | _ | NE | Few Fine roots. Thin horizontal bedded laminae |
| 2 | ST (loose) | C1b | 5.0-7.0 | 10YR 6/3 (10YR 4/2) | Massive | Silty Clay Loam | Very Hard | _ | NE | Few fine roots |
| 3 | SS | C2b | 8.5-10.0 | 10YR 5/3 (10YR 4/2) | Massive | Silt Loam | Hard | _ | NE | Few fine and medium roots<br>Few med Fe concentrations within matrix 10YR 5/6 |
| 4 | ST (core) | C3b | 13.0-13.4 | 10YR 6/3 (10YR 5/3) | Massive | Silt Loam | Hard | Clear | NE | Few fine roots<br>Thin horizontal bedded laminae<br>Common medium Fe concentrations within matrix 10YR 5/6 |
| 5 | ST (core) | C4b | 13.4-14.2 | 10YR 5/3 (10YR 4/2) | Massive | Silt Loam | Firm | Clear | NE | Few fine roots<br>Faint thin horizontal bedded laminae<br>Common medium Fe concentrations along root channels 10YR 5/6 |
| 6 | ST (core) | C4b | 14.2-15.0 | 10YR 5/3 (10YR 4/2) | Massive | Silt Loam | Hard | _ | NE | Few fine roots<br>Thin horizontal bedded laminae<br>Common medium Fe concentrations along root channels 10YR 5/6 |
| 7 | SS | C5b | 18.5-20.0 | 10YR 5/3 (10YR 4/2) | 1mSBK | Silt Loam | Friable | _ | NE | Compacted from coring. Siltans (gray)<br>Thin horizontal bedded laminae<br>Common medium Fe concentrations within matrix (5YR 3/4) |
| 8 | SS | Ag1b2 | 28.5-30.0 | Gley1 5/N (Gley1 3/N) | 1mSBK | Silt Loam | Friable | _ | NE | Siltans (gray)<br>Common medium Fe concentrations within matrix (5YR 3/2) |
| 9 | SS | Ag2b2 | 33.5-35.0 | Gley1 5/N (Gley1 3/N) | 2mSBK | Silt Loam | Friable | _ | NE | Siltans (gray)<br>Common medium and course Fe concentrations within matrix (5YR 3/2) |
| 10 | SS | Ag3b2 | 38.5-40.0 | Gley1 4/N (Gley1 3/N) | 2mSBK | Silty Clay Loam | Friable | _ | NE | Siltans (gray)<br>Common medium and course Fe concentrations within matrix (5YR 4/4) |

§ Core Type: SS=Split Spoon (Ziploc bagged, fragmented core); ST=Shelby Tube;
*Structure: 1=weak 2=moderate; f=fine m=medium; SBK= sub-angular blocky
** Horizon left blank no determinable boundary due to coring irregularity
*** NE=non effervescent

## Table 2: Soil Profile Description for Core B-6 from the Proposed Barge Fleeting Area Catoosa, OK

Soil Profile Description: Proposed Barge Fleeting Area Catoosa, OK Describer: Scott T Fine

Date: 1-13-12 Core B-6 Project # 121181

| | Core Type | Horizon | Depth (ft) | Color (moist) | Structure | Texture | Consistence | Boundary | Effervesce*** | Special Features |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SS | C | 3.5-5.0 | 10YR 5/3 (10YR 3/1) | Massive | Loam | Hard | _ | NE | Few Fine roots. Thin horizontal bedded laminae. Few fine Fe concentrations 5YR 5/6 |
| 2 | ST (core) | Ab | 5.0-5.2 | 10YR 5/3 (10YR 3/2) | 2mSBK | Silt Loam | Firm | Clear | NE | Few fine roots<br>Siltans (gray) |
| 3 | ST (core) | BCb | 5.2-5.5 | 10YR 5/3 (10YR 3/2) | Massive | Silt Loam | Friable | Clear | NE | Few fine and medium roots, worm castings<br>Thin horizontal bedded laminae<br>Few fine Fe concentrations along laminae 5YR 5/6 |
| 4 | ST (core) | C1b | 5.5-5.8 | 10YR 5/3 (10YR 3/2) | Massive | Loam | Friable | Clear | NE | Few fine and medium roots<br>Thin horizontal bedded laminae<br>Few fine Fe concentrations along laminae 5YR 5/6 |
| 5 | ST (core) | C2b | 5.8-6.0 | 10YR 4/3 (10YR 3/1) | Massive | Silty Clay Loam | Firm | _ | NE | Few fine and medium roots<br>Thin horizontal bedded laminae<br>Few fine Fe concentrations along laminae 5YR 5/6 |
| 6 | ST (core) | C3b | 6.0-6.4 | 10YR 5/2 (10YR 3/2) | Massive | Silt Loam | Friable | Clear | NE | Few fine and medium roots<br>Thin horizontal bedded laminae<br>Common medium Fe concentrations along laminae 5YR 5/6 |
| 7 | ST (core) | C3b | 6.4-6.7 | 10YR 5/3 (10YR 3/2) | Massive | Silt Loam | Friable | Abrupt | NE | Few fine roots<br>Thin horizontal bedded laminae<br>Common fine Fe concentrations along laminae 5YR 5/6 |
| 8 | ST (core) | C4b | 6.7-6.8 | 10YR 5/3 (10YR 3/2) | Single Grain | Med. Sandy Loam | Loose | Abrupt | NE | Few fine roots |
| 9 | ST (core) | C5b | 6.8-7 | 10YR 5/4 (10YR 4/2) | Single Grain | Med. Loamy Sand | Loose | _ | NE | Few fine roots |
| 10 | SS | BCb2 | 8.5-10.0 | 10YR 5/2 (10YR 3/2) | 1mSBK | Loam | Friable | _ | NE | Few fine roots<br>Common fine Fe concentrations in matrix along root channels |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 11 | ST (core) | BCb2 | 13.0-13.3 | Gley1 5/10Y (Gley1 2.5/N) | 2mSBK | Silty Clay Loam | Friable | Abrupt | NE | Few fine roots and wood fragments<br>Thin horizontal bedded laminae<br>Few fine Fe concentrations in matrix |
| 12 | ST (core) | Cb2 | 13.3-13.6 | 2.5 YR 5/1 (10YR 3/1) | Massive | Clay Loam | Friable | Clear | NE | Thin horizontal bedded laminae, consisting of alternating silt, sand, and organic debris<br>Common fine Fe concentrations along laminae 5YR 5/6 |
| 13 | ST (core) | Ag1b3 | 13.6-13.9 | 2.5YR 5/2 (2.5YR 3/1) | 2mSBK | SiL | Friable | Abrupt | NE | Very few fine roots<br>Siltans (gray)<br>Common fine Fe concentration within matrix 5YR 5/6 |
| 14 | ST (core) | Ag1b3 | 13.9-14.3 | 2.5YR 5/2 (2.5YR 3/1) | 2mSBK | SiL | Friable | _ | NE | Siltans (gray)<br>Common fine Fe concentration within matrix 5YR 5/6 |
| 15 | SS | Ag2b3 | 18.5-23.0 | 2.5YR 5/2 (2.5YR 3/1) | 2mSBK | SiCL | Firm | _ | NE | Siltans (gray)<br>Common fine Fe concentration within matrix 5YR 5/6 |
| 16 | SS | Ag3b3 | 23.5-25.0 | Gley1 4/N (Gley1 2.5/N) | 2mSBK | SiL | Firm | _ | NE | Siltans (gray) Wood fragments<br>Common fine Fe concentration within matrix 5YR 5/6 |
| 17 | SS | Ag4b3 | 28.5-29.0 | Gley1 5/N (Gley1 3/N) | 2mSBK | SiCL | Firm | _ | NE | Siltans (gray) Few gravels (chert, shale, sandstone)<br>Common fine Fe concentration within matrix 5YR 5/6 |
| 18 | SS | ABgb3 | 33.5-35.0 | Gley1 4/N (Gley1 2.5/N) | 2fSBK | SiCL | Firm | _ | NE | Siltans (gray)<br>Common fine Fe concentration within matrix 5YR 5/6 |
| 19 | SS | 2Rb3 | 38.5-38.6 | 2.5YR 6/1 (2.5YR 4/1) | Massive | _ | Rigid | _ | NE | Gray Shale |

§ Core Type: SS=Split Spoon (Ziploc bagged, fragmented core); ST=Shelby Tube;
*Structure: 1=weak 2=moderate; f=fine m=medium; SBK= sub-angular blocky
**Horizon left blank no determinable boundary due to coring irregularity
*** NE=non effervescent

Source: USGS
Source: NASA, NGA, USGS
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SOURCE: ESRI

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CHECKED B' HML
FILE NAME:
121181

BORING LOCATION DIAGRAM

TULSA PORT OF CATOOSA
BARGE FLEETING AREA
CATOOSA, OKLAHOMA

PLATE:
2

**Figure 1: Map of boring locations (B-5 and B-6) from the Proposed Barge Fleeting Area Catoosa, OK from Kleinfelder Central, Inc. (Tulsa, OK).**

*Christopher A. Cojeen*
**Principal Investigator**
**Cojeen Archaeological Services, LLC**

Archaeology
Research
History

# Report on the Preliminary Archeological Site Assessment of the Tulsa Port of Catoosa, East Bank Portion of the Barge Fleeting Area Project, Rogers County, Oklahoma

Land Administration: Tulsa Port Authority

Client: Dewberry, representative: Andrea Burk (973)739-9400
Location: E/2 of the E/2 of the NE/4 of Section 17 T20N, R15E (approximately 30 acres)
USGS Catoosa, OKLA quadrangle, 7.5-minute series 1963 (photo revised 1980)

File Search: Amy Cojeen, 11/05/2010
Survey: Christopher Cojeen, Amy Cojeen, David Boling,
Barker Fariss and Adam Wooten, 11/07-09/2010
Report: Christopher Cojeen and Amy Cojeen, 12/08/2010

***P.O. Box 1186 | Norman, Oklahoma 73070 | (405) 360-9996 FAX: (405) 366-7020***

## Abstract:

On 11/07-09/2010, Cojeen Archaeological Services, LLC (CAS) conducted a preliminary archeological site assessment of approximately 30-acre area (study area) for Dewberry, on Tulsa Port Authority (Port) lands located in portions of the NE/4 of Sections 17 T20N, R15E, Rogers County, Oklahoma. The Port proposes a land swap with the United States, Army Corps of Engineers (USACE). The approximately 30 acres of land area studied for this report represents the portion of the footprint of proposed impact on the east bank of Bird Creek. Prior to a larger study of both, the Port Authority requested this project footprint be examined for what might be “fatal flaws” in the project logistics.

This report discusses the concern for deeper buried deposits but does not include field work testing that possibility. In discussion with Dewberry, that concern could be addressed when coring for engineering purposes is conducted.

According to files at the Oklahoma Archeological Survey (OAS) no previously recorded sites are located within the specific study area. One new archeological site, 34RO343, was recorded in the study area during the course of this survey. This site is the remains of a 20th century homestead. Artifacts and aerial photographs indicate an occupation period from the 1940's to the 1970's. Based on the lack of integrity of the artifacts (a mixture of flotsam, modern dumping activity and occupation-related debris) and the poor condition of the features, the site would not appear eligible under Criterion C or D of the National Register of Historic Places (NRHP). An initial records check of the NE/NE of Section 17 T20N, R15E did not suggest association with an event or important persons. Therefore, this site would not appear eligible under Criterion A or B of the NRHP. No further concern for 34RO343 is recommended.

Additionally, three isolated occurrences of artifacts (IO) were located (Appendix B). IO by their isolated nature are not considered NRHP eligible resources, and no further archeological concern is warranted for the identified IO.

## Location and Setting:

### Specific Location:

The Tulsa Port of Catoosa, Barge Fleeting Area Project is located in the E/2 of the E/2 of the NE/4 of Sections 17 T20N, R15E, Rogers County, Oklahoma (Figure 1). The study area is approximately 30 acres in size.

The study area occupies a lowland floodplain overlooking the old confluence of Bird Creek and Verdigris River (Figure 2). This area consists of level, open grazing pasture and moderately wooded rocky terraces along the channel. Short to medium height grasses cover the majority of the floodplain area with scattered areas of brush and hardwoods (Photos 1 and 2). Surface visibility in the pasture areas averaged 0-10% at the time of survey with two-track roads, cattle trails and areas of erosion offering up to 40% visibility.

The Verdigris River is lined by heavily wooded areas with mostly post oak and blackjack oak with a moderate scrub understory. Surface visibility along the creek channels ranged from 0-30% with leaf litter and mixed grasses covering the surface. Areas offering higher visibility (up to 60%) including areas of erosion, game trails and the river bank were noted.

### General Location:

The project is located within Claremore Cuesta Plains Geomorphic province (within the Prairie Plains Physiographic Region [Bruner 1976]), an area generally described as “resistant Pennsylvanian sandstones and limestones dipping gently westward, forming cuestas between broad shale plains” (Curtis Jr., Ham and Johnson 2008). The study area is considered within the Tallgrass Prairie Vegetation type (Hoagland 2008), characterized by “prominent grass species buffalograss, gramas (blue, black, hairy, and sideoats), and silver bluestem”. Elevation in the study areas ranges from 530-575 ft. AMSL.

Soils in the project area are floodplain alluvial deposits associated with the Verdigris River and the Bird Creek basin. Soils in the study area consist of Verdigris silt loam, 0 to 1 percent slopes, occasionally flooded and Verdigris silty clay loam, 0 to 2 percent slopes, frequently flooded. These soils are described as linear, well drained soils occupying floodplains and floodplain steps parented from silty alluvium (Natural Resources Conservation Service, 2009). At present, the study area has a temperate, subhumid climate, typical of the north-central part of Oklahoma. Seasonal changes vary in intensity, but the changes between seasons are gradual. Summer is usually the wettest season. Average annual precipitation varies from 36 cm to 40 cm.

Vegetation in the project area is associated with the Tallgrass Prairie Plains (Hoagland 2008). The Tallgrass Prairie Preserve managed by the Nature Conservancy has documented the native plant and animal communities in this region (Coppedge et. al 1999, Palmer et. al 2003, Palmer 2007). The dominant plants on the uplands are Indiangrass, big and little bluestem, sideoats grama, blue grama, and hairy grama. Recent invasive species such as the Eastern Red Cedar (*Juniperous virginiana*) are scattered over the prairie, creating a savanna-like vegetation community. Small groves of low broadleaf deciduous trees and shrubs occur along major drainages and valley bottoms as riparian woodlands and crosstimbers on some north-facing slopes. The dominant species in these groves are oaks (*Quecus stellata* and *Quercus marilandica*), hackberry (*Celtis occidentalis*), cottonwood, plum (*Prunus* sp.), and coralberry (*Symphoricarpos orbicultus*).

## Research Biases:

The purpose of this investigation was to locate any cultural resources within the defined impact area of the project, and to provide sufficient detail for the protection and management of such resources. Interpretation of any cultural resources found followed standard methodology practices. By strict definition, cultural resources are any evidence of human use or occupation without any age limitations, but for this project, the term was restricted to cultural remains that were at least 45 years in age.

Land management and modification activities including land clearing for use as pasture, plowing, contour terracing, roads, fences, and overhead utility corridors have all impacted the study area. Modern trash dumping activity and flotsum was observed throughout the study area particularly in the south and west portion adjacent the two-track road and along the wooded terraces adjacent the old Verdigris River channel. Deer stands and debris related to hunting activity was also observed. These items and modifications were discounted as cultural resources for the purposes of this report.

## Paleontological Resources:

No vertebrate paleontological resources or significant invertebrate resources were observed during the course of this archeological investigation.

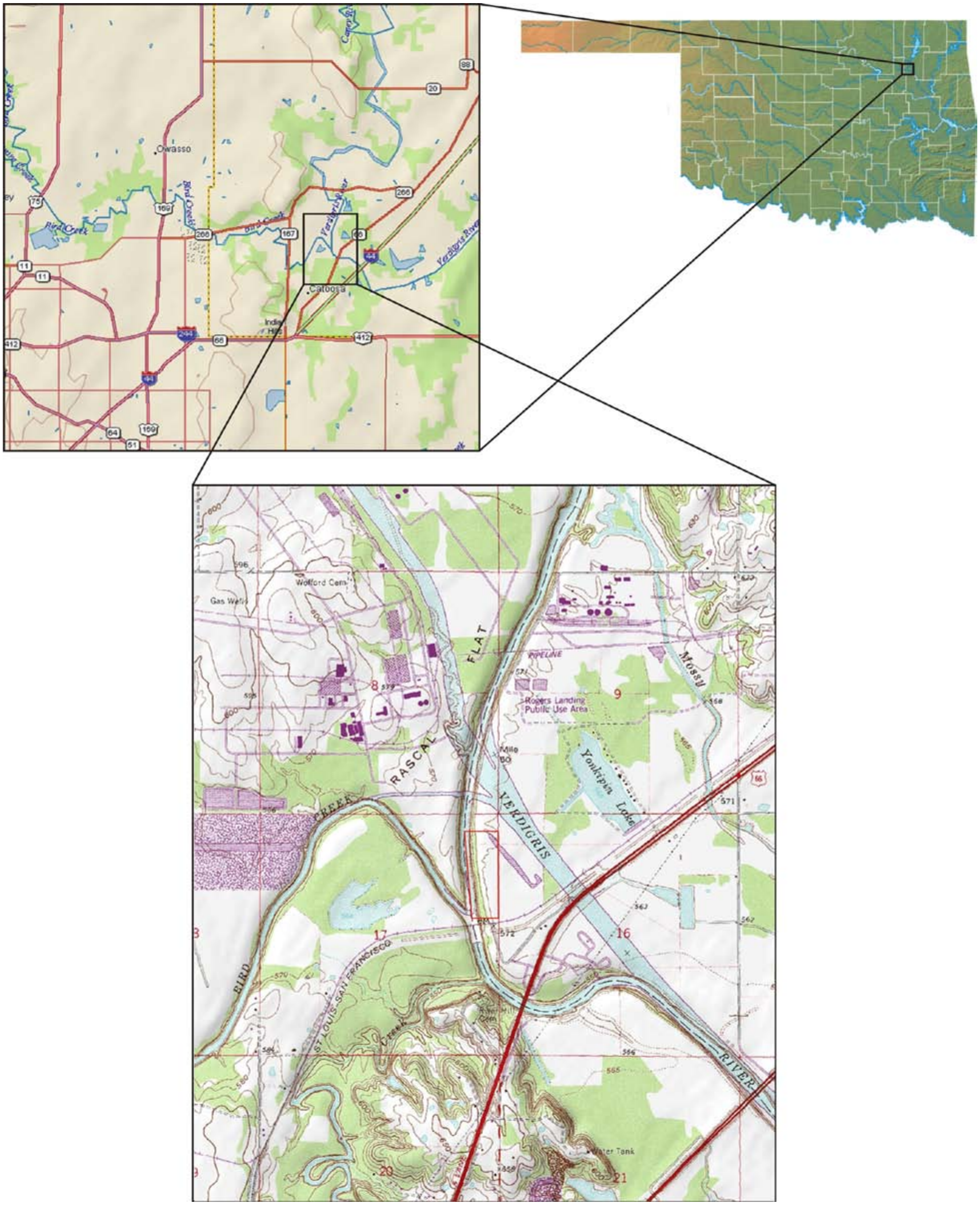


Figure 1. Project vicinity (study area outlined in red).

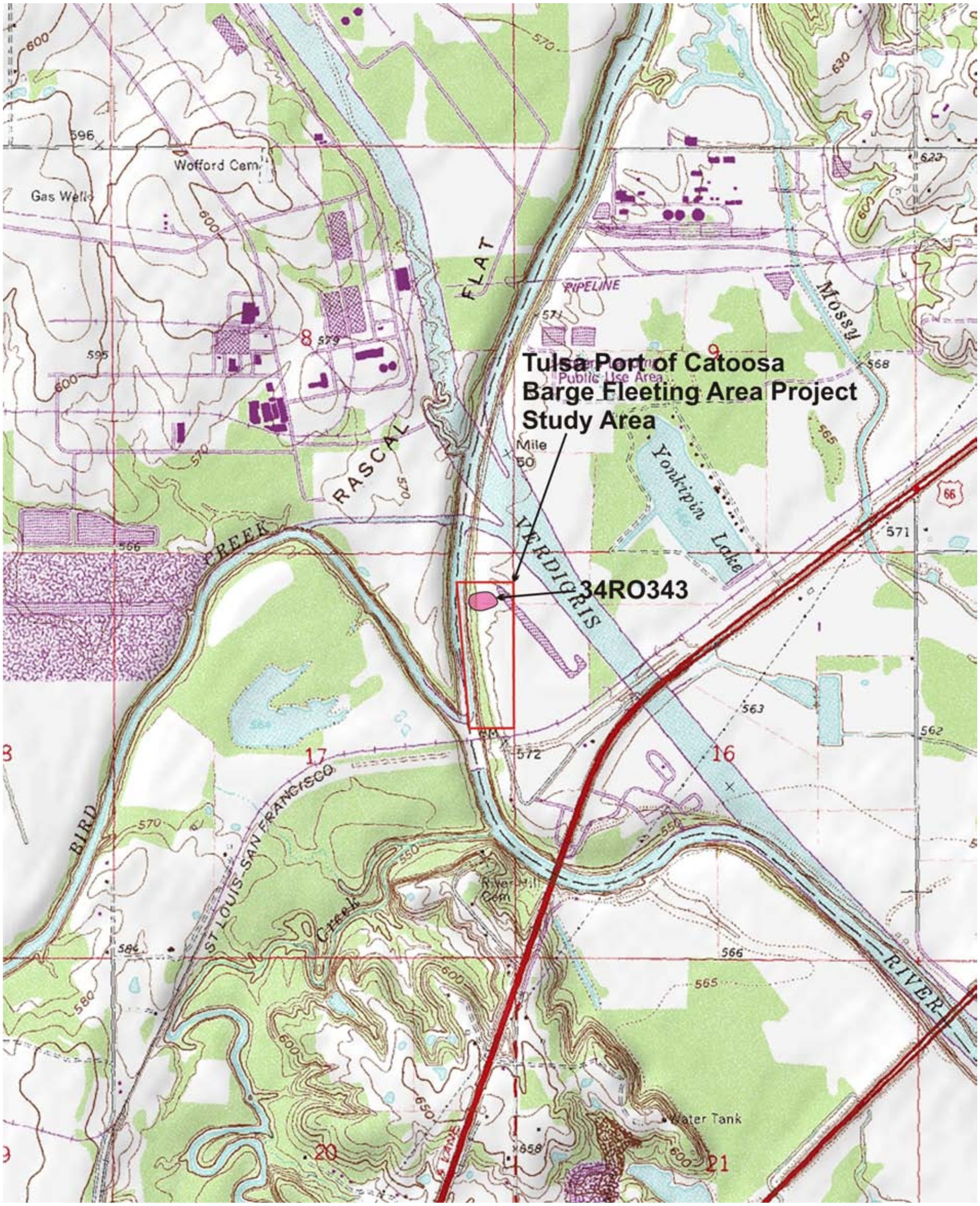


Figure 2. Study area (outlined in red), USGS Catoosa, OKLA quadrangle, 7.5-minute series 1963 (photo revised 1980).

Photo 1. Facing northeast from the southern boundary of the study area.

Photo 2. Facing west to lower benches adjacent the Verdigris River.

## Relevant Previous Archeological Studies In or Near the Project Area:

The most relevant major study near this project was conducted by Richard Drass in 1985, discussing archeological resources within the Bird Creek Basin. Drass acknowledges that the sparse site distribution of Archaic time period occupations in the Bird Creek Basin may be a function of geological processes due to the extensive alluvial deposition in the river valleys of the region. With this in mind, Drass concludes only extensive subsurface explorations into bottom lands will add to the knowledge of Archaic site distributions and densities in these settings of alluvial deposition. For example, both the Oolagah and Copan reservoirs have deeply buried Archaic camps exposed by creek bank erosion.

Plains Woodland period sites are more abundant in the north-central Oklahoma region, with representative artifacts including Scallorn and Reed points (the Von Elm site at Kaw Reservoir is the type site for the Scallorn point). The abundance of Woodland period sites may be a reflection of greater population density during this period; or, Drass notes (1985) that it again may be the alluvium covering Archaic (and older) sites that alter our perception of the settlement activity adjacent these waterways.

One consideration of the Bird Creek study was to examine the impact of Tulsa metroplex development on Bird Creek archeological resources. Much of Bird Creek has not been affected by urban growth, as development has favored the tributaries and avoided the flood-prone bottom lands. Drass indicates (as of 1984) that modern quarry and transportation development have reached a limit, and expects few additional concerns for impact to Bird Creek sites, with the exception to developments of railroads and port facilities (Drass 1984).

Drass states that future work should concentrate on impacts to potential buried habitation materials; summarizing that unless deep excavations occur with construction, little impact will occur to archeological sites.

As Drass’ comments relate to the current project in consideration, this port expansion project does offer an opportunity to examine potential effects on deeper buried deposits, if they indeed exist and if they can be identified. However, the (potential) sites need to be extensive enough (containing enough cultural materials) to be found by soil coring or other deeper sampling methods.

Another large format study touching on the boundaries of the Port of Catoosa project area was the Tulsa North Triangle, an archeological study of northern Tulsa and western Rogers counties, Oklahoma (Dickerson et. al 1991). The Port of Catoosa itself was excluded from the study area. The concern for potential sites buried in the deep alluvial settings adjacent waterways was also expressed (Dickerson et. al 1991:107).

Efforts at identifying buried soils on USACE projects in the general region have previously been conducted, with limited results. In particular, the Candy Creek study in Osage County, Oklahoma (Tucker et. al 2008) identified two named buried pedostratigraphic units, both within a time period known for human occupation of the general area (determined through C-14 samples within soil core samples). No identifiable artifacts were recovered in the limited number of cores placed over a relatively large area. The authors note a concern that the coring sample was too small to locate artifacts, and they describe an artifact search in this method as a ‘needle in a haystack’ search; also, ephemeral prehistoric land use within time periods represented by the buried soils may contribute to a lack of ability to identify cultural materials.

Still, the Candy Creek study identified alluvium to a depth of 25 to 40 ft. and, according to C-14 dates, from the early to late Pleistocene through the late Holocene in chronological age, lending to the possibility for buried human activity areas.

Although well summarized, written and researched by geophysicist Dr. Brian Carter, there remains a lack of decision and objective as to how to proceed with investigating deeply buried soils. The report acknowledges that cost factors would inhibit a greater sampling capacity by increased coring, and for the likely sparse and ephemeral nature of potential early occupations these sites do not lend well to this method of detection, even when buried soils are known to exist.

Geophysical methods to compliment coring are suggested, such as ground penetrating radar (Tucker 2008:55), however if sites are deeply buried and sparse in nature one would question if this method would successfully identify physical cultural remains.

In personal communication with Leland Bement, who also utilized coring under the direction of Dr. Carter at the now well known Cooper site (a buried Folsom bone bed), Dr. Bement suggests once deeper soils are identified, removal of soils (such as with a backhoe) and spreading the matrix out in search of larger artifacts or concentrations of artifacts represents a realistic research method.

Thus, relating the above discussions to the Port project, in particular to the 30 acres of project impact, a combination of soil coring and/or backhoe trench testing to identify possible buried soil may be possible. If identified, the buried soils may be “spread out” during monitoring of the disturbance activities. According to Dr. Bement looking for larger objects (i.e., bone beds or non-naturally occurring rock features) may be the only realistic way to determine if cultural materials associate with potential age appropriate buried soils.

## **Soils Within the 30-Acre Project Area, Natural Resources Conservation Service Soil Descriptions:**

Soils noted during the surface and shovel testing study of the Port of Catoosa Barge Fleeting Project 30-acre footprint are Verdigris silty clay loam (Vf) and Verdigris silt loam (Vd), described as follows:

According to the United States Department of Agriculture, Natural Resources Conservation Service, soils within the specific area of the project footprint include Verdigris silty clay loam, 0-2% slopes (channel and embankment areas) and Verdigris silt loam, 0-1% slopes (pasture areas adjacent the old channel of Bird Creek). Both these soils are similar in composition, with slight variations in slope varying the properties and qualities. Both soils are silty alluvium with a typical profile of silt loam from 0-19 inches (0-48cm), and a silty clay loam to 80 inches (48-203cm). For the Verdigris silt loam; the water table is encountered at approximately 80 inches (203cmbs). For the Verdigris silty clay loam, a typical profile consists of 0-17 inches (0-43cm) of silty clay loam, and 17-80 inches (43-203cm) silty clay loam. Contact with lower soils (the contact at 17-19cm) is gradual and undefined.

## File Search:

CAS visited the OAS in Norman, Oklahoma, to examine maps and files pertaining to the study area in an effort to identify previously recorded cultural resources within the proposed project location. **OAS files indicate that no previously recorded archeological sites are located within the specific study area.**

On 12/02/2010 an initial records search was performed at the Rogers County Court house in Claremore, Oklahoma. The earliest entries in the index book for T20N, R15E revealed
NE/NE of Section 17:
- Bearl Deweese et ux granted an Amortization Mortgage to the Land Bank Commissioners on 104/01/936
-L. O. Gravitt and Newton M. Foster granted an Affidavit to the Public on 10/13/1939.
-State of Oklahoma Corporation Commission granted a Certificate of non-Deed to the Public (Conservancy District #30) on 03/29/1962
-Public Service Company of Oklahoma granted a Quit Claim Deed to the United States of America on 09/24/1969.

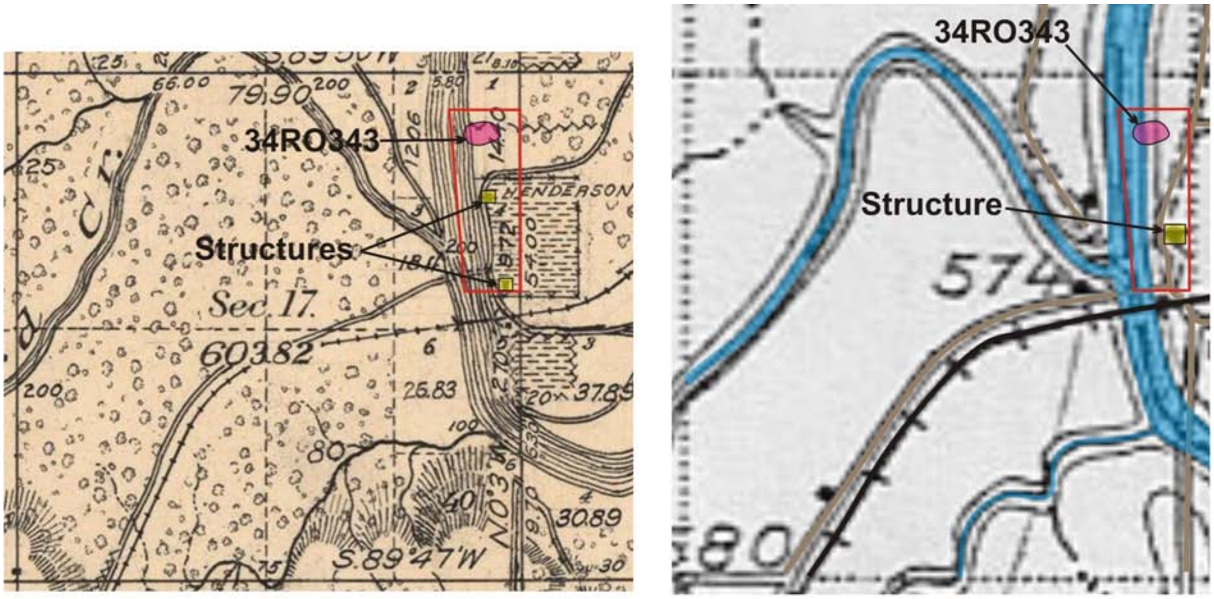
According to the most recent listings, no properties listed on the NRHP are within the specific study area of this project. No properties considered eligible for the NRHP but not yet nominated (Oklahoma SHPO Determinations of Eligibility listings, October 2009, supplemental listing April 2010) are noted in the specific study area.

Early and mid-20th century maps as well as mid to late-20th century and current aerial photographs were examined for structures, trails and roads in the study area. General Land Office (GLO) plat maps of the study area were examined including the Original Survey dated 04/09/1898 (survey completed 07/03/1896) (Bureau of Land Management 2008). The map shows the study area as both plowed field and open pasture with two structures, one labeled Henderson, plotted adjacent a road within the study area (Figure 3a). No indications of these two structures were observed on the surface or in shovel tests.

The USGS Claremore, OKLA quadrangle, 30-minute series, 1916 map (surveyed 1913-1914) was also examined (Figure 3b). This map shows one structure adjacent a road trending through the center of the study area. This structure is plotted within the vicinity of the southern-most 1898 structure and may represent the same occupation. No remains of this structure were noted on the surface or in shovel tests.

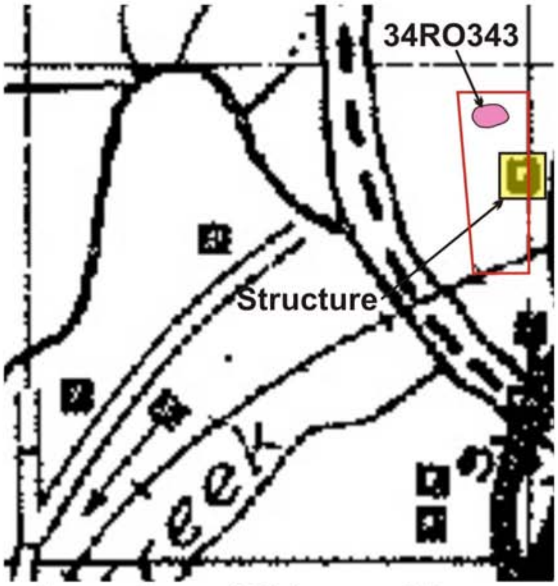
The 1936 Oklahoma State Highway Department’s General Highway and Transportation Map of

Rogers County was also examined (Figure 3c). One structure indicated with a “dwelling- other than farm” symbol is within the study area. This structure is plotted within the vicinity of the southern-most 1898 structure and may represent the same occupation. No remains of this structure were noted on the surface or in shovel tests.



a. 1898 GLO Original Survey plat map.

b. 1916 USGS Claremore, OKLA quadrangle, 30-minute series.



c. 1936 Rogers County General Highway and Transportation Map.

Figure 3. Early and mid-20th century maps of study area (outlined in red).

Aerial photographs at the Oklahoma Geological Survey (Norman, Oklahoma) were also examined. The 1942, 1958, 1964 and 1972 aerial images show the study area as predominantly open pasture with wooded areas adjacent the waterway (Figure 4a-4d). 34RO343 is visible on the 1942, 1958 and 1964 aerial photographs. The 1972 aerial photograph shows the site area as wooded with no visible standing structures.

a. 1942 aerial photograph

b. 1958 aerial photograph

c. 1964 aerial photograph

d. 1972 aerial photograph

Figure 4. Aerial photographs of study area (outlined in red) and 34RO343 (outlined in magenta).

The 2008 satellite image shows the study area as it exists today (National Agricultural Inventory Project 2008) (Figure 5). Figure 6 shows a computer generated oblique view of the study area illustrating the geographic features.

Figure 5. 2008 NAIP satellite image of the study area (outlined in red) and 34RO343 (outlined in magenta).

Figure 6. Computer generated oblique view of the 2008 NAIP satellite image of the study area. The view is to the north and the vertical exaggeration is x2.

## Archeological Investigations

On 11/07-09/2010, CAS conducted an archeological site assessment of an approximate 30-acre area (study area) for Dewberry, on Tulsa Port Authority (Port) lands located in portions of the NE/4 of Sections 17 T20N, R15E, Rogers County, Oklahoma.

Pedestrian transects augmented by hand dug shovel tests were utilized as field methodology. Matrix was screened through ¼ inch screen mesh, excavated to between 30 and 70 cm. No deep testing methods were utilized during this preliminary reconnaissance (see shovel test log, Appendix A).

One new archeological site was recorded during the course of these investigations.

*Newly Recorded Archeological Site:*

**34RO343**
C E/2 NE/NE Section 17 T20N, R15E
Site area: 110x65 m (360x215 ft.)
UTM NAD27 CONUS Zone 15S E0254827 N4011445

This site is the remains of a mid-20th century farmstead located on a terrace overlooking the Verdigris River channel to the west. Features observed at the site include a house foundation (Feature 1), a cellar (Feature 2), two 12 inch (30 cm) cement circular casings (Feature 3), a possible water well represented by a metal pipe set in concrete (Feature 4), and two rectangular cement stem wall foundations (Feature 5). The five features and associated artifacts were observed on the surface in a moderately wooded setting over a 360x215 ft. (110x65 m) area with leaf litter and sparse understory showing 40-50% visibility.

Feature 1 consists of a partial cement block stem wall foundation with poured cement over native stone steps at the entry way. The south facing entry way steps are 2x3.5 ft. (0.6x1.2 m) flanked by cement block 5 ft. (1.5 m) on either side. The west wall extends 17 ft. (5.1 m) terminating at a push pile on the north end of the foundation. Only 5 ft. (1.5 m) of the east wall remains in place. Cement block and plain red brick pavers are scattered around the foundation.

Feature 2, the cellar, is located 55 ft. (16.8 m) southwest of the house foundation. The cellar is constructed of reinforced concrete with a vaulted ceiling, an east facing 6x3.5 ft. (1.8x1.2 m) entrance, and measures 14x7 ft. (4.3x2.1 m) The door has been removed and some modern debris fills the interior.

Feature 3 consists of two 12 inch (30 cm) cylindrical concrete casings spaced 10 ft. (3 m) apart adjacent the cellar to the southeast.

Feature 4 is a 12 inch (30 cm) metal pipe set in concrete possibly representing a water well pipe west of the cellar approximately 30 ft. (10 m).

Feature 5 consists of two rectangular concrete foundations located on a lower terrace approximately 100 ft. (30 m) west of the cellar. The northern-most foundation measure 8x6 (2.4x1.8 m) and adjacent 8.5 ft. (2.5 m) south is a10x8 ft. (3x2.4 m) foundation set at a slight angle.

The majority of the debris related to the occupation is located west and south of the cellar including metal 55 gallon drums, portable outdoor grill, carpet, carpet padding, a large “EVER FRESH WIND POWER” freezer, pull-tab beverage cans, aluminum food cans, plastic bottles, 1950’s style Chevrolet truck hood. Artifacts with maker’s marks include an amber “Duraglas” bottle with Owens-Illinois “I” inside the “O” and 15 6 on either side and Duraglas script used after 1940 (Toulouse 1971), a Dr. Pepper bottle stamped “1947” on the base, a Karo Syrup bottle with the Owens-Illinois diamond IO mark with 7 and 9 on either side produced in Alton, Illinois 1930 to present (Toulouse 1971), a large amber glass bottle base with the Owens-Illinois diamond IO mark with 7 and 3. (date code 1943) on either side and 12 below it (Lockhart 2004), and a cobalt glass Vicks Vaporub bottle with three overlapping “V” and 57 below it. More recent debris was also observed such as beer bottles, plastic containers and Styrofoam.

Modern activities such as trash dumping, camping and hunting are evident in the site area; a deer stand is located adjacent to the north of the foundation features.

The farmstead appears to have been built in the late 1930’s to early 1940’s (first appearing on the 1942 aerial photographs). The 1942, 1958 and 1964 aerial photographs show three discernible standing structures (Figure 4a-4c). The farmstead is extant on the 1972 aerial photograph.

Based on the lack of integrity of the artifacts (a mixture of flotsam, modern dumping activity and occupation-related debris) and the poor condition of the features, the site would not appear eligible under Criterion C or D of the NRHP. An initial records check of the NE/NE of Section 17 T20N, R15E did not suggest association with an event or important persons. Therefore, this site would not appear eligible under Criterion A or B of the NRHP. No further concern for 34RO343 is considered necessary.

Photo 3. Facing southwest to cellar at 34RO343.

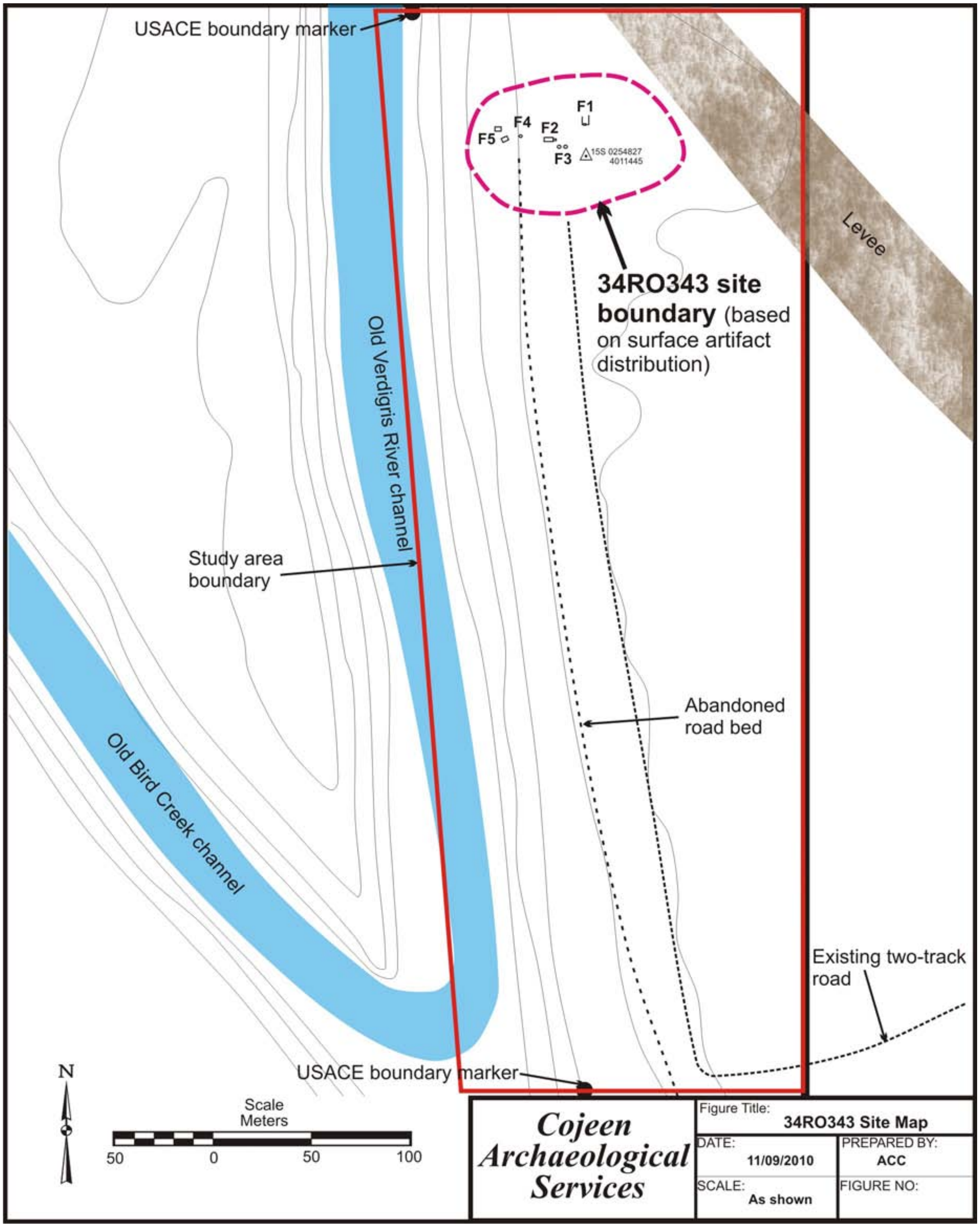


Figure 7. Site map of 34RO343.

## Recommendations:

The 20th century farmstead site 34RO343 and the associated artifacts do not appear to be resources warranting inclusion on the NRHP.

The location is adjacent major waterways and has alluvial deposition. In discussion with the USACE archeologist Kenneth Shingleton and Michelle Horn (office meeting 11/10/2010) six to nine coring placements spaced over the east triangle would be a sufficient search for buried sites. This would require the assistance of a geomorphologist to interpret the core soils and an archeologist to inspect core matrix for archeological materials.

Christopher Cojeen
Principal Investigator

copies:

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600 Parsippany Rd., Suite 301
Parsippany, NJ 07054-3715
attention: Andrea Burk

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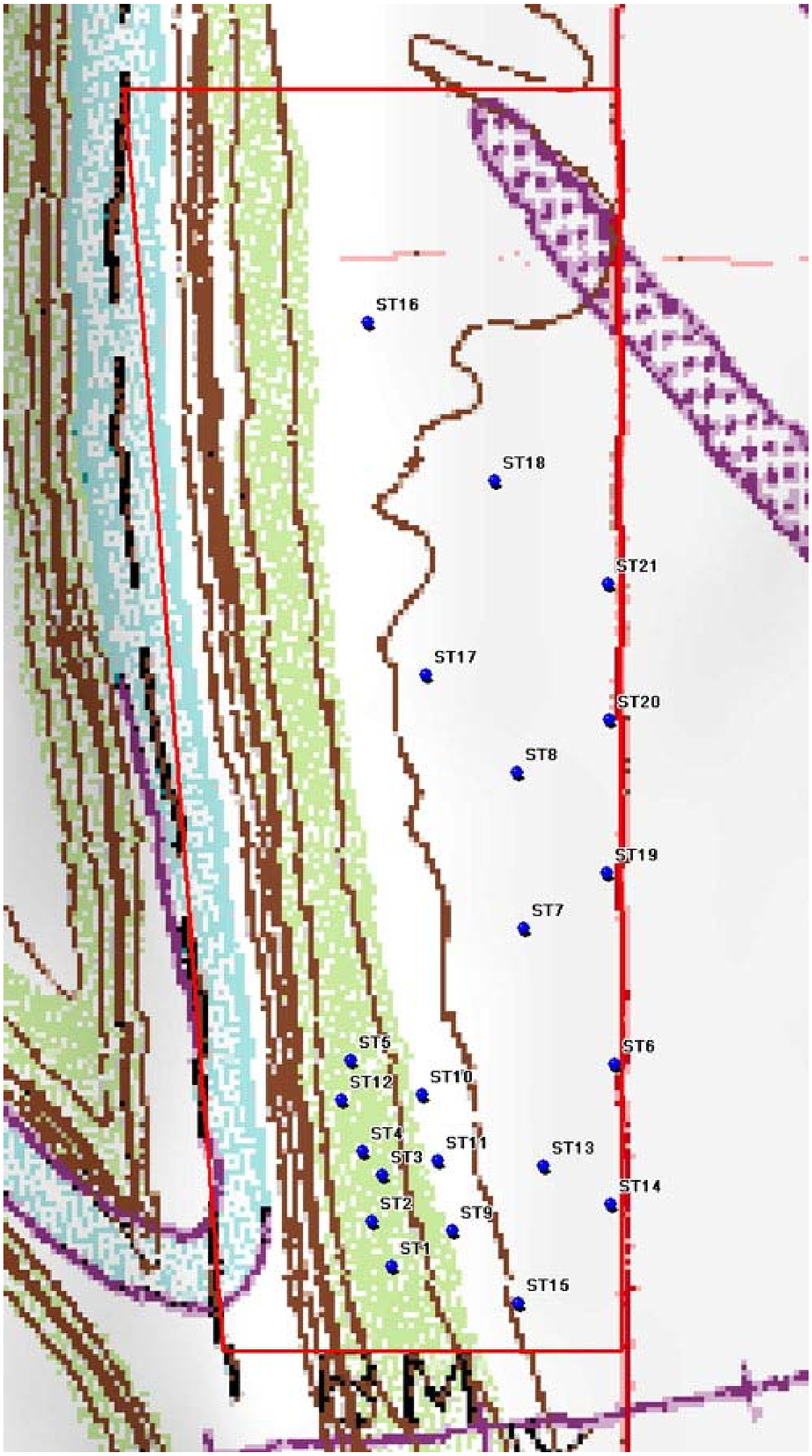
## Appendix A: Shovel Test Log

| Shovel Test # | Easting | Northing | Setting/Soil Description |
|---|---|---|---|
| **ST1** | 0254824 | 4011008 | Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay to 45cmbs. **Negative** |
| **ST2** | 0254825 | 4011019 | Lower terrace, gently sloping, wooded, 10% visibility/Compact gray brown silty loam 0-40cmbs, mottled with gray clay to 45-50cmbs. **Negative** |
| **ST3** | 0254822 | 4011030 | Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay to 45cmbs. **Positive with 5 pieces of clear, non-solarized glass in top 10cmbs.** |
| **ST4** | 0254813 | 4011041 | Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay to 50cmbs. **Negative** |
| **ST5** | 0254809 | 4011082 | Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay ending at 30cmbs. **Negative** |
| **ST6** | 0254935 | 4011074 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-30cmbs, reddish brown silty loam 30-50cmbs, medium brown clay 55-70cmbs. **Negative** |
| **ST7** | 0254890 | 4011140 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. |
| **ST8** | 0254888 | 4011210 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| **ST9** | 0254853 | 4011001 | First terrace, gently sloping, adjacent hay field in moderately wooded area, 30% visibility/ Brown sily clay loam 0-10cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. **Negative** |
| **ST10** | 0254840 | 4011065 | First terrace, gently sloping, adjacent hay field in moderately wooded area, 30% visibility/ Dark brown sily clay loam 0-10cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. **Negative** |
| **ST11** | 0254847 | 4011033 | First terrace, gently sloping, adjacent hay field in moderately wooded area, 30% visibility/ Brown sily clay loam 0-cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. **Negative** |
| **ST12** | 0254804 | 4011064 | Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay ending at 30cmbs. **Negative** |
| **ST13** | 0254895 | 4011032 | Level, open hay field adjacent two-track road, 0 visibility /Compact brown silty loam 0-30cmbs, reddish brown silty loam 30-55cmbs, medium brown clay 55-70cmbs. **Negative** |
| **ST14** | 0254925 | 4011014 | Level, open hay field, 0 visibility/ Compact brown silty loam |

| | | | |
|---|---|---|---|
| | | | 0-30cmbs, reddish brown silty loam 30-50cmbs, medium brown clay 55-70cmbs. **Negative** |
| **ST15** | 0254882 | 4010970 | Level, open hay field adjacent two-track road, 0 visibility /Compact brown silty loam 0-30cmbs, reddish brown silty loam 30-55cmbs, medium brown clay 55-70cmbs. **Negative** |
| **ST16** | 0254826 | 4011415 | Level, open hay field, 0 visibility /Compact brown silty loam 0-30cmbs, reddish brown silty loam 30-55cmbs, medium brown clay at 65cmbs. **Negative** |
| **ST17** | 0254848 | 4011255 | Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. **Negative** |
| **ST18** | 0254880 | 4011343 | Level, open hay field, 0 visibility /Compact brown silty loam 0-30cmbs, reddish brown silty loam 30-55cmbs, medium brown clay 55-70cmbs. **Negative** |
| **ST19** | 0254935 | 4011154 | Level, open hay field, 0 visibility /Compact brown silty loam 0-30cmbs, reddish brown silty loam 30-55cmbs, medium brown clay 55-70cmbs. **Negative** |
| **ST20** | 0254941 | 4011227 | Level, open hay field, 0 visibility/Compact brown silty loam 0-30cmbs, reddish brown silty loam 30-55cmbs, medium brown clay 55-70cmbs. **Negative** |
| **ST21** | 0254932 | 4011294 | Level, open hay field, 0 visibility/Compact brown silty loam 0-30cmbs, reddish brown silty loam 30-55cmbs, medium brown clay 55-70cmbs. **Negative** |



`Figure 8. Shovel test locations.

## Appendix B: Isolated Occurrences

IO1 15S E0254864 N4011044
This IO is a utility pole, metal tie down hook and steel cable observed adjacent an abandoned road bed in a moderately wooded setting. Visibility was 40% in leaf litter and short grasses.

IO2 15S E0254811 N4011125
This IO consists of a 55 gallon metal drum, a car fender, metal frame and springs of a car seat front loading washing machine, paint, coffee and food cans observed adjacent an abandoned road bed in a moderately wooded setting. Visibility was 40% in leaf litter and short grasses.

IO3 15S E0254828 N4010984
This IO is the base to a medicinal bottle with the maker's make H A 7. This IO was observed in a modern dump area consisting of a glass measuring cup, a Coke bottle and aluminum food cans observed on a lower terrace adjacent the Verdigris River in a moderately wooded setting. Visibility was 30% in leaf litter and short grasses.

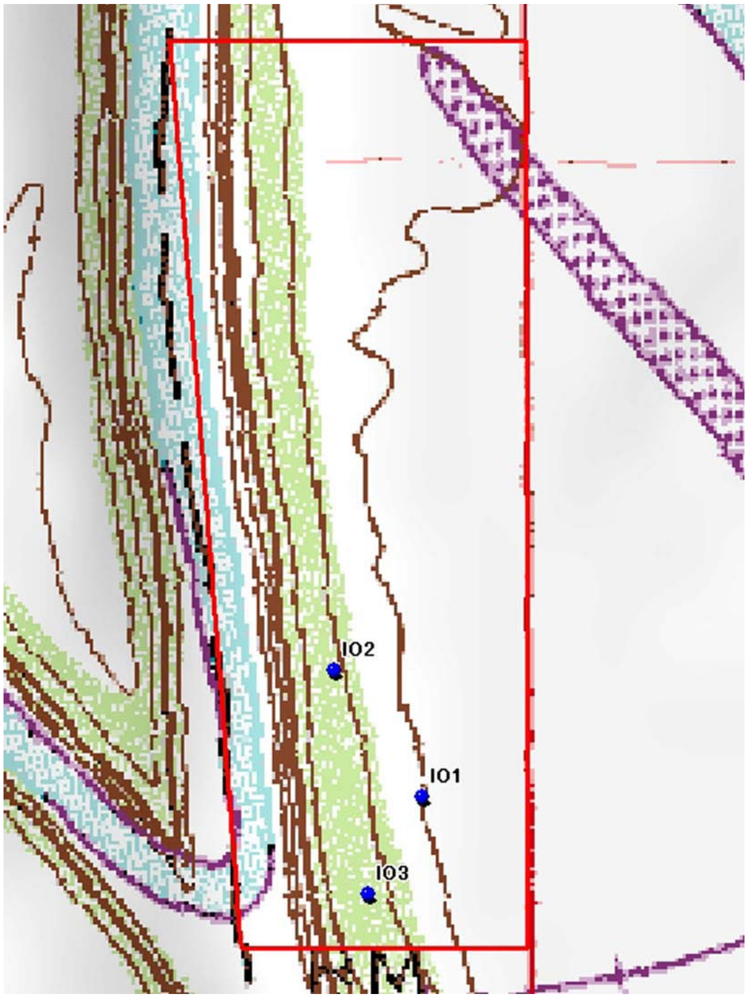


Figure 9. Isolated Occurrences of Artifacts.

**DEPARTMENT OF ARMY**
CORPS OF ENGINEERS, TULSA DISTRICT
TULSA, OKLAHOMA 74128-4609

February 8, 2013

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Mekko George Scott
Thlopthlocco Tribal Town, Oklahoma
P.O. Box 188
Okemah, OK 74859

Dear Mekko Scott:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In addition to the fleeting area there are other ancillary construction features. For example, construction of the fleeting area will require the removal of a point of land at the confluence of the existing Bird Creek channel and the Verdigris River so that barges can appropriately enter and exit the fleeting area. Lastly, a bridge over the existing Bird Creek channel will be required for the removal of fill material and an associated road for transport will be required along the north bank of Bird Creek. Fill material will be transported to the immediate west of the project area and deposited on Tulsa Port

of Catoosa property. This action will be handled separately (with an accompanying cultural resources survey) under Section 404 of the Clean Water Act, for which a permit may be required.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Jeff Knack
for Chief, Environmental Analysis
and Compliance Branch

2 Encls

**DEPARTMENT OF ARMY**
CORPS OF ENGINEERS, TULSA DISTRICT
TULSA, OKLAHOMA 74128-4609

February 8, 2013

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Principal Chief Leonard Harjo
Seminole Nation of Oklahoma
P.O. Box 1498
Wewoka, OK 74884

Dear Principal Chief Harjo:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In addition to the fleeting area there are other ancillary construction features. For example, construction of the fleeting area will require the removal of a point of land at the confluence of the existing Bird Creek channel and the Verdigris River so that barges can appropriately enter and exit the fleeting area. Lastly, a bridge over the existing Bird Creek channel will be required for the removal of fill material and an associated road for transport will be required along the north bank of Bird Creek. Fill material will be transported to the immediate west of the project area and deposited on Tulsa Port

of Catoosa property. This action will be handled separately (with an accompanying cultural resources survey) under Section 404 of the Clean Water Act, for which a permit may be required.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Jeff Knack
for Chief, Environmental Analysis
and Compliance Branch

2 Encls

**DEPARTMENT OF ARMY**
CORPS OF ENGINEERS, TULSA DISTRICT
TULSA, OKLAHOMA 74128-4609

February 8, 2013

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Principal Chief John Red Eagle
Osage Nation, Oklahoma
P.O. Box 779
Pawhuska, OK 74056

Dear Principal Chief Red Eagle:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In addition to the fleeting area there are other ancillary construction features. For example, construction of the fleeting area will require the removal of a point of land at the confluence of the existing Bird Creek channel and the Verdigris River so that barges can appropriately enter and exit the fleeting area. Lastly, a bridge over the existing Bird Creek channel will be required for the removal of fill material and an associated road for transport will be required along the north bank of Bird Creek. Fill material will be transported to the immediate west of the project area and deposited on Tulsa Port

of Catoosa property. This action will be handled separately (with an accompanying cultural resources survey) under Section 404 of the Clean Water Act, for which a permit may be required.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Tonya Dunn

for Jeff Knack
Chief, Environmental Analysis
and Compliance Branch

2 Encls

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

**DEPARTMENT OF ARMY**
CORPS OF ENGINEERS, TULSA DISTRICT
TULSA, OKLAHOMA 74128-4609

February 8, 2013

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Principal Chief A.D. Ellis
Muscogee (Creek) Nation, Oklahoma
P.O. Box 580
Okmulgee, OK 74447

Dear Principal Chief Ellis:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In addition to the fleeting area there are other ancillary construction features. For example, construction of the fleeting area will require the removal of a point of land at the confluence of the existing Bird Creek channel and the Verdigris River so that barges can appropriately enter and exit the fleeting area. Lastly, a bridge over the existing Bird Creek channel will be required for the removal of fill material and an associated road for transport will be required along the north bank of Bird Creek. Fill material will be transported to the immediate west of the project area and deposited on Tulsa Port

of Catoosa property. This action will be handled separately (with an accompanying cultural resources survey) under Section 404 of the Clean Water Act, for which a permit may be required.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Tonya Dunn

for Jeff Knack
Chief, Environmental Analysis
and Compliance Branch

2 Encls

**DEPARTMENT OF ARMY**
CORPS OF ENGINEERS, TULSA DISTRICT
TULSA, OKLAHOMA 74128-4609

February 8, 2013

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Mekko Tiger Hobia
Kialegee Tribal Town, Oklahoma
P.O. Box 332
Wetumka, OK 74883

Dear Mekko Hobia:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In addition to the fleeting area there are other ancillary construction features. For example, construction of the fleeting area will require the removal of a point of land at the confluence of the existing Bird Creek channel and the Verdigris River so that barges can appropriately enter and exit the fleeting area. Lastly, a bridge over the existing Bird Creek channel will be required for the removal of fill material and an associated road for transport will be required along the north bank of Bird Creek. Fill material will be transported to the immediate west of the project area and deposited on Tulsa Port

of Catoosa property. This action will be handled separately (with an accompanying cultural resources survey) under Section 404 of the Clean Water Act, for which a permit may be required.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

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Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

for Jeff Knack
Chief, Environmental Analysis
and Compliance Branch

2 Encls

**DEPARTMENT OF ARMY**
CORPS OF ENGINEERS, TULSA DISTRICT
TULSA, OKLAHOMA 74128-4609

February 8, 2013

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Chairperson Brenda Shemayme Edwards
Caddo Indian Tribe of Oklahoma
P.O. Box 487
Binger, OK 73009

Dear Chairperson Edwards:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

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Sincerely,

Tonya Dunn

for Jeff Knack
Chief, Environmental Analysis
and Compliance Branch

2 Encls

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

**DEPARTMENT OF ARMY**
CORPS OF ENGINEERS, TULSA DISTRICT
TULSA, OKLAHOMA 74128-4609

February 8, 2013

Planning and Environmental Division
Environmental Analysis and Compliance Branch

President Leslie Standing
Wichita and Affiliated Tribes of Oklahoma
P.O. Box 729
Anadarko, OK 73005

Dear President Standing:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

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Sincerely,

Tonya Dunn

for Jeff Knack
Chief, Environmental Analysis
and Compliance Branch

2 Encls

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

**DEPARTMENT OF ARMY**
CORPS OF ENGINEERS, TULSA DISTRICT
TULSA, OKLAHOMA 74128-4609

February 8, 2013

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Chief George Wickliffe
United Keetoowah Band of Cherokee Indians in Oklahoma
P.O. Box 746
Tahlequah, OK 74465-0746

Dear Chief Wickliffe:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In addition to the fleeting area there are other ancillary construction features. For example, construction of the fleeting area will require the removal of a point of land at the confluence of the existing Bird Creek channel and the Verdigris River so that barges can appropriately enter and exit the fleeting area. Lastly, a bridge over the existing Bird Creek channel will be required for the removal of fill material and an associated road for transport will be required along the north bank of Bird Creek. Fill material will be transported to the immediate west of the project area and deposited on Tulsa Port

of Catoosa property. This action will be handled separately (with an accompanying cultural resources survey) under Section 404 of the Clean Water Act, for which a permit may be required.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Tonya Dunn

for Jeff Knack
Chief, Environmental Analysis
and Compliance Branch

2 Encls

**DEPARTMENT OF ARMY**
CORPS OF ENGINEERS, TULSA DISTRICT
TULSA, OKLAHOMA 74128-4609

February 8, 2013

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Principal Chief Bill John Baker
Cherokee Nation, Oklahoma
P.O. Box 948
Tahlequah, OK 74465

Dear Principal Chief Baker:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

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Sincerely,

for Jeff Knack
Chief, Environmental Analysis
and Compliance Branch

2 Encls

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

**DEPARTMENT OF ARMY**
CORPS OF ENGINEERS, TULSA DISTRICT
TULSA, OKLAHOMA 74128-4609

February 8, 2013

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Dr. Robert Brooks
Oklahoma Archeological Survey
111 E. Chesapeake
Norman, OK 73019-5111

Dear Dr. Brooks:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

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We request your comment on our determination of "not eligible" for archaeological sites 34RO343 and 34RO347, and on our determination of "no historic properties affected" for the proposed sale of federal land and all connected actions associated with the construction of the barge fleeting area for the Tulsa Port of Catoosa. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Tonya Dunn

for Jeff Knack
Chief, Environmental Analysis
and Compliance Branch

2 Encls

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

**DEPARTMENT OF ARMY**
CORPS OF ENGINEERS, TULSA DISTRICT
TULSA, OKLAHOMA 74128-4609

February 8, 2013

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Dr. Bob Blackburn
State Historic Preservation Officer
Oklahoma Historical Society
Oklahoma History Center
800 Nazih Zuhdi Dr.
Oklahoma City, OK 73105

Dear Dr. Blackburn:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

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Sincerely,

for Jeff Knack
Chief, Environmental Analysis
and Compliance Branch

2 Encls

# APPENDIX C

# AGENCY AND PUBLIC COORDINATION

# U. S. DEPARTMENT OF COMMERCE
# ECONOMIC DEVELOPMENT ADMINISTRATION

# U.S. ARMY CORPS OF ENGINEERS

# TULSA PORT OF CATOOSA

## SCOPING MEETING
## for
## BARGE FLEETING AREA ENVIRONMENTAL ASSESSMENT
## at the
## Tulsa Port of Catoosa, Oklahoma

**Meeting Date:** July 27, 2009
**Time:** 10:00 a.m.
**Location:** USACE Conference Room #________

**Attendees:**

| | |
|---|---|
| Dr. Jonathon Markley | U.S. Dept. of Commerce, Economic Development Admin (EDA)<br>512.381.8156<br>jmarkley@eda.doc.gov |
| Rick Gardner | U.S. Army Corps of Engineers (USACE)<br>918.669.7090<br>Rick.gardner@usace.army.mil |
| Shane Charlson | USACE Regulatory<br>918.669.7395<br>Shane.charlson@usace.army.mil |
| Steve Nolan | USACE Environmental<br>918.669.7660<br>Stephen.l.nolan@usace.army.mil |
| Mark Moore | USACE |
| Patricia Newell | USACE<br>918.669.4937<br>Patricia.a.newell@usace.army.mil |

**Attendees (Continued):**

| | |
|---|---|
| Ken Shingleton | USACE Cultural Resources<br>918.669.7661<br>Kenneth.l.shingleton@usace.army.mil |
| Richard Stark | U.S. Fish & Wildlife Service (USFWS)<br>918.382.4520<br>Richard_stark@fws.gov |
| Cheryl Brown | Indian Nations Council of Governments (INCOG)<br>918.579.9483<br>cbrown@incog.org |
| David Yarbrough | Tulsa Port of Catoosa (TPC)<br>918.266.2291<br>david@tulsaport.com |
| Scott Legate | PSA-Dewberry (PSA-D)<br>918.295.5262<br>slegate@dewberry.com |
| Craig Swengle | PSA-Dewberry (PSA-D)<br>918.295.5255<br>cswengle@dewberry.com |

PLEASE NOTE: These Meeting Notes constitute PSA-D's recollection of the items discussed and decisions reached at this meeting. Please contact Craig Swengle by cob Thursday, November XX$^{th}$ with changes that are required of these notes.

## DISCUSSION ITEMS

David Yarbrough, Tulsa Port of Catoosa (TPC), briefed group on the Port's plans to construct a Barge Fleeting Area 300 feet wide by 2,100 feet long ... large enough to store upwards of 60 barges. The Port's concept is to construct this slack water arm of the Port along the old Verdigris River channel. Drawing that was used as an exhibit is attached.

Rick Gardner, U.S. Army Corps of Engineers (USACE) briefed the group on the land swap that has been proposed to facilitate the Barge Fleeting Area. A green / red shaded figure was used to explain the limits of the USACE and TPC land that could change ownership. The TPC would use the current USACE land (85 acres) for the barge fleeting area and for mitigation of the land that will be removed from riparian habitat. The USACE would use the current TPC land (34 acres) as a dredge spoil storage area.

USACE will need to have both parcels appraised as part of the Land Swap process.

NEPA documents will be required for both the Land Swap and the Barge Fleeting Area construction. USACE agreed to combine the two documents in order to shorten the Project timeframe. EDA will share in the cost of preparing the NEPA Document.

USACE NEPA requirements –
- Grown to Fleeting area,
- Construction, disposal,
- Social, economics, traffic patterns,
- Broad analysis,
- Disposal areas.

The NEPA Document can be prepared by a consultant as long as the Document meets the applicable requirements and is adopted by USACE. The same goes for the preparation of Section 404 and 10 permits.

Prepare only one document, will e-mail to attendees.

Cultural Resources field survey, information already sent to Oklahoma State Historic Preservation Office (SHPO), but no comments received back yet. Dr. Bob Perocks (?) indicated that there will likely be buried archeological sites in this area.

Pedestrian survey and limited subsurface investigation will be likely required. Pre-historic archeology sites are a possibility. SHPO is focused on buried archeological sites. What triggered this requirement was not USACE obtaining 34 acres but disposing of the 85 acres and the construction of a new channel.

Dumping dredged material is not a problem, but construction of dikes will be a problem.

Geomorphology. A previous study was done in the 3-forks area. USACE will contract this out as well as EDA. Geotechnical investigation and field samples can be done by same firm. Not interested in rock, archeology only is possible in the earthen area.

Waste site is the same as a dredge disposal area.

National Historical Preservation Act –
- EIS: Environmental Impact Statement,
- EA: Environmental Assessment,
- FONSI: Finding of No Significant Impact

The USACE EA will likely cover the EA required for the 404 Permit

Ken Shingleton summarized the requirements for the Cultural Resources studies –

Step 2 – Testing, limited archeological work required, archival research, eligible for register, adverse affect, mitigation, photos, architectural drawings.

If buried archeological site found, then a Memorandum of Agreement will need to be worked out with SHPO and the State Archeologist.

SHPO website has a list of recommended archeological study consultants.

David Yarbrough asked if the Port should be meeting with SHPO? No, SHPO coordination should be left up to USACE and EDA.

Shane Charlson briefly discussed permitting items –

- Shane is the point of contact for the 404 and 10 permits.
- Depending on value of the site ????
- Tribal coordination will be required as part of the 404 permit. This coordination will be government to government. Shane will prepare the Gov't to Gov't letter.
- USACE will be the lead agency for the 404 permit. EDA is the lead agency for the entire project.
- Good analysis of barge fleeting alternatives will be required.
- Studies will need to cover waste sites, effected streams, and whatever mitigation is required.
- Once Final Design is complete, then the 404 permit can be finalized.

Wetland Delineation is important. This can be contracted out to a consultant. Wetlands will need to be delineated on all of the EDA construction project related areas, including the barge fleeting channel and all excavated material fill sites.

Richard Stark with USFWS summarized the requirements of the Endangered Species Act –

- Need to get the Rogers County list of endangered and threatened species. There is a good likelihood that these species will be present somewhere within the project limits.
- A written analysis will be required to be prepared. List alternatives to proposed construction.
- If there is no effect whatsoever, then put this in writing, file it, and do not contact USFWS.
- If there is an effect, then prepare a Section 7 consultation.
- If a Formal consultation is required, then it is a 130-day plus process.
- American Burying Beetle, if project greater than 1.2 acres, then surveys will be required along the barge channel and within the limits of the excavated material fill sites. Surveys are only valid for one year. May 15 thru September 15 is the active season for the Beetle. Trappings can only be done within the window of time.
- Oklahoma Ecological Services website has a list of authorized American Burying Beetle trappers.
- Fish and Wildlife Coordination Act protects against impacts to animal and plant habitat.
- There will definitely be stream / riparian issues.
- Temporary access to the Corps' island can be permitted under the Nationwide Permit 33. This permit can be approved by USACE (Shane Charlson) in one week.
- The Port and USACE already have a real estate right-of-entry in place for the Corps' island.

Bottomland Hardwood Wetlands –

- USACE believes that most if not all of the recently Port-purchased 500 acres was formerly Bottomland Hardwood Wetlands.

- In areas that have restorative acreage, the mitigation ratio is 3 to 1, for every acre that is disturbed, 3 acres must be restored.
- In areas that does not have restorative acreage, the mitigation ratio is 10 to 1, for every acre disturbed ten acres must be restored.
- USACE stated that a corridor along the old Bird Creek channel will not be enough mitigation for the amount of disturbance area being discussed. Port should be ready to restore agricultural fields as part of the mitigation requirements.

EA requires a Public Scoping Meeting be held –

- Meeting will be for the general public and will provide information of the upcoming Port plans.
- These meetings are typically informal in nature, with a come & go format.
- Normally 2 to 4 weeks notice is given.
- Port can host the meeting at their offices.
- Representatives need to be present from EDA, USACE, USFWS, and TPC.
- Meetings should not be held on Wednesday. Best weekdays are Tuesday or Thursday.
- Once the Public Meeting is held, that fulfills the EA's public notice requirement.

Rick Gardner summarized the final steps –

- NEPA Document must be completed before EDA grant can be awarded.
- Land swap between TPC and USACE cannot start until a FONSI is issued and approved.
- A 401 Certification will be required from the Oklahoma Department of Environmental Quality (ODEQ).
- Finding of Sustibility to transfer …(?)
- The 404 permit is not tied to the Land Swap.
- An Environmental Phase I is required for the Land Swap, therefore USACE will complete this process and will pay for it.
- If contamination is found, USACE will clean it up before the transfer can take place.
- The transfer execution order requires a 30-day notice.
- The draft EA will be sent out by USACE on CD to multiple agencies for a 30-day review period. This is normal practice for USACE.
- Public notices are required for the Public Scoping Meeting and the Draft EA Review.

USACE offered that fees for just the consultants to do the Archeology and Wetland Delineation could be in the neighborhood of $325,000.

David Yarbrough reported that the proposal for determining whether or not the Bird Creek floodplain could be used as an excavation fill site is being prepared and will likely be approved in the coming weeks.

**END OF MEETING**

**Mailing List for Port of Catoosa Land Exchange**
**Environmental Assessment Coordination**
**Revised 2/1/2013**

Honorable Mary Fallin
Governor of Oklahoma
State Capitol Building
2300 North Lincoln Boulevard, Room 212
Oklahoma City, OK  73105

Honorable James M Inhofe
U. S. Senator
1900 NW Expressway, Suite 1210
Oklahoma City, OK 73118

Honorable Tom Coburn
U. S. Senator
100 North Broadway, Suite 1820
Oklahoma City, OK 73102

Honorable James F Bridenstein
Representative in Congress, District 001
2448 E 81st Street
Tulsa, OK 74137

Honorable Markwayne Mullin
Representative in Congress, District 002
104 South Muskogee
Claremore, OK  74017

Senator Nathan Dahm
State Senate, District 033
2300 North Lincoln Blvd., Rm. 533A
Oklahoma City, OK  73105

Senator Rick Brinkley
State Senate, District 034
2300 North Lincoln Blvd., Rm. 512
Oklahoma City, OK  73105

Senator Bill Brown
State Senate, District 036
2300 North Lincoln Blvd., Rm. 413A
Oklahoma City, OK  73105

Senator Sean Burrage
State Senate, District 002
2300 N. Lincoln Blvd., Rm. 522
Oklahoma City, OK 73105

Senator Brian Crain
State Senate, District 039
2300 North Lincoln Blvd., Rm. 417B
Oklahoma City, OK 73105

Senator Kim David
State Senate, District 018
2300 North Lincoln Blvd., Room 428B
Oklahoma City, OK  73105

Senator Jabar Shumate
State Senate, District 011
2300 North Lincoln Blvd., Rm. 521
Oklahoma City, OK  73105

Senator Dan Newberry
State Senate, District 037
2300 North Lincoln Blvd., Rm. 414
Oklahoma City, OK  73105

Senator Gary Stanislawski
State Senate, District 035
2300 North Lincoln Blvd., Room 427A
Oklahoma City, OK  73105

Senator Earl Garrison
State Senate, District 009
2300 North Lincoln Blvd., Room 528A
Oklahoma City, OK  73105

Senator Mike Mazzei
State Senate, District 025
2300 North Lincoln Blvd., Room 424
Oklahoma City, OK  73105

Senator Wayne Shaw
State Senate, District 003
2300 North Lincoln Blvd., Rm. 513A
Oklahoma City, OK  73105

Representative Earl Sears
State Representative, District 011
2300 North Lincoln Blvd., Rm. 333
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Representative Glen Mulready
State Representative, District 068
2300 north Lincoln Blvd., Rm. 338
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Representative Wade Rousselot
State Representative, District 012
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Oklahoma City, OK 73105

Representative David Derby
State Representative, District 074
Post Office Box 2150
Owasso, OK  74055

Representative Jerry McPeak
State Representative, District 013
2300 North Lincoln Blvd., Rm. 503
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State Representative, District 014
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Representative Skye McNeil
State Representative, District 029
2300 North Lincoln Blvd., Rm. 433-B
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Representative Mark McCullough
State Representative, District 030
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Representative Sean Roberts
State Representative, District 036
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Representative Marty Quinn
State Representative, District 009
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Representative Fred Jordan
State Representative, District 069
2300 North Lincoln Blvd., Rm. 405
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Representative Dan Kirby
State Representative, District 075
2300 North Lincoln Blvd., Rm. 302-B
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Representative Jadine Nollan
State Representative, District 066
2300 North Lincoln Blvd., Rm. 329-A
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Representative Jeannie McDaniel
State Representative, District 078
2300 North Lincoln Blvd., Rm. 508
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Representative Ken Walker
State Representative, District 070
2300 North Lincoln Blvd., Rm. 317
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Representative Pam Peterson
State Representative, District 067
2300 North Lincoln Blvd., Rm. 442
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Representative Eric Proctor
State Representative, District 077
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Representative Mike Ritze
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State Representative, District 008
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Representative Kevin Matthews
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Representative Terry O'Donnell
State Representative, District 023
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Representative John Trebilcock
State Representative, District 098
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Representative Weldon Watson
State Representative, District 079
2300 North Lincoln Blvd., Rm. 302
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Representative David Brumbaugh
State Representative, District 076
2300 North Lincoln Blvd., Rm. 400B
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Mr. Mike Helm, Commissioner
Rogers County District 2
6190 E. 400 Road
Oologah, OK 74053

Mr. Kirt Thacker, Commissioner
Rogers County District 3
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Claremore, OK  74019

Mr. Dan DeLozier, Commissioner
Rogers County District 1
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Chelsea, OK  74016

Mr. Ron Curry
Federal Region VI Administrator
U. S. Environmental Protection Agency
1445 Ross Ave., Suite 1200
Dallas, TX 75202

Mr. Larry Curtis, CFM
Rogers County Floodplain Administrator
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Dr. Dixie Porter, Field Supervisor
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Oklahoma Ecological Services Field Office
9014 E. 21st St.
Tulsa, OK  74129- 1428

Mr. Ronald L. Hilliard
State Conservationist
USDA, Natural Resources Conservation Service
100 USDA, Suite 206
Stillwater, OK 74074-2655

Ms. Kim Winton
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U.S. Geological Survey, South Central Area
202 NW 66th, Building 7
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Mr. Dave Lopez, Secretary
Oklahoma Department of Commerce
900 North Stiles Ave.
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INCOG
Attn: Julie Miner,
Principal Economic Development Planner
Economic Development
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Tulsa, OK 74103

Dr. Robert L. Brooks
University of Oklahoma
Oklahoma Archeological Survey
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Norman, OK 73019-0575

Dr. Bob Blackburn
State Historic Preservation Officer
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Oklahoma History Center
800 Nazih Zuhdi Drive
Oklahoma City, OK 73105

Chief Tarpie Yargee
Alabama-Quassarte Tribal Town, Oklahoma
PO Box 187
Wetumka, OK 74883

Principal Chief Bill John Baker
Cherokee Nation, Oklahoma
PO Box 948
Tahlequah, OK 74465

Mekko Tiger Hobia
Kialegee Tribal Town, Oklahoma
PO Box 332
Wetumka, OK 74883

Principal Chief George Tiger
Muscogee (Creek) Nation, Oklahoma
PO Box 580
Okmulgee, OK 74447

Chairperson Brenda Shemayme Edwards
Caddo Nation, Oklahoma
PO Box 487
Binger, OK 73009

Mekko George Scott
Thlopthlocco Tribal Town, Oklahoma
PO Box 188
Okemah, OK 74859

Chief George Wickliffe
United Keetoowah Band of Cherokee Indians in Oklahoma
PO Box 746
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Governor Bill Anoatubby
Chickasaw Nation, Oklahoma
PO Box 1548
Ada, OK 74821

Principal Chief John Red Eagle
Osage Tribe, Oklahoma
PO Box 779
Pawhuska, OK 74056

President Terri Parton
Wichita and Affiliated Tribes of Oklahoma
PO Box 729
Anadarko, OK  73005

Principle Chief Leonard Harjo
Seminole Nation of Oklahoma
PO Box 1498
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# U. S. DEPARTMENT OF COMMERCE EDA
# U.S. ARMY CORPS OF ENGINEERS
# TULSA PORT OF CATOOSA

## SCOPING CLARIFICATION MEETING
## for
## BARGE FLEETING AREA ENVIRONMENTAL ASSESSMENT
## at the
## Tulsa Port of Catoosa, Oklahoma

**Meeting Date:** September 21, 2009
**Time:** 10:30 a.m.
**Location:** USACE Conference Room #________

**Attendees:**

| | |
|---|---|
| Rick Gardner | U.S. Army Corps of Engineers (USACE)<br>918.669.7090<br>Rick.gardner@usace.army.mil |
| Shane Charlson | USACE Regulatory<br>918.669.7395<br>Shane.charlson@usace.army.mil |
| Steve Nolen | USACE Environmental<br>918.669.7660<br>Stephen.l.nolen@usace.army.mil |
| Ken Shingleton | USACE Cultural Resources<br>918.669.7661<br>Kenneth.l.shingleton@usace.army.mil |
| Keith Francis | USACE |
| John Tenner | USACE |
| David Yarbrough | Tulsa Port of Catoosa (TPC)<br>918.266.2291<br>david@tulsaport.com |

**Attendees (Continued):**

| | |
|---|---|
| Craig Swengle | PSA-Dewberry (PSA-D)<br>918.295.5255<br>cswengle@dewberry.com |

No one was in attendance at this meeting from U.S. Dept. of Commerce EDA.

PLEASE NOTE: These Meeting Notes constitute PSA-D's recollection of the items discussed and decisions reached at this meeting. Please contact Craig Swengle by cob Thursday, November XX$^{th}$ with changes that are required of these notes.

## DISCUSSION ITEMS

David Yarbrough, Tulsa Port of Catoosa (TPC), thanked everyone for making time to meet and explained that there were a couple of items that he wanted to discuss with USACE in order to have a better idea of what would be required with the Environmental Assessment (EA) document the Port was about to embark on. He reported that Dewberry had submitted a fee proposal to prepare the EA and the Port had it under consideration.

Topics discussed included:

- The Land Exchange process between the Tulsa Port of Catoosa (TPC) and USACE cannot begin until the EA document has been prepared, reviewed, and accepted and a FONSI has been determined and signed.

- Nationwide Permit 33 is a permit that allows access to be constructed across waterways for temporary purposes only. TPC and Dewberry (TPC's Engineer) has discussed numerous ways to cross the Bird Creek Cutoff in order to gain access to the Corps' Island, including corrugated metal pipes topped with aggregate, a surplus military Bailey bridge, and the use of barges. Each of these ideas looked to have fatal flaws; CMPs with aggregate surface - Bird Creek Cutoff is upwards of 10 feet deep; surplus bridge – significant design would still be required to make such a bridge safe to transport construction loaded vehicles; and barge use – too dependent on Verdigris River water levels and barge availability

  The latest idea is to cross the former Verdigris River Channel near where is joins with the former Bird Creek Channel. During a recent boat tour of the area, the depth of the former River channel dwindled to less than 18 inches the farther south the boat went. Crossing the channel with metal pipes and an aggregate surface would be feasible in this case and this location would be less likely to wash out since the current along this reach is not as strong even in flood events. USACE agreed that this would be a better crossing alternative.

  Land access could be provided along the former Route 66 alignment, along which TPC has an agreement with the landowner to access the TPC land south of Bird Creek.

- TPC needed a clarification of how Bottomland Hardwood Wetlands are defined. Shane Charlson stated that any area having the traits of a Bottomland Hardwood Wetland would be defined as one. He said that most of the new 500 acres appears to have those traits and could be reverted back to wetlands. TPC noted that the the majority of the 500 acres has been farmed for many years, as long as the current Port Director can remember. Mr. Charlson said even so that does not matter. Any man-made use over 5 years old that changes is required to revert back to wetlands

- What areas should the EA cover?
- 404 / 10 Permits
- Pre-construction notification, submit paperwork

**END OF MEETING**

## U.S. ARMY CORPS OF ENGINEERS, TULSA DISTRICT

## TULSA PORT OF CATOOSA

# INITIAL ENVIRONMENTAL RESULTS REVIEW MEETING
# for
# BARGE FLEETING AREA ENVIRONMENTAL ASSESSMENT

### Tulsa Port of Catoosa, Oklahoma

**Meeting Date:** May 3, 2011
**Time:** 9:30 a.m.
**Location:** USACE – Tulsa District Offices

|  |  |  |  |
|---|---|---|---|
| **Attendees:** | Connie Holliday | USACE – Real Estate | 918.669.7688 |
|  | Ken Shingleton | USACE – Environmental | 918.669.7661 |
|  | Patricia Newell | USACE – Environmental | 918.669.4937 |
|  | Shane Charlson | USACE - Regulatory Office | 918.669.7395 |
|  | Ed Parisotto | USACE - Regulatory Office | 918.669.7549 |
|  | Keith Francis | USACE – Counsel | 918.669.7364 |
|  | Doug Beck | USACE – Counsel | 918.669.7178 |
|  | Patrick McQueen | USACE – Operations | 918.775.4475 x- 5815 |
|  | Kenneth Todd | USACE – Navigation | 918.687.4501 |
|  | Tom Heathcock | USACE – Ft. Gibson Office | 918.682.4314 |
|  | Gary Sallee | Consultant – USACE | 918.669.7264 |
|  | Bob Portis | Tulsa Port of Catoosa | 918.266.2291 |
|  | David Yarbrough | Tulsa Port of Catoosa | 918.266.2291 |
|  | Kim Shannon | Kleinfelder – Environmental | 918.627.6161 |
|  | Mike Arand | PSA-Dewberry | 918.295.5226 |
|  | Andrea Burk | Dewberry | 973.576.9681 |
|  | Brian Sayre | Dewberry | 973.576.9637 |
|  | Matt Schlitzer | Dewberry | 973.576.9638 |
|  | Craig Swengle | PSA-Dewberry | 918.295.5255 |

**Recorded By:** Craig Swengle

NOTE: These Meeting Notes constitute Dewberry's recollection of the topics discussed and decisions reached at this meeting.

## DISCUSSION

Craig Swengle, PSA-Dewberry (PSA-D), facilitated the meeting. Dewberry displayed PowerPoint slides on the conference room's monitor and used them throughout the meeting to support the topics discussed. There were three goals for the meeting:

- Overview of Tulsa Port of Catoosa and the proposed Barge Fleeting Area;
- Review of Dewberry's initial environmental investigation findings; and
- Environmental Assessment approach and schedule.

David Yarbrough, Tulsa Port of Catoosa (TPC), briefed attendees on the Port's location, size, number of industries, shipping tonnage, method of operation, number of employees, and benefit to the Tulsa Metro region. David described the proposed Barge Fleeting Area, its proposed location on the former Verdigris River channel, and how this improvement will facilitate future Port growth.

Brian Sayre and Andrea Burk, Dewberry, presented a brief summary of Dewberry's findings in the following three areas:

- Archaeology;
- Natural Resources; and
- Wetlands.

**Archaeology** – Andrea Burk explained that no previously recorded archaeological sites are located within the project area. An initial archaeological investigation was conducted for the 30-acre Port-owned land. Although the remains of a 20th century building were recorded during this investigation, the site does not appear to be eligible for listing in the National Register of Historic Places and no further investigation is recommended. Ms. Burk explained that based on initial consultation with Ken Shingleton of the USACE, there is a concern regarding the potential for deeper buried deposits to exist in the project area. Such areas would be investigated in coordination with proposed geotechnical coring, and in consultation with the USACE.

**Natural Resources** – Brian Sayre explained that eight federally threatened, endangered or candidate species are listed for Rogers County that have the potential to occur at or near the project site. No critical habitat has been identified in Rogers County by the US Fish and Wildlife Service (USFWS) for these species. However, during the completed field activities, suitable habitat (approximately 50 acres) for the American Burying Beetle (ABB) was determined to be present within the study area. Further studies will be needed to determine the presence or absence of the ABB within the project area. Based on data requests and record reviews, no state listed species are believed to be present in the study area.

**Wetlands** – Brian Sayre stated that, based on field investigations, approximately 73 acres of potentially jurisdictional waters/wetlands and approximately 23 acres of potentially non-jurisdictional waters/wetlands were identified in the study area; however, the US Army Corps of Engineers (USACE) will ultimately decide what is under its jurisdiction based on an area's "nexus" to a jurisdictional water, i.e. either connected to or somehow associated with an adjacent, navigable waterway. A slide depicting these waters/wetlands was included in the presentation and a slide depicting the potential Historic Wetlands was also included. Two potential wetland mitigation areas were shown on a third slide; one being acreage in the

Riverside Business Park located between SH-266 and the Verdigris River and the other being acreage north of Bird Creek within the parcel purchased by the Port for development.

Craig Swengle explained that a companion project is nearing completion that identified the developable land within the purchased property when looked at solely from a floodplain perspective (i.e., not constrained by the floodplain). The 100-year floodplain boundary was relocated as close to the creek as possible without raising the 100-year water surface upstream. Since this area (green hatched area on slide) cannot have any buildings constructed within it, this area may be suitable for wetlands mitigation.

Shane Charlson, USACE, stated that wetland mitigation ratios can be as low as 1:1, but can go as high as 10:1 and that open water mitigation can be difficult. Matt Schlitzer asked if impacts and mitigation for open waters would be best described in linear feet of stream, to which Shane responded "yes". Shane stated that use of the former Bird Creek channel may be suitable for open water mitigation. Mr. Charlson also commented that the long, rectangular open water body on the Port property (the failed port project by another party) might also be suitable mitigation for open water impacts. A function and value assessment will need to be completed in order to determine what functions and values the mitigation must replace and what the mitigation ratio(s) would be. The Tulsa District does not have an officially adopted function/value assessment method, but on a prior project, Mr. Charlson said that the "Kansas City Stream Assessment" method had been used and was acceptable to commenting agencies.

Shane Charlson asked Kim Shannon if the areas of potential historic wetlands were researched to see if they were prior converted farmlands, as identified by the NRCS. This designation could have an impact on the overall amount of wetlands (including former wetlands) that will need to be mitigated, as well as on the amount of land that could be developed by the Port. Kim responded that she had not, but would look into it.

Ken Shingleton said there are no "red flags" in the materials that were presented. He also stated that there is nothing in the USACE process that will "kill" a project. However, depending upon what is required to mitigate potential impacts to the environment, the developer (Port) will have to determine if the Project is economically feasible.

Brian Sayre described the steps necessary for the **completion of the Environmental Assessment (EA)** for the proposed Barge Fleeting Area. Two areas were delineated on the slide; one was colored red and the other blue. The red areas have been evaluated for wetlands and natural resources. The rectangular red area has been investigated for archaeological resources, while the blue area has not. Dewberry is in the process of developing an approach and assembling updated project fees in order to complete the EA.

Craig Swengle summarized the **EA completion schedule**. The Port has asked that the EA be completed prior to the end of 2012. While Dewberry believes it is technically feasible to complete the field and office work within this timeframe, the question was posed if it is feasible for the EA to be completed in such a timeframe from the USACE's point of view? The USACE personnel stated that yes, the EA can be completed and reviewed within the described timeframe.

Connie Holliday, USACE, reviewed the draft **Right-of-Entry for Investigative Work** Agreement between the USACE and the Port of Catoosa. This agreement was drafted and circulated to the Port for review earlier in the week. The Port inquired whether restoration of damaged vegetation on USACE-owned land needed to be covered in the Agreement. The question was discussed and all agreed that such text was not required. The Port signed the Agreement at the meeting.

Dewberry will need to submit a Pre-Construction Notification (PCN) for a Nationwide Permit for impacts to **Section 10 resources (open waters)** detailing the location, area of impact, and construction techniques used to access the USACE-owned island. Temporary construction timber mats would be best and would result in less damage to the environment. The USACE is only concerned with bank to bank impacts to the stream (former channel of Bird Creek) to be crossed. Ken Shingleton said there will not be any Section 106 or Section 404 issues. The PCN will need a site map, description of the type of access construction, and potential limits of disturbance. If temporary construction timber mats are used, the permit could be approved by the USACE within two working days.

The meeting concluded at 11:00 a.m.

**END OF MEETING**

## U.S. ARMY CORPS OF ENGINEERS, TULSA DISTRICT

## TULSA PORT OF CATOOSA

# ENVIRONMENTAL RESULTS PROGRESS BRIEFING For BARGE FLEETING AREA ENVIRONMENTAL ASSESSMENT

### Tulsa Port of Catoosa, Oklahoma

**Meeting Date:** Feb 14, 2012
**Time:** 2:00 p.m.
**Location:** USACE – Tulsa District Offices, Conference Room # 210

**Attendees:**

| | | | |
|---|---|---|---|
| **Attendees:** | John Roberts | 918.669.7201 | john.h.roberts@us.army.mil |
| | Connie Holliday | 918.669.7688 | connie.holiday@usace.army.mil |
| | Ed Parisotto | 918.669.7548 | edward.parisotto@us.army.mil |
| | Ken Shingleton | 918.669.7661 | kenneth.l.shingleton@usace.army.mil |
| | Patricia Newell | 918.669.4937 | patricia.a.newell@usace.army.mil |
| | Kalli Clark | 918.669.7271 | kalli.clark@us.army.mil |
| | Jonathan Polk | 918.682.4314 | jonathan.polk@usace.army.mil |
| | Rhonda Sallee | 918.669.7255 | rhonda.sallee@usace.army.mil |
| | Tom Angel | 918.669.7545 | tom.angel@usace.army.mil |
| | David Yarbrough | 918.857.0313 | david@tulsaport.com |
| | Kim Shannon | 918.627.6161 | kshannon@kleinfelder.com |
| | Craig Swengle | 918.295.5255 | cswengle@dewberry.com |
| | Brian Sayre | 973.576.9637 | bsayre@dewberry.com |
| | Matthew Schlitzer | 973.576.9638 | mschlitzer@dewberry.com |
| | Billy Cox | 918.295.5246 | bcox@dewberry.com |

**Recorded By:** Billy Cox

PLEASE NOTE: These Meeting Notes constitute Dewberry's recollection of the topics discussed and decisions reached at this meeting.

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## DISCUSSION

Craig Swengle / Dewberry facilitated the meeting and used a slide presentation to describe the progress on the Environmental Assessment (EA) to date.

David Yarbrough / Tulsa Port of Catoosa stated that the greatest need on the McClellan-Kerr navigation channel was additional barge fleeting areas. The current terminal channel is, at certain times of the year, at or near capacity. Companies wanting to transport new commodities, such as fracking sand for oil drilling processes, have expressed interest in using the Port to ship large amounts of the material into the region. However, due to the lack of barge fleeting areas, the Port is unable to accommodate these requests or can do so only on a limited basis. Such a situation, if left unresolved, will limit the amount of growth and lessen the potential economic development of the region.

Brian Sayre / Dewberry explained the preliminary investigation findings. He added that the required American Burying Beetle study will be completed within the May 20th to September 20th study window. Mr. Sayre also described potential wetland mitigation areas and approaches.

Craig Swengle concluded the presentation with a discussion of the originally developed barge fleeting area concepts and those concepts that have been selected for further study. The remaining concepts were identified and the reasons for their dismissal were outlined. Mr. Swengle presented the upcoming steps required to complete the EA, so that a NEPA decision can be made by the end of 2012. Mr. Yarbrough stated there is a limited window available to apply for funding of this project through the EDA (Economic Development Administration). He explained that is why such an aggressive schedule has been identified.

John Roberts / USACE requested that a progress meeting be scheduled for the end of March to review the Project again.

Following the presentation, several questions were raised and discussed:

Mr. Roberts asked what the depth to bedrock was in the preferred barge fleeting area. Mr. Swengle responded that a recent Geotechnical investigation shows the bedrock layer to be below the bottom of proposed excavation. Based on these findings, it is anticipated that the volume of required bedrock excavation for the preferred alternative will be insignificant.

Mr. Roberts inquired about the Land Swap progress. Kalli Clark / USACE reported that the USACE has set this action aside, waiting on further direction. Ms. Clark said an appraisal of the land is needed before moving ahead. Mr. Roberts asked if there was a difference in appraisal values, and what the procedure for exchanging the land will be. It was concluded there would be a possible fee involved in the exchange of land based on the appraisal value of each property. Ms. Clark also stated that excavated material from the preferred Barge Fleeting Area would not be required to build the dredge disposal area. The USACE will build the dredge disposal area by pushing material from the bottom of the proposed disposal area to construct the containment pond berms.

Further discussion of the mitigation process began with Ed Parisotto / USACE, who stated that the Port will need to demonstrate that it's Initially Preferred Alternative, is the "least environmentally damaging, practicable alternative" and that alternatives that avoid and or minimize impacts to wetlands must also be considered. The preservation of existing wetlands may be used as mitigation, but at a ratio of at least 10:1. Kim Shannon / Kleinfelder stated that enhancing the existing wetlands in the proposed mitigation area by removing invasive plants can be used as a justification for lowering the 10:1 ratio (i.e., for every one acre of impacted wetland, 10 acres of existing wetlands must be preserved). Ms. Shannon and Mr. Sayre indicated that they will further investigate the mitigation ratios required by reviewing the Mitigation Guidelines for the Tulsa USACE District.

Mr. Swengle and Mr. Sayre reviewed the Port's proposal to preserve the 65 acres of wetlands in the Riverview Business Park as mitigation. Mr Parisotto stressed the importance of demonstrating that wetland impacts in the proposed disposal area have been minimized, which will also result in less mitigation requirements.
Mr. Swengle will provide a preliminary grading plan for the potential fill areas once the Port agrees on the limits of grading in the proposed fill area.

Mr. Yarbrough inquired if the Port will be required to allow public access to the areas used for wetland mitigation? Mr. Parisotto stated that it would not.

Permitting issues were discussed with Patricia Newell / USACE. Ms. Newell suggested combining the agency review with the public review. Mr. Parisotto stated he would like to have the final FONSI approved before the Port submits the Section 404 wetland permit application. A response to the application is estimated to take approximately 120 days following receipt of a complete application.

Mr. Swengle asked if the land swap and 404 permit reviews can be done concurrently, to which Mr. Parisotto and Ms. Newell replied it would not be a problem. Mr. Sayre asked if a mitigation plan should be included in the 404 permit application, to which Mr. Parisotto replied yes. Ken Shingleton / USACE added that he would coordinate with the State Historic Preservation Office (SHPO) on the wetlands mitigation, as needed.

Ms. Newell suggested adding a discussion regarding the economic impact the Port has on the regional economy to the NEPA document and a discussion of the expansion of the Panama Canal and Port 33, which is anticipated to have an impact on the McClellan-Kerr Navigation System.

Ms. Holliday discussed possible meeting dates in late March with Mr. Swengle. Due to Spring Break and other conflicts, it was decided to schedule the requested meeting during the first week of April.

The meeting concluded at 3:45 pm.

**END OF MEETING**

# U.S. ARMY CORPS OF ENGINEERS / U.S. FISH & WILDLIFE SERVICE
# TULSA PORT OF CATOOSA

## AMERICAN BURYING BEETLE PROTOCOL MEETING
for the
## BARGE FLEETING AREA ENVIRONMENTAL ASSESSMENT DOCUMENT

| | |
|---|---|
| **Meeting Date:** | June 21, 2012 |
| **Time:** | 9:00 a.m. |
| **Location:** | U.S. Fish & Wildlife Service, Tulsa Office |
| **Dewberry Proj #:** | 50042679 / 99601039 |
| **Attendees:** | Patricia Newell, USACE – Environmental Programs (Meeting Moderator)<br>Anita Barstow, USFWS<br>Angela Burgess, USFWS<br>Kevin Stubbs, USFWS<br>Stacy Dunkin, USACE - Biology<br>Ken Shingleton, USACE – Environmental Programs<br>Craig Swengle, Dewberry |
| **Recorded By:** | Craig Swengle |

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NOTE: These Meeting Notes constitute Dewberry's recollection of the topics discussed during this meeting.

### DISCUSSION TOPICS

Ms. Newell facilitated the meeting, noting that due to the USFWS' recent change in policy as to how American Burying Beetles' (ABB) presence is confirmed and beetles are relocated away from a project site, the Corps and Dewberry desired to meet to better understand future requirements. The following topics were discussed:

- Formal consultation is the process currently in place.

- Non-Federal projects – if ABB habitat will be destroyed, mitigation will be required. If prime ABB habitat will be destroyed, the mitigation ratio will start at 3 acres replaced for every 1 acre destroyed.

- Federal projects – Set-asides, habitat banking, and offsets are allowed. Currently, there are no habitat banks in place within the state of Oklahoma. A future habitat bank could be in place within 6 months.

- "Bait-away" was done away with because the procedure did not work. There was no way of determining if beetles were lured away from project areas permanently or not.

- "Trap and relocate" worked, but this mitigation did not address the habitat that was destroyed and not replicated somewhere else. In addition, no follow up was required, therefore, it is not known if the relocated beetles survived their relocation.

- For the Barge Fleeting Area – the Port is not a federal entity, but the land transfer is a federal action.

- Two possible documents: Biological Opinion (BO) – this has the shortest timeframe of the two options and the USFWS prepares this document; and Biological Assessment (BA) – this is a longer process and the Port (or Dewberry) would be expected to prepare this document.

- USFWS suggested the Port conduct an ABB Presence Survey. Each trap used to entice ABB have a one-mile effective circumference (or 0.5 mile radius) of the trap. All agreed that a trap located south of the Port's new salt storage building would encompass the potential footprint of the Project. Therefore, only one trap would be required. If two traps were used, there would be the potential of luring beetles from beyond the project limits. If beetles came from beyond the Project limits, the Port still would have to mitigate for any beetle trapped. It will be determined after the survey is completed whether to involve the USFWS depending upon whether beetles are trapped or not.

- USFWS pointed out that an ABB Habitat Study is different from an ABB Presence Study.

- USACE suggested that it is unlikely that ABB are present because of the wetland habitat identified along the former Verdigris River channel. ABB cannot live within wetland habitat.

- USFWS stated that if ABB are present, then a USFWS Take Permit will be required.

- USFWS recommended that an Eagle Nest Survey be conducted to determine whether or not Bald Eagles are present within the Project footprint. USACE suggested contacting the Sutton Center (The George Miksch Sutton Avian Research Center) in Bartlesville to determine if eagle nests are documented in the Port area. An Eagle Nest Survey could be a significant delay to the Project.

- Possible Study / Action scenarios are attached to these notes.

- Dewberry asked if there was one permit to obtain from USFWS if ABB were present or is two permits required. From the discussion, it sounded like a Take permit and a "habitat" permit would be required if ABB's were present. But if ABB's were not present, would the Port still be required to obtain a "habitat" or Take permit from the USFWS? Neither the USACE nor USFWS could say for sure if the Port will need to fund ABB habitat mitigation or not. This decision will be made during the USFWS' review of the Section 10 / 404 permit application.

Meeting concluded at 10:35 a.m.

# U.S. ARMY CORPS OF ENGINEERS
# TULSA PORT OF CATOOSA
## COMMENT REVIEW MEETING
on
## BARGE FLEETING AREA ENVIRONMENTAL ASSESSMENT DOCUMENT

**Meeting Date:** January 30, 2013
**Time:** 1:00 p.m.
**Location:** USACE – Tulsa District
3rd Floor Conference Room
**Dewberry Proj #:** 50042679 / 99601039

**Attendees:** Shaun Lenz, USACE - Real Estate (Meeting Moderator)
Ed Parisotto, USACE – Regulatory
Patricia Newell, USACE – Environmental Programs
Stacy Dunkin, USACE - Biology
Craig Swengle, Dewberry

**Call-ins:** David Yarbrough, Tulsa Port of Catoosa
Michelle Measday, Dewberry Parsippany
Brian Sayre, Dewberry Parsippany
Matt Schlitzer, Dewberry Parsippany

**Recorded By:** Craig Swengle

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NOTE: These Meeting Notes constitute our recollection of the items discussed at this meeting.

### DISCUSSION ITEMS

Mr. Swengle thanked everyone for attending this meeting to discuss several of the USACE comments on the Tulsa Port of Catoosa's Barge Fleeting Area Environmental Assessment document received on January 24, 2013 via email from Dawn Rice, USACE project manager. Ms. Measday in Parsippany NJ was given the floor to identify the comments that Dewberry needed clarification on.

### A. Ed Parisotto Comments

Section 2.1.4 Build Alternatives

1.a) Build alternative 5; references 12 acres of wetland impacts. How does Dewberry need to delineate the 12 acres of wetlands to confirm their presence?

Discussion - Ed asked how the limits of wetlands were identified on the Alternative 5 site. Dewberry used US Fish & Wildlife Service's online National Wetlands Inventory to estimate the 12 acres of wetlands. Ed Parisotto advised Dewberry that this is not an acceptable way to quantify wetlands. The National Wetland Inventory uses aerial photography and is not very reliable. If wetlands were a comparison criterion, wetland field surveys would be required for each alternative being compared. Therefore, Dewberry agreed to remove wetlands as a comparison criterion and will replace it with open water criterion which can be estimated accurately using aerial photography for all build alternatives.

1.b) Build alternative 6; this alternative has no wetland impacts and has the lowest estimated cost of construction. Pat indicated that the alternative is located on an active dredge disposal site

Discussion – Pat commented that if this location were pursued, the transfer of ownership would have to go through the same process as the current preferred alternative. Pat suggested that this alternative could be removed because of its current use as a dredge disposal area. Or, Dewberry could go into greater detail on the undesirable characteristics of the alternative due to the Verdigris River current and difficulty in moving barges around. In the end, the group decided to move this alternative to the list of alternatives not advanced due to safety issues and unavailability.

1.c) Build alternative 2 (PA); this alternative references the "temporary" haul road which would block small vessels from entering Bird Creek. A timeline should be considered and approved by the Corps considering the duration of this blockage.

Discussion - Craig explained that Dewberry's design of this crossing has progressed and placing pipes in Bird Creek is no longer being considered. The proposed location of the crossing as been moved to the narrowest point of the cut-off and a single span bridge will be specified for the crossing. The distance between low chord and the normal pool elevation is approximately five feet. Such clearance will allow typical recreational vessels (fishermen in low-profile boats) to travel upstream on Bird Creek without hindrance. USACE was in agreement with the design. Ed said a timeline is no longer required.

2. Mitigation

   Compensatory Mitigation is discussed in Section 4.2.1.4.

   Discussion – Michelle explained that Dewberry is preparing a draft Mitigation Plan. David reported that the Port's legal counsel said that it would be okay for the Port to donate money to the Redbud Nature Preserve for future identified Open Water restoration projects. Dewberry explained that this could be a part of the Port's proposed Mitigation Plan that will be presented to the Corps in the coming week or so. Ed indicated that while all of the Port's proposed plan elements would be considered, he discouraged dewberry from moving ahead with the Nature Preserve option. He urged that the mitigation elements be contained on Port property. Pat agreed that the Port has sufficient property available to restore and create open water and wetland areas. A suggestion was made by the Corps to create a meandering stream that would flow from the kidney-shaped wetland at the southwest corner of the 500-acre parcel, south to Bird creek. Even though the Bird Creek stream banks are quite a bit higher in this location, it was thought that the meandering stream could have small ponds periodically to hold the water before it would drain into Bird Creek. Pat said that the EA only needs to contain a stated commitment from the Port that the acreage will be restored or created to mitigate for impacts to open waters, wetlands, and upland forest, and identify where the mitigated acreage will be located. Mitigation details will be worked out at the permit stage.

**B. Pat Newell's Comments**

Page 2-1, Section 2.1.1.1 Alternative 1: Direct Sale.

Discussion – The Direct Sale discussion no longer applies. Dewberry will insert Shaun's text describing the 25-year lease in its place. The sentence "This EA will include the application for a DA Permit in Appendix __." Found in the section titled 'Application for the Department of the Army Permit Alternatives' was agreed to be removed.

**C. Stacy Dunkin's Comments**

Page 4-1, 3rd paragraph, Line 5; Please include a copy of the projects Storm Water Pollution Prevention Plan.

Discussion - Craig reported that the Storm Water Pollution Prevention Plan (SWP3) has been drafted and is being refined. Dewberry plans on meeting with the Oklahoma Department of Environmental Quality (ODEQ) prior to including the SWP3 in the EA. Stacy stated that the SWP3 does not need to be included in the EA document. Pat said it will need to be included in the 404 Permit application, but not in the EA.

Page 4-2, Section 4.2.1.1 Surface Water, Line 14; Please describe the BMP's that will be employed to mitigate activities.

Discussion - Craig stated that he will list the best management practices (BMPs) that have been selected from EPA's national menu of Stormwater Best Management Practices referenced in ODEQ's SWP3 guidelines in both the second and third paragraphs of Section 4.2.1.1, Surface Water, Construction Impacts. Stacy and Pat agreed with this approach.

D. Port Comments

David Yarbrough thanked everyone for meeting to discuss USACE's comments on this Document. He said the Port is anxious to move ahead with this project and that construction of the initial phases could begin as soon as the permits are issued. The Corps project schedule shows this could happen as early as mid-August 2013. Pat said that if this is the case, then the Port should complete the American Burying Beetle (ABB) Presence Survey as soon as the calendar permits. The ABB study is good for one year.

Meeting concluded at 1:50 p.m.

## Measday, Michelle

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**From:** Sasha Kirk [sashagkirk@gmail.com]
**Sent:** Tuesday, January 25, 2011 12:12 PM
**To:** Measday, Michelle
**Subject:** OBS Information Request: Tulsa Port of Catoosa Project

OBS Ref. 2011-030-BUS-MEA

Dear Ms. Measday,

We have reviewed occurrence information on any species currently in the Oklahoma Natural Heritage Inventory database for the following location you provided:

Tulsa Port of Catoosa Project
Sections 07 & 17-19, T20N, R15E, Rogers County, Oklahoma Within approximately 1 mile:

ORCONECTES NAIS
Common Name: A CRAYFISH
Organism Type: CRUSTACEANS
Rank: Unknown State Rank
First Observed: 1991
Township Range: 20N15E 19
Precision: S

You can find an explanation of the codes used to rank endangered and threatened species at:
http://vmpincel.ou.edu/heritage/ranking guide.html
If you have any questions about this response, please send me an email, or telephone the number given below.

Sincerely,

Sasha Kirk
For Ian Butler
Oklahoma Biological Survey
111 East Chesapeake St.
Norman, OK 73019
405.325.1985

# APPENDIX D

# FISH AND WILDLIFE COORDINATION