MITIGATION BANKING INSTRUMENT

DEEP FORK MITIGATION BANK
Lincoln County, Oklahoma
USACE Project Number: SWT-2015-94

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I.0 INTRODUCTION

Section 404 of the Clean Water Act (CWA) (33 USC 1344 et seq.) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) authorize the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into waters of the United States, including wetlands, and for activities in, or affecting, navigable waters of the United States. The Department of the Army (DA), through the U. S. Army Corps of Engineers (USACE) Regulatory Program makes decisions to issue or deny permits based on a public interest review (33 CFR Parts 320-330) and, for activities subject to regulation under Sections 404, in compliance with the U.S. Environmental Protection Agency's (EPA) "Guidelines for the Specification of Disposal Sites for Dredged and Fill Material" (40 CFR Part 230), known as the section 404(b)(1) guidelines.

The USACE requires mitigation for adverse impacts to waters of the United States, including wetlands, associated with activities regulated under Sections 404 and 10 that are likely to occur, and that would be of importance to the human or aquatic environment. The Council on Environmental Quality has defined mitigation to include avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts. The 404(b)(1) guidelines provide tools to evaluate impacts to the aquatic ecosystem and measures that can be taken to minimize those impacts. For those impacts that remain after all appropriate steps to avoid and minimize adverse impacts have been taken, appropriate and practicable compensatory mitigation is required to offset those remaining unavoidable adverse impacts.

Guidance pertaining to the type and extent of mitigation that may be required by the USACE is provided in the *Compensatory Mitigation for Losses of Aquatic Resources* (EPA 2008) which states that preference shall be given, to the maximum extent practicable, to the use of mitigation banks. The guidance also emphasizes the importance of a national goal to achieve an overall no net loss of the nation's remaining wetlands base.

Compensatory mitigation includes restoring, enhancing, creating, and preserving aquatic system functions that would be lost or impaired due to a USACE-authorized activity. Compensatory mitigation may be implemented to offset the adverse impacts of one or more USACE–authorized projects within a single consolidated mitigation project. Consolidated mitigation projects may result in greater overall environmental benefit than those achieved with numerous small, individual mitigation projects and are usually more cost-effective to implement.

Mitigation banking is the restoration, enhancement, creation, and, in exceptional circumstances, preservation undertaken to compensate in advance for adverse impacts to the aquatic ecosystem. The bank sponsor typically funds the establishment of the bank in anticipation of recouping that investment by selling shares, or credits, in the bank to provide a means for USACE permittees to offset adverse project impacts to the aquatic ecosystem. The USACE and other federal agencies recognize the potential benefits of mitigation banking to the aquatic ecosystem, permit applicants under Section 404 or Section 10, regulatory and natural resources agencies, and the general public.

Green Country Wetland Mitigation, LLC (Green Country) will develop a mitigation bank to be known as the Deep Fork Mitigation Bank (DFMB) that would enhance, restore, and protect approximately 109.37 acres of bottomland habitat in Lincoln County, Oklahoma.

2.0 LEGAL AUTHORITY

The bank is established in accordance with, and consideration of, the following federal and state statutes, regulations, and policies:

- Clean Water Act Section 404 (33 USC 1251 et seq.)
- Rivers and Harbors Act of 1899 Section 10 (33 USC 403, et seq.)
- Environmental Protection Agency, Section 401(b)(1) Guidelines (40 CFR Part 230). Guidelines for Specification of Disposal Sites for Dredged or Fill Material
- Department of the Army, Section 404 Permit Regulations (33 CFR Parts 320-330), Policies for Evaluating permit applications to discharge dredged or fill material
- Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines (February 6, 1990)
- National Environmental Policy Act (42 USC 4321 et seq.), including the Council on Environmental Quality's implementing regulations (40 CFR Parts 1500-1508)
- Fish and Wildlife Coordination Act (16 USC 661 et seq.)
- Fish and Wildlife Service Mitigation Policy (46 FR 7644-7663, 1981)
- Regulatory Guidance Letter No. 08-03. U.S. Army Corps of Engineers, October 10, 2008.

Nothing in the agreement shall be construed as altering the requirements of any agency responsibilities as specified in existing law, regulation and policy.

3.0 SCOPE OF AGREEMENT

This Mitigation Banking Instrument (MBI) shall serve as the agreement authorizing Green Country Wetland Mitigation, LLC (Sponsor) to establish and operate the DFMB in Lincoln County, Oklahoma. For purposes of this agreement, "Sponsor" shall mean Green Country Wetland Mitigation, LLC, or any subsequent sponsors (successors) of the DFMB. Under the terms of this agreement, the Sponsor shall:

- Implement and maintain the DFMB as specified in this document,
- Establish a perpetual conservation easement on lands contained within the DFMB,
- Maintain current accounting records on the DFMB,
- Monitor the DFMB property for ecological sustainability and conduct required remedial activities, and
- Achieve all performance standards.

The following agencies participated in the development of this MBI as members of the Interagency Review Team (IRT):

- Oklahoma Department of Environmental Quality (ODEQ)
- U.S. Army Corps of Engineers, Tulsa District (USACE)
- U.S. Fish and Wildlife Service (USFWS)
- Environmental Protection Agency, Region 6 (EPA)
- Natural Resources Conservation Service (NRCS)
- Oklahoma Department of Wildlife Conservation (ODWC)
- Oklahoma Conservation Commission (OCC)

The USACE shall serve as chair of the IRT and be responsible for making final decisions regarding the terms and conditions of this document where consensus among the IRT members cannot otherwise be reached within a reasonable time frame. Notwithstanding any provision of the MBI to the contrary, 401 certification is required by the State of Oklahoma.

4.0 PURPOSE AND GOALS OF THE MITIGATION BANK

The purpose of the DFMB is to compensate for losses of aquatic resources resulting from projects authorized by the USACE. The DFMB will provide environmentally responsible, economical, efficient, and flexible off-site compensatory mitigation opportunities for those seeking to develop land in accordance with the relevant Federal, State, and local regulations. The DFMB will be established to compensate for losses of aquatic resources from authorized development within the DFMB *Geographical Service Area* in a manner that contributes to improvements in the long-term ecological function of the Deep Fork River. Four primary objectives of the proposed DFMB are summarized below:

1. Provide for the replacement of the chemical, physical, and biological functions of wetlands and other aquatic resources that are lost or degraded as a result of USACE-authorized impacts,

2. Provide USACE permit applicants greater flexibility in compensating for unavoidable adverse impacts to the aquatic ecosystem after appropriate and practicable measures have been taken to avoid and minimize project-related impacts on site, and after practicable compensation has been conducted or shown not to be in the best interest of the environment, especially when those impacts would be relatively minor,

3. Provide more extensive, higher quality, and more cost-effective protection of wetlands and other aquatic resources over that typically achieved by other forms of compensatory mitigation for activities that have minor adverse impacts on the aquatic ecosystem, and

4. Provide enhancement, restoration, protection, and maintenance of a 109.37-acre degraded and altered bottomland ecosystem by developing a native, self-sustaining, and diverse bottomland forest community indigenous to the Deep Fork River Basin.

The goal of the DFMB is to develop a commercial mitigation bank in the Deep Fork River watershed in association with the granting of DA permits through restoration and enhancement of perennial, intermittent, and ephemeral streams, wetland habitat, and associated riparian and upland buffers along the Deep Fork River. The specific design objectives of the DFMB include:

1. Restoration and enhancement of disconnected, diverted, and channelized streams,

2. Restoration of floodplain and river connectivity,

3. Water quality enhancement in the Deep Fork River watershed through sediment reduction, nutrient removal, stream bank stability, and erosion control,

4. Water quantity improvement through water storage and flood control, improved ground water recharge, and improved and restored hydrologic connections,

5. Restoration and enhancement of bottomland forested communities, defragmentation of habitat, and improved wildlife travel corridors, and

6. Enhancement and restoration of aquatic and terrestrial habitats through improved substrate and in-stream cover, addition of woody debris, reduction in water temperature due to shading, increase of spatial extent of natural area, and improved aesthetics.

More specifically, the DFMB will restore and enhance existing altered streams and wetlands to their natural stable condition. The streams and wetlands will be protected with a perpetual conservation easement, and fences will be constructed where necessary at the limits of the site

to exclude cattle and other anthropogenic actions. The restored and enhanced streams and wetlands will improve habitat and species diversity, improve water quality, and provide increased flood storage capacity, which will encourage a net ecological uplift to the DFMB site and the Deep Fork River watershed.

The long-term goal is a net gain of stable stream and wetland functions and services. The DFMB will establish stable natural streams with riparian buffers and bottomland forested wetland communities that will provide a positive contribution to water quality, native plant and animal habitat, and erosion control.

5.0 BANK OWNERSHIP

All real property to be included within the DFMB is owned in fee simple by the Sponsor, and has been pledged for use in the bank consistent with this MBI. The Sponsor shall be responsible for developing, operating, and maintaining the DFMB subject to the requirements of this MBI, but may convey ownership or sponsorship of the bank to a successor as provided below. There are no plans to transfer title of the property to another party at his time, and it is the intention of the Sponsor to maintain the property in perpetuity as highly functioning habitat in accordance with the terms of the long-term management plan and the conservation easement. The conservation easement shall restrict any development of the site in perpetuity and shall stay with the property in the instance that the title to the property is transferred to another party. The inclusion of Sponsor's property in the bank and the granting of a conservation easement restricting future land uses for the benefit of the bank shall not convey or establish any property interest on the part of any party to this instrument nor to any purchaser of bank credits.

This MBI does not authorize, nor shall it be construed to permit, the establishment of any lien, encumbrance, or other claim with respect to the property, with the sole exception of the right on the part of USACE to require the Sponsor to implement elements of this MBI, including recording any conservation easement, required as a condition of the issuance of a permit under Section 404 of the Clean Water Act for discharge of dredged and fill material into waters of the U.S. associated with construction, operation, and maintenance of the bank.

Sponsor may convey fee simple title to, or other forms of property interest in, any property included within the bank, provided the necessary conservation easements have been recorded for any property that is the subject of a previously withdrawn credit. In the event of a transfer in ownership, Sponsor will ensure that the property is conveyed to an environmentally responsible party. The Sponsor may transfer sponsorship of the bank to another public or private party, such as a non-profit land trust or governmental entity, provided the USACE, after coordination with the IRT, approves the transfer and the new Sponsor agrees to abide by the terms of this MBI or an approved modified MBI. Any such request shall be submitted in writing to the USACE. The IRT reserves the right to review and approve any party to whom responsibility for construction, maintenance, or monitoring may be transferred under this MBI. IRT approval shall not be unreasonably withheld. Upon approval of the transfer, all obligations for future performance of the original Sponsor shall be terminated. Unless a substitute financial assurance mechanism is established, all unused funds in the Financial Assurances, as well as the right to draw against the account, will be transferred to the third party Sponsor successor. The physical ownership of the bank lands and the operating rights (sponsorship) are separable components of the bank and may be transferred independently.

6.0 LOCATION AND BASELINE CONDITIONS

6.1 Site Location

The proposed 109.37-acre DFMB is part of a 114.86-acre tract located approximately 4.5 miles southwest of Chandler, Lincoln County, Oklahoma (Figure 1). The Site can be accessed by N3410 Rd., north of the old community of Midlothian. The site is centered approximately at Latitude 35.646462 N; Longitude -96.926855 W in Section 31, Township 14 North, Range 4 East. The project site consists of primarily undeveloped rural land located in the Cross Timbers region of Oklahoma, and is in a transitional zone from the Central Great Plains. Lincoln County has a humid, subtropical climate characterized by relatively high rainfall (average 40 inches per year). The average daily maximum temperature is 94°F and the average daily minimum temperature is 27°F. The growing season in Lincoln County spans from March to November, approximately 211 days. A copy of the legal description and plat for the DFMB is provided in Appendix G.

6.2 Historic and Current State of the Bank Site and Adjacent Lands

The DFMB land base is located along the Deep Fork of the Canadian River, in Lincoln County, Oklahoma. The bank site is located in the Northern Cross Timbers Level III Ecoregion of Oklahoma. The land base presents a mosaic of habitat types including bottomland forested and emergent wetlands, stream channels and associated riparian habitat, upland forest and native grass pasture habitat, and miscellaneous features such as roads, levees, and an abandoned railroad embankment. This results in an increased overall diversity, as various portions of the property have characteristics of upland, mesic, bottomland, and riverine habitat. The topography of the site is relatively flat and uniform, except for natural and man-made levees adjacent to the Deep Fork River and tributary streams, abandoned tram, and a small area of uplands in the southwest portion of the property. Most of the forested areas have been significantly altered by timber harvests, past agricultural activities, grazing by livestock, and managed water retention for recreational purposes. A review of historic aerial photographs and topographic maps (Appendix D) indicate that over 90% of the property has been maintained as open land, either for cattle grazing or farming activities, since the early 1970's. Much of the cleared riparian habitat has subsequently undergone a re-growth of low quality and undesirable tree species; however, to date the vast majority of the land base is still maintained as open ground.

Since European settlement, there has been significant and widespread alteration and destruction of wetland and stream habitats across Oklahoma. According to Oklahoma's Comprehensive Wetlands Conservation Plan (OCC, 1996), approximately 67% of Oklahoma's wetlands have been lost over the past 200 years as a result of conversion to agriculture, a drop in groundwater levels due to irrigation, levee construction, river management and navigation programs, urban development activities, and other actions. Impoundment of major streams has had a negative impact on in-stream functions, and inundation from lakes has also likely caused a significant loss of wetlands associated with river systems. Other causes of historic wetland and wildlife habitat loss within the bank's watershed include agricultural conversion, urbanization, and sedimentation caused by detrimental land use practices. Another significant contributor to wetland and habitat loss within the watershed is bed degradation of the Deep Fork River. This has caused considerable loss of wetlands due to a lower water table within the Deep Fork River floodplain and a reduction in sand/point bar habitat which is essential for many species of wildlife.

Other historic activities affecting vegetation communities and hydrology on the site are past dredging activities on the Deep Fork River that continue to affect the natural flood regime, drainage patterns, and hydraulics of the site to date. Additionally, there is an abandoned railroad tram located on the west side of the Deep Fork River on the eastern portion of the property.

The tram initiates at the north edge of the property and extends almost due south beyond the southeast boundary. The presence of the old tram has significantly influenced hydrology on the property. Accordingly, the tram is also restricting runoff from reaching some areas located between the tram and the river. Previous dredging activities associated with the Deep Fork River have significantly altered and channelized the historic route of the river. Dredging activities have caused significant changes in hydraulic functions of floodwater during outbank events.

After the Second World War, life in the U.S. was dramatically changed. With memories of the 1930's still in mind, family farms were abandoned in favor of steadier jobs in the urban areas such as Oklahoma City and Tulsa. This mass exodus began in the 1940's, and farms began to be reclaimed by the native forest species. These recovered farms, combined with woods that had naturally regenerated after the early 1900's harvesting, formed yet a Second Forest. Increased use of land for cattle and hay production in the last thirty years brought about the next large-scale change. By creating the extremely clean pastureland we see today, wildlife species such as bobwhite quail have suffered from the lack of proper habitat. Indiscriminate timber harvesting and a total lack of management investment have combined with large-scale cattle production to severely impact the entire forest community. The reversal of this trend (i.e., the shift toward active forest management, restoration efforts, tree planting, and multiple resource management), is the beginning of the Third Forest for most Central Oklahoma lands. This is what we see today on the DFMB property - an assortment of woodlands, fields, wetlands, uplands and bottomlands; the combined result of time and nature along with 100 years of man's impact on the ecosystem.

The forest and land that we see today on the DFMB site can only be understood in light of the conditions of the past. The original pre-Columbian woodland was a medley of forest types and openings on a very large scale. Natural disturbances such as windstorms, wildfire, tornadoes, and ice storms worked with disease and insect infestations to create this mosaic pattern. Native American inhabitants would clear openings and set fires, adding to the disturbance of the forest. The concept of a perfectly stable forest community is not only a false one, but is ecologically impossible. It is rather a continuum in which the parts are in an unstable equilibrium. The forest can reach a point of relative stability in human life span terms, but true long-term forest community management will look far beyond this.

The DFMB is bordered by State School Lands on the majority of the west side and the northwest corner. The current habitat on these lands is open ground, and based on aerial photography and mapped soils, potentially is dominated by herbaceous wetlands. Ownership of these lands will remain with the State of Oklahoma in perpetuity; however, the state leases this acreage on an annual basis for cattle grazing and/or recreation uses. The property bordering the northeast and southwest corners of the proposed bank site are privately owned and consist of open ground, primarily pasture, and current uses appear to be for cattle grazing or recreation. The entire southern boundary and approximately half of the eastern boundary of the bank site is bordered by the Excel Mitigation Center. The land included in the Excel Mitigation Center has been afforded protection in perpetuity through a conservation easement.

6.3 Baseline Information

The DFMB site is ecologically suitable for wetland, stream, and riparian corridor restoration and enhancement. It contains a long stretch of a perennial stream, one intermittent stream, three altered or degraded ephemeral streams that require restoration to restore their hydrologic function, and one ephemeral stream channel that requires reconstruction. As a result, the parcel has great potential for enhancing and reestablishing riparian corridors along these streams systems and the aquatic habitat value of the site. Additionally, the site currently supports large expanses of emergent wetlands located in the floodplain of the Deep Fork River that were historically cleared and maintained for agriculture and now are maintained for recreation. These

emergent wetlands were historically comprised of bottomland hardwood similar to what is found in small remnant stands up and down the watershed. Restoring and enhancing the forested wetland areas will increase habitat opportunities for a multitude of species. The restored and enhanced wetlands will decrease the amount of nutrients traveling to downstream waters. The restored and enhanced riparian corridors will reduce the amount of sediment eroding from the stream banks into the Deep Fork River, and the restored stream channels will restore site hydrology, restore proper sediment transport processes, and increase the aquatic habitat value of the site.

In February of 2015, Hoffman Environmental, Inc. (HEI) conducted an on-site assessment of the proposed DFMB site to characterize habitat types and other land uses, with particular emphasis on vegetation, soils, and hydrology. The following subsections give the results from this baseline assessment and are shown on Figure 2. A breakdown of the habitat types and other land uses revealed that there are 62.5 acres of herbaceous dominated emergent wetlands, 7.6 acres of mature bottomland forested wetlands, 16.4 acres of juvenile forested wetlands, 8.5 acres of riparian habitat, 1.1 acres of upland forested habitat, 3.2 acres of upland native grass pasture habitat, 4.2 acres of perennial stream (3,855 LF), 0.2 acres of intermittent stream (840 LF), 0.4 acres of ephemeral streams (3,927 LF), and 8.2 acres of levees, old tram, and roads.

1. Plant Communities

A baseline plant community survey was conducted in association with the wetland assessment within the DFMB site. Four dominant and distinct plant communities, or habitat types, were identified within the DFMB site. These four habitat types consisted of herbaceous dominated wetlands, mature bottomland forested wetlands, juvenile bottomland forested wetlands, and hardwood dominated riparian habitat. A small component of the habitats identified within the DFMB site consisted of upland native grass pasture and scattered hardwood. The vegetational component for each of the four main habitat types is characterized below and representative photographs are located in Appendix B.

Herbaceous Dominated Wetlands

Four separate areas totaling approximately 62.5 acres of herbaceous dominated emergent wetlands were identified within the DFMB site (Photographs 11-16). These areas were cleared many years ago and have been maintained as open ground to date. The vegetation dominating these areas consists of sumpweed (*Iva annua*), balloon vine (*Cardiospermum halicacabum*), broadleaf cattail (*Typha latifolia*), giant ragweed (*Ambrosia trifida*), rough cocklebur (*Xanthium strumarium*), aster (*Symphyotrichum* spp.), lean flatsedge (*Cyperus setigerus*), Pennsylvania smartweed (*Polygonum pennsylvanicum*), Florida paspalum (*Paspalum floridanum*), camphor pluchea (*Pluchea camphorata*), valley redstem (*Ammannia coccinea*), bentawn flatsedge (*Cyperus reflexus*), ravenfoot sedge (*Carex crus-corvi*), beaked panicgrass (*Panicum anceps*), eastern annual saltmarsh aster (*Symphyotrichum subulatum*), and cucumberleaf sunflower (*Helianthus debilis*).

Mature Forested Wetlands

Three separate areas totaling approximately 7.6 acres of mature, bottomland, hardwood, forested wetlands were identified within the DFMB site (Photographs 19-21). The vegetation dominating these areas consists of sugarberry (*Celtis laevigata*), boxelder (*Acer negundo*), green ash (*Fraxinus pennsylvanica*), pecan (*Carya illinoensis*), black willow (*Salix nigra*), bois d' arc (*Maclura pomifera*), American elm (*Ulmus americana*), possumhaw (*Ilex decidua*), Indian woodoats (*Chasmanthium latifolium*), Canada wildrye (*Elymus canadensis*), nutsedge (*Cyperus rotundus*), American wild carrot (*Daucus pusillus*), sticky chickweed (*Cerastium glomeratum*), coralberry (*Symphoricarpos orbiculatus*), and riverbank grape (*Vitis riparia).*

Juvenile Forested Wetlands

Seven separate areas totaling 16.4 acres of juvenile, forested wetland habitat were identified within the DFMB site (Photographs 17 & 18). This habitat appeared to be naturally regenerated hardwood dominated by light-seed pioneer species, and is located on the margins of the previously cleared and maintained emergent wetland areas. The vegetation dominating this habitat type consists of green ash, American elm, bois d' arc, black willow, Canada wildrye, and American wild carrot

Riparian Habitat

Approximately 8.5 acres of hardwood dominated riparian habitat was identified within the DFMB site and was associated primarily with Deep Fork River (Photographs 22-32). The most abundant riparian community currently existing on the DFMB site is associated with the Deep Fork River and intermittent stream. The river and intermittent stream riparian corridors are located on spoil piles that are the result of channelization and dredging activities. The existing riparian buffer adjacent to the Deep Fork River varies in width across the site, and in places exceeds 100 ft on each side; however, the majority of the riparian corridor for the river and the intermittent stream averages 50 ft on each side. However, at least half of the riparian width for the river and intermittent stream, for a majority of the total length, includes areas of young naturally regenerated hardwood associated with moist soil units. The dominant vegetation within this habitat type consists of sugarberry, pecan, American elm, eastern redcedar (*Juniperus virginiana*), coralberry, eastern cottonwood (*Populus deltoids*), Indian woodoats, Canada wildrye, poison ivy (*Toxicodendron radicans*), saw greenbrier (*Smilax bona-nox*), and riverbank grape.

2. Soils

The *NRCS Web Soil Survey for Lincoln County* was used to determine mapped soil series. The revised official series descriptions were used to confirm profile matrix, redox features, and texture of soils underlying the site. The Soil Survey shows that the site may be underlain by Darsil-Stephenville complex, 5 to 12 percent slopes (DsE), Konawa loamy fine sand, 3 to 8 percent slopes, severely eroded (KoD3), Miller clay, 0 to 1 percent slopes, occasionally flooded (Mc), Ashport clay loam, 0 to 1 percent slopes, occasionally flooded (Pc), Easpur loam, 0 to 1 percent slopes, occasionally flooded (Po), Renthin-Grainola complex, 3 to 5 percent slopes, severely eroded (RvC3), and Ustibuck clay, 0 to 1 percent slopes, occasionally flooded (Rx) (Figure 5). Miller clay and Ustibuck clay are listed as a hydric on both the NRCS Web Soil Survey (2010) and national soils list (NRCS 2010 National Hydric Soils List by State). The Darsil-Stephenville complex, Konawa, Ashport, Easpur, and Renthin-Grainola series are not listed as hydric.

Soil samples were observed between the surface and approximately 16 inches below grade within each of the dominant habitat types. The depth of each sample was sufficient to determine changes in upper horizons and to observe field indicators of hydric soils. Field data indicate that the majority of the site is underlain by heavy clay, similar to the mapped Miller and Ustibuck series, except for the riparian areas adjacent to the river and tributary streams, and the upland areas. Based on the field examination, the areas mapped as Easpur loam contained heavy clays are more akin to the Miller and Ustibuck series (Photograph 39). The wetland criterion for hydric soils was met at all 10 sample locations established to characterize the site (Appendix C – Data Sheets). All of the soils encountered within the DFMB, except for the uplands, consisted of silt loams to heavy clays, and exhibited a red color. Therefore, the soils were determined to be problem soils formed from red parent material. All of the data locations, except for the uplands, were located in the floodplain and exhibited some degree of wetland hydrology.

3. Hydrology

The DFMB site is located in the Deep Fork River Watershed within the United States Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC) 11100303. The site is relatively flat with elevations ranging from 810-845 feet above the National Geodetic Vertical Datum (NGVD) for mean sea level (Figure 3). Sources of hydrology on the site are primarily rainfall sheet flow and overbanking from the Deep Fork River and associated tributaries. The site drains primarily northwest to southeast into the Deep Fork River which ultimately drains into the Arkansas River. The Deep Fork River is the primary hydrological feature within the DFMB site (Photographs 9 & 10). The river enters the site on the north end of the property and flows south-southeast before exiting the site near the southeast corner.

One unnamed intermittent tributary is located in the northern half of the site and enters the property from the west and flows east before entering the Deep Fork River (Photographs 7 & 8). This stream is a large, incised channel that drains a large watershed to the northwest. The first ephemeral tributary is located near the middle of the site and enters the property from the west and flows to the east before entering a man-made drainage ditch between a constructed levee and the old tram (Photographs 5 & 6). This stream was channelized many years ago apparently to facilitate drainage of the site for agricultural purposes. The drainage ditch is the main drainage channel for the two moist soil units in the southern half of the property. A second ephemeral tributary is located on the southern portion of the site and is blocked with an earthen plug near the west edge of the property in order to divert water to the southernmost moist soil unit (Photographs 1-4). Both of these streams enter the Deep Fork River just south of the property boundary. A third ephemeral tributary is located in the northern half of the site and quickly enters the previously described intermittent stream.

There are four moist soil units located on the DFMB site. All four locations are surrounded by a constructed levee (Photographs 35-37), natural stream levee, old tram (Photograph 38), hill land, or the levee/spoil pile adjacent to the Deep Fork River. The three moist soil units located west of the river can capture or release rainfall runoff, or outbanked water, through a series of water control structures (Photograph 40). Each unit has two to three control structures that can be opened or closed manually to manipulate water levels in each unit. The fourth moist soil unit, located in the northeast portion of the site, was created by the construction of a levee on the adjacent property to the east, and the outflow is restricted by a levee along the river and a natural levee along the old Deep Fork channel to the south.

Wetland hydrologic indicators observed at the site include oxidized root channels, cracked soil surfaces, water marks, drainage patterns, drift lines, rack lines, geomorphic position, and inundation visible on aerial photography. The wetland criterion for hydrology was met at 8 out of 10 sample locations established to characterize the site.

6.4 Existing Waters of the U.S.

A Wetland Assessment was conducted on the site by HEI, for the Sponsor in February 2015 to determine the presence of potential waters of the U.S. within the boundaries of the DFMB site (Figure 2). The identified waters of the U.S. were delineated and their boundaries were recorded using a handheld GPS unit. The GPS data was mapped using ArcMap software. The results of the assessment revealed the presence of 62.5 acres of emergent wetlands, 16.4 acres of young forested wetlands, 7.6 acres of mature forested wetlands, 3,855 lf (4.2 acres) of perennial stream (Deep Fork River), 840 lf (0.2 acres) of intermittent stream, and three ephemeral streams totaling 3,927 lf (0.4 acres) as listed in Table 1 below. Additionally, there are 8.5 acres of riparian habitat adjacent to the Deep Fork River and intermittent stream. *It should be noted that the initial review by HEI of existing waters of the U.S. was conducted on 112.34 acres of the original land base. The DFMB site is 109.37 acres which is the result of removing easements*

and encumbrances. Potential waters of the U.S. maps and wetland delineation data sheets are included in Appendices A and C respectively.

Table 1. Existing waters of the U.S. and other habitat within the DFMB site.

Waters of the U.S.	Acres/Linear Feet
Emergent Wetlands	62.5 ac.
Forested Wetlands - Young	16.4 ac.
Forested Wetlands - Mature	7.6 ac.
Perennial Streams	4.2 ac. (3,855 lf.)
Intermittent Streams	0.2 ac. (840 lf.)
Ephemeral Streams	0.4 ac. (3,927 lf.)
Riparian Habitat (Non-Jurisdictional)	8.5 ac.

A total of five existing easements were removed from the DFMB site (Appendix G). These easements included Lincoln County section line easements on the west and north end, and a powerline and water line easement within the county easement in the southwest corner. Additionally, three oil pipeline easements, two of which were located within the county easement on the west side were released and one on the north end within the county easement that is still in place. Finally, a small area was also removed near the entrance at the southwest corner of the property for parking and staging of equipment. All told, of the 114.86 total acreage of the property, 5.49 acres of easements and muster area were removed, resulting in 109.37 acres within the DFMB.

6.5 Short-Term and Long-Term Off-Site Threats

There are no foreseen short-term or long-term threats to the site. The site's remote location removes surrounding urbanization as a potential threat. Additionally, the surrounding properties are rural and agricultural in nature so there are no foreseeable hazards to the site caused by incompatible surrounding land uses.

7.0 WATERSHED APPROACH

7.1 Watershed Boundary

The watershed boundary considered by the Sponsor in the location and establishment of the DFMB is predicated on an 8-digit HUC basis as shown on Figure 6. The watershed boundary (primary service area) consists of three 8-digit HUCs that include 11100303 Deep Fork, which the bank is located within, and two adjacent HUCs consisting of 11100302 Lower North Canadian and 11090203 Little. The Deep Fork River is a tributary of the North Canadian River and major tributaries within the Deep Fork watershed upstream of the bank site are Cowbell Creek, Coffee Creek, Soldier Creek, Coon Creek, Smith Creek, Wildhorse Creek, Fall Creek, Bear Creek, Captain Creek, Spring Creek, Eagle Creek, and Pecan Creek. The Sponsor utilized a watershed selection process to evaluate potential aquatic resource replacement needs within the bank's geographical service area. Through the establishment and use of the DFMB, Sponsor seeks to provide a wide variety of landscape, resource, and habitat types to enhance, restore, and protect aquatic resource functions to improve water quality and wildlife habitat within the bank's watershed.

7.2 Water Quality Issues

The Deep Fork River, North Canadian River, and Little River are all listed on the EPA's 303(d) list of impaired waters. To help protect water quality and aquatic resources of these watersheds, there is a need for mitigation within the watersheds. Currently, there is not an established mitigation bank located within the boundaries of the any of these watersheds. When considering population growth for the region, subsequent development, the boom in oil and gas exploration, and the current impaired status of many of the aquatic resources in the proposed bank service area, there is a considerable need for a watershed level bank that develops a concept to promote restoration and enhancement of ecosystem integrity and function by focusing on landscape-scale mitigation opportunities that provide potential for ecological connectivity, restoration, enhancement, and protection for many natural resources in the watershed.

Currently, the North Canadian and Little watersheds are impaired for E. coli, enterococcus, and oxygen, and the Deep Fork watershed is impaired for Fish Bioassessment. These impairments within the Deep Fork, North Canadian, and Little watersheds are attributed to both point sources and nonpoint sources. Within the watersheds, likely sources of nonpoint source pollution and nutrients include: agricultural runoff, sedimentation from erosion in disturbed watersheds, sludge application from waste water treatment facilities, seepage from septic tanks, and many urban runoff sources. Proposed wetlands and stream improvements can help offset water quality issues like low dissolved oxygen levels, E. coli, and enterococcus. Wetland restoration and enhancement efforts will take up excess movement of nutrients, sediment, and organic matter that historically were transferred to the Deep Fork as runoff. Also, restored stream bank and riparian vegetation will help maintain stable water temperatures.

7.3 Immediate and Long-Term Watershed Needs

The DFMB's *Geographical Service Area* includes central Oklahoma, of which Oklahoma City is the metropolitan hub of the region and the net resource loss is similar throughout the watershed. It should be noted that approximately 67% of Oklahoma's wetlands have been lost over the past 200 years as a result of conversion to agriculture, a drop in groundwater levels due to irrigation, levee construction, river management and navigation programs, urban development activities, and other actions. According to the U.S. Census Bureau, the Oklahoma City region had a population growth of 15% from 2000 to 2010, as compared to the rest of the state which had a population growth of 8.7%. Oklahoma City's position as a financial center, and a city of many corporate headquarters, indicates that continued development can be anticipated in the region. Along with this development, additional transportation and infrastructure needs will be required to support the growth in population. Additionally, 6 of the top 10 fastest growing cities in Oklahoma are located within 30 miles of Oklahoma City. The Oklahoma City region also includes the municipalities of Norman, Moore, Edmond, Piedmont, Harrah, Mustang, Blanchard, and El Reno, all of which are experiencing rapid growth. Central Oklahoma is one of the fastest growing areas in the country, and in 2013 Oklahoma City was ranked as the seventh fastest growing metro area in the U.S. Though the recent economic down-turn has slowed growth somewhat, urban development and transportation projects are on the rise again, which will most likely result in unavoidable adverse impacts to aquatic resources in the Deep Fork River, North Canadian River, and Little River watersheds in Central Oklahoma. With this in mind, the DFMB is located approximately 35 miles northeast of the Oklahoma City metro area and will provide an option to permittees to purchase stream and wetland mitigation credits from a bank that has mitigation available where the impacts to aquatic resources will occur within the region.

Some of the long-term water quality needs for the watershed include: a reduction in excessive nutrient and sediment loading, a reduction in stream bank erosion, reduction in impervious surface, and protection and restoration of wetlands and riparian areas. Long-term habitat needs are restoration of native prairie areas, wetlands, and riparian corridors. Native prairie is the

predominant historical ecological land cover within the watershed, which the majority of the native terrestrial species are adapted to live in. Very little of this native prairie remains. Riparian corridors and wetlands are important not only for water quality, but they also are a critical habitat element for terrestrial and aquatic organisms. The DFMB will help to offset some of these needs by increasing the size of riparian corridors which will reduce sediment and nutrient loading, stream bank erosion, and runoff. Stream bank stabilization activities will limit stream instability, sediment-loading, and bank erosion. Stream habitat restoration will remove invasive species, restore site hydrology, and improve habitat for aquatic fauna.

8.0 GEOGRAPHIC SERVICE AREA

The service area is the geographical region, primarily based on watersheds or HUCs, within which the mitigation bank may be utilized for compensatory mitigation for adverse impacts to the aquatic ecosystem anticipated by the Tulsa District, USACE-permit applicants. The DFMB service area encompasses several continuous 8 digit HUCs to provide the DFMB the best opportunity to fulfill the watershed approach contained in the mitigation banking rule. The service area was determined by selecting an area that is large enough to support an economically viable mitigation bank while ensuring that appropriate aquatic resources provided by the DFMB will effectively compensate for adverse environmental impacts across the entire service area. The Compensatory Mitigation for Loss of Aquatic Resources; Final Rule [33 CFR 332.8 (6)(ii)(A)] states “The service area must be appropriately sized to ensure that the aquatic resources provided will effectively compensate for adverse environmental impacts across the entire service area. For example, in urban areas, a U.S. Geological Survey 8-digit hydrologic unit code (HUC) watershed or a smaller watershed may be an appropriate service area. In rural areas, several contiguous 8-digit HUCs or a 6-digit HUC watershed may be an appropriate service area. Delineation of the service area must also consider any locally-developed standards and criteria that may be applicable.

The economic viability of the mitigation bank or in-lieu fee program may also be considered in determining the size of the service area”. With this is mind, it is important to note that the DFMB site is in a very rural area approximately 50 miles east of Oklahoma City and approximately 70 miles west of Tulsa. The DFMB site is located in the Deep Fork 8-digit HUC, which is a linear HUC running east-west and is on average 20-25 miles wide. The proposed primary service area for the DFMB consists of two, contiguous 8-digit HUC’s (11100303 & 11100302) comprised of the Deep Fork and Lower North Canadian watersheds. Both HUC’s run in an east-west direction and the western portions of both HUC’s go through Oklahoma City and the greater Oklahoma City area. Second, in the opinion of the sponsor, it is critical for the DFMB to include the Lower North Canadian 8-digit HUC in the primary service in order for the proposed bank to be economically viable, since the Deep Fork HUC would only service the northern third of Oklahoma City. Third, from an ecological standpoint, approximately 90-95% of the proposed primary service area is located within one Level III Ecoregion, the Cross Timbers.

The geographic service area for the DFMB is graphically described on Figure 6. Any aquatic resource impacts which occur within the described service area, subject to USACE approval, will be eligible for credit withdrawal from the DFMB. The proposed service area shall be as follows:

1. ***Primary Service Area***

   In-kind habitat and out-of-kind habitat types associated with the Deep Fork Watershed (HUC 11100303) and Lower North Canadian Watershed (HUC 11100302), specifically including all or portions of the following counties: Creek, Cleveland, Hughes, Lincoln, Logan, McIntosh, Muskogee, Okfuskee, Oklahoma, Okmulgee, Pottawatomie, and

Seminole. Level III Ecoregions included in the primary service area include the Cross Timbers, Central Great Plains, Central Irregular Plains, and Arkansas Valley.

2. Secondary Service Area

In-kind habitat and out-of-kind habitat types associated with all or part of the Little Watershed (HUC 11090203), Polecat-Snake Watershed (HUC 11110101), the portion of the Dirty-Greenleaf Watershed (HUC 11110102) west of the Arkansas River, Middle North Canadian Watershed (HUC 11100301), and a portion of the Lower Cimarron-Skeleton Watershed (HUC 11050002), specifically including all or portions of the following counties: Canadian, Cleveland, Creek, Hughes, McIntosh, Muskogee, Oklahoma, Okmulgee, Osage, Pottawatomie, Seminole, Tulsa, and Wagoner. Level III Ecoregions included in the secondary service area include the Cross Timbers, Central Great Plains, Central Irregular Plains, Boston Mountains, and Arkansas Valley.

3. *Case by Case Basis*

In exceptional cases, the USACE would consider, and may approve, the use of the DFMB for compensatory mitigation located outside the primary and secondary service areas but within the regulatory boundary of the USACE, Tulsa District.

For impacts occurring within the bank's primary service area crediting ratios will be 1:1. For impacts occurring outside of the bank's primary service area, but within the secondary service area, crediting ratios will include a 1.5 multiplier (i.e. 1.5 credits would be required instead of 1 credit for projects/impacts in the secondary service area). At the USACE's discretion, projects not included within the primary or secondary service areas will be evaluated on a case-by-case basis to determine the eligibility for credit withdrawal. If a project located outside the primary and secondary service areas is approved by the USACE, the ratio of mitigation to impact will be 3:1.

9.0 MITIGATION PLAN

9.1 Objectives

The Sponsor has developed a mitigation plan for the DFMB. Implementing this plan would restore and enhance waters of the U.S. for the site and provide additional aquatic ecosystem functioning for the watershed. Under this MBI, the Sponsor will create the DFMB which will be approximately 109.37 acres in area. To achieve this goal, the Sponsor proposes to undertake the following activities:

- Restore 71.4 acres of Forested Wetlands
- Enhance 10.5 acres of Forested Wetlands
- Restore 3.5 acres of riparian buffer
- Enhance 11.3 acres of riparian buffer
- Restore 3,018 lineal feet of ephemeral stream channel
- Enhance 2,665 linear feet of ephemeral stream channel
- Enhance 840 lineal feet of intermittent stream channel
- Enhance 3,822 linear feet of perennial stream channel
- Restore 3.3 acres of upland buffer
- Enhance 1.0 acres of upland buffer

All of these activities are in accordance with the provisions of this MBI and the Site Development Plan detailed in Section 10.0. The Sponsor shall then maintain the bank in such condition in perpetuity. The aquatic benefits provided by the planned restoration and enhancement activities will compensate for the loss of such habitats within the geographic

service area of the bank. The creation of the bank will improve water quality by filtering surface and subsurface water that drains across the property and will store and treat water that floods the site when the Deep Fork River or its tributaries overflow their banks and flood portions of the property. All these benefits (wetland restoration and enhancement, riparian corridor restoration and enhancement, stream channel restoration and enhancement, and upland buffer restoration and enhancement) are practices that are sorely needed in the Deep Fork watershed to prevent erosion, capture erosion from other sources, improve water quality, and improve streambank stability.

9.2 Site Selection

The DFMB property was selected by the Sponsor for several reasons, including but not limited to, the amount of degraded or altered stream channels onsite which offers great potential for the restoration and enhancement; favorable topography and hydric soils for wetland restoration and enhancement, as well as the potential for restoring natural hydrology that has been excluded by the construction of levees and other barriers. The bank has a landscape position within the watershed that will allow for significant water quality benefits. The property's location immediately adjacent to the Deep Fork River will create important benefits for the watershed as runoff will be filtered as it flows across the DFMB. The bank's position adjacent to a large perennial stream makes it ideal for riparian restoration. Restoring and enhancing large wetland areas will increase habitat connectivity for migratory waterfowl between existing wetland and open water habitats. Finally, by enhancing existing riparian corridors and reestablishing non-existent corridors, the bank will enhance wildlife corridors already used by animals that travel along the banks of the Deep Fork River.

The feasibility of restoring and enhancing streams and wetlands within the DFMB is considered excellent for several reasons. First, the majority of the wetlands and streams identified on the site have been heavily degraded or altered as a result of past agricultural or recreational activities. As a result, there is ample opportunity to restore and enhance streams and wetlands on the site. Additionally, there is excellent potential to restore and enhance streams and wetlands within the site due to the relatively flat topography and poor drainage characteristics of the soil. There are multiple locations with this combination of traits where previously cleared forested wetlands can be reestablished and the natural hydroperiod restored without altering topography. Second, the primary source of water for wetlands located within the bank is precipitation falling within site and overbanking from the Deep Fork River and its tributaries. A major objective of the DFMB will be to reconnect the Deep Fork River and its tributaries to the floodplain by removing water control structures and breaching the existing levee and tram at key locations which will promote a natural flood regime for the associated aquatic resources. Third, opportunity exists to restore and enhance three ephemeral tributaries by reconstructing a previously channelized segment, and reconnecting two segments that were previously diverted. Finally, the DFMB site is currently being utilized for recreational purposes and consists of open ground with easy access and few constraints. Management of the DFMB will limit anthropogenic disturbance that would degrade sensitive species and habitats on the site as well as ensure monitoring of conditions to identify and reduce challenges to long-term viability of the project.

9.3 Water Rights

It is important to note that the Sponsor controls sufficient water rights to ensure success of the DFMB. The overall approach to establishing and maintaining the DFMB is restoration and enhancement of naturally occurring and functioning aquatic systems that have been altered or degraded by anthropogenic activities. The aquatic resources that exist at the DFMB site derive necessary hydrology from localized rainfall and periodic overbanking form the Deep Fork River. The Sponsor makes no warranty, either currently or in the future, that the availability of water for the site will not decrease due to the watershed being built out. While that assurance cannot be

made, location and land use do help alleviate that concern for the DFMB. First, the DFMB is located in a rural area that has very little development, other than homesteads, and development of any consequence within a 20-30 mile radius in the next 20-30 years is very unlikely. Second, adjacent lands to the west and north of the DFMB comprise several hundred acres that are owned by the State of Oklahoma. These properties are designated as "school land", and as school land, the state cannot sell these properties and they cannot be developed. This will provide a certain measure of protection for a significant portion of the watershed upstream of the DFMB site. Additionally, there are no temporary or long-term structural management requirements associated with the forested wetland and/or stream restoration or enhancement activities that are needed to assure hydrologic/vegetative restoration. The levees and control structures that are currently in place were constructed to manipulate water levels for recreational purposes.

9.4 Threatened and Endangered Species

Threatened and endangered species listed for Lincoln County include the interior least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), red knot (*Calidris cantus rufa*), and the whooping crane (*Grus americana*) (USFWS, 2015). Potential nesting habitat for the least tern often includes sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats associated with rivers and reservoirs. Sandbars do occur within the Deep Fork River; however, they are less prominent now than before channelization efforts in the 1920's and 30's. For feeding, least terns need shallow water with an abundance of small fish. Shallow water areas of lakes, ponds, and rivers located close to nesting areas are preferred. Piping plovers in the Great Plains make their nests on open, sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, and on beaches, sand bars, and dredged material islands of major river systems. Again, the Deep Fork River offers potential nesting habitat for piping plover; however, the DFMB site would not provide suitable feeding habitat. Red knot breeding grounds consist of sparsely vegetated hillsides in drier tundra areas in the Artic. Outside of the breeding season, the red knot utilizes intertidal, marine habitats near costal inlets, estuaries, and bays. While the DFMB obviously does not contain suitable habitat for the red knot, the potential for utilizing the site as a stopover during annual migration may occur. The whooping crane breeds, migrates, winters, and forages in a variety of wetland and other habitats, including coastal marshes and estuaries, inland marshes, lakes, ponds, wet meadows and rivers, and agricultural fields. Whooping cranes breed and nest in wetland habitat in Canada. During migration, whooping cranes use a variety of habitats; however wetland mosaics appear to be the most suitable. For feeding, whooping cranes primarily use shallow, seasonally and semi permanently flooded palustrine wetlands for roosting, and various cropland and emergent wetlands. The whooping crane is a bi-annual migrant, traveling between its summer habitat in central Canada, and its wintering grounds on the Texas coast, across the Great Plains of the U.S. in the spring and fall of each year. Based on the habitat requirements of the whooping crane, the DFMB site may be utilized during migration.

It is the opinion of the Sponsor that implementation of stream and wetland restoration and enhancement activities required to establish and develop the DFMB will have no effect on potential threatened and endangered species or their habitat.

9.5 Cultural Resources

A Phase I Cultural Resources Survey was conducted by Holt Consulting Services, LLC in October 2015 for the DFMB site. The purpose of the survey was to determine if there were previously documented sites and/or undiscovered sites that may eligible for listing on the National Register of Historic Places (NRHP) that may be impacted by proposed mitigation activities. The results of the survey indicated that the DFMB site contains no cultural resources that meet the criteria for listing on the NRHP. If any cultural resources are encountered in the

course of development of the DFMB, all work will cease until a determination of significance can be made by the USACE. A copy of the archaeological survey report has been included as Appendix F.

10.0 MITIGATION WORK PLAN

The overall management objective of the DFMB is to restore and enhance streams and wetlands by 1) reversing or modifying existing hydrologic alterations to promote wetland hydrology and natural flood regimes, 2) reconstruct and reconnect altered stream courses, 3) plant native trees to restore/enhance forested wetlands, riparian habitat, and upland buffers, and 4) reconnect the floodplain to the river and its tributaries in order to reestablish a natural flood regime, hydroperiod, and dynamic watershed interaction. Sponsor will develop the DFMB according to the site development plan outlined in the following sections (see Figure 4).

The targeted plant communities will be those that best represent the potential natural vegetation expected for the respective range and woodland/forest site conditions (i.e. soils, climate, hydrology, fire, etc.) for the area. Concurrently, management planning also considers the potentially destabilizing impacts of changes in soils, hydrology, fire, and non-native plant invasions on the site, and long-term maintenance of the targeted native plant communities. Also, management begins with current conditions and works gradually to achieve sustainable, low maintenance, plant community objectives. The general approach will be to first reverse or modify hydrologic alterations to provide conditions suitable for hydrophytic species and then plant native, tree and shrub species, as well encourage natural establishment of native plants.

To establish the DFMB, the Sponsor will restore one ephemeral stream reach to its appropriate geomorphic dimension and pattern, and reconnect two additional ephemeral stream reaches, so that they are capable of moving water flows and sediment provided by their watersheds, in order to achieve dynamic equilibrium. Additionally, floodplain and river connectivity will be restored by restoring natural meanders, breaching levees and/or other man-made barriers, and removing water diversion and control structures. The DFMB will establish riparian buffers and replace light-seeded, undesirable species with native, hard and soft mast producing trees and shrubs. In summary, the DFMB will restore and enhance approximately 5,683 lf of ephemeral streams, approximately 4,662 lf of intermittent and perennial streams, restore and enhance 14.8 acres of riparian corridors, restore and enhance 81.9 acres of forested wetlands, and enhance and restore 4.3 acres of upland forest buffer habitat.

Efforts will be made to conduct mitigation activities with the following order, with the understanding that multiple activities may be conducted concurrently:

- Bottomland Hardwood Restoration of Moist Soil Units
- Bottomland Hardwood Enhancement of Existing Forested Wetlands
- Reconstruction of Channelized Ephemeral Stream and Reconnection of Diverted Ephemeral Streams
- Riparian Habitat Enhancement Associated with Deep Fork River and Tributaries
- Riparian Habitat Restoration Associated with Reconstructed Ephemeral Stream
- Upland Buffer Restoration and Enhancement
- Reconnection of Floodplain to Deep Fork River and Tributaries by Removal of Water Control Structures and Levee/Tram Breaches

Once established, the DFMB will improve aquatic functions and services (water quality, flood storage, and wildlife habitat), more specifically, reestablishing and improving hydraulic connection of the river and its tributaries to the floodplain and watershed, creating stable

meandering channels, and replacing low quality and undesirable species with a diversity of native plants with improved wildlife value. These restored and enhanced streams, wetlands, and riparian and upland buffers will provide habitat for a wide variety of water-dependent and terrestrial wildlife species as well as significantly increasing the physical, chemical, and biological processes of water resources.

1. Hydrology

A priority of the management strategy for the DFMB is to restore natural hydrology to the site. Over the years, hydrology within the DFMB site has been manipulated, altered, and precluded across the entire site. First, the Deep Fork River was channelized to facilitate agricultural activities. Since that time, the channel has become incised and the spoil material removed during the channelization process was deposited on the river bank that currently acts as a levee. As a result, the natural flood regime has been altered and overbanking events are less common. Second, many of the tributary streams have been channelized or diverted in order to manipulate the water regime for the site. Third, levees were constructed years ago in order to exclude flood waters to facilitate agricultural operations. Fourth, an abandoned railroad tram crosses the entire length of the property on the west side of the river and presents yet another barrier for the natural interaction of the river and the associated floodplain.

Hydrologic restoration, indeed most ecological restoration, can often be seen as a subtractive design process rather than an additive procedure. Often, restoration success can begin by simply undoing anthropogenic changes that transformed a functioning ecosystem into its current nonfunctioning state. In order for any wetland restoration project to become functionally successful, natural hydroperiods must be reestablished. As previously mentioned, the constructed levees, stream alterations, water control structures, and other hydraulic impediments have created an unnatural hydroperiod and flood regime for the DFMB; however, more importantly these anthropogenic influences have had a long-term negative effect on the watershed.

Specific hydrology restoration goals for the DFMB include reestablishing a natural hydraulic dynamic between the river and the floodplain by removing water control structures, breaching constructed levees, old tram, and river spoil piles at key locations, and to restore a hydrologic connection to the streams. Location of the water control structures that will be removed and the points where the constructed and river levees will be breached are shown were determined by employing a 1-foot contour map developed specifically for the DFMB site (Figure 7). The proposed breaches in the river spoil piles and constructed levees will average approximately 100 ft in width, depending on the location and potential for damming by beavers, and will occur at every location water control structures are removed. If beavers plug breach locations, “beaver-proof” modifications will be added as described in the *Beaver Management Plan* described in Section 13.4. Reconnecting the river and its tributaries to the floodplain is critical in order to realize the benefits of key processes including flood storage, sediment and nutrient filtration, reduction in storm flow velocities, and overall watershed health that has been severely impaired for decades. The intended hydrologic regime for the forested wetlands is a seasonally saturated condition capable of supporting a forested wetland system. Hydrologic input to the wetland mitigation site will consist of groundwater, direct precipitation, surface runoff from the adjacent watershed, and stream overbanking. Both wetland restoration and enhancement areas will be hydrologically enhanced by stream restoration and floodplain reconnection efforts.

In an effort to show that the previously described efforts will restore and enhance natural hydrology to the site by reconnecting the floodplain to the river, the Sponsor has collected and reviewed Deep Fork River elevation data collected from the USACE-maintained gage at

Warwick, OK (07242380), which is approximately 5 miles upstream of the site. The data collected dates from 1983, which provides 33 years of flood stage information in order to accurately predict future impacts of the proposed hydrology restoration activities. However, it should be noted that since there is no gage data for the DFMB site and that streamflow and flood stage modeling was not performed for the DFMB specifically, several assumptions must be made. First, the DFMB site will have the same flood stage elevation as the Warwick gage. Second, river channel morphology at the DFMB site is similar to the Warwick gage site which would allow for both sites to have similar flood stage elevations. Third, zero stage for the Warwick gage was derived from the thalweg at zero flow. The zero stage elevation for the DFMB was also taken in the thalweg at zero flow and was determined to be 794 ft.

Based on these assumptions and measurements, and utilizing the Warwick gage data, it was determined that since 1983 the river has overtopped the existing levee and entered the floodplain 9 times over the past 33 years, or 1 event every 3 years (33%). If the river levee had been breached to the elevation of the floodplain, then during the same time period, the river would have entered the floodplain on 22 occasions, or 1 event every 1.5 years (67%). Based on these results, it is easy to realize the effectiveness that river channelization efforts and the constructed levees has had on precluding flood events from the site. However, it is also easy to realize that by breaching these levees, the number of flood events for the site would more than double.

2. Bottomland Hardwood Restoration & Enhancement

The EPA utilizes the definition of restoration as described in 1992 National Research Council (NRC) report, *Restoration of Aquatic Ecosystems*, as the "*return of an ecosystem to a close approximation of its condition prior to disturbance."* That report also states*, "The term restoration means the reestablishment of predisturbance aquatic functions and related physical, chemical, and biological characteristics. Restoration is a holistic process not achieved through the isolated manipulation of individual elements. Merely recreating a form without the functions, or the functions in an artificial configuration bearing little resemblance to a natural form, does not constitute restoration. The objective is to emulate a natural, self-regulating system that is integrated ecologically with the landscape in which it occurs. Often, restoration requires one or more of the following processes: reconstruction of antecedent physical conditions, chemical adjustment of the soil and water; and biological manipulation, including the reintroduction of absent native flora and fauna*".

With this in mind, the Sponsor will restore approximately 71.4 and enhance 10.5 acres of bottomland hardwood forested wetland habitat. Restoration will be accomplished by restoring natural hydrology to the site and planting an appropriate mixture of native bottomland hardwood species during the standard planting season (December-March). Within restoration areas, 1-year old bare-root or containerized seedlings will be planted using 12 x 12 foot spacing, for an initial stand density of at least 302 seedlings per acre. Within the enhancement areas, seedlings will be understory planted using a 14 x 14 foot spacing, for an initial stand density of at least 225 seedlings per acre. A mixture of at least 85 percent hard-mast and a maximum of 15 percent soft-mast producing, or light seeded species, will be planted in both the restoration and enhancement areas in accordance with the species listed in Table 2. If seedling availability renders a discrepancy of more than five percent from the desired mixture of hard-mast to soft-mast and/or light seeded species, approval from the USACE to modify the plan will be obtained.

Table 2. List of native tree and shrub species to be planted on the DFMB site.

Common Name	Scientific Name	Hard Mast	Soft Mast	Location*
Shumard Oak	*Quercus shumardii*	x		W/R
Water Oak	*Quercus nigra*	x		W/R
Bur Oak	*Quercus macrocarpa*	x		W
Post Oak	*Quercus stellata*	x		U
Southern Red Oak	*Quercus falcata*	x		U
Blackjack Oak	*Quercus marilandica*	x		U
Pin Oak	*Quercus palustris*	x		W/R
Black Oak	*Quercus velutina*	x		U
Sweet Pecan	*Carya illinoensis*	x		W/R
Bitternut Hickory	*Carya cordiformis*	x		W/R
Black Hickory	*Carya texana*	x		U
Black Cherry	*Prunus serotina*	x		U
Chickasaw Plum	*Prunus angustifolia*		x	U
Buttonbush	*Cephalanthus occidentalis*		x	W
Persimmon	*Diospyros virginiana*		x	W/R
River Birch	*Betula nigra*			W/R
Eastern Cottonwood	*Populus deltoides*			W/R

* Location abbreviations are as follows: Wetland (W), Riparian (R), and Upland (U)

In determining the desired stocking level and species composition for the proposed bottomland forested wetland restoration and enhancement prescriptions, it is important to discuss the forest that members of the IRT expect as a result of the reforestation efforts. Very little information is available for characterizing old growth bottomland hardwood forests in Central Oklahoma. Comparisons can be drawn by looking at isolated pockets within other portions of the Cross Timbers Ecoregion; however, very few examples exist in the region of the bank site. The main reason being that since the early 1900's approximately 80 to 90 percent of old growth bottomland forested habitat in Oklahoma has been cleared or high-graded for agricultural purposes, including pasture or farming. As a result, very little acreage remains that consists of mature, hard-mast producing forests. Further, the remaining mature bottomland forests contain a very low percentage of hard-mast producing species, and are primarily dominated by less desirable light-seeded species.

With this in mind, it is widely accepted that the appropriate bottomland hardwood community for mitigation projects should be an even-aged stand dominated by large, hard-mast producing species, with complete canopy coverage, despite the fact that very few documented old growth, or remnant, hardwood stands located in other parts of the U.S. exhibit these traits. Thus, a quandary, of sorts, exists for the entity tasked with realizing this vision. It is widely accepted that old growth forests are dynamic and fluid, and are extremely diverse. This idea runs counter to the normal picture painted for old growth forests being static systems dominated by a few very large species. In fact, old growth forests are primarily uneven-aged due to fires, floods, tornadoes, insects, and other natural events. Tree species range from pioneer to climax, or light-seeded to hard-mast producing, and stem densities can vary wildly from 60 to 70 to several thousand per acre. In short, there are no guidelines for reestablishing an old growth bottomland forest community, except that there are no shortcuts and time heals all wounds.

With that being said, since no data exists for characterizing stand dynamics of old growth bottomland hardwood forests in Central Oklahoma, the Sponsor has developed reforestation

prescriptions utilizing widely accepted native tree species for the region and hardwood reestablishment stocking rates commonly used by the Natural Resource Conservation Service (NRCS), U.S. Fish and Wildlife Service (USFWS), and Forest Service. Existing data suggests that typical mature hardwood bottom forests from Illinois to East Texas contain an oak component ranging from 25 to 50 percent with an average stocking level from 130 to 150 trees per acre (Allen 1997). The standard spacing utilized by the NRCS and USFWS for hardwood restoration projects is 12 ft x 12 ft, or 302 trees per acre (Allen et al. 2004). When considering hardwood restoration, research conducted by the NRCS and USFWS has shown that fewer seedlings are required per acre and may be just as effective in meeting project goals. A wider spacing of planted hard-mast species will allow for establishment of light-seeded species and will ultimately produce a more diverse and ecologically rich forest. Based on USDA Forest Service guidance for southern hardwood management, they recommend planting 100 to 450 trees per acre, with 300 to 400 trees per acre being more desirable to account for mortality (USDA 1994). Finally, the NRCS in Oklahoma currently utilizes a prescription of 302 trees per acre (12 ft x 12 ft spacing) for all hardwood reforestation projects in Lincoln County associated with the Wetland Reserve Program (unpublished guidance). Site preparation activities associate with the forested wetland restoration and enhancement areas will include removal of invasive herbaceous species and pioneer tree species that have encroached around the margins of these management units. Broadcast and selective herbicide treatments will be utilized during the spring and early summer to remove undesirable herbaceous vegetation and sapling-sized light-seeded species in preparation for planting. Additionally, dense areas of light-seeded tree species will be mechanically removed by clearing and piling. The resulting piles will be left in place for wildlife habitat; however, the piles will be small, less than 1/10th-acre in size, and will be evenly spaced across the site.

The ability to retain water within the moist soil units prior to planting trees would provide critical soil moisture that would benefit the tree seedlings greatly. The existing water control structures are not intended to be long-term management tools, but rather will act as short-term insurance until the planted trees have established sufficient root growth. Plans include removing the water control structures one year after planting.

3. Riparian Restoration & Enhancement

In association with stream restoration and enhancement activities, the Sponsor will restore approximately 3.5 acres of previously cleared riparian buffer adjacent to the reconstructed ephemeral stream channel. The Sponsor will also enhance approximately 11.3 acres of existing, low quality riparian habitat adjacent to the Deep Fork River, intermittent stream, and remaining ephemeral streams. Riparian vegetation provides water shading which reduces water temperatures and in turn increases dissolved oxygen. Increased dissolved oxygen and lower water temperatures improve in-stream habitat for micro and macro invertebrates, fish, amphibians, and reptiles. Additionally, riparian buffers provide bank stabilization that can reduce erosion and incision. Moreover, reestablishing riparian buffers can reduce or remove nutrient runoff, specifically nitrogen, which can have detrimental effects on water quality and aquatic life.

With regard to riparian enhancement activities associated with the river and intermittent stream, the Sponsor will remove invasive species such as eastern redcedar, and interplant hard and soft mast tree species and shrubs. This will improve habitat quality for wildlife and provide higher functioning travel corridors. It is important to note that the majority of the existing riparian habitat associated with the Deep Fork River and intermittent stream has little to no understory component. The introduction of a shrub layer is important in creating a layered vegetational strata for filtering sediment, and to increase root mass to improve bank stability to reduce erosion. When considering species composition, the existing riparian

communities contain a few scattered native pecans; however, they represent less than 1% of the total composition, and there are no other hard-mast species such as oak or hickory and very few soft-mast species. Additionally, long-term protection of the riparian areas adjacent to the intermittent stream and river will ensure that vegetation cannot be removed at some point in the future which would substantially reduce streambank stability. Finally, the most critical component to enhancing function of the intermittent stream and river is restoring a hydrologic connection between the streams and the floodplain. As previously described in the section on hydrology, when the Deep Fork River and intermittent stream were channelized, the spoil removed from dredging the new channels was deposited along the new stream banks.

Riparian corridor restoration and enhancement for all of the streams will be achieved by planting native tree and shrub species in order to expand existing corridors of intermittent and perennial streams to 50 ft per side and reestablish non-existent and enhance existing corridors of ephemeral streams to 25 feet per side. The enhancement of existing riparian corridors will involve selective removal by mechanical or chemical means to remove undesirable early successional species as well as planting mast-producing late successional tree species and shrub species during the standard planting season (December-March). Within the riparian restoration areas, seedlings will be planted using 12 x 12 foot spacing, for an initial stand density of at least 302 seedlings per acre. Within the enhancement areas, seedlings will be understory planted using 14 x 14 foot spacing, for an initial stand density of at least 225 seedlings per acre. A mixture of at least 85 percent hard-mast and a maximum of 15 percent soft-mast or light-seeded tree and shrub species will be planted in both the restoration and enhancement areas in accordance with the species listed in Table 2. If seedling availability renders a discrepancy of more than ten (10) percent from the desired mixture of hard-mast to soft-mast species, approval from the USACE to modify the plan will be obtained.

1. Stream Restoration & Enhancement

The overall approach to establishing and maintaining the DFMB is restoration and enhancement of naturally occurring and functioning aquatic systems that have been altered or degraded by anthropogenic activities. The goals and objectives of stream restoration and enhancement efforts associated with the DFMB are to remove water control structures, and/or dams, from existing streams, reconnect diverted streams, reconstruct historic stream courses, and reconnect streams to the floodplain and Deep Fork River. In essence, the Sponsor will be restoring natural stream courses, natural flow regimes and drainage patterns, and natural floodplain hydraulics that have been altered by historic actions associated with agricultural and recreational activities. To that end, the majority of stream restoration and enhancement activities will consist of in-stream work that will include restoring stream connectivity, reestablishing natural flow and flood regimes, and hydraulic interaction of the Deep Fork River and the tributary streams on the site.

The existing streams on the DFMB are 1st, 2nd, and 3rd order streams that contribute to the Deep Fork River. The Deep Fork River is an impaired 303(d) stream due to turbidity and bacteria. Six streams are included in the DFMB management scope, consisting of four ephemerals, one intermittent, and one perennial, the Deep Fork River. Stream types within the bank consist of ephemeral, intermittent, and perennial. Assessed stream type was determined by a number of physical, geomorphic, and biological factors. The Deep Fork River was channelized between 1912 and 1923 to facilitate agriculture, and portions of the river were re-channelized in 1975. Today, the Deep Fork River consists of an incised channel, with more than 30 feet from top bank to bed, and lateral widening with severe bank erosion is ongoing. The intermittent stream located within the DFMB is a channelized tributary of the Deep Fork and is severely incised; however, the banks are relatively stable.

Most of the ephemeral tributaries identified within the DFMB site have been severely altered, by either channelization, diversion, or have been deprived of natural flows.

The Sponsor will restore one ephemeral stream reach (#1) and enhance three other stream reaches (#2 & #3) within the DFMB. The stream restoration work will include reconstruction of a previously obliterated channel and enhancement work will consist of significant in-stream modifications that include removal of diversions and water control structures which inhibit natural flows. Stream geomorphology of all of the ephemeral stream channels was altered due to continual agricultural site grading, which destroyed the small onsite streams and converted them to agricultural drainages. Restoration of ephemeral stream #1 is feasible due to the existence of undisturbed reference streams in the area that are visible on aerial photography. Stream geomorphology of the restored channel will mimic, to some degree, the sinuosity, slope, and channel cross-section of existing stream channels on-site.

The first ephemeral stream (#1) is approximately 1,262 LF and is located in the middle of the property, and enters the site from the west and runs in an easterly direction before turning south and paralleling the old tram to the southern boundary. Today, the channel is utilized as the primary drainage channel for the two southernmost moist soil units west of the river. Restoration plans for this stream segment include reconstructing the channel from the point where it enters the property on the west side to where it exits the property on the south boundary. The stream will be restored to appropriate width (approximately 4 ft bed and 10 ft top bank width), sinuosity, and channel geometry, similar to previously noted reference steams, capable of moving flows and sediment. The reconstructed length of ephemeral stream #1 will be 3,018 LF. A plan view and cross section for the restoration of stream #1 is detailed on Figure 8. The Sponsor has observed sufficient hydrology consistent with ephemeral flow during the growing season.

Stream channel characteristics will be designed similar to the geomorphic conditions of the existing ephemeral streams. Although the existing ephemeral streams have low sinuosity and low width to depth ratios as a result of historic channelization activities, the restored channel will produce substantial stream channel restoration by restoring the stream channel to maintain similar gentle slopes and low width to depth ratios as the existing ephemerals. Stream sinuosity will be increased from previous straightening, and restoration will enhance sediment transport capacity while maintaining appropriate erosion/sedimentation rates and channel stability. While current or historic topographic maps do not provide enough detail to discern whether or not a stream once existed at the location of the proposed reconstruction of Stream #1, the landform and detailed contour map produced for the site definitely reflect a natural swale in this area. While it is doubtful this area was landplaned for agricultural purposes, it is highly likely that if a stream was present it was diverted, channelized, re-routed, or obliterated to facilitate drainage for agriculture. A quick review of aerial photography up and down the Deep Fork River reveals that most, if not all, tributary streams located in the floodplain were altered in some form or fashion by channelization, re-routing, or diversion. As a result, natural, unaltered reference streams in the floodplain are difficult to locate. With that said, the sponsor has used available resources, like the 1-foot contour map, to try and reconstruct what may have been present on the landscape before man's influence. It is the opinion of the sponsor that a first-order stream was present in the general area of Stream #1 and followed the same general course.

As far as sinuosity, the design of the reconstructed stream is not only to transport water and sediment, but to encourage out bank events through natural processes as opposed to using unnatural means like levees and water control structures. The sponsor was able to locate four reference stream sections upstream and downstream of the DFMB site using available aerial photography. These streams were located in the floodplain of the Deep Fork River and were either first order or small second order streams. Sinuosity was calculated for these

four reference streams and the average sinuosity of the four streams is 0.73 and the proposed sinuosity of Stream #1 on the DFMB site is 0.74. Thus the reconstructed stream will have the same sinuosity as the four reference streams that were evaluated.

Ephemeral stream segment #2, approximately 1,256 LF, will also be enhanced and is located along the southern boundary of the site and west of the river. The stream enters the property near the southwest corner and runs in an easterly direction before exiting the south property boundary. The Sponsor will remove the earthen plug and reconnect the bisected channel and breach the pond dam. These two efforts will restore a hydraulic connection for the entire length of the stream within the DFMB site. Additionally, these measures will reestablish a connection to the original floodplain, restore the streams natural flow regime, and provide adequate hydrology for the aquatic resources during peak flows and overbanking events.

Ephemeral stream segment #3, approximately 1,409 LF, consists of the portion of the first stream (#1) described that parallels the old tram. Plans include enhancing current stream functions without relocating the stream channel. Currently, water only enters this channel through a stand pipe on the north end that controls the maximum water level for the associated moist soil unit. Levees, the old tram, and water control structures impede the natural flow regime as it moves south. While the course of this stream will not be modified, the stand pipe and water control structures will be removed in order to reconnect the stream to the floodplain and to restore a natural flood and flow regime.

Additional stream enhancement activities include the remaining stream segments within the DFMB site, which consist of the Deep Fork River (3,822 LF), and an unnamed intermittent tributary (840 LF). As a result of hydrology improvements (e.g. breaching of constructed levees, old tram, and river spoil piles) the viability and function of all the streams within the DFMB will be greatly increased as a result of a reconnection to the floodplain and dynamic hydraulic interaction on a watershed level. Even though the course and profile of these streams will not be altered, significant in-stream modifications will result from restoration of hydrology. Restoring hydrology will reestablish a normal flow and flood regime for the ephemeral and intermittent streams.

Finally, management for all of the streams within the DFMB, including the Deep Fork River, will include enhancement and restoration of associated riparian buffers, which will improve streambank stability by increasing rooting density and will shade the channels as trees mature and canopies close. It is important to emphasize that riparian enhancement activities that the Sponsor will conduct are an integral part of the overall goal of the intermittent and perennial stream enhancement efforts.

2. Upland Buffer

The DFMB will include 4.3 acres of non-riparian upland buffer confined to the southwest corner of the property. The DFMB will place a high priority on establishing and maintaining upland buffers around the restored and enhanced wetland habitats to ensure those habitats can be self-sustaining. These upland buffers will help maintain the integrity of the aquatic resources within the DFMB despite development outside the bank. Approximately 4.3 acres of upland forest and pasture will be enhanced and restored, respectively, in the southwest portion of the bank site. Restoration and enhancement of the upland habitat will be accomplished by the following activities:

- Planting an appropriate mixture of upland hardwood species during the standard planting season (December-March).

- Within the restoration areas, seedlings will be planted using 12 x 12 foot spacing, for an initial stand density of at least 302 seedlings per acre.
- Within the enhancement areas, seedlings will be understory planted using 14 x 14 foot spacing, for an initial stand density of at least 225 seedlings per acre.
- A mixture of at least 85 percent hard-mast and a maximum of 15 percent soft-mast producing or light–seeded species will be planted in both the restoration and enhancement areas in accordance with the species listed in Table 2. If seedling availability renders a discrepancy of more than five percent from the desired mixture of hard-mast to soft-mast species, approval from the USACE to modify the plan will be obtained.

11.0 BANK OPERATION

11.1 Credit Determination

As discussed in the Site Development Plan in Section 10.0, data support the assessment that ecological functions are operating at generally low quality on the property. Therefore, the potential is demonstrated for substantial improvement through restoration and enhancement practices. Consequently, establishment of the DFMB can be expected to produce considerable gains for ecological function for the site. There are several assessment methods available to determine the potential for restoring functions of the DFMB wetlands and streams. At present, the Tulsa District USACE does not use a functional assessment method to determine both the amount of credits necessary to replace wetland or stream functions impacted by authorized projects, and the credits available for a particular mitigation project. Therefore, the Sponsor has chosen to utilize specific indices, typically associated with qualitative and quantitative assessment methods, in order to generate a viable credit valuation, albeit subjective in nature, for the expected increases in functional value, or uplift, and the corresponding amount of wetland and stream credit that will be generated, per acre for wetlands and per foot for streams, as a result of the proposed site restoration and/or enhancement activities.

When considering, qualitatively, the amount of credit, or uplift, that the previously described restoration and enhancement activities will generate for the streams and wetlands within the site, it is necessary to consider the pre and post prescription conditions of the landscape, biota, physical, chemical, and biological processes of the water resources and hydrology. First, hydrology is the primary process needed for the development and maintenance of wetland functions and is the epicenter of the landscape-scale approach for restoration of the site. As previously stated, hydrology on the DFMB site has been severely altered and degraded. However, while a majority of the site still retains wetland characteristics, the floodplain is fragmented and disconnected, and primary functions such as flood storage, ground water recharge, sediment filtration, water quality enhancement, sediment reduction, and nutrient removal have been severely impaired or removed. Significant functional uplift will be generated from the reintroduction of these processes by removing water control structures, breaching the constructed levees, old tram, and natural river levee in key locations, and by reconstructing and reconnecting altered streams within the site. Subsequently, hydrology restoration efforts proposed for the DFMB will not only reestablish a localized hydraulic connection between the Deep Fork River and the local floodplain, but moreover it will reestablish a hydraulic connection on a landscape level with the watershed.

Second, vegetation manipulation is another key component of the overall management strategy for the site. As previously stated, the majority of the site currently consists of previously cleared and maintained herbaceous dominated emergent wetlands, and low quality forested wetlands and riparian habitat. In addition to hydrology restoration efforts, the DFMB will reestablish a self-sustaining, native, diverse, high quality, bottomland forest community that will increase overall

wetland function of the site and provide substantial uplift for the Deep Fork watershed. Vegetation manipulation will consist of planting native hard and soft mast producing tree and shrub species in the herbaceous dominated wetlands and in the low quality light-seeded dominated forested wetlands and riparian buffers. The proposed habitat improvements will work in concert with hydrology restoration to substantially increase the physical, chemical, and biological process for the aquatic resources associated with the DFMB. In summary, it is expected that there will be a significant increase in function on a landscape level for hydrology, associated aquatic resources, and the biota, as a result of the establishment of the DFMB, and implementation of management objectives.

The DFMB is 109.37 acres and currently includes a mosaic of emergent and forested wetlands, streams, riparian buffers, and non-wetland habitat (see Figure 2). After the mitigation bank is complete, the Sponsor anticipates that approximately 104.77 acres of habitat and streams will be restored and enhanced including 81.9 acres of forested wetlands, 4.3 acres of upland buffer, and 19.6 acres of stream mitigation consisting of 3,822 LF of perennial stream (4.1 acres), 840 LF of intermittent stream (0.2 acres), 5,683 LF of ephemeral stream (0.52 acres), and 14.8 acres of riparian habitat. Proposed credit valuation ratios listed in Table 3 account for the restoration and enhancement of existing degraded features into the proposed features. As such, although the total bank area is approximately 109.37 acres, there will be an estimated 104.77 acres of credits generated as compensatory mitigation through the restoration and enhancement of bottomland hardwoods, riparian habitat, streams, and upland buffer. The remaining acreage will consist of maintained roads, levees, and old tram. The applicable mitigation activity for the existing and proposed features, the acreage/linear feet of each feature, and the credit valuation ratio is detailed in Table 3 below.

The MBI will define the area and work that will be the basis for the stream and wetland mitigation credits. The mitigation credits will become available in accordance with the credit release schedule detailed in Section 14.0.

1. Wetland Credits

Upon approval of this document, the USACE, in consultation with the IRT, grants the bank three (3) credits for every acre of forested wetland habitat that is enhanced, as shown in Table 3, for a total of 31.5 forested wetland enhancement credits. Furthermore, the USACE, in consultation with the IRT, grants the bank five (5) credits for every acre of forested wetland that is restored for a total of 357 forested wetland restoration credits. The release of these credits shall follow the schedule described in Section 14.0.

Areas proposed to receive forested wetland credits for restoration and enhancement have been observed to contain all three criteria necessary for wetland determination (wetland hydrology, hydrophytic vegetation, and hydric soils) but provide limited ecological function as a result of degradation from anthropogenic impacts. Existing wetlands that have not been dramatically affected by agriculture will be enhanced and restored by tree planting and hydrologic modification.

2. Stream Credits

Upon signature of this document, the USACE, in consultation with the IRT, grants the bank one (1) credit for every linear foot of perennial and intermittent stream that is enhanced, as shown in Table 3, for a total of 3,822 perennial stream credits and 840 intermittent stream credits. Furthermore, the USACE, in consultation with the IRT, grants the bank two (2) credits for every linear foot of ephemeral stream that is enhanced by reconnecting natural flows (#2 & #3), and two (2) credits for every linear foot of ephemeral stream that is restored by reconstructing the natural channel course and pattern (#1), for a total of 11,366 ephemeral stream credits.

The Sponsor has not requested credit for riparian habitat restoration and enhancement. Instead, the Sponsor has included the expected ecological uplift generated by riparian enhancement and restoration into credit determination for the streams. The release of these credits shall follow the schedule described in Section 14.0.

3. Upland Buffer

Buffer restoration/enhancement will consist of less than 3% of the total bank area and will be located in the southwest corner of the site. The buffers will separate the wetlands from adjacent agricultural properties. These activities will improve the aquatic resources within the bank by filtering some of the agricultural runoff and by preventing the establishment of undesirable vegetation through the creation of a mature perennial plant community. No wetland credit will be attributed to upland buffer enhancement and/or restoration activities.

Table 3. Mitigation activities and credit valuation ratios for the DFMB.

Mitigation Activity	Existing Feature	Proposed Feature	Linear Feet	Acres	Credit Valuation Ratio	Total Stream Credits	Total Wetland Credits
Forested Wetland Enhancement	Low Quality Forested Wetlands	High Quality Forested Wetlands & Hydrology Restoration	-	10.5	3:1	-	31.5
Forested Wetland Restoration	Herbaceous Wetlands	High Quality Forested Wetlands & Hydrology Restoration	-	71.4	5:1	-	357
Perennial Stream Enhancement	Stream Disconnected to Floodplain	Reconnection to Floodplain & Riparian Improvements	3,822	4.1	1:1	3,822	-
Intermittent Stream Enhancement	Stream Disconnected to Floodplain	Reconnection to Floodplain & Riparian Improvements	840	0.2	1:1	840	-
Ephemeral Stream Restoration (#1)	Channelized Stream	Reconstructed Channel and Riparian Improvements	3,018	0.3	2:1	6,036	-
Ephemeral Stream Enhancement (#2 & #3)	Diverted & Disconnected Streams	Reconnected Channel and Riparian Improvements	2,665	0.2	2:1	5,330	-
Riparian Restoration & Enhancement	Degraded Riparian Buffer Forest	High Quality Riparian Buffer Forest	-	14.8	0:0	-	0.0
Upland Buffer Restoration and Enhancement	Low Quality Forested & Native Pasture	High Quality Forested Habitat	-	4.3	0:0	-	0.0
Other	Levees, Tram, & Roads	Levees, Tram, & Roads	-	3.6	0:0	-	0.0
Total			**10,345**	**109.4**		**16,028**	**388.5**

11.2 Mitigation Ratios

USACE-permit applicants may purchase mitigation credits from the DFMB sponsor to provide compensatory mitigation for authorized unavoidable adverse impacts to the aquatic environment if approved by the USACE on a case-by-case basis. Any USACE-permit applicant proposing to

use the DFMB in lieu of other forms of compensatory mitigation must, at a minimum, demonstrate to the USACE that:

1. There is no practicable alternative to the discharge of dredged or fill material into a wetland or other water of the United States, and

2. All appropriate and practicable measures to minimize adverse impacts to the aquatic ecosystem have been included in the project, and

3. All appropriate and practicable compensatory mitigation for unavoidable adverse impacts is included in the project.

To adequately replace aquatic functions that would be lost or degraded in the project area, in-kind compensation of aquatic resource impacts will generally be required. However, out-of kind compensation may be acceptable if the USACE determines that it is appropriate, practicable, and environmentally preferable. The DFMB can provide forested wetland credit for mitigation of impacts to emergent and shrub/scrub wetlands. When considering the justification for this, the Sponsor would stress that naturally occurring emergent and shrub/scrub wetland habitat in the state of Oklahoma, and more specifically within the proposed bank service area, are very rare. All other occurrences of emergent and shrub/scrub wetland habitat is a result of anthropogenic influence resulting from cleared forested wetland habitat that is mechanically or chemically maintained as herbaceous dominated, or by manipulating hydrology in order to promote emergent or submergent vegetation. The existence of emergent and shrub/scrub wetland habitat in central and eastern Oklahoma is merely a successional vegetation phase of plaustrine forested wetland development. All other occurrences of emergent or shrub/scrub wetlands are man-made or man-induced, as in litoral fringe wetlands or moist soil units. The only exception to this would be vernal pools in far western Oklahoma and seasonally inundated beaver ponds in central and eastern Oklahoma.

With that said, if a forest dominated by mature, or mixed-aged, hardwood tree species is the climax phase of wetland development, and the most desirable in terms of wetland functions, then it follows that emergent and shrub/scrub wetlands are less desirable and are merely a structural phase. This assumption is bared out in most, if not all, functional assessment and qualitative methods which place a higher value on forested wetland habitat than emergent or shrub/scrub habitat. Therefore, if emergent and shrub/scrub wetland habitat was left undisturbed, and natural hydrology and soil conditions were restored, a forested condition would be the dominant, and/or climax, vegetation component within a few years. Furthermore, emergent and shrub/scrub wetlands, as compared to forested wetlands, perform different functions, and subsequently have different values. As a result, if the Sponsor restores and enhances naturally occurring and dominant, forested wetland habitat, then it is logical to infer that it would provide a higher functioning and more desirable ecological replacement for man-made, emergent and shrub/scrub wetland habitat.

The USACE shall have the final authority in determining the number of credits required to compensate for unavoidable adverse project impacts to waters of the United States. The USACE shall determine on a permit-by-permit basis the relative quality of the aquatic resources that would be adversely impacted unless another IRT member requests in writing to coordinate with the USACE on a particular case or all subsequent cases. In the absence of consensus among the USACE and coordinating IRT member or members on the quality of an impacted area, some other IRT-approved assessment methodology shall be used to determine the relative quality (low, medium or high) of the aquatic resources impacted. Credits in the credit availability account may be used to compensate for adverse impacts to waters of the U.S. For applicants choosing to utilize the DFMB for adverse impacts to waters of the U.S., the following wetland and stream mitigation ratios below shall be applied:

1. Wetlands

For adverse impacts to waters of the U.S., other than streams, that have been authorized by a DA permit occurring in the DFMB's primary service area, the credit availability account will be debited, whether in-kind or out-of-kind, as follows and detailed in Table 4:

- Two (2) credits, three (3) credits, and four (4) credits for each acre of low quality, medium quality, and high quality, respectively, water of the U.S., specifically emergent wetlands, adversely impacted.

- Three (3) credits, four (4) credits, and five (5) credits for each acre of low quality, medium quality, and high quality, respectively, water of the U.S., specifically shrub/scrub wetlands, adversely impacted

- Three (3) credits, five (5) credits, and seven (7) credits for each acre of low quality, medium quality, and high quality, respectively, water of the U.S., specifically forested wetlands, adversely impacted.

Table 4. In-kind and out-of-kind wetland impact ratios for projects in the DFMB.

Wetland Impact Type / Quality	**Forested Wetland Bank Credits**	
	In-Kind	**Out-of-Kind**
Emergent (Low)	-	2:1
Emergent (Medium)	-	3:1
Emergent (High)	-	4:1
Shrub/Scrub (Low)	-	3:1
Shrub/Scrub (Medium)	-	4:1
Shrub/Scrub (High)	-	5:1
Forested (Low)	3:1	-
Forested (Medium)	5:1	-
Forested (High)	7:1	-

Note: For projects located in the DFMB's secondary service area authorized by a DA permit, the required mitigation will utilize the ratios stated above but with the addition of a minimum 1.5 multiplier.

2. Streams

For adverse impacts to streams that have been authorized by a DA permit occurring in the DFMB's primary service area, the credit availability account will be debited in-kind as follows and detailed in Table 5:

A. Ephemeral Streams

Ephemeral Stream for Ephemeral Stream (In-Kind) – One and one-half (1.5) credits, two (2.0) credits, and two and one-half (2.5) credits per linear foot of low quality, medium quality, and high quality, respectively, ephemeral stream adversely impacted.

B. Intermittent Streams

Intermittent Stream for Intermittent Stream (In-Kind) – One and one-half (1.5) credits, two (2.0) credits, and two and one-half (2.5) credits per linear foot of low quality,

medium quality, and high quality, respectively, intermittent stream adversely impacted.

C. Perennial Streams

Perennial Stream for Perennial Stream (In-Kind) – One and one-half (1.5) credits, two (2.0) credits, and two and one-half (2.5) credits per linear foot of low quality, medium quality, and high quality, respectively, perennial stream adversely impacted.

Table 5. In-kind stream mitigation ratios for projects in the DFMB.

Stream Impact Type / Quality	**Stream Credit Mitigation Ratio (Impact : Mitigation)**
Ephemeral (Low)	1.0 : 1.5
Ephemeral (Medium)	1.0 : 2.0
Ephemeral (High)	1.0 : 2.5
Intermittent (Low)	1.0 : 1.5
Intermittent (Medium)	1.0 : 2.0
Intermittent (High)	1.0 : 2.5
Perennial (Low)	1.0 : 1.5
Perennial (Medium)	1.0 : 2.0
Perennial (High)	1.0 : 2.5

Note: For projects located in the DFMB's secondary service area authorized by a DA permit, the required mitigation will utilize the ratios stated above but with the addition of a minimum 1.5 multiplier.

For adverse impacts to waters of the United States in the DFMB's secondary service area authorized by a DA permit, the credit availability account will be debited as stated above but with a minimum 1.5 multiplier. At the USACE's discretion, projects not included within the DFMB's primary or secondary service areas will be evaluated on a case-by-case basis to determine the eligibility for credit withdrawal. If a project located outside the primary and secondary service areas is approved by the USACE, the credit availability account will be debited as stated above but with a minimum 3.0 multiplier.

A minimum of one-tenth (0.1) credit shall be debited from the credit availability account for each transaction. If the number of credits required for compensation is not a whole number, then it shall be rounded to the nearest one-tenth credit.

The USACE shall determine on a permit-by-permit basis the relative quality of the aquatic resources that would be adversely impacted unless an IRT member requests in writing to coordinate with the USACE on a particular case or all subsequent cases. In the absence of consensus between the USACE and coordinating IRT member or members regarding the quality of an impacted area, IRT-approved functional assessment technique will be used to determine the relative quality (low, medium, or high) of the aquatic resource impacted.

11.3 Ecological Performance Standards

In order for the DFMB to be considered an acceptable mechanism for mitigating wetland impacts associated with USACE permits, wetlands and streams that have been enhanced or restored within the site must satisfy wetland criteria described in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (U.S. Army Corps of Engineers, Wetland Regulatory Assistance Program 2010).

In order to be considered fully successful, efforts within the DFMB must result in the restoration and/or enhancement of viable streams and wetlands capable of performing the important functions lost as a result of projects it is intended to mitigate. The following criteria will be used to determine the minimum level of success in reaching the ecological goals of the mitigation efforts:

1. Site Protection

A. The Sponsor shall dedicate in perpetuity by an appropriate conservation easement for the entire 109.37-acre DFMB, as a condition of credit release.

B. The Sponsor shall secure USACE-approved financial assurances, in compliance with the requirements of Section 13.5, as a condition of credit release.

2. Forested Wetland, Riparian, and Upland Restoration and Enhancement

The goal of the forested wetland, riparian, and upland buffer restoration and enhancement efforts is to reestablish habitats that exhibit the characteristics of a viable bottomland hardwood forested wetland, riparian habitat, and upland forest communities commensurate with the age of the stand and site conditions. These characteristics include canopy cover, density and diameter of trees, species diversity, vertical stratification, and other factors. Measurables used to assess the success of these efforts are listed below:

A. A minimum of 150 woody stems of native trees and shrubs per acre (including volunteers) within forested wetland, riparian, and upland buffer restoration areas shall be achieved by the end of the first growing season following planting and maintained each monitoring year. The initial hard-mast to soft-mast/light-seeded ratio of 85% to 15% will be maintained and the site will be managed to minimize populations of exotic/invasive species throughout the monitoring period.

B. A minimum of 112 woody stems of native trees and shrubs per acre (including volunteers) within forested wetland, riparian, and upland buffer enhancement areas shall be achieved by the end of the first growing season following planting and maintained each monitoring year. The initial hard-mast to soft-mast/light-seeded ratio of 85% to 15% will be maintained and the site will be managed to minimize populations of exotic/invasive species throughout the monitoring period.

C. Native non-invasive herbaceous plant coverage shall be at least 50% by the end of the first growing season, and at least 70% each monitoring year thereafter.

D. No more than 1% of tree or shrub stems in any area designated as forested wetland enhancement or restoration, riparian enhancement or restoration, and upland forest restoration or enhancement may be made up by invasive or exotic species.

E. The final monitoring report shall include documentation that the average height of all woody stems (including volunteers) in all mitigation areas is at least five feet, or that the forested woody vegetation has shown an average growth of 10% per year.

3. Stream Restoration and Enhancement

The overall goal for stream and riparian mitigation success is to ensure that the dimension, pattern, and profile of stream enhancement and restoration remain within the natural range of variability for the design and existing stream baseline characteristics.

The USACE and IRT will use best professional judgment, visual observations, and monitoring reports to evaluate fulfillment of performance standards in determining whether all or part of the bank site is successful, and if corrective actions are warranted. The following success criteria will apply:

A. Channel Characteristics

Stream geomorphologic measurements, including channel dimension, pattern, profile, and stream reach stability will be evaluated for the ephemeral and intermittent streams using cross-section analysis to determine whether a particular stream segment has aggraded, degraded, widened, or narrowed to the point where it has become unstable or will cause instability.

Dimension

The analysis of representative stream channel cross-sections shall indicate that a particular stream has neither aggraded, degraded, widened, nor narrowed to the point where it has become unstable or will cause instability. The following measurements will be used to aid in making this determination each monitoring year:

- The Width/Depth Ratio Stability Rating (measured Width/Depth Ratio divided by the baseline Width / Depth Ratio) shall not be greater than 1.3. If the channel is incising, then the Width / Depth Ratio Stability Rating shall not be less than 0.7.
- The Bank Height Ratio shall not increase or decrease by an amount greater than 0.2 of the baseline Bank Height Ratio (existing streams).

Pattern

The analysis of the plan-view survey or field measurements shall indicate that the stream is not migrating significantly to the point where it will cause significant bank erosion and cause instability. The following criteria will be used to aid in making this determination each monitoring year:

- The sinuosity of the stream shall not increase or decrease by an amount greater than 0.2 of the existing stream characteristics.
- The centerline of each channel cross-section will not move by more than 10% of the width of the approved as-built channel width in any given year.
- The Radius of Curvature/Width Ratio shall remain within the range of variability present in the existing stream characteristics.

Profile

The analysis of the longitudinal profile shall indicate that the bed elevation has neither aggraded nor degraded to the point where it will cause instability. The following criteria will be used to aid in making this determination each monitoring year:

- The analysis of the Longitudinal Profile shall not indicate significant alterations in the locations, depths, and slopes of stream features.
- The slope of the longitudinal profile shall not increase or decrease by an amount greater than 0.1% during the monitoring period.

Stream Reach Stability

The analysis of the streambank from the top of the bank to the ordinary high water mark shall indicate a significant amount of natural protection to prevent streambank erosion that could jeopardize the stability of the streambank or the stream reach. The following measurements will be used to aid in making this determination each monitoring year:

- The individual Index Values of the Bank Erodibility Hazard Index (BEHI) rating for any identified reach shall be equal to or less than the previous year's Index Value. In addition, the Total Score shall be equal to or less than the previous year's Total Score, and shall have a Total Score of "Moderate" by Monitoring Year 3, and a Total Score of "Low" by Monitoring Year 5.
- The U.S. Forest Service Stream Reach Inventory and Channel Stability Evaluation (Pfankuch, 1975) rating shall be "Good" each monitoring year, beginning with Year 2.

B. Connectivity and Flow Regime

Primary stream connectivity restoration and enhancement activities will consist of removal of impoundments, diversions, or water control structures and restoration of natural stream dynamics and physical structure associated with ephemeral streams 1, 2, & 3. To assess the efficacy of these efforts, HOBO brand data loggers will be placed at the lower end of all three ephemeral streams. The data loggers will be placed in the bed of the streams to record the presence of water.

Exclusive to the restoration of ephemeral stream 1, once the stream has been constructed the bankfull elevation will be determined and the data logger will be placed at that elevation in order to document bankfull events. In the four years subsequent to restoration, ephemeral stream 1 must have one bankfull event in years three and five in order for stream restoration activities to be successful.

C. Biotic Characteristics

Habitat assessments will be conducted allowing year to year comparisons of riparian restoration and enhancement activities described in the previous Section 11.3 - 2 *Forested Wetland, Riparian, and Upland Restoration and Enhancement*. The survival of planted trees and stocking level of naturally established woody (tree and shrub) species will be the same as the restored and enhanced forested wetland survival criteria previously described. Additionally, habitat assessment will monitor percent cover of herbaceous, shrub and tree cover as well as stream bank shading.

Assessments will be conducted annually and will consist of permanent transects at predetermined intervals for each stream reach at the DFMB. Quadrat sampling will be used to monitor percent cover for herbaceous vegetation, 1/100th acre plots will be used for monitoring percent cover for trees and shrubs, and a spherical densitometer will be used to monitor stream bank shading.

4. Hydrology

Specific hydrology restoration goals for the DFMB include reestablishing a natural hydraulic dynamic between the river and the floodplain. Restoration actions that will be used to assess the success of these efforts are listed below:

A. Removal of water control structures as detailed in the Site Development Plan in Section 10.0 and on Figure 4.

B. Breaching of constructed levees, old tram, and river levee at specific locations, as detailed in the Site Development Plan in Section 10.0 and on Figure 4, to reconnect the floodplain with the Deep Fork River and allow water flow into and out of the site during out of bank events. It is important that water be allowed to circulate throughout the site as well as leave the site so as to maintain an open hydrologic system.

12.0 MONITORING AND REPORTING REQUIREMENTS

12.1 Monitoring Plan

The Sponsor agrees to perform all necessary work to monitor the DFMB in order to demonstrate compliance with the performance standards established in this MBI. Monitoring will be conducted annually and the monitoring period for forested wetland, riparian, and upland forest restoration and enhancement will be 10 years, and stream restoration and enhancement will be 10 years, unless the mitigation project has met its performance standards prior to these terms. If the mitigation project has met its performance standards in less than 10 years for wetland and stream improvement activities, the monitoring terms can be reduced if there are at least three consecutive monitoring reports that demonstrate that success, and with USACE approval. The site will also be monitored for invasive species and animal damage during these visits. The methods described in the 1987 Corps of Engineers Wetlands Delineation Manual and its regional supplements provide a snapshot view of wetland conditions at one moment in time, but by evaluating data taken repeatedly, this monitoring method will provide information on wetland conditions along a timeline, specifically the frequency and duration of wetland hydrology.

The Sponsor shall monitor the condition of the bank and its progress toward achieving the goals and performance standards of the DFMB by conducting periodic surveys until the Sponsor can demonstrate to the satisfaction of the IRT that all performance standards have been achieved. The Sponsor shall establish the minimum number of monitoring stations necessary to reliably evaluate the ecological processes and document the success of the bank. All sampling stations will be located across the ecological gradient of each area. Stations will be permanently identified with a t-post and labeled using field verified GPS coordinates on a site map to be included with each monitoring report.

1. Forested Restoration/Enhancement

Visual Description. Visual descriptions shall be provided with each monitoring report in narrative form along with documentation and ground level photographs taken from stations located adjacent to vegetation plot (permanent markers shall be established to ensure that the same locations are monitored in each monitoring period).

Vegetation. Sample plots shall be located on a stratified random basis over the site in order to sample all areas of restored and enhanced wetlands at locations adjacent to each photo location marker. The vegetation data shall include:

- Dominant vegetation species identification
- Coverage assessment
- Number of woody plant stems (total and #/acre)
- Percent survival of planted species
- An invasive/noxious species assessment, including percent cover

- Average height of woody species (including volunteers) in each sample

The following minimum numbers of samples will be required:

- If the site is < 5 acres, then a minimum of 3 plots/acre is necessary
- If the site is > 5 acres but less than 20 acres, then a minimum of 2 plots/acre is necessary
- If the site is > 20 acres, then a minimum of 1 plot/acre is necessary

Each plot shall be 1/100th-acre (11.8 foot radius) for woody plants and a nested 3'x3' plot for herbaceous plants (or circular with approximately the same surface area). Alternative sampling methods may be submitted for IRT review and approval.

Timing. The vegetation data shall be collected at the end of the growing season (October – November) and at least once during the 1st, 2nd, 3rd, 5th, 7th and 10th growing seasons following completion of planting. In addition, monitoring shall adhere to the following schedules:

- For any year in which planting was conducted, monitoring of woody vegetation shall take place no sooner than at the end of the first growing season following planting.
- If all performance criteria are not been met in the 10th year, then a monitoring report shall be required for each consecutive year until three sequential annual reports indicate that all criteria have been successfully satisfied.
- A final monitoring report (typically prepared the 10th growing season following completion of planting).

2. Stream Restoration/Enhancement

Visual Description. Visual descriptions shall be provided with each monitoring report in narrative form along with documentation and ground level photographs taken from stations located adjacent to vegetation plot (permanent markers shall be established to ensure that the same locations are monitored in each monitoring period), for the purpose of documenting vegetation and stream stability. The photographs will be taken annually at representative cross-sections and will clearly show the channel upstream and downstream, the riparian buffer area, and each stream bank.

Channel Characteristics. For linear footage of stream restoration and enhancement permanent cross-sections shall be established to ensure that the same locations are used each monitoring year. A minimum of one cross-section per 500 linear feet will be required. Total number required will vary depending on project length and complexity. Additional cross-sections may be required to show areas where aggradation, degradation, erosion, and mid-channel bars have developed. The following will be documented at each cross-section:

- Sample plots for streambank vegetation (10 square feet in size) shall be located on each bank at each sample location within representative sections of streambank where streambank plantings were completed.
- A surveyed longitudinal profile of the stream within the thalweg with measurements of the locations, depths, and slopes of riffles, runs, pools, and glides;
- Sinuosity of representative sections;
- Radius of curvature within a representative longitudinal profile;

- Width / Depth Ratio Stability Rating
- Bank Height Ratio
- The Bank Erodibility Hazard Index (BHI) will be assessed at each permanent cross-section and additional locations to provide a representative assessment.
- Beginning with Year 2, The U.S. Forest Service Stream Reach Inventory and Channel Stability Evaluation (Pfankuch, 1975) will be performed at each permanent cross-section and additional locations to provide a representative assessment.

Timing. The stream data shall be collected concurrent with the forest restoration/enhancement sampling (October – November) and at least once during the 1st, 2nd, 3rd, and 5th monitoring years. In addition, monitoring shall adhere to the following schedules:

- If all performance criteria are not been met in the 10th year, then a monitoring report shall be required for each consecutive year until three sequential annual reports indicate that all criteria have been successfully satisfied.
- A final monitoring report will be prepared the 10th year.

3. Hydrology Restoration

The goal of hydrology restoration for the DFMB is not to increase or reestablish wetland hydrology, but rather to reconnect the floodplain to the river by removing man-made impediments. Sediment accumulation will be assessed using sediment pins and water level data loggers and river gauge data will be monitored to assess the success of the river levee breaches. Monitoring of sediment accumulation and the frequency of flood storage events will determine if the goal of reconnecting the river and its tributaries to the floodplain is successful.

HOBO brand data loggers will be placed in three locations where the river will be breached (Figure 4) and will be set at the elevation of the floodplain. The river levee breaches will be located at the north end, middle, and south end of the site on the west side of the river. The data loggers will record the presence of water that passes through the breach locations and this data can be compared to river gage data to verify outbank events. Sediment pins will be installed at three locations and will be used to monitor the depth of sediment accumulation through time by measuring the distance from the top of the pins to the surface of the sediment. The sediment pins will consist of t-posts placed in the three existing moist-soil units located on the west side of the river (Figure 4).

12.2 Reporting

The Sponsor shall submit an annual monitoring report to the USACE for review, for distribution to the other members of the IRT after USACE approval, in accordance with USACE Regulatory Guidance Letter 08-03, or any future relevant guidance, for a period of 10 years, or until the minimum success criteria are met, whichever is earlier, after final construction and planting. The monitoring report will be of sufficient content to accurately describe the progress, or lack thereof, of the bank in meeting the performance standards. Monitoring reports will include as-built drawings, maps, and ground photography illustrating the site conditions and interpretation of the current site conditions.

The Sponsor shall provide a progress report to the USACE by November 30th of each year for the first 10 years after this MBI is signed, or until the minimum success criteria are met, whichever is earlier. Each report shall document the following:

1. A detailed discussion of the relative success of restoration and enhancement activities conducted to date, including the Sponsor's conclusions about the likely cause and impact of any setback or failure that occurred and recommendations for future actions and strategies that might resolve those problems.
2. An overview of the current general ecological condition of the bank including a description of the vegetative and wildlife communities, effectiveness of the enhancement and restoration activities accomplished to date, and relative progress of the bank in achieving the ecological goals of the bank.
3. Pertinent additional information on such aspects of the bank as hydrology, soils, vegetation, wildlife use of the area, recreational and scientific use of the bank, and acts of nature, such as disease, wildfire, and flooding, that occurred.
4. Summary of management activities and resulting conditions, as well as proposals for any additional contingency or remedial measures to promote the health of the developing wetland habitats
5. Photographs of the bank taken from permanent locations that are accurately drawn on a photo location map. The photographs are intended to document the progress of each component of the bank, as well as the bank in general, toward achieving the goals and performance standards of the bank.
6. A summary of the credit transactions for the year and a total number of available credits. Separate stream and wetland credit ledgers will be maintained.
7. Financial assurance accounting statement.

13.0 SITE MANAGEMENT AND MAINTENANCE

The Sponsor shall restore and enhance wetland and streams described the Site Development Plan in Section 10.0 and shall operate the bank in accordance with the provisions of this MBI. The Sponsor shall receive wetland and stream credits upon satisfaction of the ecological performance standards contained in Section 11.3 and according to the credit release schedule contained in Section 14.0. After all ecological performance standards have been met and after all credits have been released to the Sponsor, the bank will have received a total of 388.5 wetland credits and a total of 19,046 stream credits to use as compensatory mitigation for impacts to waters of the U.S. in accordance with all applicable requirements. Credits will be sold to third parties at an appropriate market rate to be determined by the Sponsor. Per 33 CFR 332.3(j)(1)(ii), proposed restoration and enhancement activities may address requirements of multiple regulatory programs and authorities for the same activity.

13.1 Long-Term Management and Maintenance Plan

The Sponsor shall dedicate in perpetuity the 109.37-acre DFMB as an aquatic ecosystem preserve. The DFMB shall not be disturbed, except by those IRT-approved activities that would not adversely affect the intended extent, condition and function of the bank or those activities specifically provided for in this MBI. The Sponsor shall record the IRT-approved conservation easement with the Lincoln County Clerk and provide a copy of the recorded conservation easement to the Regulatory Branch, USACE, Tulsa District. The conservation easement shall not be removed or modified without written approval of the USACE, after coordination with the IRT. Conveyance of any interest in the property shall be subject to the conservation easement.

There are no long-term plans to transfer title of the property to another party. It is the intention of the Sponsor to maintain the property in perpetuity as highly functioning habitat in accordance with the terms of the long-term management plan and conservation easement. The site's conservation easement shall stay with the property in the instance that the title to the property is transferred to another party. Maintenance of the bank property will be carried out by the

Sponsor for a minimum of 10 years after approval of the final banking instrument, or until all credits have been sold and all performance standards have been met, whichever is earlier, at which point the ecosystems on the property will be self-sustaining and self-regulating. Long-term maintenance needs will focus on vegetation management, trespass prevention, and removal of trash. Supplemental tree plantings and mowing will be the primary tasks implemented on an every other year rotation. Timber Stand Improvement (TSI) may be an important management activity. TSI activities may include selective cutting of early successional deciduous species, removal of softwoods, girdling, and removal of invasive woody species. Additional maintenance tasks like trash removal and vandalism repairs will be conducted as identified at bi-yearly maintenance visits. Other activities, such as hunting and wildlife food plots, may be conducted within the bank provided the activity will enhance aquatic ecosystem functions such as wildlife habitat or water quality, and not interfere with the long-term ecological objectives of the DFMB. All structures and facilities within the bank, including fences, roads, and trails, etc. shall be properly maintained in perpetuity or for as long as each is needed to accomplish the goals of the bank and achieve the requirements of this MBI. Protective fencing will be used, where applicable, to control trespassing and prevent incidental grazing from neighboring properties. Most of the adjoining properties are comprised of pasture or undeveloped land that, with the existing fence lines, should act to further reduce the risk of grazing and other deleterious activities.

Recreational activities on the part of the property owners and their invitees such as bird watching, hunting, fishing, and nature hikes are appropriate, if conducted so as to have minimal adverse effects on the aquatic environment. Other recreational activities may be conducted within the DFMB provided the activities are authorized in this MBI or otherwise would not degrade water quality, wildlife habitat, or other wetland or stream functions and are approved by the USACE after coordination with the IRT.

The DFMB is vulnerable to acts of nature such as wildfires, climatic instability, and disease. Occurrence of such an act, following attainment of performance standards may require changes to the DFMB, including revision of this MBI, to allow for maintenance activities to offset and counteract negative impacts. Depending upon the circumstances, however, it may be appropriate to let nature take its course, particularly when wetland vegetation is expected to reestablish due to continued existence of seed sources, wetland hydrology, hydric soils, and restrictions on incompatible land uses. Decisions on such issues shall be subject to approval by the USACE after coordination with the IRT.

A. Maintenance Plan

Long-term maintenance will be conducted annually and will include the following provisions:

1. Patrol the site for signs of trespass and vandalism. Maintenance will include reasonable actions to deter trespass by posting “No Trespassing” signs and repair vandalized features (e.g. collect/dispose of trash).

2. Monitoring the condition of structural elements and facilities of the Bank site such as signage, fencing, access roads and maintain and repair these improvements as necessary to achieve the objectives of the Bank and comply with the provisions of the real estate instrument providing protection to the site. Improvements such as access roads, berms, or water control structures that are no longer needed to facilitate or protect the ecological function of the Bank site may be removed or abandoned if consistent with the terms and conditions of the recorded real estate instrument.

3. Inspection of the Bank site to locate invasive species. Any invasive or exotic plant species listed in Table 4 that is discovered on the Bank site and occupying more than 1% cover in in the overstory and 5% in the understory should be controlled. In the event the USACE, in coordination with the IRT, determines that the watershed or drainage basin within which the Bank is located becomes infested with these species in the future, so that their effective control on the Bank site is either no longer practicable or unreasonably expensive, the USACE, in coordination with the IRT, will consider appropriate changes to the Long-Term Management Plan.

B. Invasive Species Management

Management of invasive and exotic species will be undertaken as is suitable to maintain biodiversity and wetland function within the DFMB. Until the 10 year monitoring period is complete, invasive and exotic species shall be controlled as follows. During bank site development (i.e. tree and shrub planting), invasive and exotic herbaceous and tree vegetation will be controlled, or eliminated, as part of the site preparation activities for forested wetland restoration and enhancement areas as described in Section 10.1 *Bottomland Hardwood Restoration and Enhancement*. The goal of site preparation activities is to remove invasive and exotic tree/herbaceous species that have encroached within the proposed planting areas. Methods of control will include broadcast herbicide treatments to remove existing populations. Invasive and exotic tree and herbaceous species of concern for the project site are detailed in Table 4 and will be controlled upon observation. These species shall not, in the aggregate, comprise more than 1% of the overstory and/or 5% of understory within any area of the Bank.

Table 6. List of invasive species to be managed on the DFMB.

Common Name	Scientific Name	Tree/Shrub	Herbaceous
Tree-of-heaven	*Ailanthus altissima*	x	
Mimosa	*Albizia julibrissin*	x	
Giant reed	*Arunda donax*		x
Paper mulberry	*Broussonetia papyrifera*	x	
Thorny olive	*Elaeegnus pungens*	x	
Eastern redcedar	*Juniperus virginiana*	x	
Chinese privet	*Ligustrum sinense*	x	
Bush honeysuckle	*Lonicera maackii*		x
Japanese climbing fern	*Lygodium japonicum*		x
Chinaberry tree	*Melia azedarch*	x	
Kudzu	*Pueraria montana*		x
Sericea Lespedeza	*Lespedeza cuneata*		x
Sugarcane plumegrass	*Saccharum ravennae*		x
Salt cedar	*Tamarix spp.*	x	
Chinese tallow tree	*Triadica sebifera*	x	

After the second growing season for planted trees, weeds may be controlled by mowing or by broadcast spraying with herbicides in the spring or early summer. A pre-emergent herbicide, such as Oust or Simazine, or a post-emergent herbicide, such as Rodeo, may be used. It is expected that most, if not all, invasive and exotic herbaceous species,

including most pioneer tree species, will diminish as the trees in reforested areas mature, canopies close, and the herbaceous layer becomes shaded. As a result, long-term control of invasive and exotic herbaceous species is not considered a high priority management objective for the project. However, if any invasive or exotic herbaceous species comprises more than 5% cover or tree species comprises more than 1% cover in any management area, then the sponsor will utilize selective removal methods such as ringing, herbicide injection, or spot broadcast spraying to control and/or remove these species.

Ten to fifteen years after planting, the forested wetlands may benefit from a timber stand thinning or release cutting. Volunteer species such as green ash, American elm, hackberry, and black willow may be selectively cut or treated with herbicide to favor hard-mast species which may otherwise be shaded out. If the sponsor proposes any invasive or weedy vegetation control or timber stand improvement after construction is complete, the sponsor will submit plans for such activity for approval from the USACE after coordination with the IRT.

C. Mineral Resources

Important mineral resources, including oil and gas, may exist under the bank and subsurface rights to these mineral resources may be owned, in whole or in part, by others. Recognizing that landowners in the state of Oklahoma cannot control a mineral owner's access to those minerals, the Sponsor shall take all reasonable steps to develop a mineral management plan with the mineral owner(s) prior to the initiation of any mineral exploration or extractions activities. The mineral management plan shall include a listing of all surface or subsurface ownerships, a description of the anticipated impacts of the exploration and extraction activities on the local aquatic ecosystem functions and values, and a set of guidelines or best management practices that would minimize the adverse impact of those activities on the local aquatic ecosystem. The Sponsor should, whenever practicable, develop a lease, easement, or other suitable surface use agreement consistent with the mineral management plan for the recovery of subsurface minerals and associated activities.

The exploration for, and production and transportation of, subsurface mineral resources beneath the Bank, is acceptable provided that the resulting ground disturbing activities and surface alterations are minimized to the maximum extent practicable; activities are conducted in a manner that minimizes adverse environmental impacts; impacted areas are restored to pre-existing conditions as soon as practicable; reasonable and appropriate compensatory mitigation is achieved, and the entity conducting these activities complies with all applicable regulatory requirements, including those under Section 404 of the Clean Water Act. The number of credits in the bank shall be reduced by the number of acres of area adversely impacted by the activities. If sufficient unused bank credits are not available, the USACE will require other appropriate off-site compensatory mitigation. The bank Sponsor may propose appropriate compensatory action subject to approval by the USACE.

13.2 Site Protection Instrument

To ensure that the DFMB remains in the desired state in perpetuity, the Sponsor shall dedicate in perpetuity by appropriate conservation easement the 109.37-acre DFMB as a wetland preserve as provided in this MBI. The DFMB shall not be disturbed, except by those IRT-approved activities that would not adversely affect the intended purpose, condition, and function of the DFMB. The Sponsor shall record a USACE-approved conservation easement with the Lincoln County Clerk and provide a copy of the recorded conservation easement to the USACE,

Tulsa District. The conservation easement shall not be removed or modified without written approval of the USACE, after coordination with the IRT. Conveyance of any interest in the property shall be subject to the conservation easement. All conservation easements shall be granted in perpetuity without encumbrances or other reservations, unless such encumbrances or reservations (e.g., retention of hunting, fishing, and hiking privileges by the landowners) do not adversely affect the ecological viability of the DFMB. A copy of the conservation easement has been included as Appendix E.

The terms and conditions of the conservation easement shall be both explicitly included in any transfer, conveyance, or encumbrance of Restricted Property or any part thereof, and; any instrument of transfer, conveyance, or encumbrance affecting all or any part of Restricted Property shall set forth the terms and conditions of this document. The terms of the easement will be enforceable by the USACE, IRT, and Land Legacy, a non-profit conservation organization that will monitor the Sponsor's compliance with the conservation easement. After the Bank is approved, copies of the finalized and recorded conservation easement shall be provided to the USACE. A 60 day advance notice will be provided to the district engineer prior to taking any action should the sponsor or other entity propose change to the site protection instrument

The Sponsor will maintain the mitigation site and enforce the terms of the conservation easement until such obligations are transferred to a land management entity approved by the USACE, after coordination with the IRT. There are no short-term or long-term plans to transfer title of the property to another party. It is the intention of the Sponsor to maintain the property in perpetuity as highly functioning habitat in accordance with the terms of the long-term management plan and conservation easement. However, in the instance that the title to the property is transferred to another party the conservation easement shall stay with the property.

13.3 Default Provisions & Corrective Actions

Sponsor shall monitor and report on the progress of the DFMB toward achieving the goals and performance standards established by the MBI and take all reasonable actions necessary to remediate any problem that prevents a component of the bank from achieving the goals and performance standards of the DFMB. Sponsor will provide annual monitoring reports by November 30th of each year to the USACE, for distribution to the other members of the IRT, on the short-term and long-term success of the DFMB and to identify any problems requiring corrective action. In the event that monitoring reveals that initial success criteria have not been met, Sponsor will take measures to achieve the criteria the following year. Monitoring, reporting, and remedial action will be conducted in accordance with the following:

1. Upon discovering that a component of the bank does not comply with the requirements of this MBI, including the conservation easement, the Sponsor shall take all appropriate actions to bring that component into compliance, as soon as practicable. During the period that a component of the bank is out of compliance, the USACE may, after providing written notice and a reasonable opportunity to cure the noncompliance, suspend its approval of the use of bank credits from that component area as compensatory mitigation for USACE-authorized projects.

2. If remedial actions taken by the Sponsor under the provisions of the preceding paragraph do not result in the failing component of the bank complying with the requirements of this MBI despite reasonable efforts, or if it is otherwise determined by the Sponsor that compliance is no longer practicable based on changed circumstances, the Sponsor may submit to the USACE proposed modifications to this MBI. Any modification of the MBI requires the approval of the USACE, after coordination with the IRT, before it may be implemented. The Sponsor shall provide written notice to the

USACE of the Sponsor's intent to discontinue efforts to achieve the performance standards for, and cease operation of, that component of the bank. Upon providing such notice, no credits may be established for the component of the bank that is ceasing operation and the Sponsor shall be released from future maintenance and monitoring obligations for that component. Any credits previously established for the component of the bank that is ceasing operation shall be removed from bank accounts. If there are insufficient unused credits in the remaining operational components of the bank to replace any credits previously withdrawn from the component of the bank that is ceasing operation, the Sponsor shall implement other appropriate compensatory mitigation as determined by the USACE, after coordination with the IRT, as necessary to compensate for withdrawn credits for the component of the bank that is ceasing operation. In such event, the USACE shall provide written consent to the Sponsor for removal of the conservation easement(s) required under Section 13.2 of this MBI for the affected component of the bank after all remedial actions have been completed to the satisfaction of the USACE, after coordination with the IRT.

3. If the failure of one or more components of the DFMB to comply with the requirements of this MBI adversely affects the ability of the bank to meet its goals and objectives or the Sponsor does not make a reasonable effort to bring the bank into compliance with this MBI, the USACE, after coordinating with the IRT, may terminate this MBI and operation of the bank after providing the Sponsor with written notice and a reasonable opportunity to resolve the noncompliance. The Sponsor shall implement other appropriate compensatory mitigation, as determined by the USACE, after coordination with the IRT, as necessary to compensate for withdrawn credits representing components of the bank that failed to comply with the requirements of this MBI. In such event, the USACE shall provide written consent to the Sponsor for removal of the conservation easement(s) required under Section 13.2 of this MBI for the affected components of the bank after all remedial actions have been completed to the satisfaction of the USACE, after coordination with the IRT.

4. In the event that a natural disaster destroys all or part of the bank, all debiting from the bank shall cease immediately. Such natural disasters include floods, tornados, fires, earthquakes, droughts, disease, regional pest infestation, etc., which the USACE, in consultation with the IRT, determines is beyond the control of the Sponsor to prevent or mitigate. The Sponsor shall not be responsible for restoring acreage for credits which were sold prior to any such natural disaster. However, the Sponsor shall be responsible for restoring acreage for which credits have been released to the Sponsor if those credits are unsold at the time of the natural disaster. If the damage is so severe that the Sponsor and the USACE, in consultation with the IRT, determine that project success is unattainable, then the Sponsor will not be obligated to restore any portion of the Bank.

13.4 Adaptive Management Plan

If the site cannot be constructed in accordance with the Site Development Plan included in Section 10.0, the Sponsor will notify the USACE. Any significant modifications in the Site Development Plan must be approved by the USACE. After initial site construction, the Sponsor shall maintain the property using an adaptive management approach that will provide flexibility when dealing with unforeseen issues. The Sponsor has extensive experience with successional plant assemblages and the bank site will be planted with young mast-producing hardwood plantings that will eventually be the dominant species as the site matures and as shaded conditions proliferate. The Sponsor is prepared to remove softwood species if necessary if they become overly prevalent as appropriate for the long-term management of the site.

Additionally, if the site is not able to be constructed to match the Site Development Plan or if site monitoring and maintenance activities determine that the project, as planned, is unable to meet the ecological performance standards contained in Section 11.3, then the Sponsor will approach the USACE and IRT with suggestions of design changes, site modifications, or revisions to monitoring or maintenance requirements in order to ensure that the bank provides aquatic resource benefits similar to the objectives described in Section 9.0. If necessary, the ecological performance standards contained in Section 11.3 may have to be revised to address deficiencies in the management strategies or objectives if the new standards provide for ecological benefits that are comparable or superior. No other revisions to performance standards will be allowed except in the case of natural disasters as described in Section 13.3. Additionally, since the success of the proposed mitigation actions at the DFMB can be negatively affected by beaver, a beaver management plan has been incorporated into this document and is described in detail in the following paragraphs.

Beaver Management Plan

As previously stated, the primary objectives of the DFMB are to reestablish natural hydrology and restore and enhance forested wetland habitat. Ultimately, the DFMB will increase wood and water on the site. This is an important fact considering beavers have resided, and periodically still reside on the DFMB. The two primary things that beavers need to create suitable habitat is wood and water. However, when beavers impound streams, they typically flood areas where trees exist. If trees are submerged for too long during the growing season they will not survive. Therefore, proper management of beaver populations is needed to address the potential negative impact that beavers can have on reforestation efforts, and overall goals and objectives of the DFMB. While it is possible to predict the range of possible beaver responses to different management strategies, it is impossible to predict exactly what beaver will do every time. Any management actions regarding beaver will require ongoing maintenance and evaluation. In order to increase the potential for the DFMB to meet the desired goals and objectives, a three-pronged management strategy for beaver control will be utilized. This strategy will consist of monitoring, evaluation of activity, and management actions. This strategy is described in detail below.

1. Monitoring

   Some form of monitoring is an essential component to any adaptive management plan because it allows for the evaluation of management actions. Monitoring at the DFMB will consist of a simple periodic monitoring program. This will consist of visual observations of the management areas, with specific attention to all stream channels and out-flow locations. This visual inspection of streams and out-flow locations will be undertaken at least quarterly or as needed, particularly before spring runoff in March or April. Additionally, a simple visual inspection of residual and planted trees will also be conducted to aid in detection of beaver activity. If undesirable harvest of desired trees occurs, this would initiate the evaluation of activity phase of the management plan. Typically, spring runoff affords the highest potential for flooding impacts as a result of beaver dams; whereas most dam building activity takes place mid to late autumn in preparation for the winter. Accordingly, monitoring sometime in spring prior to the peak of spring runoff, and monitoring sometime in the fall during the peak of beaver winter preparations are recommended. The monitoring frequency and timing can be adjusted and/or augmented by DFMB to meet specific concerns as they arise.

2. Evaluation of Activity

   Once beaver, or their activity, has been detected at the DFMB, their presence will be evaluated to determine if the dam building or harvest of woody material is causing harm. For example, if flooding of critical reforestation areas is taking place or undesired

harvesting of woody trees is taking place, these would be considered harm. If the beaver activity is determined to be causing harm, the activity will be evaluated individually. By contrast, if the beaver activity is deemed not to be causing harm, and no new risks are apparent the beaver and any dams present will simply be left alone. People who learn to tolerate a certain amount of beaver influence on their land generally find that co-existing with beavers provides more benefits than perceived harm. In situations in which beavers are simply an inconvenience to landowners, tolerance is the easiest solution.

3. Management Actions

A. Dam Breaching

Dam breaching is an immediate, but short-term solution to flooding problems caused by beaver. Breaching is not recommended in situations where beaver are still actively maintaining a dam as they can repair a breach in a matter of hours. Cued by the sound of escaping water, beavers will usually rebuild the damaged dam quickly, sometimes overnight. If the afflicted landowner does not want beaver lethally removed, it is recommended that a water level control device be installed to prevent beaver from rebuilding the dam. The Sponsor is aware that dismantling or breaching a dam can result in severe flooding for property adjacent and downstream of the dam, and will take all appropriate precautions before doing so.

B. Water Level & Dam Deterrent Structures

As previously mentioned, reforestation of forested wetland habitat is one the primary goals of the DFMB. In an effort to increase reforestation success, the Sponsor may elect to leave existing water control structures in place for one two years after tree planting. If beaver plug water control structures, two methods of mitigating impacts will be employed. The first is fencing the control structures (i.e. beaver deceiver) to physically exclude beaver from the structures and prevent them from detecting the flow of water into the devices. Second, if fencing does not control the plugging of the structures, water level control device will be utilized. There are many different types of water level control devices (i.e. Clemson pond leveler or flexible drain tubes) that can be used to minimize ponding in areas that are behind levees until the water control structures are removed and the levees are breached.

Once the water control structures are removed and the levees have been breached, it is anticipated that beaver will attempt to dam the levee breaches. In order to deter and/or mitigate this problem, the Sponsor will utilize two approaches. The first approach is to make the levee breaches at least 100 ft in width. The goal of making the breaches this width is hope that beaver will not attempt, or fail in attempting, to dam a span of this size. Second, if a breach of this size is not adequate to deter beaver dams, the Sponsor may elect to widen the breach and monitor the location or utilize a piping array which consists of multiple buried pipes spanning the length of the breach. The pipes extend 15-20 ft, or more, on each side of the breach and prevent beaver detecting flow and subsequently prevent dam building.

C. Removal, Live Trapping & Relocation

In conjunction with the previous management action, the Sponsor may also elect to trap, remove, or relocate beaver. Removal of beaver includes both the lethal trapping and live trapping. Consultation with ODWF staff and adherence to Oklahoma laws regarding trapping, removal, and relocation of beaver will be adhered to. If removal is deemed necessary to effectively mitigate impacts of nuisance beaver, the party providing elimination will attempt to trap all the beavers present at the time on the site. While effectively trapping all nuisance beaver is easy to say, it is much more difficult to achieve in practice. Even if done successfully, beaver located nearby may

simply take their place, returning to the cleared spot within a short amount of time. As a result, timing is a key component of live trapping. Winter trapping and relocation is not recommended since beaver dam building and harvest activity is at a minimum, resulting in limited impact on the environment. Since beaver are central-place foragers, they stockpile woody vegetation on the bottom of their ponds in late fall to provide a winter food cache to sustain them in areas with hard winters. Food caching is typically carried out from September to mid-November. If a fall trapping/relocation is necessary, beaver need at least one to two weeks to build new dams and forage for food caches before the onset of winter. Live trapping and relocation during the late spring and summer months is appropriate, with consideration given to providing adequate habitat and woody material for forage and dam building.

13.5 Financial Assurances

A. Short-Term Financial Assurances

For the advance release of credits (not to exceed 15% of the total number of credits that could be derived from this site) the Sponsor agrees to provide adequate Financial Assurances in the form of a liability insurance, performance bond, letter of credit, escrow account or trust fund, or obtain some other form of financial assurance that is capable of ensure that aquatic resources will be restored and enhanced on the DFMB site and is suitable to the USACE.

The amount of the assurances will be sufficient to complete the initial mitigation activities and annual maintenance and monitoring in the event of a default. Release of funds from this Financial Assurance will be recommended by the USACE and IRT once they have reviewed and approved the annual monitoring report which demonstrates that performance standards have been met for the type of credits previously released (i.e. stream or wetland). Complete release of the financial assurance agreement may only occur if the submitted report demonstrates that sufficient area has met the specific performance standard (as stated herein) to offset the advanced release of credits.

1. Construction Phase

   Based on the credit release schedule identified in Section 14.0, 15% of credits will be available for sale upon signing of the final instrument, recordation of the protective instrument (Year 0), and 25% of the credits will be available upon completion of initial mitigation bank establishment activities, including but not limited to, tree planting, stream improvements, and submittal of an as-built figure (Year 1). The Sponsor holds an unencumbered fee simple title to the bank site; therefore, no financial assurances are required for land acquisition.

   The Sponsor agrees to provide financial assurances in the form of a performance bond for the sum of $75,000 U.S. Dollars for the initial work, or construction phase, described above and detailed in this Mitigation Banking Instrument. This sum was derived by calculating the costs necessary to carry out the wetland and stream mitigation restoration and enhancement activities outlined in Section 10.0 Site development Plan in this MBI. A breakdown of the cost associated with each activity is shown in Table 7. Historical averages provide guidance for budgeted restoration and enhancement activities. For the purpose of financial assurance determination, the averages have been increased by 1.25 in order to provide additional funds for unplanned expenses including inflation.

Table 7. Costs for initial establishment activities on the DFMB.

Mitigation Action	Requirement	Treatment Amount	Cost/Unit*	Total Cost
Planting (Restoration)	302 trees/acre	78.2 ac	$0.35/tree x 1.25	$10,332.18
Planting (Enhancement)	225 trees/acre	22.8 ac	$0.35/tree x 1.25	$2,244.38
Stream Improvements	1 treatment	60 hr	$150/hour x 1.25	$11,250.00
Clearing	1 treatment	35 hr	$150/hour x 1.25	$6,562.50
Mowing	1 treatment	25 hr	$125/hour x 1.25	$3,906.25
Herbicide (Restoration)	1 treatment	78.2 ac	$150/acre x 1.25	$14,662.50
Herbicide (Enhancement)	1 treatment	22.8 ac	$150/acre x 1.25	$4,275.00
Fencing/Signage	1 treatment	8,400 ft	$2.00/foot x 1.25	$21,000.00
Total				**$74,232.81**

*Unplanned expenses and annual inflation rate of 1.25 percent.

2. Monitoring Phase

The remaining credit releases (60%) are based upon annual maintenance and monitoring reports that assess the fulfillment of performance standards and bank success as outlined in Section 11.3 *Ecological Performance Standards* in this MBI. Therefore, financial assurances are provided for those credits available throughout the monitoring term. One percent (1%) of all cash proceeds from credit transactions shall be placed in an escrow account to be called the *Maintenance and Monitoring Fund*. If the required monitoring or maintenance is not conducted as specified in Section 12.0 of this instrument, then the USACE and IRT shall request release of funds to an USACE or IRT agency or its designee from this account sufficient to cover the necessary monitoring or maintenance activities.

One-tenth of this fund (or 0.1% of the total cash proceeds from wetland credit sales and 0.1% of the total cash proceeds from stream credit sales) shall be released to the Sponsor on each January 1st after the USACE and IRT have reviewed and approved the most recently submitted monitoring report that documents that part or all of the Restoration/Enhancement portion of the site satisfies the Bank Performance Standards to cover the expected costs of maintenance and monitoring over the required 10 year monitoring period for wetland and stream restoration and enhancement activities. The last one-tenth of the fund for wetlands and two-tenths for streams shall be held until the final monitoring report is submitted and approved.

Post-establishment maintenance tasks at a mitigation bank may include replanting of trees and shrubs, selective spraying of invasive species, site mowing, and annual monitoring. Based on the Sponsor's management of Excel Mitigation Center, historical averages for maintenance and monitoring to provide guidance for budgeted maintenance activities. This sum was derived by calculating the costs necessary to insure that performance standards are achieved and that annual maintenance and monitoring requirements can be met. The associated costs for these actions are detailed in Table 8. For the purpose of financial assurance determination, averages are increased by 1.25 in order to provide additional funds for unplanned expenses including inflation. The Sponsor shall establish an escrow account for maintenance and monitoring activities.

Table 8. Costs associated for monitoring and maintenance activities on the DFMB.

Mitigation Action	Requirement	Treatment Amount	Cost/Unit*	Total Cost
Replant (Restoration)	302/acre	78.2 ac	$0.35/tree x 1.25	$10,332.18
Replant (Enhancement)	225/acre	22.8 ac	$0.35/tree x 1.25	$2,244.38
Mowing	10 treatments	20 hr	$125/hour x 1.25	$31,250.00
Monitoring (Wetlands)	10 years	Annual	$1,500/Visit x 1.25	$18,750.00
Monitoring (Streams)	5 years	Annual	$1,500/Visit x 1.25	$9,375.00
Total				**$71,951.56**

*Unplanned expenses and annual inflation rate of 1.25 percent.

The Sponsor may, at its discretion, revise or replace the existing financial assurances with a different type of financial assurance at any point during the life of the bank. The Sponsor shall provide the USACE with notice prior to replacement of any of the financial assurances, and a draft of the new instrument for review. The provisions of the new instrument shall conform to the provisions of the former instrument.

B. Long-Term Financial Assurances

Once the monitoring phase has ended, money set aside in the escrow account will be moved to a long-term endowment called the *Catastrophic Event and Long Term Management Fund*. Damages from the catastrophic events identified below are permitted to be repaired using the principal and interest accumulated in the Catastrophic Event and Long Term Management Fund by either the Sponsor or the Long-Term Steward, the funds being provided to whichever entity has responsibility to repair the resulting damages. Expenditures shall be approved by the IRT if the damage occurs within the 10-year monitoring period associated with Bank establishment. The Sponsor is responsible for demonstrating to the IRT's satisfaction that catastrophic damage has taken place. Expenditures may be approved to address issues including, but not limited to, floods, tornados, hurricanes, earthquakes, extreme drought, fire, and insect or animal damage to planted vegetation.

Long-term (past 10 years) maintenance requirements will be determined on a site-specific basis. However, any such activities shall be the responsibility of the Long-Term Steward. The DFMB mitigation bank site has been designed for low-maintenance and long-term self-sustainability. As long as the bank site is owned by the sponsor, it will be maintained for its designated use. After the mitigation bank has achieved the required performance standards and the bank has been approved for closure, the sponsor will transfer the site to a third party non-profit conservation group for long-term stewardship. Such transfer shall not require a commitment from the sponsor to provide funds to the third party to support the management activities.

The Bank Sponsor and Assurance Provider will notify the USACE at least 120 days in advance of any modification, termination, or revocation of any financial assurance mechanism associated with Bank operations. If ownership of the DFMB is conveyed to a successor, the financial assurance may be modified, transferred, or replaced by another financial assurance, with the written approval of the USACE, after coordination with the IRT. Failure to maintain an adequate financial assurance shall constitute good cause for suspending or terminating operation of the DFMB. However, prior to taking such action, the USACE, after coordination with the IRT, shall provide the sponsor reasonable opportunity to correct any alleged financial assurance deficiencies.

14.0 CREDIT RELEASE SCHEDULE

1. Credit Release Provisions

The credit release approval process shall follow the schedule described in 33 CFR Part 332.8(o)(9). Credits shall be released to the Sponsor by the USACE, in consultation with the IRT, following the credit release schedule described below. As the Sponsor reaches stated performance milestones, documentation shall be submitted to the USACE demonstrating that appropriate milestones for credit release have been achieved along with a request for the release of credits. The USACE will provide copies of this documentation to the IRT members for review. IRT members must provide any comments to the USACE within 15 days of receiving this documentation. However, if the USACE determines that a site visit is necessary, IRT members must provide any comments to the USACE within 15 days of the site visit. The USACE must schedule the site visit so that it occurs as soon as it is practicable, but the site visit may be delayed by seasonal considerations that affect the ability of the USACE and the IRT to assess whether the applicable credit release milestones have been achieved. After full consideration of any comments received, the USACE will determine whether milestones have been achieved and credits can be released. The USACE shall make a decision within 30 days of the end of that comment period, and shall notify the Sponsor and IRT of their decision. The USACE, in consultation with the IRT, may modify the credit release schedule, reduce the number of available credits or suspend credit sales or transfers altogether when deficiencies in the performance standards have been observed or specific requirements of the instrument have not been met. The USACE, or any IRT member, will provide the Sponsor a minimum of 24 hours' notice before any compliance inspection or other visit to the Bank site.

2. Credit Release Schedule

Upon submittal of all appropriate documentation by the Sponsor and subsequent written approval by the USACE, it is agreed that credits will become available for use by the Sponsor, or for transfer to a third party, in accordance with the following schedule and detailed in Tables 9 and 10.

A. Site Protection (Year 0)

15% of the total number of anticipated wetland and stream credits, except for Ephemeral Stream 1, shall be available for debiting immediately upon implementation of the following:

- Approved Mitigation Banking Instrument, and
- Establishment and funding of the bank's financial assurances; and
- Copy of the approved and recorded conservation easement is provided to USACE and IRT.

B. Forested Wetland, Riparian, and Upland Restoration and Enhancement

For those credits associated with forested wetland, riparian, and upland buffer restoration and enhancement activities, release of credits beyond 15% will adhere to the following schedule:

Year 1 - Planting Release

25% (40% cumulative) of the total number of anticipated forested wetland, riparian, and upland buffer credits will be released as each mitigation type is planted pursuant to the Site Development Plan Section 10.0.

Year 2 - Following Completion of Planting

20% (60% cumulative) of the total number of anticipated forested wetland, riparian, and upland buffer credits will be released after USACE approval of the first year monitoring report which documents compliance pursuant to the performance standards in Section 11.3 Performance Standards.

Year 3 - Following Completion of Planting

20% (80% cumulative) of the total number of anticipated forested wetland, riparian, and upland buffer credits will be released after USACE approval of the second year monitoring report which documents compliance pursuant to the performance standards in Section 11.3 Performance Standards.

Year 4 - Following Completion of Planting

20% (100% cumulative) of the total number of anticipated forested wetland, riparian, and upland buffer credits will be released after USACE approval of the third year monitoring report which documents compliance pursuant to the performance standards in Section 11.3 Performance Standards.

Table 9. Wetland credit release schedule for the DFMB.

Mitigation Action	Year	Release Action	Individual Credit Release	Cumulative Credit Release
Site Protection	0	Executed MBI, Conservation Easement, & Financial Assurances	15%	15%
Wetlands	1	After Tree Planting	25%	40%
	2	Approval of 1st Year Monitoring & Performance Standards	20%	60%
	3	Approval of 2nd Year Monitoring & Performance Standards	20%	80%
	4	Approval of 3rd Year Monitoring & Performance Standards	20%	100%

C. Stream Restoration and Enhancement

Credits associated with stream restoration and enhancement activities will adhere to the following release schedule:

Year 0 – Site Protection

Perennial, Intermittent, and Ephemerals 2 & 3 only
15% of the total number of anticipated stream restoration and enhancement credits associated with perennial, intermittent, and ephemeral streams 2 and 3 will be released immediately upon completion of the site protection requirements described above.

Year 1 - Stream Improvements Release

Perennial, Intermittent, and Ephemerals 2 & 3
25% (40% cumulative) of the total number of anticipated stream restoration and enhancement credits associated with the perennial, intermittent stream, and ephemeral streams 2 and 3 will be released after proposed activities have been completed as described in Section 10.0 Site Development Plan and USACE approval, including hydrology and riparian activities.

Ephemeral 1
15% (15% cumulative) of the total number of anticipated stream restoration credits associated with ephemeral stream 1 will be released after proposed activities have been completed as described in Section 10.0 Site Development Plan and USACE approval, including hydrology and riparian activities.

Year 2 - Following Completion of Stream Improvements

Perennial, Intermittent, and Ephemerals 2 & 3
20% (60% cumulative) of the total number of anticipated stream credits will be released after USACE approval of the second year monitoring report which documents ephemerals 2 and 3 and intermittent stream are stable and all performance standards in Section 11.3 Performance Standards are met.

Ephemeral 1
25% (40% cumulative) of the total number of anticipated stream credits will be released after USACE approval of the first year monitoring report which documents the stream is stable and all performance standards in Section 11.3 Performance Standards are met.

Year 3 - Following Completion of Stream Improvements

Perennial, Intermittent, and Ephemerals 2 & 3
20% (80% cumulative) of the total number of anticipated stream credits will be released after USACE approval of the third year monitoring report which documents ephemerals 2 and 3 and intermittent stream are stable and all performance standards in Section 11.3 Performance Standards are met.

Ephemeral 1
20% (60% cumulative) of the total number of anticipated stream credits will be released after USACE approval of the second year monitoring report which documents the stream is stable and all performance standards in Section 11.3 Performance Standards are met, and one recorded bankfull event for the year.

Year 4 - Following Completion of Stream Improvements

Perennial, Intermittent, and Ephemerals 2 & 3
20% (100% cumulative) of the total number of anticipated stream credits will be released after USACE approval of the fourth year monitoring report which documents ephemerals 2 and 3 and intermittent stream are stable and all performance standards in Section 11.3 Performance Standards are met.

Ephemeral 1
20% (80% cumulative) of the total number of anticipated stream credits will be released after USACE approval of the third year monitoring report which documents the stream is stable and all performance standards in Section 11.3 Performance Standards are met.

Year 5 - Following Completion of Stream Improvements

Ephemeral 1
20% (100% cumulative) of the total number of anticipated stream credits will be released after USACE approval of the fourth year monitoring report which documents the stream is stable and all performance standards in Section 11.3 Performance Standards are met, and one recorded bankfull event for the year.

Table 10. Stream credit release schedule for the DFMB.

Mitigation Action	Year	Release Action	Individual Credit Release	Cumulative Credit Release
Streams (Perennial, Intermittent, Ephemerals 2 & 3)	0	Executed MBI, Conservation Easement, & Financial Assurances	15%	15%
	1	After Stream Improvements	25%	40%
	2	Approval of 1st Year Monitoring & Performance Standards	20%	60%
	3	Approval of 2nd Year Monitoring & Performance Standards	20%	80%
	4	Approval of 3rd Year Monitoring & Performance Standards	20%	100%
Streams (Ephemeral 1)	1	After Stream Improvements and Submission of As-Built Drawing	15%	15%
	2	Approval of 1st Year Monitoring & Performance Standards	25%	40%
	3	Approval of 2nd Year Monitoring & Performance Standards and One Bankfull Event	20%	60%
	4	Approval of 3rd Year Monitoring & Performance Standards	20%	80%
	5	Approval of 4th Year Monitoring & Performance Standards and One Bankfull Event	20%	100%

Note: Because areas within the bank that are designated for restoration and enhancement may achieve performance milestones at different times, the Sponsor may request the release of credits either together or separately.

15.0 ACCOUNTING PROCEDURES

Sponsor will submit a Ledger Statement to the USACE each time credits are debited or additional credits are approved for release. If requested, the USACE may distribute the Ledger Statement to other members of the IRT or the public. In addition, Sponsor will submit an Annual Ledger Statement to the USACE for distribution to all members of the IRT, showing all transactions at the DFMB for the previous year.

1. Use of Credits

The USACE, after coordination with the IRT, will determine the eligibility of projects to use the bank for compensatory mitigation on a case-by-case basis. Projects that can be considered will be determined by the USACE and will include those requiring authorization under Section 404 and/or Section 401 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act, as well as mitigation projects, unauthorized activities, non-compliance actions, and after-the-fact permits. The number and type(s) of credits required to compensate for the authorized impacts of each DA permit will be based on the mitigation ratios detailed in Section 11.2.

2. Credit Ledger

The Sponsor will establish and maintain a credit ledger for the bank in order to account for all credit transactions. This credit ledger will show all credit transactions for the bank and will include the beginning and current balance of available credits for each credit type (wetland and stream), all additions and subtractions of credits, and any other changes in credit availability, such as additional credits released or suspended credit sales. The Sponsor will notify the USACE in writing each time a credit transaction occurs and will supply the USACE with an updated ledger with each transaction within 30 days of the transaction.

3. **Credit Ledger Accounting Reports**

A credit ledger report will be submitted to the USACE on an annual basis after the first of each calendar year and will be part of the administrative record for the bank. The credit ledger report will show the beginning and ending balance of available credits and permitted impacts for each resource type, including types of credits debited, all additions and subtractions of credits, and any other changes in credit availability. The USACE will distribute copies of this ledger to the other IRT members.

4. RIBITS

The USACE will be responsible for maintaining the bank's credit ledger in the Regulatory In-Lieu Fee and Bank Information System (RIBITS).

16.0 BANK CLOSURE PROVISIONS

Bank closure will occur when the terms and conditions of this MBI have been determined by the USACE, after coordination with the IRT, to be fully satisfied or until all credits have been debited, whichever is later. Subsequent to bank closure, site management and maintenance will remain the responsibility of the Sponsor. If adaptive management strategies are unsuccessful and performance standards are unattainable, the USACE may close or suspend bank operations until modifications, including release schedule changes, remedial activities, etc. are completed.

17.0 VALIDITY AND TENURE OF AGREEMENT

USACE approval of this Instrument constitutes the regulatory approval required for the Deep Fork Mitigation Bank to be used to provide compensatory mitigation for Department of the Army permits pursuant to 33 C.F.R. 332.8(a)(l). This Instrument is not a contract between the Sponsor or Property Owner and USACE or any other agency of the federal government. Any dispute arising under this Instrument will not give rise to any claim by the Sponsor or Property Owner for monetary damages. This provision is controlling notwithstanding any other provision or statement in the Instrument to the contrary.

This agreement is effective immediately on the date it is signed by the Sponsor, the USACE and the signatory agencies, but in no event later than the date it is signed by the Sponsor and the USACE, and shall remain in effect until it is modified or revoked by mutual agreement among the signatories. Any signatory to this agreement may terminate its participation in this agreement at any time upon written notice to the other signatories. If either the Sponsor or the USACE terminate their participation, the agreement is terminated or revoked. Notwithstanding any future termination, revocation or modification of this agreement, the conservation easement that directs the bank to protect the aquatic ecosystem is perpetual.

This agreement may be modified as mutually agreed to by the Sponsor and the USACE, after coordination with the IRT. The IRT will work to reach a consensus among the signatories regarding all modifications and shall follow the dispute resolution procedure guidance of the November 28, 1995, "Federal Guidance for the Establishment, Use and Operation of Mitigation Banks" in the event of disagreements. No recourse shall be taken against any individuals who have contracted with the Sponsor prior to modification, nor against said parties in the event the agreement is terminated. In the event of termination of the agreement, the Sponsor or subsequent bank Sponsor shall maintain the mitigation to the degree required by the applicable Section 404 permit. Nothing in this agreement shall be construed as altering the responsibilities or empowering new authority in favor of the signatory agencies. The Sponsor will be allowed to implement supplemental mitigation actions or activities to protect or enhance ecological services on the bank provided that such activities are not inconsistent with this MBI or governing Conservation Easement.

Once a DA permit applicant has purchased credits from the Sponsor and the USACE has recorded the purchase of those credits from the bank as satisfying all or a portion of the mitigation responsibilities of the permit applicant, the legal responsibilities for providing compensatory mitigation for any project impacts to jurisdictional waters of the U.S. is transferred from the permit applicant to the Sponsor.

To the extent that specific language in this document changes, modifies, or deletes terms and conditions contained in those documents that are incorporated into this MBI by reference, and that are not legally binding, the specific language within this MBI shall be controlling.

18.0 IRT SIGNATORIES

In accordance with The Final Rule for 33 CFR 332 and 40 CFR 230 Compensatory Mitigation for Losses of Aquatic Resources (Federal Register I V. 73 No. 70 pages 19594-19642, 04-10-2008) this document has been prepared to describe the provisions for establishment, use, and operation of the Deep Fork Mitigation Bank in Lincoln County, OK by Green Country. The undersigned Sponsor hereby agrees that this banking instrument shall provide the basis for proceeding with establishment and operation of the Deep Fork Mitigation Bank site in accordance with its terms as approved or as subsequently amended with the concurrence of all signatory agencies.

SPONSOR, GREEN COUNTRY WETLAND MITIGATION, LLC

_____

Date

18.0 IRT SIGNATORIES

In accordance with The Final Rule for 33 CFR 332 and 40 CFR 230 Compensatory Mitigation for Losses of Aquatic Resources (Federal Register I V. 73 No. 70 pages 19594-19642, 04-10-2008) this document has been prepared to describe the provisions for establishment, use, and operation of the Deep Fork Mitigation Bank in Lincoln County, OK by Green Country. The undersigned agencies hereby agree that this banking instrument shall provide the basis for proceeding with establishment and operation of the Deep Fork Mitigation Bank site in accordance with its terms as approved or as subsequently amended with the concurrence of all signatory agencies.

OKLAHOMA DEPARTMENT OF ENVIRONEMNTAL QUALITY

Date

18.0 IRT SIGNATORIES

In accordance with The Final Rule for 33 CFR 332 and 40 CFR 230 Compensatory Mitigation for Losses of Aquatic Resources (Federal Register I V. 73 No. 70 pages 19594-19642, 04-10-2008) this document has been prepared to describe the provisions for establishment, use, and operation of the Deep Fork Mitigation Bank in Lincoln County, OK by Green Country. The undersigned agencies hereby agree that this banking instrument shall provide the basis for proceeding with establishment and operation of the Deep Fork Mitigation Bank site in accordance with its terms as approved or as subsequently amended with the concurrence of all signatory agencies.

U.S. ARMY CORPS OF ENGINEERS, TULSA DISTRICT

Date

18.0 IRT SIGNATORIES

In accordance with The Final Rule for 33 CFR 332 and 40 CFR 230 Compensatory Mitigation for Losses of Aquatic Resources (Federal Register I V. 73 No. 70 pages 19594-19642, 04-10-2008) this document has been prepared to describe the provisions for establishment, use, and operation of the Deep Fork Mitigation Bank in Lincoln County, OK by Green Country. The undersigned agencies hereby agree that this banking instrument shall provide the basis for proceeding with establishment and operation of the Deep Fork Mitigation Bank site in accordance with its terms as approved or as subsequently amended with the concurrence of all signatory agencies.

U.S. FISH AND WILDLIFE SERVICE

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Date

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U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 6

_____

Date

18.0 IRT SIGNATORIES

In accordance with The Final Rule for 33 CFR 332 and 40 CFR 230 Compensatory Mitigation for Losses of Aquatic Resources (Federal Register I V. 73 No. 70 pages 19594-19642, 04-10-2008) this document has been prepared to describe the provisions for establishment, use, and operation of the Deep Fork Mitigation Bank in Lincoln County, OK by Green Country. The undersigned agencies hereby agree that this banking instrument shall provide the basis for proceeding with establishment and operation of the Deep Fork Mitigation Bank site in accordance with its terms as approved or as subsequently amended with the concurrence of all signatory agencies.

U.S.D.A. NATURAL RESOURCES CONSERVATION SERVICE

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Date

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OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

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Date

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OKLAHOMA CONSERVATION COMMISSION

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Date

19.0 LITERATURE CITED

Allen, J. A., B. D. Keeland, J. A. Stanturf, A. F. Clewell, and H. E. Kennedy, Jr. Revised 2004. A Guide to Bottomland Hardwood Restoration. United States Geological Survey, Biological Resources Division Information and Technology Report USGS/BRD.ITR-2000-0011, U.S. Dept. of Agriculture, Forest Service, Southern Research Station, General Technical Report SRS-40, 132 p.

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United States Fish and Wildlife Service. 2015, Information for Planning and Conservation (IPaC), available online at http://ecos.fws.gov/ipac.

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United States Army Corps of Engineers. 2008. Regulatory Technical Guidance Letter 08-03: Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Restoration, Establishment, and/or Enhancement of Aquatic Resources. 6 p.

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United States Fish and Wildlife Service. 2015, Information for Planning and Conservation (IPaC), available online at http://ecos.fws.gov/ipac.

2. Credit Ledger

The Sponsor will establish and maintain a credit ledger for the bank in order to account for all credit transactions. This credit ledger will show all credit transactions for the bank and will include the beginning and current balance of available credits for each credit type (wetland and stream), all additions and subtractions of credits, and any other changes in credit availability, such as additional credits released or suspended credit sales. The Sponsor will notify the USACE in writing each time a credit transaction occurs and will supply the USACE with an updated ledger with each transaction within 30 days of the transaction.

3. **Credit Ledger Accounting Reports**

A credit ledger report will be submitted to the USACE on an annual basis after the first of each calendar year and will be part of the administrative record for the bank. The credit ledger report will show the beginning and ending balance of available credits and permitted impacts for each resource type, including types of credits debited, all additions and subtractions of credits, and any other changes in credit availability. The USACE will distribute copies of this ledger to the other IRT members.

4. RIBITS

The USACE will be responsible for maintaining the bank's credit ledger in the Regulatory In-Lieu Fee and Bank Information System (RIBITS).

16.0 BANK CLOSURE PROVISIONS

Bank closure will occur when the terms and conditions of this MBI have been determined by the USACE, after coordination with the IRT, to be fully satisfied or until all credits have been debited, whichever is later. Subsequent to bank closure, site management and maintenance will remain the responsibility of the Sponsor. If adaptive management strategies are unsuccessful and performance standards are unattainable, the USACE may close or suspend bank operations until modifications, including release schedule changes, remedial activities, etc. are completed.

17.0 VALIDITY AND TENURE OF AGREEMENT

USACE approval of this Instrument constitutes the regulatory approval required for the Deep Fork Mitigation Bank to be used to provide compensatory mitigation for Department of the Army permits pursuant to 33 C.F.R. 332.8(a)(l). This Instrument is not a contract between the Sponsor or Property Owner and USACE or any other agency of the federal government. Any dispute arising under this Instrument will not give rise to any claim by the Sponsor or Property Owner for monetary damages. This provision is controlling notwithstanding any other provision or statement in the Instrument to the contrary.

This agreement is effective immediately on the date it is signed by the Sponsor, the USACE and the signatory agencies, but in no event later than the date it is signed by the Sponsor and the USACE, and shall remain in effect until it is modified or revoked by mutual agreement among the signatories. Any signatory to this agreement may terminate its participation in this agreement at any time upon written notice to the other signatories. If either the Sponsor or the USACE terminate their participation, the agreement is terminated or revoked. Notwithstanding any future termination, revocation or modification of this agreement, the conservation easement that directs the bank to protect the aquatic ecosystem is perpetual.

2. Credit Ledger

The Sponsor will establish and maintain a credit ledger for the bank in order to account for all credit transactions. This credit ledger will show all credit transactions for the bank and will include the beginning and current balance of available credits for each credit type (wetland and stream), all additions and subtractions of credits, and any other changes in credit availability, such as additional credits released or suspended credit sales. The Sponsor will notify the USACE in writing each time a credit transaction occurs and will supply the USACE with an updated ledger with each transaction within 30 days of the transaction.

3. **Credit Ledger Accounting Reports**

A credit ledger report will be submitted to the USACE on an annual basis after the first of each calendar year and will be part of the administrative record for the bank. The credit ledger report will show the beginning and ending balance of available credits and permitted impacts for each resource type, including types of credits debited, all additions and subtractions of credits, and any other changes in credit availability. The USACE will distribute copies of this ledger to the other IRT members.

4. RIBITS

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Bank closure will occur when the terms and conditions of this MBI have been determined by the USACE, after coordination with the IRT, to be fully satisfied or until all credits have been debited, whichever is later. Subsequent to bank closure, site management and maintenance will remain the responsibility of the Sponsor. If adaptive management strategies are unsuccessful and performance standards are unattainable, the USACE may close or suspend bank operations until modifications, including release schedule changes, remedial activities, etc. are completed.

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This agreement is effective immediately on the date it is signed by the Sponsor, the USACE and the signatory agencies, but in no event later than the date it is signed by the Sponsor and the USACE, and shall remain in effect until it is modified or revoked by mutual agreement among the signatories. Any signatory to this agreement may terminate its participation in this agreement at any time upon written notice to the other signatories. If either the Sponsor or the USACE terminate their participation, the agreement is terminated or revoked. Notwithstanding any future termination, revocation or modification of this agreement, the conservation easement that directs the bank to protect the aquatic ecosystem is perpetual.

This agreement may be modified as mutually agreed to by the Sponsor and the USACE, after coordination with the IRT. The IRT will work to reach a consensus among the signatories regarding all modifications and shall follow the dispute resolution procedure guidance of the November 28, 1995, "Federal Guidance for the Establishment, Use and Operation of Mitigation Banks" in the event of disagreements. No recourse shall be taken against any individuals who have contracted with the Sponsor prior to modification, nor against said parties in the event the agreement is terminated. In the event of termination of the agreement, the Sponsor or subsequent bank Sponsor shall maintain the mitigation to the degree required by the applicable Section 404 permit. Nothing in this agreement shall be construed as altering the responsibilities or empowering new authority in favor of the signatory agencies. The Sponsor will be allowed to implement supplemental mitigation actions or activities to protect or enhance ecological services on the bank provided that such activities are not inconsistent with this MBI or governing Conservation Easement.

Once a DA permit applicant has purchased credits from the Sponsor and the USACE has recorded the purchase of those credits from the bank as satisfying all or a portion of the mitigation responsibilities of the permit applicant, the legal responsibilities for providing compensatory mitigation for any project impacts to jurisdictional waters of the U.S. is transferred from the permit applicant to the Sponsor.

To the extent that specific language in this document changes, modifies, or deletes terms and conditions contained in those documents that are incorporated into this MBI by reference, and that are not legally binding, the specific language within this MBI shall be controlling.

18.0 IRT SIGNATORIES

In accordance with The Final Rule for 33 CFR 332 and 40 CFR 230 Compensatory Mitigation for Losses of Aquatic Resources (Federal Register I V. 73 No. 70 pages 19594-19642, 04-10-2008) this document has been prepared to describe the provisions for establishment, use, and operation of the Deep Fork Mitigation Bank in Lincoln County, OK by Green Country. The undersigned Sponsor hereby agrees that this banking instrument shall provide the basis for proceeding with establishment and operation of the Deep Fork Mitigation Bank site in accordance with its terms as approved or as subsequently amended with the concurrence of all signatory agencies.

SPONSOR, GREEN COUNTRY WETLAND MITIGATION, LLC

Date

18.0 IRT SIGNATORIES

In accordance with The Final Rule for 33 CFR 332 and 40 CFR 230 Compensatory Mitigation for Losses of Aquatic Resources (Federal Register I V. 73 No. 70 pages 19594-19642, 04-10-2008) this document has been prepared to describe the provisions for establishment, use, and operation of the Deep Fork Mitigation Bank in Lincoln County, OK by Green Country. The undersigned agencies hereby agree that this banking instrument shall provide the basis for proceeding with establishment and operation of the Deep Fork Mitigation Bank site in accordance with its terms as approved or as subsequently amended with the concurrence of all signatory agencies.

OKLAHOMA DEPARTMENT OF ENVIRONEMNTAL QUALITY

Date

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U.S. ARMY CORPS OF ENGINEERS, TULSA DISTRICT

Date

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U.S. FISH AND WILDLIFE SERVICE

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Date

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U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 6

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Date

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OKLAHOMA CONSERVATION COMMISSION

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19.0 LITERATURE CITED

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APPENDIX A

FIGURES:

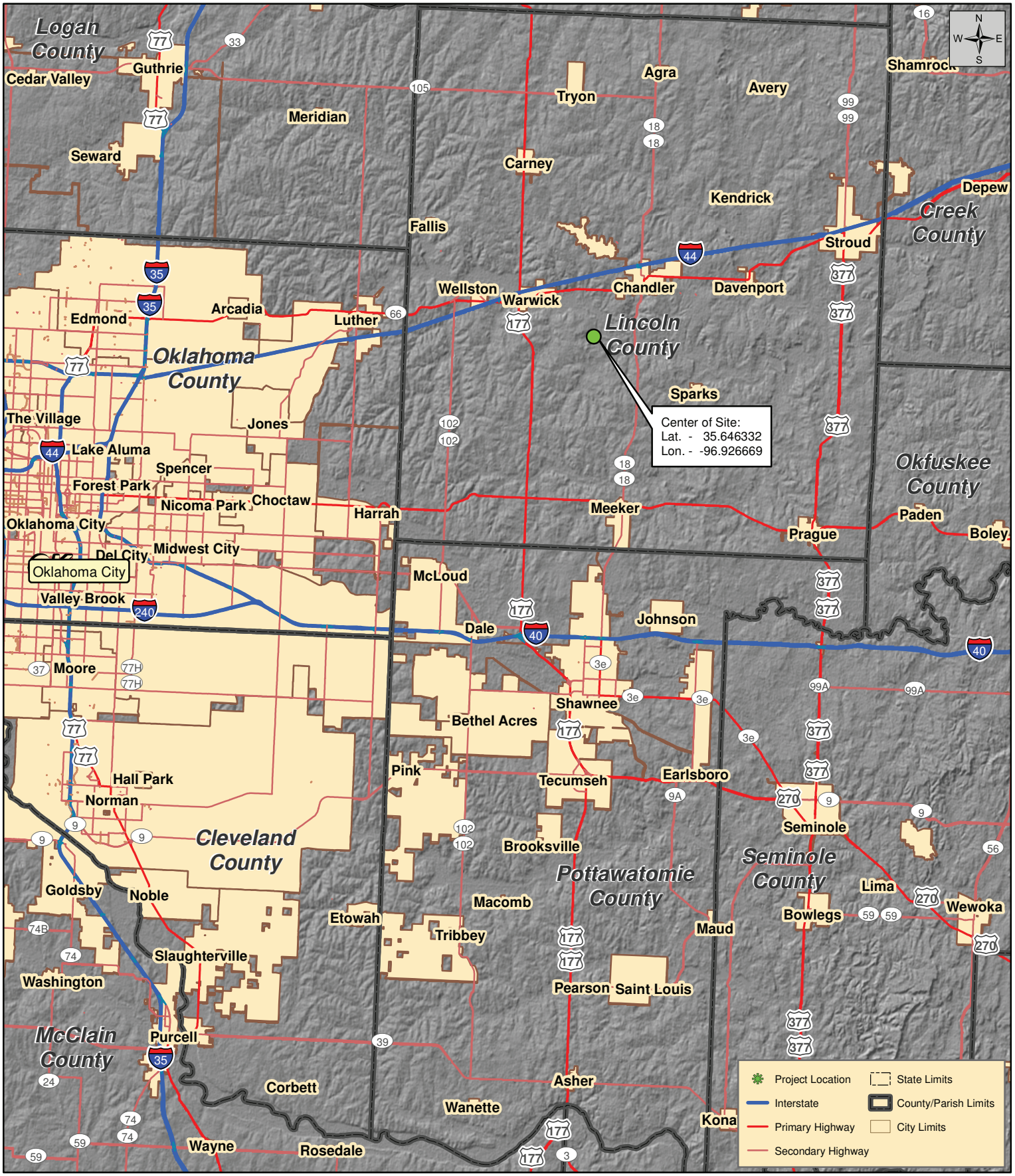


Figure 1 of 8 Location Map	Deep Fork Mitigation Bank	Date: October 21, 2015
HOFFMAN ENVIRONMENTAL, INC. Sulphur Springs, TX 903.885.0304	0 5 10 15 20 25 30 Miles Green Country Wetland Mitigation, LLC Lincoln County, Oklahoma Created By: Jason Hoffman HEI Project No. HEI-15-11 Datum: NAD83 Imagery Source: NAIP Vector Source: HEI	Green Country Wetland Mitigation

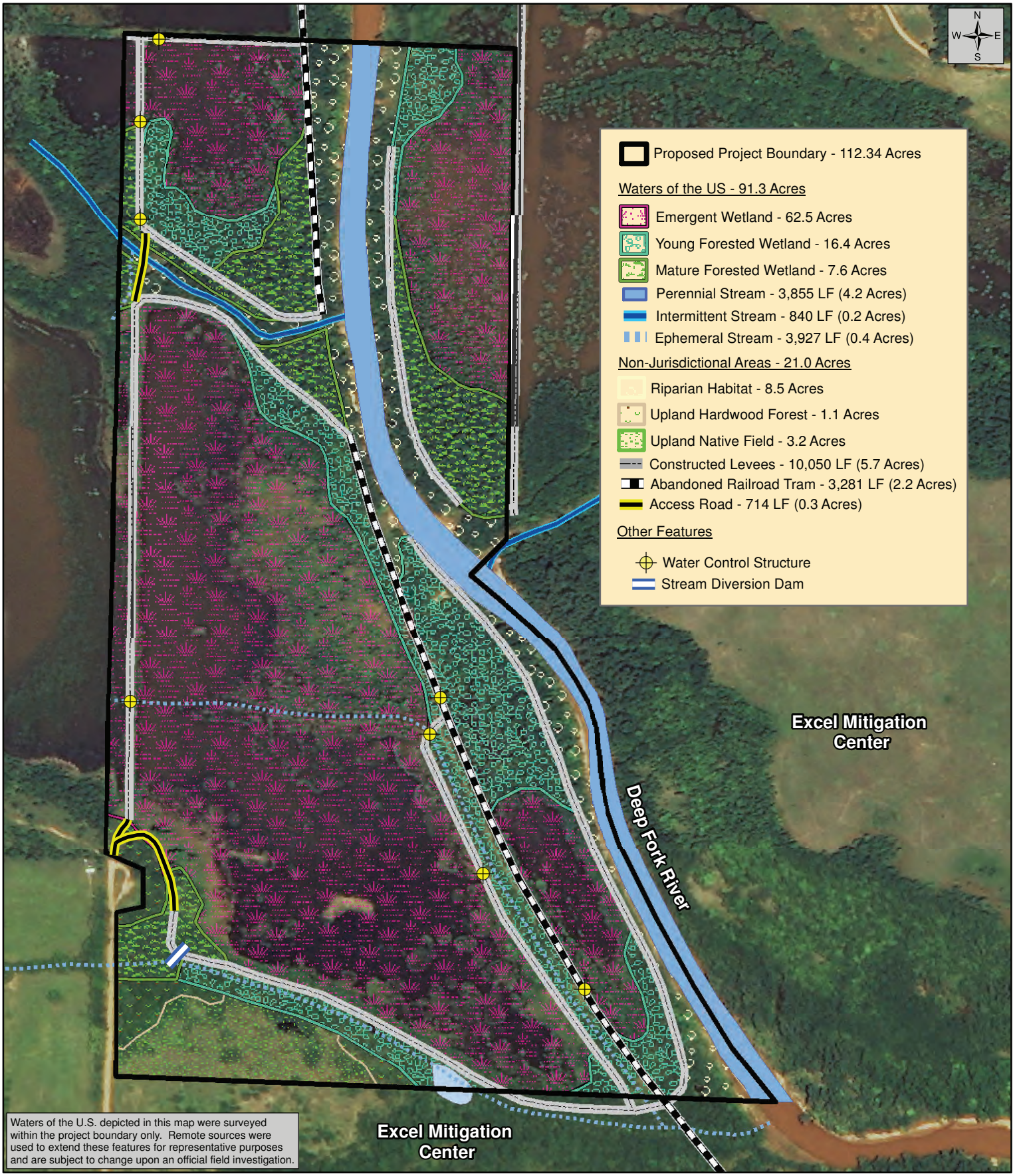


Figure 2 of 8
Baseline Conditions & WOUS 2013 Aerial Map

Deep Fork Mitigation Bank

Date: October 21, 2015

HOFFMAN ENVIRONMENTAL, INC.
Sulphur Springs, TX 903.885.0304

0 200 400 600 800 1,000 1,200 1,400 1,600 Feet

Green Country Wetland Mitigation, LLC
Lincoln County, Oklahoma

Created By:
Jason Hoffman
HEI Project No. HEI-15-11

Datum: NAD83
Imagery Source: NAIP
Vector Source: HEI

Green Country
Wetland Mitigation

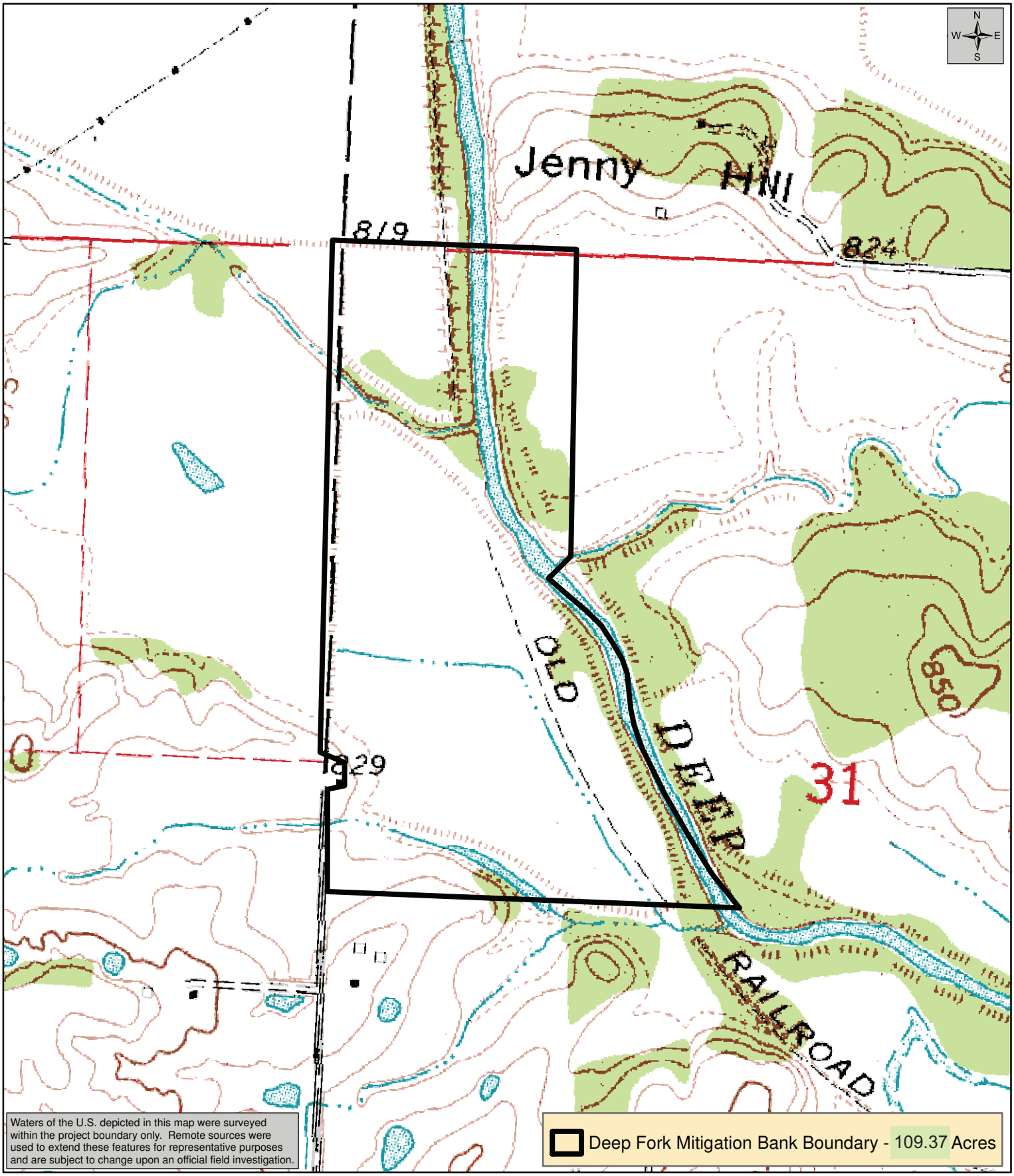


Figure 3 of 8
Baseline Conditions & WOUS Topographic Map

Deep Fork Mitigation Bank

Date: October 21, 2015

HOFFMAN ENVIRONMENTAL, INC.
Sulphur Springs, TX 903.885.0304

0 200 400 600 800 1,000 1,200 1,400 1,600 1,800 2,000 2,200 2,400 Feet

Green Country Wetland Mitigation, LLC
Lincoln County, Oklahoma

Created By:
Jason Hoffman
HEI Project No. HEI-15-11

Datum: NAD83
Imagery Source: USGS
Vector Source: HEI

Green Country Wetland Mitigation

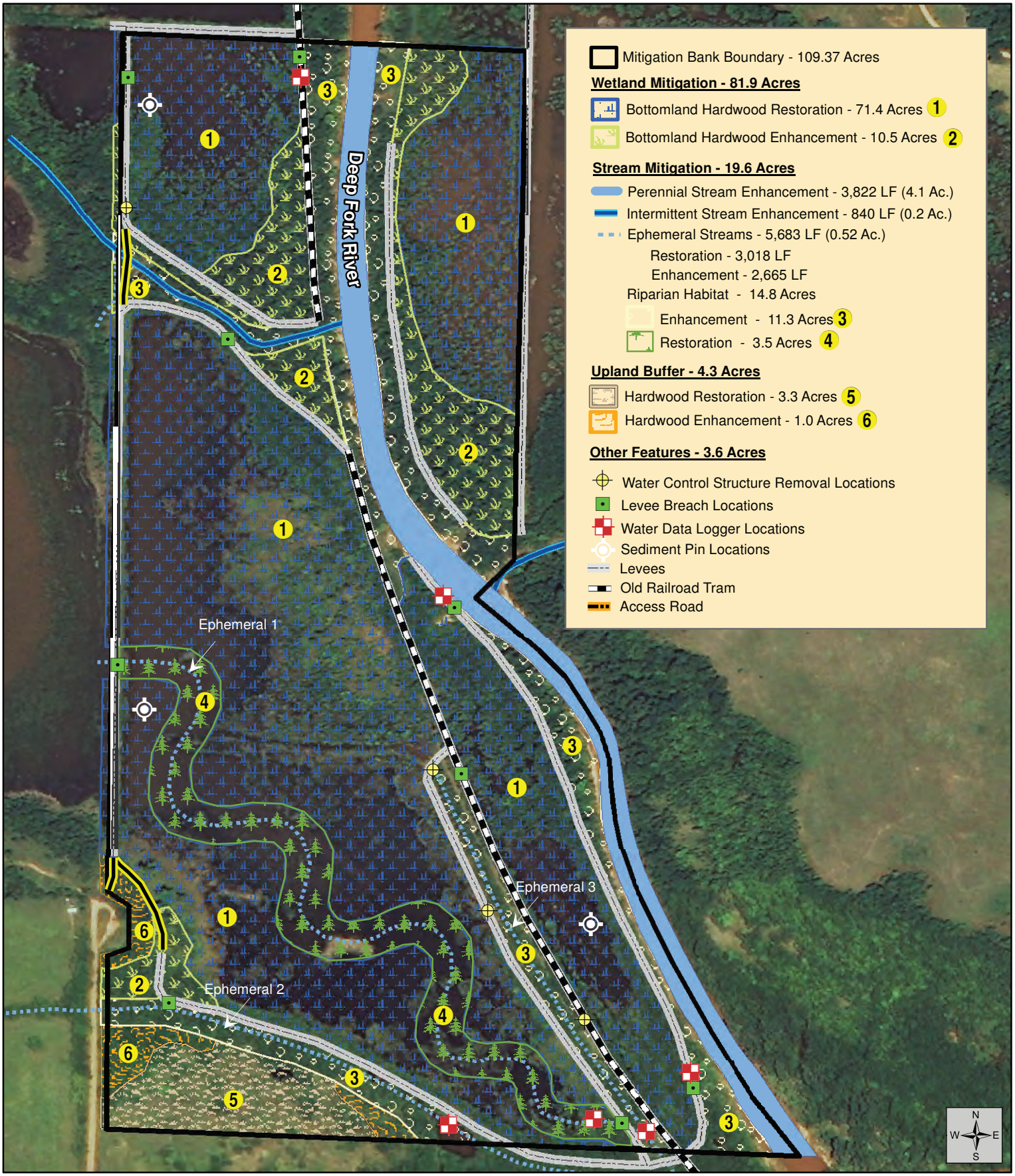


Figure 4 of 8
Conceptual Development Plan
2013 Aerial Map

Deep Fork Mitigation Bank

Date: December 21, 2016

HOFFMAN ENVIRONMENTAL, INC.
Sulphur Springs, TX 903.885.0304

0 200 400 600 800 1,000 1,200 1,400 Feet

Green Country Wetland Mitigation, LLC
Lincoln County, Oklahoma

Created By:
Jason Hoffman
HEI Project No. HEI-15-11

Datum: NAD83
Imagery Source: NAIP
Vector Source: HEI

Green Country
Wetland Mitigation

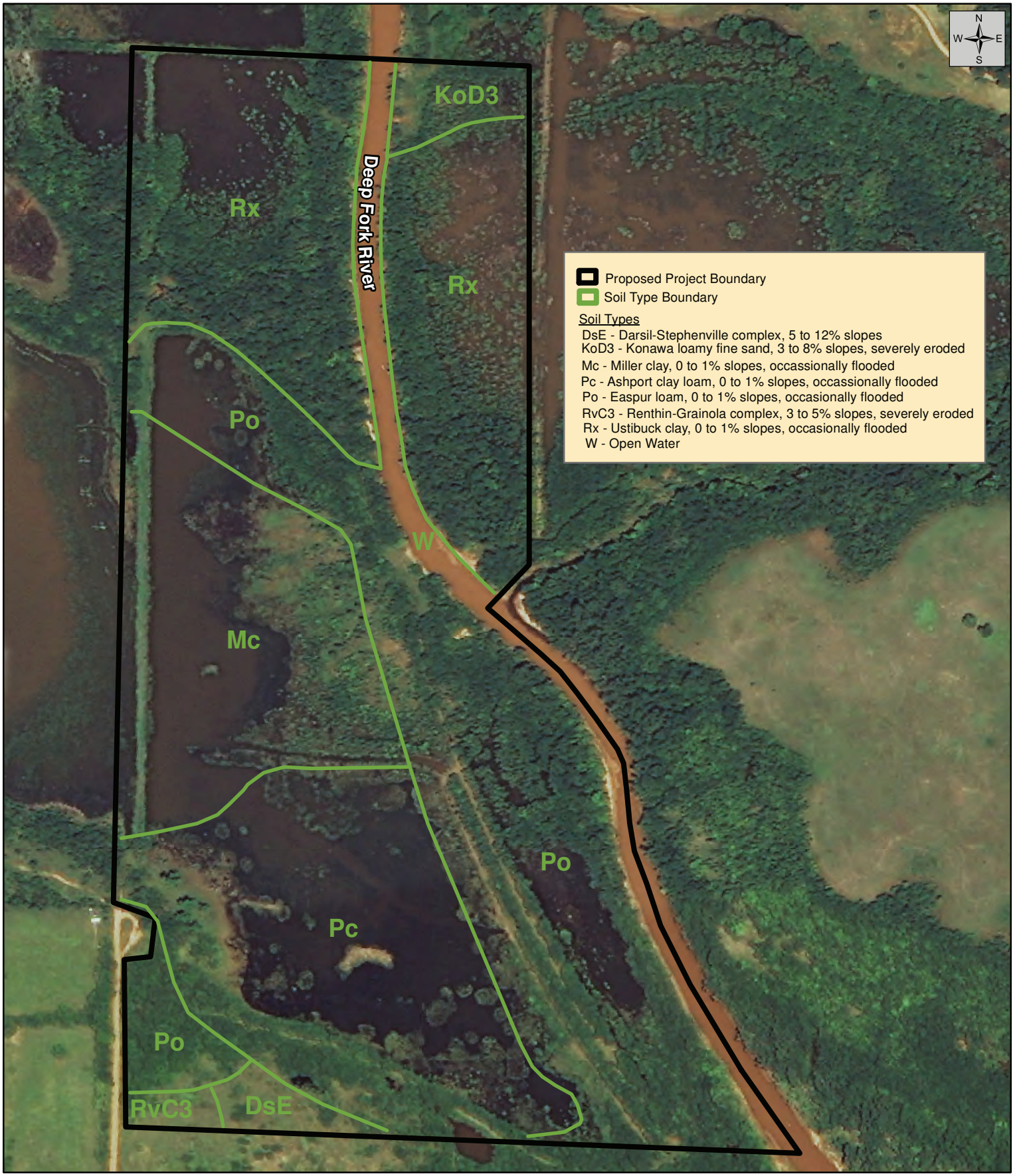


Figure 5 of 8
Soils Map

Deep Fork Mitigation Bank

Date: October 22, 2015

HOFFMAN ENVIRONMENTAL, INC.
Sulphur Springs, TX 903.885.0304

0 250 500 750 1,000 1,250 1,500 Feet

Green Country Wetland Mitigation, LLC
Lincoln County, Oklahoma

Created By:
Jason Hoffman
HEI Project No. HEI-15-11

Datum: NAD83
Imagery Source: NAIP
Vector Source: HEI

Green Country
Wetland Mitigation

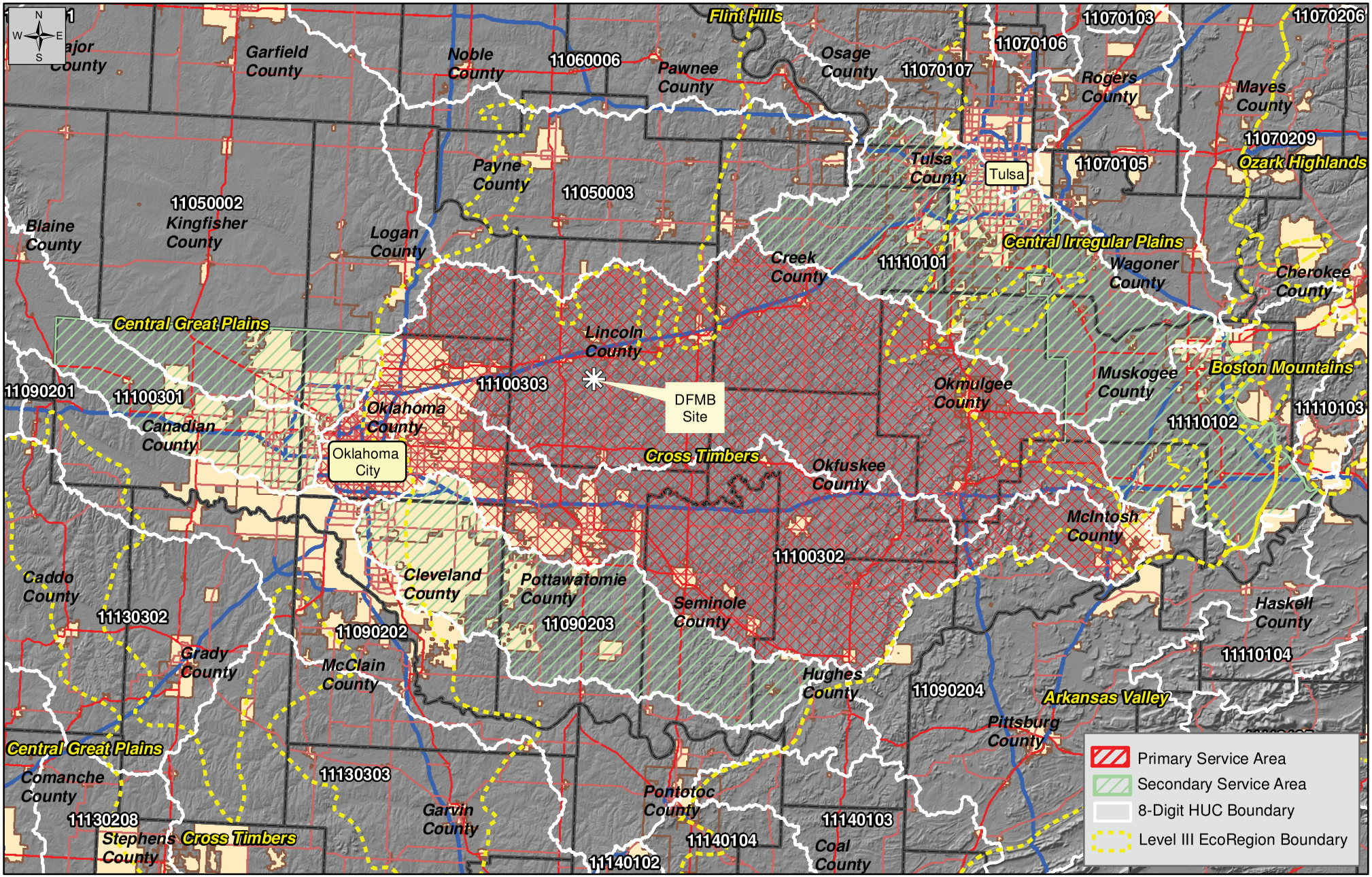


Figure 6 of 8
Service Area Map

Deep Fork Mitigation Bank Service Area

Date Revised:
December 16, 2016

0 10 20 30 40 50 60 70 80 90 100 110 Miles

HOFFMAN ENVIRONMENTAL, INC.
Sulphur Springs, TX 903.885.0304

Created By:
Jason Hoffman
HEI Project No. HEI-15-11

Green Country Wetland Mitigation, LLC
Lincoln County, Oklahoma

Datum: NAD83
Imagery Source: ESRI
Vector Source: HEI

Green Country
Wetland Mitigation

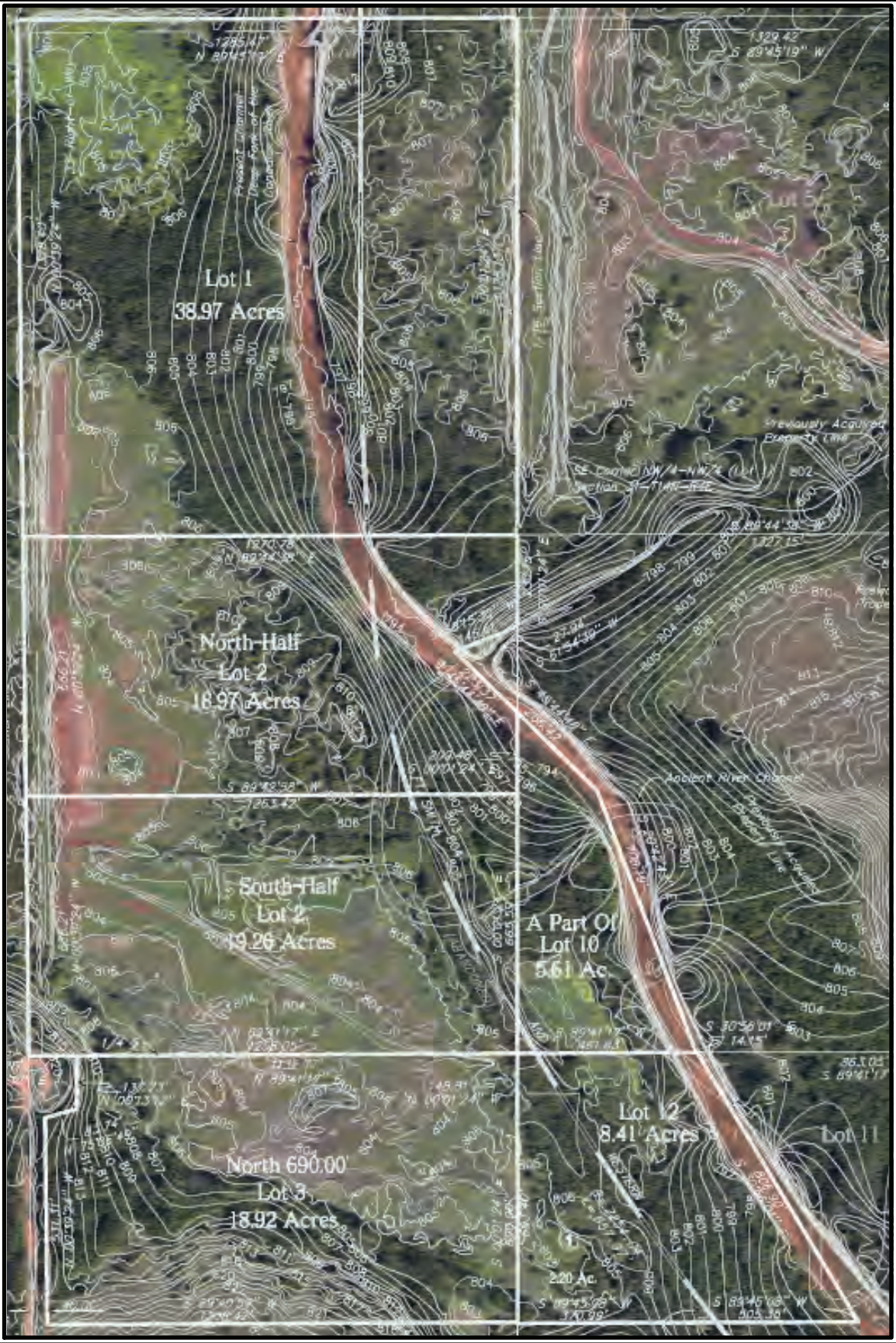
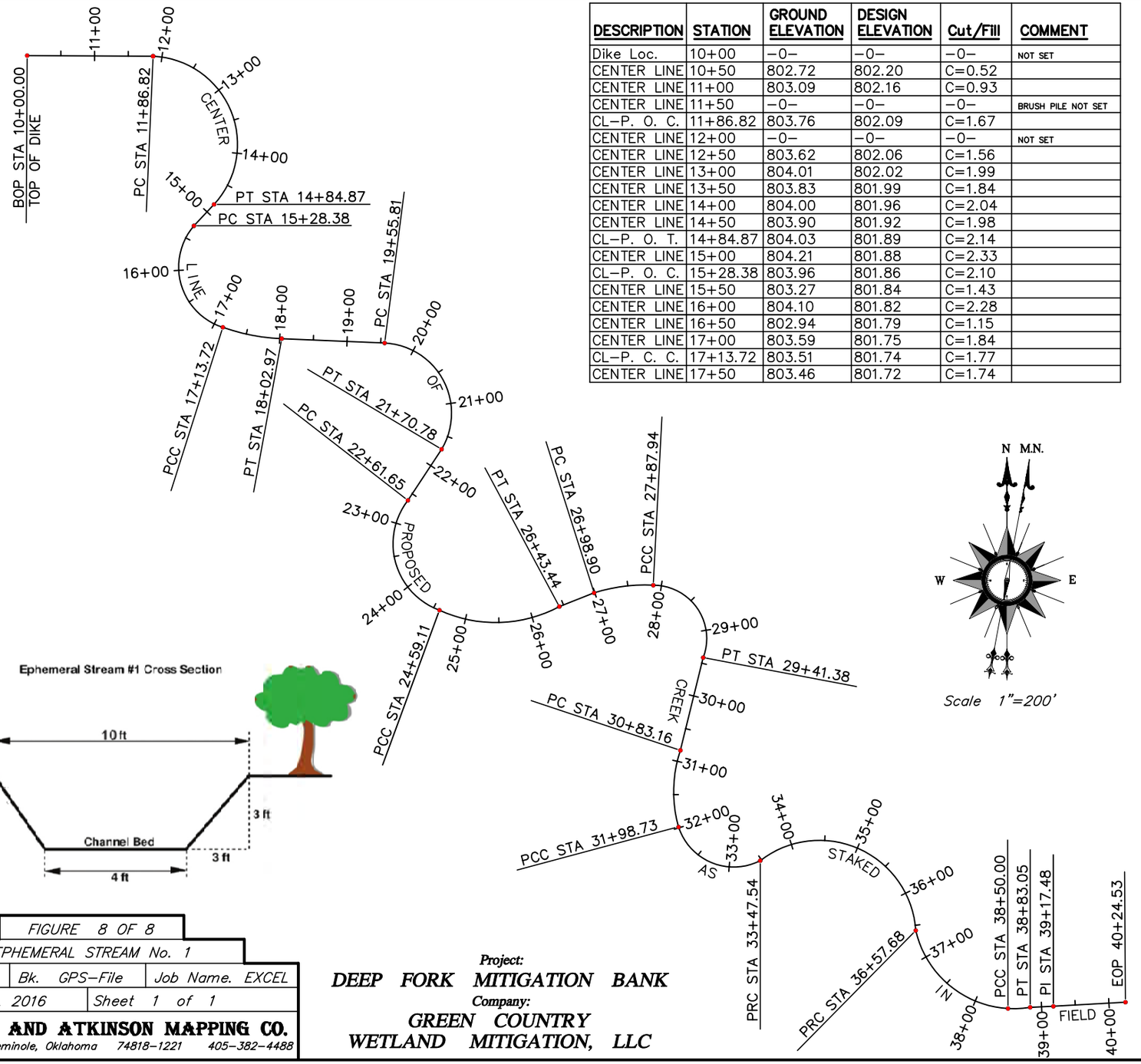


Figure 7 of 8 **Custom Topographic Map** **1-Foot Contours**	**Deep Fork Mitigation Bank**	**Date: October 22, 2015**
HOFFMAN ENVIRONMENTAL, INC. **Sulphur Springs, TX** **903.885.0304**	**Green Country Wetland Mitigation, LLC** **Lincoln County, Oklahoma** Created By: Jason Hoffman HEI Project No. HEI-15-11 Datum: NAD83 Imagery Source: NAIP Vector Source: HEI	**Green Country** **Wetland Mitigation**



DESCRIPTION	STATION	GROUND ELEVATION	DESIGN ELEVATION	Cut/Fill	COMMENT
Dike Loc.	10+00	–0–	–0–	–0–	NOT SET
CENTER LINE	10+50	802.72	802.20	C=0.52	
CENTER LINE	11+00	803.09	802.16	C=0.93	
CENTER LINE	11+50	–0–	–0–	–0–	BRUSH PILE NOT SET
CL–P. O. C.	11+86.82	803.76	802.09	C=1.67	
CENTER LINE	12+00	–0–	–0–	–0–	NOT SET
CENTER LINE	12+50	803.62	802.06	C=1.56	
CENTER LINE	13+00	804.01	802.02	C=1.99	
CENTER LINE	13+50	803.83	801.99	C=1.84	
CENTER LINE	14+00	804.00	801.96	C=2.04	
CENTER LINE	14+50	803.90	801.92	C=1.98	
CL–P. O. T.	14+84.87	804.03	801.89	C=2.14	
CENTER LINE	15+00	804.21	801.88	C=2.33	
CL–P. O. C.	15+28.38	803.96	801.86	C=2.10	
CENTER LINE	15+50	803.27	801.84	C=1.43	
CENTER LINE	16+00	804.10	801.82	C=2.28	
CENTER LINE	16+50	802.94	801.79	C=1.15	
CENTER LINE	17+00	803.59	801.75	C=1.84	
CL–P. C. C.	17+13.72	803.51	801.74	C=1.77	
CENTER LINE	17+50	803.46	801.72	C=1.74	

DESCRIPTION	STATION	GROUND ELEVATION	DESIGN ELEVATION	Cut/Fill	COMMENT
CENTER LINE	18+00	803.61	801.68	C=1.93	
CENTER LINE	18+50	803.81	801.65	C=2.16	
CENTER LINE	19+00	803.74	801.61	C=2.13	
CENTER LINE	19+50	803.60	801.59	C=2.01	
CL–P. O. C.	19+55.81	803.62	801.57	C=2.05	
CENTER LINE	20+00	803.73	801.53	C=2.20	
CENTER LINE	20+50	803.64	801.49	C=2.15	
CENTER LINE	21+00	803.85	801.46	C=2.39	
CENTER LINE	21+50	803.71	801.38	C=2.33	
CL–P. O. T.	21+70.78	803.54	801.37	C=2.17	
CENTER LINE	22+00	803.79	801.35	C=2.44	
CENTER LINE	22+50	803.54	801.33	C=2.11	
CL–P. O. C.	22+61.65	803.80	801.32	C=2.48	
CENTER LINE	23+00	803.86	801.28	C=2.58	
CENTER LINE	23+50	804.15	801.24	C=2.91	
CENTER LINE	24+00	804.02	801.21	C=2.81	
CENTER LINE	24+50	804.35	801.19	C=3.18	
CL–P. C. C.	24+59.11	804.21	801.17	C=3.04	
CENTER LINE	25+00	804.12	801.14	C=2.98	
CENTER LINE	25+50	804.08	801.14	C=2.94	
CENTER LINE	26+00	803.92	801.11	C=2.81	
CL–P. O. T.	26+43.44	803.85	801.07	C=2.78	
CENTER LINE	26+50	803.87	801.05	C=2.82	
CL–P. O. C.	26+98.90	803.86	801.04	C=2.82	
CENTER LINE	27+00	803.97	801.02	C=2.95	
CENTER LINE	27+50	804.07	801.00	C=3.07	
CL–P. C. C.	27+87.94	803.88	800.98	C=2.90	
CENTER LINE	28+00	803.97	800.96	C=3.01	
CENTER LINE	28+50	804.13	800.93	C=3.20	
CENTER LINE	29+00	804.08	800.89	C=3.19	
CL–P. O. T.	29+41.38	804.03	800.87	C=3.16	
CENTER LINE	29+50	804.18	800.86	C=3.32	
CENTER LINE	30+00	804.05	800.82	C=3.23	
CENTER LINE	30+50	804.19	800.79	C=3.40	
CL–P. O. C.	30+83.16	804.37	800.77	C=3.60	
CENTER LINE	31+00	804.42	800.75	C=3.67	
CENTER LINE	31+50	804.22	800.72	C=3.50	
CL–P. C. C.	31+98.73	804.26	800.68	C=3.58	
CENTER LINE	32+00	804.37	800.66	C=3.71	
CENTER LINE	32+50	804.44	800.65	C=3.79	
CENTER LINE	33+00	804.86	800.61	C=4.25	
CL–P. R. C.	33+47.54	804.69	800.58	C=4.11	
CENTER LINE	33+50	804.04	800.56	C=3.48	
CENTER LINE	34+00	804.38	800.54	C=3.84	
CENTER LINE	34+50	804.72	800.51	C=4.21	
CENTER LINE	35+00	804.75	800.47	C=4.28	
CENTER LINE	35+50	804.32	800.44	C=3.88	
CENTER LINE	36+00	804.15	800.40	C=3.75	
CENTER LINE	36+50	803.89	800.37	C=3.52	
CL–P. R. C.	36+57.68	803.93	800.36	C=3.57	
CENTER LINE	37+00	804.00	800.33	C=3.67	
CENTER LINE	37+50	804.31	800.30	C=4.01	
CENTER LINE	38+00	805.03	800.26	C=4.77	
CENTER LINE	38+50	805.55	800.23	5.32	
CL–P. O. T.	38+83.05	805.90	800.20	C=5.70	
CENTER LINE	39+00	806.63	800.19	C=6.44	
CL–P. I.	39+17.48	806.91	800.40	C=6.51	
CENTER LINE	39+50	807.01	800.16	C=6.85	
CENTER LINE	40+00	807.16	800.12	C=7.04	
E. O. P.	40+24.53	–0–	–0–	–0–	MEET & MATCH EXIST CREEK CL

FIGURE 8 OF 8

EPHEMERAL STREAM No. 1

Drawn By JLA	Bk. GPS–File	Job Name. EXCEL
Date: Dec. 21, 2016	Sheet 1 of 1	

MARSHALL AND ATKINSON MAPPING CO.

P.O. Box 1221 Seminole, Oklahoma 74818–1221 405–382–4488

Project:

DEEP FORK MITIGATION BANK

Company:

GREEN COUNTRY WETLAND MITIGATION, LLC

APPENDIX B

SITE PHOTOGRAPHS:

Project Photographs

Photograph 1. View of the ephemeral stream and adjacent habitat located on the south end of the project.

Photograph 2. Another view of the ephemeral stream located on the south end of the project.

Photograph 3. View of earthen diversion plug on the ephemeral stream located on the south end of the project.

Photograph 4. View of southern-most ephemeral stream near the confluence of main wetland cell drainage channel.

Photograph 5. View of channelized ephemeral stream located in the middle of the project and west of the river.

Photograph 6. View of the main wetland cell drainage channel south of the main water control structure.

Project Photographs

Photograph 7. View of an unnamed intermittent stream located in the northwestern portion of the project.

Photograph 8. Another view of the intermittent stream located in the northwestern portion of the project.

Photograph 9. View of the Deep Fork River from the west bank looking north.

Photograph 10. View of the Deep Fork River from the west bank looking south.

Photograph 11. View of the emergent wetland habitat located in the west-central portion of the project.

Photograph 12. Another view of the emergent wetland habitat located in the west-central portion of the project.

Project Photographs

Photograph 13. Another view of the emergent wetland habitat located in the west-central portion of the project.

Photograph 14. Another view of the emergent wetland habitat located in the west-central portion of the project.

Photograph 15. Another view of the emergent wetland habitat located in the west-central portion of the project.

Photograph 16. View of the emergent wetland habitat located in the southeastern portion of the project.

Photograph 17. View of the juvenile forested wetland habitat located adjacent to the emergent wetland areas.

Photograph 18. View of the juvenile forested wetland habitat located adjacent to the emergent wetland areas.

Project Photographs

Photograph 19. View of the mature forested wetland habitat located within the project site.

Photograph 20. Another view of the mature forested wetland habitat located within the project site.

Photograph 21. Another view of the mature forested wetland habitat located within the project site.

Photograph 22. View of the riparian habitat located on the west bank of the Deep Fork River – south end.

Photograph 23. View of the riparian habitat located on the east bank of the Deep Fork River.

Photograph 24. View of the riparian habitat located on the west bank of the Deep Fork River – south end.

Project Photographs

Photograph 25. View of the riparian habitat located on the southern end of west bank along the Deep Fork River.

Photograph 26. View of the riparian habitat located on the southern end of west bank along the Deep Fork River.

Photograph 27. View of the riparian habitat located on the southern end of west bank along the Deep Fork River.

Photograph 28. View of the riparian habitat located on the southern end of west bank along the Deep Fork River.

Photograph 29. View of the riparian habitat located in the middle section of west bank along the Deep Fork River.

Photograph 30. View of the riparian habitat located in the middle section of west bank along the Deep Fork River.

Project Photographs

Photograph 31. View of the typical riparian habitat located along the intermittent stream.

Photograph 32. Another view of the typical riparian habitat located along the intermittent stream.

Photograph 33. View of the upland buffer habitat located in the southwest corner of the site.

Photograph 34. Another view of the upland buffer habitat located in the southwest corner of the site.

Photograph 35. View of one of the many levees that are located within the project site.

Photograph 36. Another view of one of the many levees that are located within the project site.

Project Photographs

Photograph 37. Another view of one of the many levees that are located within the project site.

Photograph 38. Another view of one of the many levees that are located within the project site.

Photograph 39. View of typical soil profile located in the emergent wetland habitat.

Photograph 40. View of one of the several water control structures associated with the moist soil units.

APPENDIX C

WETLAND DELINEATION DATA SHEETS:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Deep Fork Mitigation Bank City/County: Lincoln Sampling Date: 2-15-15

Applicant/Owner: Excel State: OK Sampling Point: SP 1

Investigator(s): Jason Hoffman Section, Township, Range: 31 - 14N - 4E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): LRR Lat: 35.651809 Long: -96.928334 Datum: _____

Soil Map Unit Name: Ustibuck clay 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 _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: .

Site consists of herbaceous dominated emergent wetland habitat in a moist soil unit. Three of three wetland criteria met. Site is a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. None			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Polygonum pennsylvanicum	35	Y	FAC
2. Ammannia coccinea	15	Y	OBL
3. Iva annua	10	N	FAC
4. Symphotrichum subulatum	10	N	OBL
5. Xanthium strumarium	5	N	FAC
6. Symphotrichum spp.	5	N	NI
7. Pluchea camphorata	3	N	FACW
8.			
9.			
10.			
	83 = Total Cover		
Woody Vine Stratum (Plot size: 30ft)			
1. Cardiospermum halicacabum	5	Y	FAC
2.			
% Bare Ground in Herb Stratum 17	5 = Total Cover		

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: 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	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.)

Site consists of herbaceous dominated emergent wetland habitat in a moist soil unit.

SOIL

Sampling Point: SP 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
0-18	2.5YR 4/3	95	2.5YR 4/6	5	C	M	Clay	Clay Texture

[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) **(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) **(LRRI, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRRH outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ✓ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): NA

Hydric Soil Present? Yes X No ____

Remarks:

Hydric soil indicators were observed. Criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ 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? (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:

Inundation visible on 2014 aerial photogrpahs

Remarks:

Three primary and two secondary wetland hydrology indicators observed. Criteria met.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Deep Fork Mitigation Bank City/County: Lincoln Sampling Date: 2-15-15

Applicant/Owner: Excel State: OK Sampling Point: SP 2

Investigator(s): Jason Hoffman Section, Township, Range: 31 - 14N - 4E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): LRR Lat: 35.649406 Long: -96.924951 Datum:

Soil Map Unit Name: Ustibuck clay 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 ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: .

Site consists of herbaceous dominated emergent wetland habitat in a moist soil unit. Three of three wetland criteria met. Site is a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. Cephalanthus occidentalis	5	Y	OBL
2.			
3.			
4.			
5.			
	5 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Carex crus-corvi	65	Y	OBL
2. Symphotrichum subulatum	15	Y	OBL
3. Ammannia coccinea	5	Y	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	85 = Total Cover		
Woody Vine Stratum (Plot size: 30ft)			
1. None			
2.			
% Bare Ground in Herb Stratum 15	5 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding 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 ____	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.)

Site consists of herbaceous dominated emergent wetland habitat in a moist soil unit.

SOIL

Sampling Point: SP 2

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
0-18	5YR 4/4	90	5YR 4/6	5	C	M	Clay Loam	Clay Texture
	5YR 4/2	5						

[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) **(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) **(LRRI, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRRH outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ✓ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): NA

Hydric Soil Present? Yes X No ____

Remarks:

Hydric soil indicators were observed. Criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ 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 X No ____ Depth (inches): 3

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 8

Wetland Hydrology Present? Yes X No ____

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

Inundation visible on 2014 aerial photogrpahs

Remarks:

Six primary and one secondary wetland hydrology indicators observed. Criteria met.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Deep Fork Mitigation Bank City/County: Lincoln Sampling Date: 2-15-15

Applicant/Owner: Excel State: OK Sampling Point: SP 3

Investigator(s): Jason Hoffman Section, Township, Range: 31 - 14N - 4E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): LRR Lat: 35.649059 Long: -96.926463 Datum:

Soil Map Unit Name: Ustibuck clay 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 _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: .

Site consists of mature, bottomland hardwood forested wetland habitat. Three of three wetland criteria met. Site is a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Celtis laevigata	35	Y	FAC
2. Ulmus americana	20	Y	FAC
3. Fraxinus pennsylvanica	12	N	FAC
4. Populus deltoides	5	N	FAC
5. Carya illinoensis	3	N	FAC
	75	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. Celtis laevigata	18	Y	FAC
2. Acer negundo	12	Y	FAC
3. Ulmus americana	7	N	FAC
4.			
5.			
	37	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. Chasmanthium latifolium	20	Y	FACU
2. Elymus canadensis	10	Y	FACU
3. Daucus pusillus	5	N	NI
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	35	= Total Cover	
Woody Vine Stratum (Plot size: 30ft)			
1. Vitis riparia	5	Y	FAC
2.			
% Bare Ground in Herb Stratum 65	5	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71 (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.)

Site consists of mature, bottomland hardwood forested wetland habitat.

SOIL

Sampling Point: SP 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
0-18	5YR 4/4	95	5YR 4/6	5	C	M	Loamy Clay	Clay Texture

[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) **(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) **(LRRI, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRRH outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ✓ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): NA

Hydric Soil Present? **Yes** X **No** ____

Remarks:

Hydric soil indicators were observed. Criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ 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? (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:

Inundation visible on 2014 aerial photogrpahs

Remarks:

Four primary and one secondary wetland hydrology indicators observed. Criteria met.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Deep Fork Mitigation Bank City/County: Lincoln Sampling Date: 2-15-15

Applicant/Owner: Excel State: OK Sampling Point: SP 4

Investigator(s): Jason Hoffman Section, Township, Range: 31 - 14N - 4E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): LRR Lat: 35.648825 Long: -96.924708 Datum:

Soil Map Unit Name: Ustibuck clay 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 _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: .

Site consists of mature, bottomland hardwood, forested wetland habitat. Three of three wetland criteria met. Site is a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica	70	Y	FAC
2. Ulmus americana	5	N	FAC
3. Celtis laevigata	5	N	FAC
4.			
5.			
	80 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. Celtis laevigata	9	Y	FAC
2. Fraxinus pennsylvanica	5	Y	FAC
3. Ilex decidua	5	Y	FAC
4. Cephalanthus occidentalis	3	N	OBL
5.			
	22 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Carex crus-corvi	10	Y	OBL
2. Chasmanthium latifolium	5	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	15 = Total Cover		
Woody Vine Stratum (Plot size: 30ft)			
1. None			
2.			
% Bare Ground in Herb Stratum 85	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (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.)

Site consists of mature, bottomland hardwood, forested wetland habitat.

SOIL

Sampling Point: SP 4

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	5YR 4/3	95	5YR 4/6	5	C	M	Loamy Clay	Clay Texture

[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) **(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) **(LRRI, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRRH outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ✓ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): NA

Hydric Soil Present? **Yes** X **No** ____

Remarks:

Hydric soil indicators were observed. Criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ 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 X No ____ Depth (inches): 4

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 7

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

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

Inundation visible on 2014 aerial photogrpahs

Remarks:

Eight primary and one secondary wetland hydrology indicators observed. Criteria met.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Deep Fork Mitigation Bank City/County: Lincoln Sampling Date: 2-15-15

Applicant/Owner: Excel State: OK Sampling Point: SP 5

Investigator(s): Jason Hoffman Section, Township, Range: 31 - 14N - 4E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): convex Slope (%): 0-1

Subregion (LRR): LRR Lat: 35.648286 Long: -96.925290 Datum:

Soil Map Unit Name: Ustibuck clay 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 _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes _____	No X	

Remarks: .

Site consists of mature forested riparian habitat located on a river levee. One of three wetland criteria met. Site is not a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Celtis laevigata	40	Y	FAC
2. Ulmus americana	20	Y	FAC
3. Carya illinoensis	8	N	FAC
4. Fraxinus pennsylvanica	4	N	FAC
5.			
	72	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15ft)			
1. Symphoricarpos orbiculatus	30	Y	FACU
2. Celtis laevigata	5	N	FAC
3. Ulmus americana	5	N	FAC
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. Elymus canadensis	35	Y	FAC
2. Chasmanthium latifolium	5	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 30ft)			
1. Smilax bona-nox	5	Y	FACU
2. Toxicodendron radicans	3	Y	FACU
% Bare Ground in Herb Stratum 60	8	= Total Cover	

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: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 37 (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.)

Site consists of mature forested riparian habitat located on a river levee.

SOIL

Sampling Point: SP 5

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
0-18	5YR 4/4	84					Loamy Clay	Clay Texture
	5YR 4/2	16					Loamy Clay	Clay Texture

[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) **(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) **(LRRI, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRRH outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ✓ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): NA

Hydric Soil Present? Yes X No ____

Remarks:

Hydric soil indicators were observed. Criteria not met.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ 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? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

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

Remarks:

No primary and one secondary wetland hydrology indicators observed. Criteria not met.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Deep Fork Mitigation Bank City/County: Lincoln Sampling Date: 2-15-15

Applicant/Owner: Excel State: OK Sampling Point: SP 6

Investigator(s): Jason Hoffman Section, Township, Range: 31 - 14N - 4E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): LRR Lat: 35.646164 Long: -96.924481 Datum:

Soil Map Unit Name: Easpur 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 _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: .

Site consists of juvenile, naturally regenerated bottomland hardwood on edge of moist soil unit. Three of three wetland criteria met. Site is a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica	35	Y	FAC
2. Ulmus americana	25	Y	FAC
3. Salix nigra	10	N	FACW
4. Maclura pomifera	5	N	FACU
5.			
	75	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. Fraxinus pennsylvanica	20	Y	FAC
2. Ulmus americana	8	Y	FAC
3. Maclura pomifera	3	N	FACU
4.			
5.			
	31	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. Elymus canadensis	10	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	10	= Total Cover	
Woody Vine Stratum (Plot size: 30ft)			
1. None			
2.			
% Bare Ground in Herb Stratum 90		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (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.)

Site consists of juvenile, naturally regenerated bottomland hardwood on edge of moist soil unit.

SOIL

Sampling Point: SP 6

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	5YR 4/4	96	5YR 4/6	4	C	PL	Clay Loam	Loamy Texture

[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) **(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) **(LRRI, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRRH outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ✓ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): NA

Hydric Soil Present? Yes X No ____

Remarks:

Hydric soil indicators were observed. Criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ 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? (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:

Inundation visible on 2014 aerial photogrpahs

Remarks:

Five primary and one secondary wetland hydrology indicators observed. Criteria met.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Deep Fork Mitigation Bank City/County: Lincoln Sampling Date: 2-15-15

Applicant/Owner: Excel State: OK Sampling Point: SP 7

Investigator(s): Jason Hoffman Section, Township, Range: 31 - 14N - 4E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): convex Slope (%): 0-1

Subregion (LRR): LRR Lat: 35.646453 Long: -96.923948 Datum:

Soil Map Unit Name: Easpur 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 _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes _____	No X	

Remarks: .

Site consists of mature hardwood dominated riparian habitat. One of three wetland criteria met. Site is not a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Celtis laevigata	45	Y	FAC
2. Ulmus americana	20	Y	FAC
3. Carya illinoensis	10	N	FAC
4. Populus deltoides	5	N	FAC
5.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15ft)			
1. Symphoricarpos orbiculatus	25	Y	FACU
2. Juniperus virginiana	10	Y	UPL
3. Celtis laevigata	8	N	FAC
4.			
5.			
	43	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. Elymus canadensis	45	Y	FACU
2. Chasmanthium latifolium	15	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	60	= Total Cover	
Woody Vine Stratum (Plot size: 30ft)			
1. Smilax bona-nox	6	Y	FACU
2. Vitis riparia	4	Y	FAC
% Bare Ground in Herb Stratum 40	10	= Total Cover	

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: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 37 (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.)

Site consists of mature hardwod dominated riparian habitat .

SOIL

Sampling Point: SP 7

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
0-18	5YR 4/4	100					Silty Sand	Sand Texture

[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) **(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) **(LRRI, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRRH outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ✓ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): NA

Hydric Soil Present? Yes X No ____

Remarks:

Hydric soil indicators were observed. Criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ 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? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

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

Remarks:

No primary and one secondary wetland hydrology indicators were observed. Criteria not met.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Deep Fork Mitigation Bank City/County: Lincoln Sampling Date: 2-15-15

Applicant/Owner: Excel State: OK Sampling Point: SP 8

Investigator(s): Jason Hoffman Section, Township, Range: 31 - 14N - 4E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): LRR Lat: 35.645154 Long: -96.926853 Datum:

Soil Map Unit Name: Ashport clay 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 _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: .

Site consists of herbaceous dominated emergent wetland habitat in a moist soil unit. Three of three wetland criteria met. Site is a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15ft)			
1. None			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Iva annua	25	Y	FAC
2. Panicum anceps	20	Y	FAC
3. Polygonum pennsylvanicum	20	Y	FAC
4. Paspalum floridanum	15	N	FACW
5. Cyperus setigerus	12	N	FAC
6. Carex crus-corvi	8	N	OBL
7. Ammannia coccinea	5	N	OBL
8. Helianthus debilis	3	N	FAC
9. Xanthium strumarium	2	N	FAC
10.			
	110 = Total Cover		
Woody Vine Stratum (Plot size: 30ft)			
1. Cardiospermum halicacabum	6	Y	FAC
2.			
% Bare Ground in Herb Stratum 0	6 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding 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	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.)

Site consists of herbaceous dominated emergent wetland habitat in a moist soil unit.

SOIL

Sampling Point: SP 8

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
0-18	2.5YR 4/3	95	2.5YR 4/6	5	C	M	Clay	Clay Texture

[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) **(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) **(LRRI, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRRH outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ✓ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): NA

Hydric Soil Present? Yes X No ____

Remarks:

Hydric soil indicators were observed. Criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ 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? (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:

Inundation visible on 2014 aerial photogrpahs

Remarks:

Three primary and two secondary wetland hydrology indicators observed. Criteria met.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Deep Fork Mitigation Bank City/County: Lincoln Sampling Date: 2-15-15

Applicant/Owner: Excel State: OK Sampling Point: SP 9

Investigator(s): Jason Hoffman Section, Township, Range: 31 - 14N - 4E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): LRR Lat: 35.643889 Long: -96.927672 Datum:

Soil Map Unit Name: Ashport clay 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 _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: .

Site consists of mature bottomland forested wetland habitat within moist soil unit. Three of three wetland criteria met. Site is a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Celtis laevigata	35	Y	FAC
2. Carya illinoensis	15	Y	FAC
3. Ulmus americana	10	N	FAC
4. Salix nigra	5	N	FACW
5. Maclura pomifera	3	N	FACU
	68	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15ft)			
1. Celtis laevigata	12	Y	FAC
2. Ulmus americana	10	Y	FAC
3. Symphoricarpus orbiculatus	8	Y	FACU
4. Maclura pomifera	3	N	FACU
5.			
	33	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. Chasmanthium latifolium	10	Y	FACU
2. Cyperus rotundus	8	Y	FAC
3. Elymus canadensis	6	N	FACU
4. Daucus carota	5	N	UPL
5.			
6.			
7.			
8.			
9.			
10.			
	29	= Total Cover	
Woody Vine Stratum (Plot size: 30ft)			
1. None			
2.			
% Bare Ground in Herb Stratum 71		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71 (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.)

Site consists of mature bottomland forested wetland habitat within moist soil unit.

SOIL

Sampling Point: SP 9

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
0-18	2.5YR 4/4	94	2.5YR 4/6	6	C	M	Loamy Clay	Clay Texture

[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) **(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) **(LRRI, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRRH outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ✓ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): NA

Hydric Soil Present? Yes X No ____

Remarks:

Hydric soil indicators were observed. Criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ 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? (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:

Four primary and one secondary wetland hydrology indicators observed. Criteria met.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Deep Fork Mitigation Bank City/County: Lincoln Sampling Date: 2-15-15

Applicant/Owner: Excel State: OK Sampling Point: SP 10

Investigator(s): Jason Hoffman Section, Township, Range: 31 - 14N - 4E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): LRR Lat: 35.644618 Long: -96.923418 Datum:

Soil Map Unit Name: Easpur 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 ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: .

Site consists of herbaceous dominated emergent wetland habitat in a moist soil unit. Three of three wetland criteria met. Site is a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. None			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Polygonum pennsylvanicum	25	Y	FAC
2. Cyperus setigerus	15	Y	FAC
3. Iva annua	12	Y	FAC
4. Paspalum floridanum	8	N	FACW
5. Xanthium strumarium	5	N	FAC
6. Ammannia coccinea	3	N	OBL
7.			
8.			
9.			
10.			
	58 = Total Cover		
Woody Vine Stratum (Plot size: 30ft)			
1. Cardiospermum halicacabum	3	Y	FAC
2.			
% Bare Ground in Herb Stratum 42	3 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding 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	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.)

Site consists of herbaceous dominated emergent wetland habitat in a moist soil unit.

SOIL

Sampling Point: SP 10

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
0-18	2.5YR 4/4	96	2.5YR 4/6	4	C	M	Clay	Clay Texture

[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) **(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) **(LRRI, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRRH outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ✓ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): NA

Hydric Soil Present? Yes X No ____

Remarks:

Hydric soil indicators were observed. Criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ 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? (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:

Inundation visible on 2014 aerial photogrpahs

Remarks:

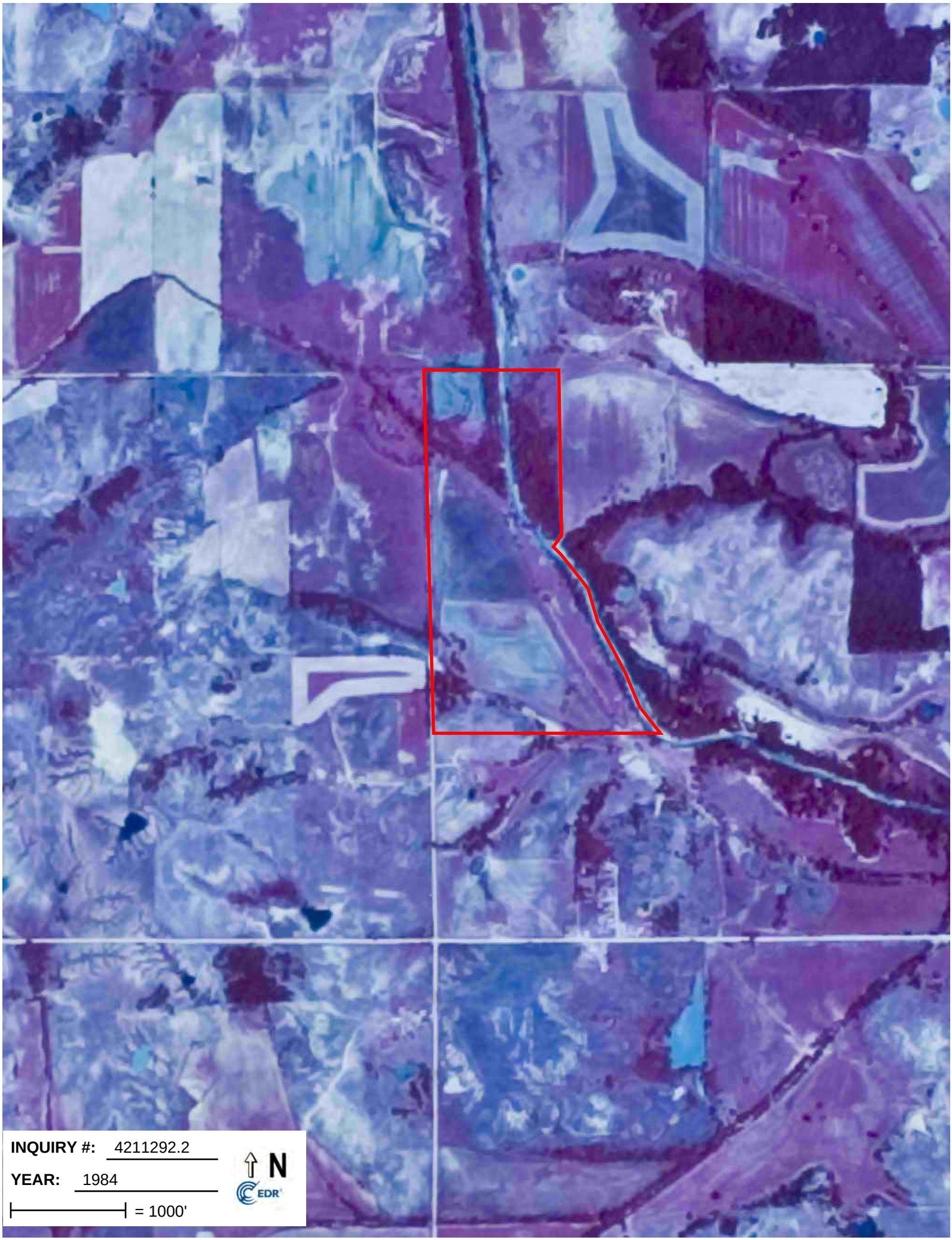
Five primary and one secondary wetland hydrology indicators observed. Criteria met.

APPENDIX D

HISTORIC AERIALS:


INQUIRY #: 4211292.2
YEAR: 1973
= 500'
N
EDR


INQUIRY #: 4211292.2
YEAR: 1980
= 1000'
N
EDR


INQUIRY #: 4211292.2
YEAR: 1984
= 1000'
N
EDR


INQUIRY #: 4211292.2
YEAR: 1995
= 500'
N
EDR


INQUIRY #: 4211292.2
YEAR: 2005
= 500'
N
EDR

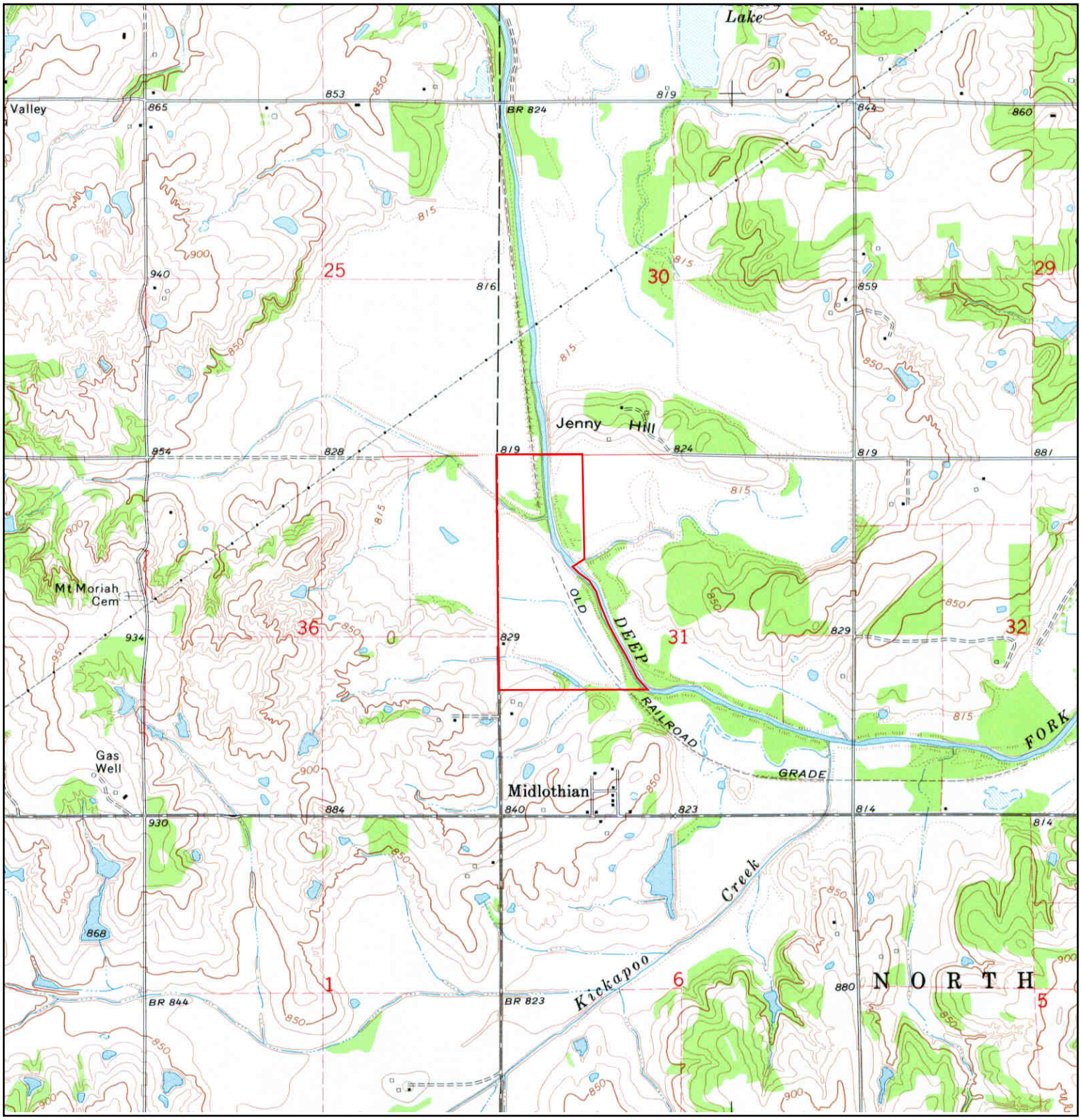

INQUIRY #: 4211292.2
YEAR: 2006
= 500'
N
EDR


INQUIRY #: 4211292.2
YEAR: 2010
= 500'
N
EDR

Historical Topographic Map

N	TARGET QUAD NAME: CHANDLER MAP YEAR: 1907 SERIES: 15 SCALE: 1:62500	SITE NAME: Lincoln 114 ADDRESS: E0950 Rd/N3410 Chandler, OK 74834 LAT/LONG: 35.6477 / -96.9261	CLIENT: Hoffman Environmental CONTACT: Jason Hoffman INQUIRY#: 4211292.1 RESEARCH DATE: 02/18/2015

Historical Topographic Map



N	TARGET QUAD NAME: CHANDLER MAP YEAR: 1974 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Lincoln 114 ADDRESS: E0950 Rd/N3410 Chandler, OK 74834 LAT/LONG: 35.6477 / -96.9261	CLIENT: Hoffman Environmental CONTACT: Jason Hoffman INQUIRY#: 4211292.1 RESEARCH DATE: 02/18/2015

APPENDIX E

SITE PROTECTION INSTRUMENT:

DECLARATION OF RESTRICTIVE COVENANTS

The Declarant, _____, is the fee simple owner of the certain real property located in _____ County, Oklahoma, as described on Exhibit A, which is attached hereto and incorporated herein by reference (the "Development"). Declarant has applied for and received Permit No. _____ from the United States Army Corps of Engineers (the "Corps") to fill certain wetlands in waters of the United States (the "Permit"). In consideration of the issuance of the Permit and in compliance with the terms thereof, and for other good and valuable consideration, the Declarant hereby declares that that the portion of the Development described in Exhibit B ("the Property") shall henceforth be subject to the following restrictive covenants (the "Restrictions"). As used herein, the term "Declarant" includes and shall be binding upon _____ and his/her/its successors, heirs, and assigns.

1. **Purpose:** The purpose of these Restrictions is to retain and maintain land or water areas on the Property in their natural, vegetative, hydrologic, scenic, open, agricultural, or wooded condition, and to retain such areas as suitable habitat for fish, plants, or wildlife. Those wetland or upland areas that are to be restored, enhanced, or created pursuant to the Permit shall be retained and maintained in the restored, enhanced, or created condition required by the Permit.

2. **Rights of Corps and Owners in the Development:** The following rights are conveyed to the Corps and any Owner of any parcel of real estate in the Development (the "Owner" or "Owners"):

a. The right to take action to preserve and protect the environmental value of the Property; and

b. The right to prevent any activity on or use of the Property that is inconsistent with the purpose of these Restrictions, and to require the restoration of areas or features of the Property that may be damaged by any inconsistent activity or use;

c. The right to enter upon and inspect the Property in a reasonable manner and at reasonable times to determine if the Declarant is complying with the covenants and prohibitions contained in these Restrictions; and

d. The right to proceed at law or in equity to enforce the provisions of these Restrictions, and to prevent the occurrence of any of the prohibited activities hereinafter set forth.

3. **Prohibited Uses:** Except for restoration, creation, enhancement, maintenance, and monitoring activities, or surface water management improvements, which are permitted or required by the Permit, the following activities are prohibited on the Property:

a. Construction of any structure or object (i.e., buildings, roads, above or below ground utilities, signs, billboards etc.) without written approval from the Corps of Engineers prior to construction;

b. Dumping or placing of soil or other substance or material as landfill, or dumping or placing of trash, waste, or unsightly or offensive materials;

c. Removal or destruction of trees, shrubs, or other vegetation, except as may be permitted by the Permit, and except for the removal of nuisance, exotic, or non-native vegetation in accordance with a maintenance plan approved by the Corps;

d. Planting of nuisance, exotic, or non-native plants as listed by the State of Oklahoma;

e. Exploration for, or extraction of, oil or gas in such a manner as to affect the surface, or excavation, dredging, or removal of coal, loam, peat, gravel, soil, rock, or other material substance, except as may be permitted or required by the Permit;

f. Use of motorized and non-motorized vehicles, the keeping or riding of horses, grazing, livestock confinement, or other surface use that may affect the natural condition of the Property, except for vehicle use for purposes of maintenance and upkeep, or as otherwise may be permitted or required by the Permit;

g. Tilling, plowing, planting of crops, digging, mining, or other activities that are or may be detrimental to drainage, flood control, water conservation, water quality, erosion control, soil conservation, or fish and wildlife habitat preservation, including but not limited to ditching, diking, and fencing, except as permitted or required by the Permit;

h. The extraction of water from the Property or adjacent properties owned by Grantor, or the impoundment of water on the Property or on adjacent properties owned by Grantor, so as to affect the hydrology of the Property;

i. Acts or uses detrimental to the aforementioned retention and maintenance of land or water areas;

j. Acts or uses detrimental to the preservation of the structural integrity or physical appearance of sites or properties of historical, architectural, archaeological, or cultural significance.

4. **Reserved Rights:** Declarant reserves all rights as owner of the Property, including the right to engage in uses of the Property that are not prohibited herein and that are not inconsistent with any Corps rule, criteria, permit, or the intent and purposes of these Restrictions.

5. **Taxes:** Declarant shall pay any and all applicable real property taxes and assessments levied by competent taxing authority on the Property.

6. **Maintenance:** Declarant shall, at Declarant's sole expense, operate, maintain and keep up the Property consistent with the purpose of these Restrictions. Declarant shall remove from the Property any nuisance, exotic, or non-native plants, if applicable, as listed by the State of Oklahoma and shall maintain the hydrology of the Property as it currently exists or as otherwise required by the Permit.

7. **Public Access:** No right of access by the general public to any portion of the Property is conveyed by these Restrictions.

8. **Liability:** Declarant shall continue to retain all liability for any injury or damage to the person or property of third parties that may occur on the Property arising from solely by reason of ownership of the Property. Neither Declarant, nor any person claiming by or through Declarant, shall hold the Corps or any Owner liable for any damage or injury that may occur on the Property.

9. **Recording Requirements:** Declarant shall record these Restrictions in the official records of _____ County, Oklahoma, and shall re-record these Restrictions at any time the Corps may require to preserve its rights. Declarant shall pay all recording costs and taxes necessary at any

time to record these Restrictions in the public records. Declarant shall thereafter insert the terms and restrictions of these Restrictions in any deed or other legal instrument by which Declarant divests himself/herself/itself of any interest in the Development, and shall provide a copy of these Restrictions to the new owner(s).

10. **Enforcement:** The terms and conditions of these Restrictions may be enforced in an action at law or equity by the Corps or any Owner against the Declarant or any other party violating or attempting to violate these Restrictions. Venue for any such action shall be in _____ County, Oklahoma. Enforcement of these Restrictions shall be at the reasonable discretion of the Corps or Owner, and any forbearance on behalf of the Corps or Owner to exercise any right hereunder in the event of any breach by Declarant shall not be deemed or construed to be a waiver of rights. Any costs incurred in enforcing, judicially or otherwise, the terms, provisions, and restrictions of these Restrictions, including without limitation, the costs of suit, and attorney's fees, shall be borne by and recoverable against the non-prevailing party in such proceedings, except that such costs shall not be recoverable against the Corps. In addition, if the Corps or any Owner shall prevail in an enforcement action, such party shall also be entitled to recover that party's cost of restoring the land to the natural vegetative and hydrologic condition existing at the time of execution of these Restrictions or to the vegetative and hydrologic condition required by the Permits.

11. **Effect of Restrictions:** These Restrictions shall take effect immediately upon declaration and shall run with the land in perpetuity. These Restrictions shall be deemed to survive unity of title. Declarant shall take no action to rescind, revoke, or otherwise nullify these Restrictions.

12. **Successors:** The covenants, terms, conditions, and restrictions of these Restrictions shall be binding upon, and inure to the benefit of the parties hereto and their respective personal representatives, heirs, successors, and assigns, and shall continue as a servitude running in perpetuity with the Property.

13. **Notices:** All notices, consents, approvals, or other communications hereunder shall be in writing and shall be deemed properly given if sent by United States certified mail, return receipt requested, addressed to the appropriate party or successor-in-interest. Any and all notices to the Declarant may be addressed to:

14. **Severability:** If any provision of these Restrictions or the application thereof to any person or circumstances is found to be invalid, the remainder of the Restrictions shall not be affected thereby, as long as the purpose of these Restrictions is preserved.

15. **Alteration or Revocation:** These Restrictions may be amended, altered, released, canceled, or revoked only by written agreement between all then-current owners of all parcels of land located in the Development as shown the by the public records of _____ County, Oklahoma. No action shall be taken, however, without advance written approval by the Corps. Corps approval shall be by letter attached as an exhibit to the document amending, altering, canceling, or revoking the Restrictions, and said letter shall be informal and shall not require notarization. It is understood and agreed that Corps approval requires a minimum of sixty (60) days written notice to the Corps, and that the Corps may require substitute or additional mitigation, a separate conservation easement or alternate deed restrictions, or other requirements as a condition of approval. Any amendment, alteration, release, cancellation, or revocation together with written Corps approval

thereof shall then be filed in the public records of _____ County, Oklahoma, within 30 days thereafter.

16. **Controlling Law:** The interpretation and performance of these Restrictions shall be governed by the laws of the State of Oklahoma.

IN WITNESS WHEREOF, the Declarant has executed this Declaration of Covenants and Restrictions this _____ day of _____, 20___.

Signed in the presence of: DECLARANT:

_____ _____

Print Witness Name: _____ By: _____

Print: _____

Title: _____

_____

Print Witness Name: _____

STATE OF OKLAHOMA
COUNTY OF _____

The foregoing Declaration of Restrictive Covenants was acknowledged before me this _____day of _____, 20___, by _____as _____ of _____ who is personally known to me or has produced _____ _____ as identification.

My Commission Expires:

_____

NOTARY PUBLIC

APPENDIX F

CULTURAL RESOURCES PHASE I SURVEY REPORT:

Holt Consulting Services, LLC

9524 E. 81st St., Suite B – Tulsa, OK 74133

(918) 407-2457 James@HoltCRM.com

www.HoltCRM.com

Archaeological Survey Report for Green Country Wetland Mitigation, LLC Deep Fork Mitigation Bank Project near Midlothian, Lincoln County, OK

Holt Consulting Services, LLC Project Number: 2015-37-OK

USACE Project Control Number: SWT-2015-094

Conducted for: Hoffman Environmental, Inc.

Project Name: Deep Fork Mitigation Bank (DFMB)

Project Legal Location: Portions of E/2 of Sec 31, T14N R4E

USGS Quad map: Chandler, OK

Land Status: Private, Unrestricted

Surveyed by: James R. Holt & Russell DeVore

Survey Date: September 17, 30, and October 2, 2015

Report Prepared by: James R. Holt on October 12, 2015

Notice: This report was prepared for review by approved parties only and is not intended for public release. All information contained (including maps and imagery) is confidential. Permission must be sought from Hoffman Environmental, Inc, Green Country Wetland Mitigation, LLC, the Oklahoma SHPO, and the Oklahoma Archaeological Survey prior to public release, and all maps and site references must first be removed lacking such permission.

Project Summary / Abstract

An archaeological survey of the Green Country Wetland Mitigation, LLC DFMB project, near the town of Midlothian, Lincoln County, OK was performed in September and October, 2015 by James R. Holt of Holt Consulting Services, LLC, and assisted by Russell DeVore, BA in Anthropology. The project is located on private land in Lincoln County, Oklahoma.

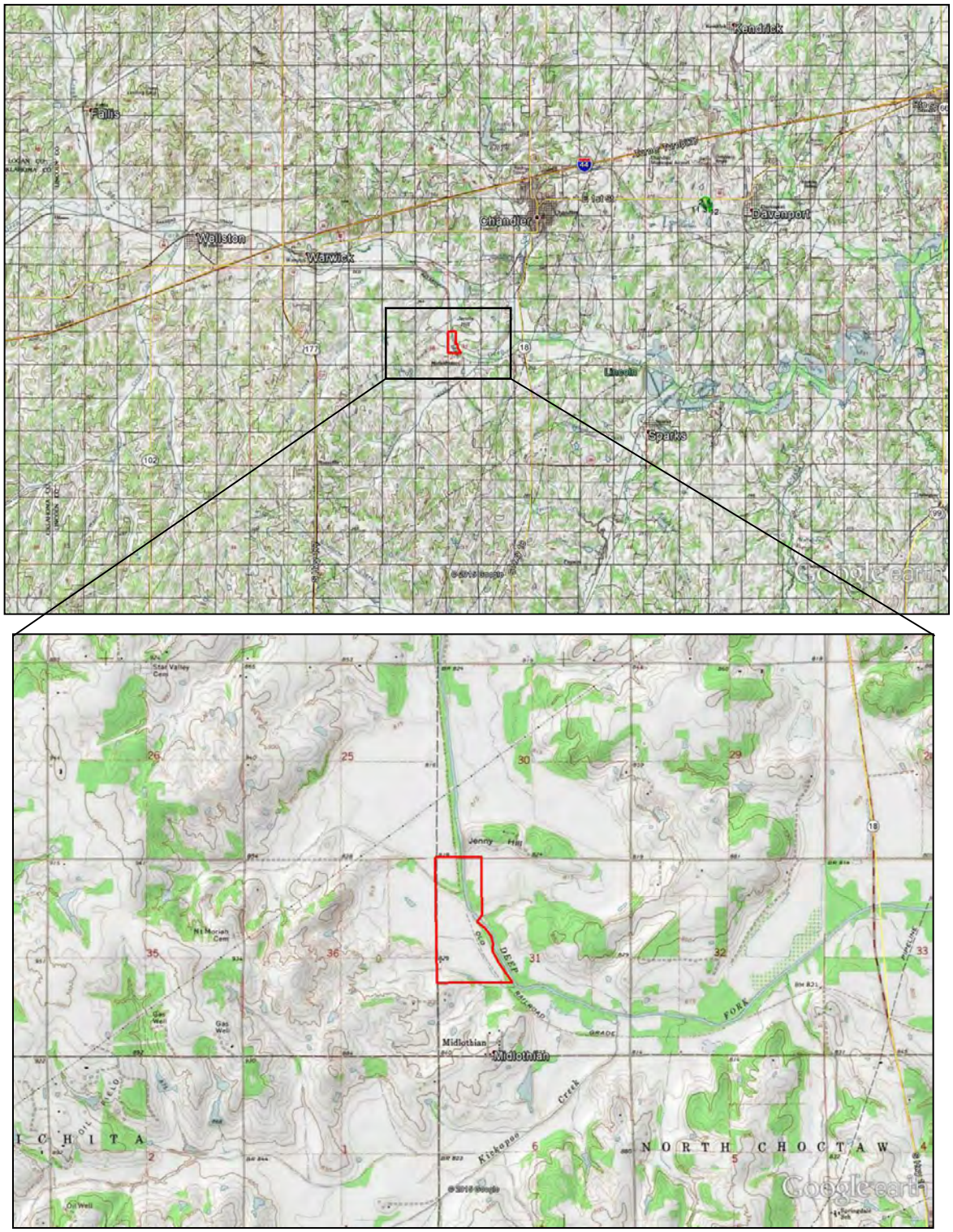
The archaeological survey consisted of a standard format file search, field survey, and report. The purpose of the investigation was to ensure that no cultural resources would be disturbed by the proposed removal of trees and replanting of trees in the parcel for mitigation purposes. The investigation was initiated at the request of Mr. Jack Dunnavant of Green Country Wetland Mitigation, LLC, PO Box 1326 Carthage, TX 75633 and Mr. Jason Hoffman of Hoffman Environmental, Inc., PO Box 452 Sulphur Springs, TX 75483. No significant cultural resources were encountered in the course of this investigation.

The recommendations contained in this report are subject to review and comment by the relevant Federal agencies, the Oklahoma SHPO, State Archaeologist, and various interested tribes and consulted parties in Section 106 of the National Historic Preservation Act and subsequent entries in the CFR.

Introduction

The Green Country Wetland Mitigation, LLC DFMB project includes approximately 114 acres of surface area on both sides of the Deep Fork of the Canadian River. Shovel test pits (STPs) were dug in areas that were judged to be high probability areas that were not clearly disturbed by recent activity on the land. The STP's were all dug to a depth of at least 50 cm and to a diameter of 50 cm. All non-inundated portions of the parcel were examined by a minimum of pedestrian transects supplemented with shovel turns, with some areas also being checked with STPs to check the subsurface for unknown cultural remains. A total of 17 STPs were dug in the 30 acres suitable for intensive investigation. Two historic sites were recorded in the course of the investigation, but both appear in historic aerial imagery in 1977 and 1995, meaning they

do not meet the 50 year standard for site listing at this time. In total, 48 man hours were spent in the field for this project.



Area maps of the study area, Chandler, OK Quad. Area is outlined in red.

Environmental Setting

The project location is in central Lincoln County, OK at approximately 820 feet in elevation. The project is located in the Cherokee Platform physiographic region of Oklahoma, in the Cross Timbers vegetation area. The Cross Timbers is a vegetation zone that consists of dense bands of broadleaf forests, largely composed of Blackjack, White, and Red Oak Trees broken by bluestem prairies. Mean annual temperatures for the area are 58 - 61 degrees Fahrenheit with annual precipitation at 36 - 42 inches and 200 - 220 frost free days a year. The dominant soil units in the area are the "Ustibuck clay" in the northern portion of the study area, the Easpur loam in a large portion of the central area of the parcel along the river, the "Miller clay" in the regularly flooded areas, and "Darsil-Stephenville complex" and the "Renthin-Grainola complex" in the southern portions of the study area according to the National Resources Conservation Service (NRCS) Soil Survey. The Ustibuck clay is a clay alluvial soil found in areas that are frequently flooded and is composed of clay soils down to more than 200 cm. The Easpur loam is a fine sandy loam alluvial soil found on flood plains, and is the native soil unit in this area near the Deep Fork River, with a stratified fine sandy loam and sand structure down to depths below 130 cm. The Darsil-Stephenville complex is a severely eroded slope soil derived from weathered sandstone and shale. The Renthin-Grainola complex is a soil unit comprised of silty clay loam above clay soils with bedrock being found between 125 and 200 cm. Early explorers of the area described it to have rich grasses with herds of buffalo, deer, and many other small mammals and birds. Today the area is dominated by cattle and farmlands. The project area drains into the Deep Fork of the North Canadian River, which flows through the middle of the project boundaries. The Deep Fork River would have been a strong draw for humans in both the prehistoric and historic periods, but subsequent human modification has altered the soils locally to the point of reducing the likelihood of intact cultural resources being present.

Cultural History

The State of Oklahoma has a long history of human habitation, beginning in Paleo-Indian times (c. 15,500 years ago) with continued occupations through to modern era (Wyckoff and Brooks eds,

1983). During the Paleo-Indian period, large portions of North America were traversed by nomadic hunter-gatherer groups who subsisted primarily on the now-extinct megafauna of the Pleistocene epoch. In following the herds upon which they subsisted, the Paleo-Indian hunter-gatherers spread across North America, eventually traveling as far south as western South America (Kelly and Todd, 1988).

Evidence for the earliest Paleo-Indian occupation of Oklahoma comes from several sites in western Oklahoma, including the Cooperton site and the Domebo site (Gilbert and Brooks, 2000). Both sites are comprised of disarticulated mammoth bones, with associated tools indicating human consumption of the animal.

The Archaic period represented substantive change in the peoples of the Great Plains. After significant climate change, in which the region became warmer and drier and the Ice Age megafauna became extinct, indigenous peoples began focusing their subsistence on modern animal species (such as bison and deer) and increased their reliance on plant foods (Henry, 1998). These changes resulted in the production and use of a wider range of tools, including ground stone axes and grinders, bone awls, and wooden atlatls (Hofman, 1989).

In general on the Great Plains, the Plains Woodland period is thought to extend from ~1950-950b.p. (Vehik 1985) and in many ways seen as a continuation from the Archaic period with a few key changes. During this time, there is the beginning of a ceramic technology, the adoption of cultigens (maize, beans, and squash), the introduction the bow and arrow, and the elaboration of ground stone tools (Johnson and Johnson 1998). People throughout this period were mostly mobile hunter/gatherers; however, with the emergence of horticulture towards the end of the Plains Woodland, groups became more sedentary as reflected in larger settlements with semi-permanent housing structures. (Johnson and Johnson 1998: 214-217). While the bow and arrow was beginning to be used, the dominant projectile point remained dart points, most likely cast by an atlatl. In Oklahoma, the Plains Woodland period was marked by early farming, accompanied by the first usage of pottery in North America. Scrapers and hoes, manos and metates (grinding stones), and ground stone axes and adzes were all typical artifacts of the Plains Woodland period (Gilbert and Brooks, 2000). An example of the Plains Woodland period to in Oklahoma is the Pruitt site in Murray County. Excavated in 1966 by Barr, the site established the Pruitt complex, which defines the southern Plains Woodland occupation (Hartley, 1974). Its characteristics include cord-marked pottery, stemmed and corner-notched projectile points, shell and stone scrapers and hoes, and some bone tools such as awls and flint-knapping tools. Radio-carbon dates

from the site suggest that this occupation occurred sometime between the 7th and 9th centuries AD, but occupation at the site continued beyond these dates (Hartley, 1974).

During the following Plains Village period which dates to approximately 950-500b.p. (Vehik 1985, Henry 1977), a dramatic shifts occurred in the life ways of the inhabitants of the region. With a greater reliance on horticulture, groups became more sedentary, with seasonal or even more permanent settlements accompanied by larger and more substantial structures (Drass 1998). There also appears to have been a trend of the coalescence of villages into fewer, larger communities; some of which in the central and northern plains appear to exhibit fortifications. In the Southern Plains, while people were farming, they still relied heavily on hunting and gathering (Drass 1998). The greater emphasis on horticulture during the period is thought to have accounted for the greater abundance of ceramic containers for storage of food-stuff. The greater focus on ceramic technology is reflected in a shift in the use of shell and mica temper over sand, although sand temper is still used. In the Southern Plains it appears that this change in the use of shell temper is much more pronounced as there is virtually no sand temper found during these later times (Johnson and Johnson 1998). By this time, people are also relying more on bow and arrows than darts, although dart points still show up throughout the period (Henry 1977). In Oklahoma, Plains Village cultures are characterized by permanent housing structures, agriculture, bison hunting, and the production of smaller, more triangular projectile points (Bell, 1961). The most common projectile points are arrow points of Fresno and Washita varieties. Two other chipped stone tools that are frequently recovered during this time also include scrapers (snub-nosed made from Alibates) and diamond-beveled knives. As for ceramics, most are globular in shape (George 1982).There is a wider range of representation for this period than the preceding cultural stages, and several late prehistoric complexes have been defined. These include the Washita River and Custer occupations of western Oklahoma, the Antelope Creek and Optima occupations of the Texas and Oklahoma panhandles, and the Henrietta occupation of central and north Texas (Bell, 1961).

Contact was first made with the indigenous peoples of Oklahoma in 1541 when European explorers reached the central United States (Rasmussen, 2000). During the next several generations, the French and Spanish explorers encountered various tribal groups, and conflict began to occur between the Native Americans and Europeans (Tennant, 1936). This interaction is exemplified by the Spanish Fort site located on the Red River between Jefferson County, Oklahoma and Montague County, Texas. The site is comprised of two fortified towns on the river which served as a trading center for French settlers and the Comanche and Taovayas Wichita (Vehik, 2002). In 1759, in response to

military conflict between natives and the Spanish, the outpost was attacked by Spanish forces led by Colonel Diego Ortiz Parrilla. However, the site withstood the attack, and Parrilla was killed in the battle (Vehik, 2002).

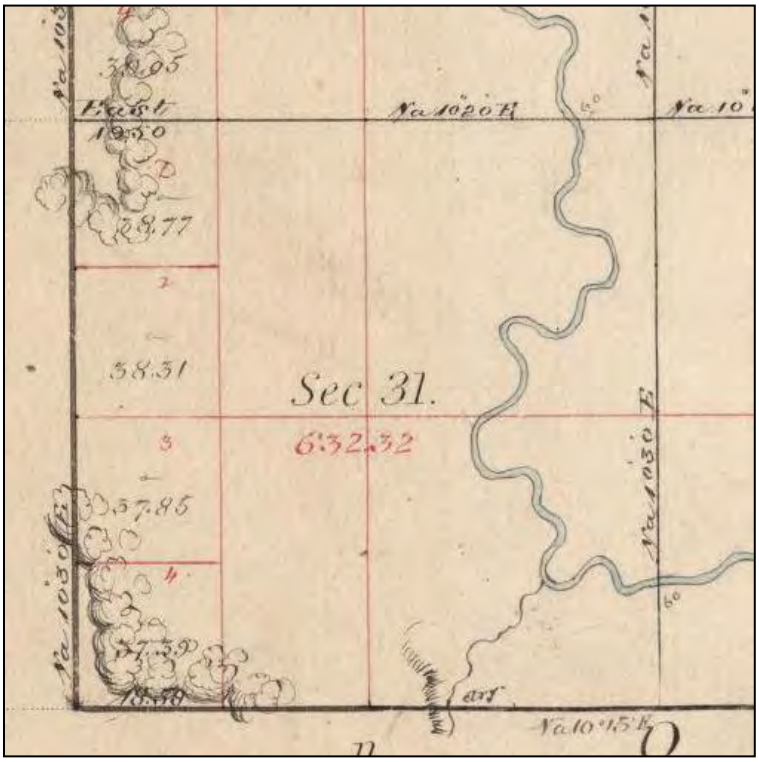
In the early 19th Century, white expansion continued. After the Louisiana Purchase of 1803, Oklahoma was acquired as a United States territory, and the country began to put pressure on native peoples to either conform to white society or leave their traditional lands for the western territories. The territory that was to become Oklahoma was initially administered through the Missouri Territory, but as Missouri was becoming a state in 1819, most of Oklahoma became part of the Arkansas Territory (Odell, 2002). The 1820's saw many French and American settlers and trappers moving into the area and several forts (Fort Smith along the Arkansas, Fort Gibson and Towson) were all built to aid in protection and trade (Odell, 2002). After the passing of the Indian Removal Act in 1830, 60 tribes native to the eastern United States were forcibly driven out of their homelands and into Oklahoma (Wright, 1977). The infamous Trail of Tears ended in Oklahoma with devastating losses to the indigenous populations.

Lincoln County was added to the United States with the Louisiana Purchase in 1803, and became part of Indian Territory as the newly acquired land was subdivided. Prior to the removal of eastern native tribes, the land was hunted and inhabited by numerous native tribes including the Osage and Wichita before treaties led to the relinquishment of rights in 1825. The land was assigned to the Creeks and Seminoles until they relinquished in the Reconstruction Treaties in 1866 and assigned to the Sac and Fox, Potawatomi, Kickapoo, and Iowa tribes. The Jerome Commission negotiated allotment with the tribes which led to a land run in 1891 for the non-Kickapoo lands, with the Kickapoo lands opened to white settlement in 1895 following a separate treaty. The West Shawnee Trail moved cattle through the area along a route that roughly follows modern state highway 18 starting in the late 1860's until the railroads became players in the region in the 1880's and 1890's. Lincoln County was incorporated into the new State of Oklahoma with the Organic Act in 1907. (Mullins, 2009)

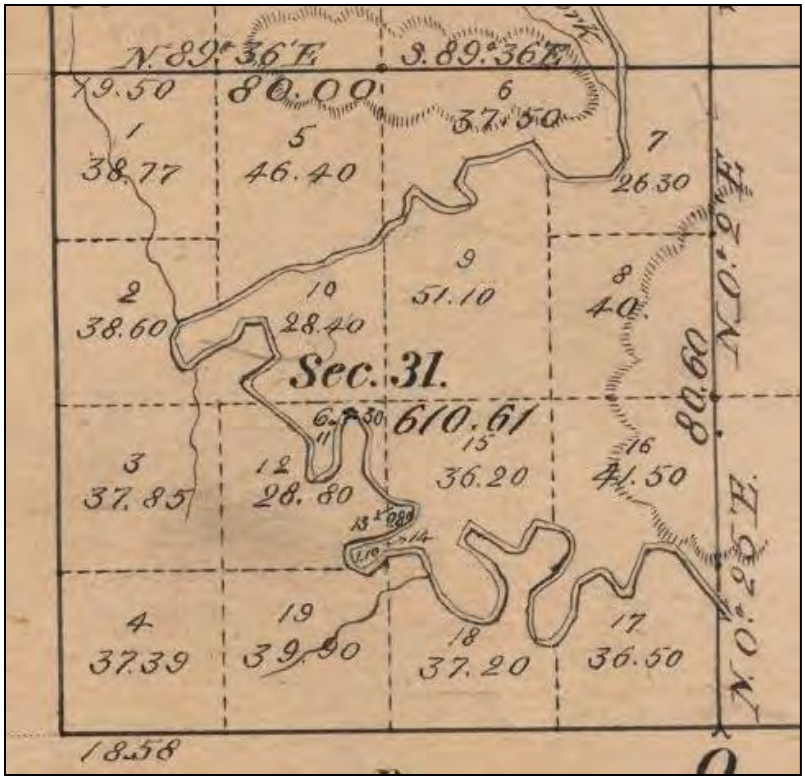
Pre-field Investigation and Records Check

The Oklahoma Archaeological Survey was consulted on September 2, 2015 regarding the presence or absence of known sites in the study area, with no previously reported archaeological sites located within 1 mile of any portion of the project boundaries. Additionally, the NRHP was consulted to determine if any listed sites could be impacted by the

proposed project, with no listings found within the boundaries of the project location. Government Land Office (GLO) survey maps from 1872 and 1893 were consulted to determine if any historic structures were shown that could be effected by the project. The maps showed no structures standing in the vicinity of the project parcel. Historic aerial photographs from 1954, 1973, 1995, 2003, 2005, 2010, 2012, and 2014 were consulted with two structures in the south end of the parcel and changes to the use of the land noted. According to the client, the land was used as agricultural property following channelization of the river. Levees were constructed to keep flood water out of the fields. In the 1990's, the land was converted into wetland for the purposes of hunting, especially waterfowl, with the levees used to hold water from the creeks and rains in the former fields. The Deep Fork River was channelized between 1910 and 1923 to help reduce flooding downstream. The 1907 Chandler 15 x 15 grid map was examined to check for the course of the river prior to alteration and to see if any structures might have existed between the dates of the GLO maps and the aerial imagery. No structures are shown in the vicinity of the project, with the nearest structures located to the south in Midlothian and in neighboring sections.



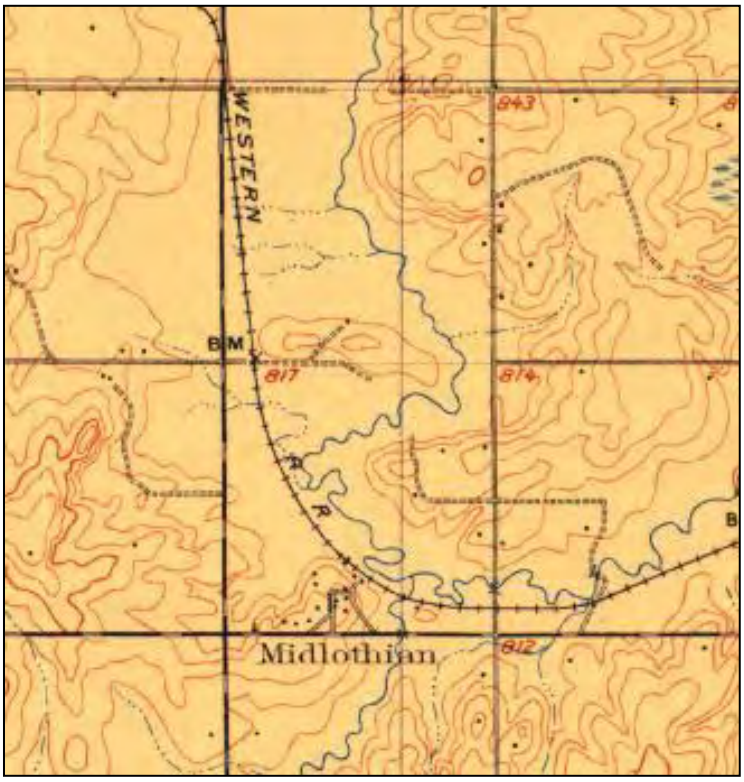
1872 GLO Map of the study area.



1893 GLO Map of the study area.

1954 Historic Aerial Image of the project area.

1954 Historic Aerial Image of the project area.



1907 Chandler 15 x 15 topographic grid map

Field Methods and Analytical Techniques

The planned mitigation area was researched in accordance with US Army Corps of Engineers (USACE) Tulsa District archaeological field methodology standards, and the methodology was tailored to comply with the local conditions encountered on the days of field investigation. USACE archaeologists were consulted prior to fieldwork regarding deep testing and shovel test depths and patterns. All components of the project were subject to pedestrian surface investigation with not more than 15 meter intervals. In areas exhibiting less than 30% surface visibility, the transects were supplemented by shovel turns and, in high probability areas, shovel test pits (STPs) were included to check the subsurface for buried cultural deposits. All shovel turns in this field investigation were done in accordance with USACE field standards by cutting a rough square with each side being a shovel blade's width, down to a shovel blade's depth, then sorting through the soil by hand to check for cultural remains. All STPs were dug in 50 x 50 cm square units, down to a depth of at least 50 cm. The STPs were dug in 10 cm intervals, and when the soil allowed, was sifted through a ¼ inch mesh screen to isolate any cultural remains. The majority of the soil encountered in the STPs was wet and clayey, and would not cleanly pass through a screen, so close hand sifting was used when screen sifting was not practical. Only 30 acres were suitable for extensive testing due to alterations made by modern humans. Flooding behind levees was the cause for most of the acreage being unsuitable for archaeological testing.

Field conditions on the days of survey were warm, with partly cloudy skies, light winds, and temperatures in the 70's and 80's Fahrenheit. Surface visibility was good to excellent depending upon which portion of the project was being checked.

Results of Archaeological Field Investigations

For individual STP results please see *Appendix 1*. No cultural resources were encountered in the course of fieldwork. The project area is divisible into three areas; the northeast corner on the east side of the river, the area on the west side of the river along the river front, and an upland area near the south boundary. The results of each individual portion of the overall proposed construction project will be discussed below.

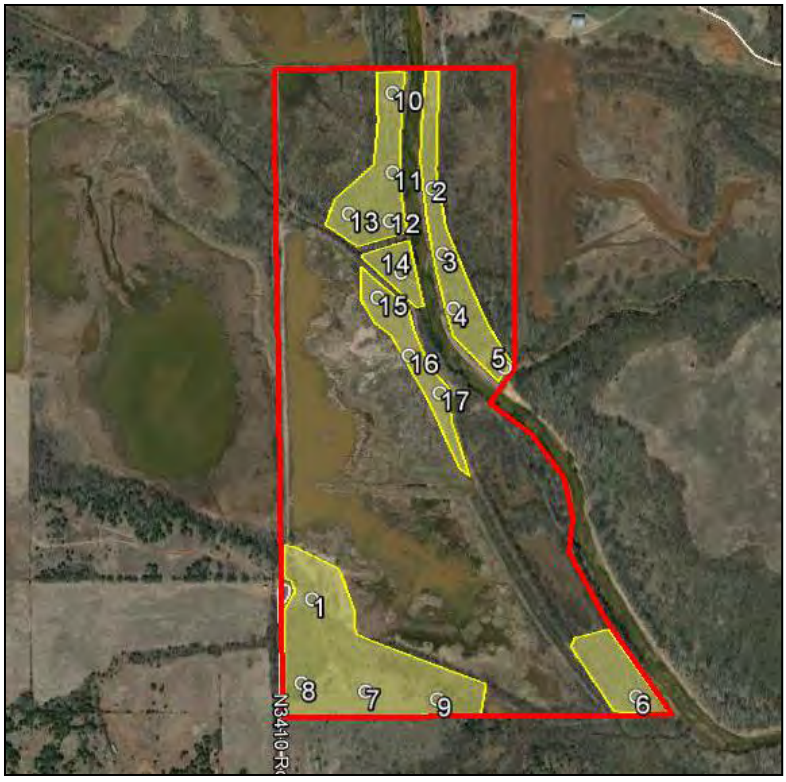


Diagram of areas suitable for intensive survey (yellow highlighted) with STP locations.

Northeast Corner on East Side of Deep Fork River

The northeast corner of the property is located on the east side of the river, and encloses approximately 17 of the 114 acres. Of the 17 acres, just less than 5 acres were suitable for intensive investigation; the other 12 were too swampy. The suitable area is bounded by the river bank on the west and a man-made levee on the east, a strip ranging from 25 – 50 meters in width and easily demarcated in the field. The 5 acre area was tested using parallel pedestrian transects, shovel turns in areas with reduced surface visibility, and four STPs to check for subsurface cultural remains. The northern portion of the strip was very grassy, with numerous subsurface exposures along the narrow strip offering very good subsurface visibility despite the reduced surface visibility. The southern portion, which comprised a large majority of the strip, was comprised of hardwood forest with very little vegetation obscuring the surface. The four STPs were placed on locations that appeared to be higher than the surrounding terrain, offering the highest likelihood of retaining cultural resources. The soil in this area was comprised of red colored fine sandy clay soils with roots present in nearly all of

the test pits. No surface or subsurface cultural remains were encountered on the east side of the river despite the tests performed and the numerous subsurface exposures examined.

General view of the landscape present on the east side of the river.

Aerial image with boundaries in red and searchable area in yellow, and STP locations superimposed.

The river from the north end of the east side strip.

The man made levee is clearly visible from the ground level.

Numerous subsurface exposures were present and examined for artifacts or features.

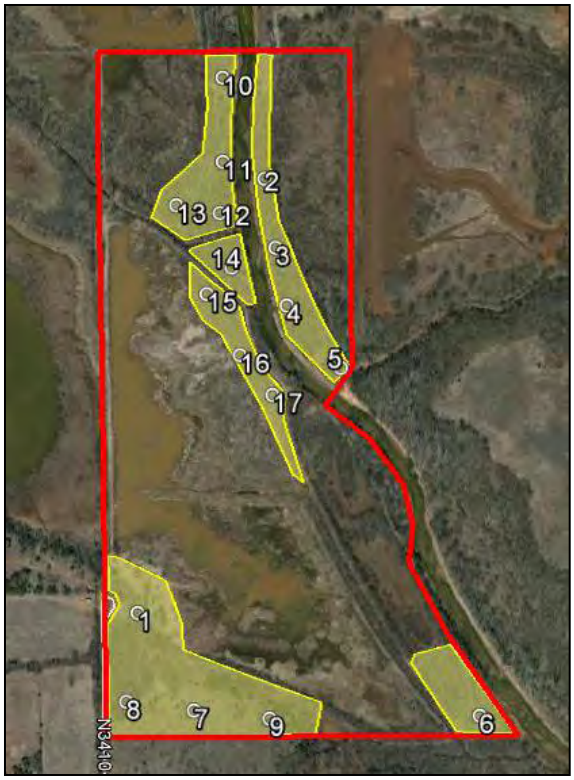
Soil column visible near north end of the east strip.

Riverside Area on the West Side of the Deep Fork River

A long strip of land along the west bank of the Deep Fork River was investigated for cultural resources. Similarly to the east side of the river, a thin strip of land was observed to be high and dry enough to be investigated. In some places, the man made levee formed the edge of the investigation area, and in others the levee bisected the area high enough to be examined. Toward the north end, a drainage canal 3 – 5 meters deep and approximately 5 meters wide cut the largest area in half. The area is comprised by mixed hardwood forest offering excellent surface visibility through most of the area. The area was investigated using parallel 15 meter interval pedestrian transects supplemented by shovel turns at 25 meter intervals. Nine STPs were dug in the west side river bank area to check for more deeply buried cultural resources, all of which were dug to a minimum of 50 cm depth and 50 cm width. Soils in the area were comprised of fine sandy silt and fine sandy clay typical of an alluvial area. Numerous surface disturbances were visible in the form of rodent burrows, water channels, and overturned trees. Levees were constructed by farmers to keep river water out of their fields, then later used by waterfowl hunters to hold water in to attract game. Also, a railroad was constructed parallel to the river in the area, offering an additional means of access. The southern portion of the area is composed of a dissected river terrace with very soft, fine sandy silt soil. The area has clearly been inundated by floodwaters numerous times in recent history, but one area was notably higher than the surrounding terrace, so was tested by STP 6. None of the testing methods employed produced any evidence of cultural remains. The extensive modern alteration, comprised of levees, a channelized river, and railroad appear to have altered the landscape and the way that the river interacts with the landscape. In fact, the river channel naturally flowed significantly further to the east than it currently flows, meaning that only the southern portion of the property would have been in close proximity to the natural river channel. The channelization process itself likely massively altered or removed any cultural deposits within the river basin.

Ground surface along the west bank of the river.

Small drainage canal near the river.



Aerial image of the parcel with the west bank area in yellow with STPs 6 and 10-17.

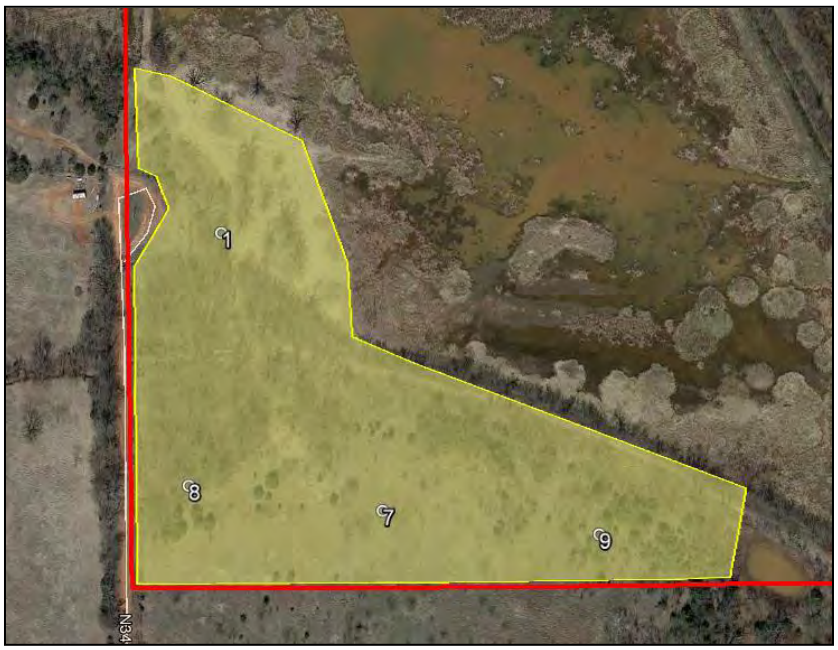
Railroad trundle facing south.

Deep drainage channel.

Southwestern Upland Area

The southwestern corner of the property is comprised of an elevated area rising out of the river basin from south to north. A levee was observed running east to west across the base of the rise. This portion of the property comprises approximately 10 acres of surface area. Two historic clusters of artifacts were observed in this portion of the property. Soils in the area were observed to be dense clay loam with layers of fine sandy clay. Groundcover consisted of hardwood forest north of the levee and savannah grassland to the south of the levee. Ground surface visibility varied between excellent visibility in the trees to poor visibility in the grassland area. The area was surveyed using maximum 15 meter interval pedestrian transects supplemented by shovel turns at 25 meter intervals in areas of poor surface visibility, and four STPs to check for subsurface cultural deposits. This area appeared to be the highest probability zone on the property. The area was clearly inhabited in historic times and both historic aerial imagery and on the ground observation confirm this. The first historic habitation consisted of what appeared to be a cinder block pump house and scatter of modern debris at the circle drive

at the end of the main access road. The debris appears to be consistent with either a campsite or small domestic structure, with plastic and metal debris noted in a low density pattern down the slope. STP 1 was dug in the middle of the debris scatter to determine if any subsurface deposits were present, with nothing found in the soil column tested. The second historic habitation consisted of another pump house consisting of a concrete pad with plumbing coming out of the ground. Also, a power pole and transformer box were observed adjacent to the pad. STP 8 was dug in the area of this structure to determine if any subsurface elements are present, with none found. Both areas were observed to have standing structures as recently as the 1995 aerial image, with the earliest appearance in the record found in the 1977 aerial image. The structures no longer appear in the 2003 image, meaning the structures were removed between 1995 and 2003, therefore not meeting the definition of an archaeological site. No further cultural remains were observed in this area.



Aerial image of the southwestern unit of the investigation with STP locations noted.

Upward slope on the northern edge of the southwestern portion of the property.

Savannah grassland present in the southwestern portion of the property.

Pump house near the circle drive on the access road.

Interior of the pump house.

Concrete pad and building materials at the pump house in the southern savannah area of the property.

Plumbing on the concrete pad.

Wellhead near the concrete pad.

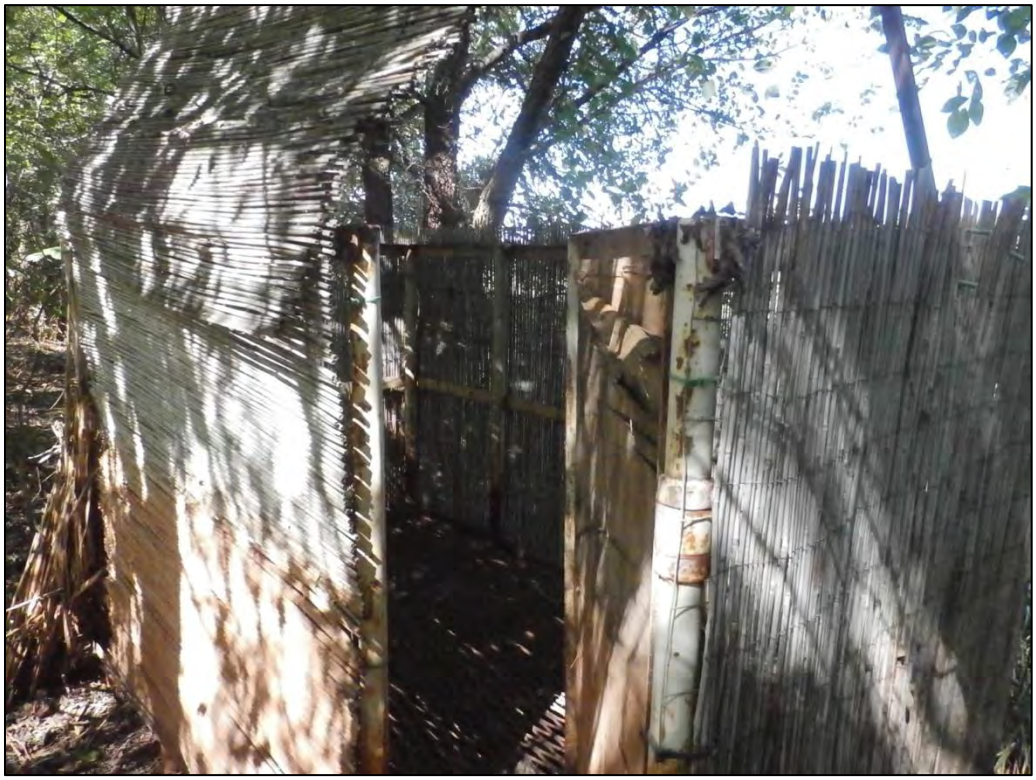
Grassy savannah near the southwestern edge of the property.

Other Areas of the Property

The remaining 84 acres of the property were deemed to be unsuitable for intensive archaeological investigation. Most of this area consists of flooded former agricultural fields. A significant portion of this area was submerged or swampy at the time of survey, while the remainder was dry, extremely dense and hard packed clay on the surface with a very shallow water table due to water being held in the basins by the levees. These flooded former fields turned basins would have been unlikely locations for intensive habitation due to the persistent flooding of the Deep Fork River, and their subsequent alteration by modern activity mean that any traces of cultural remains are likely disturbed. The soil for the levees was obtained from the boring of channels for the new river course and from these farm fields. The fields were dug down and the levees were raised up to reduce the likelihood of flooding. The changes made in the river course further suggest that the locations of any prehistoric occupations were lost in the process of the excavation of the new river channel. The only cultural artifacts noted were the levees, channels, levee control gates, and waterfowl hunting blinds.

Portion of the central flood basin in an area of dry surface and shallow groundwater.

Edge of the wetland just downhill of the entry road.



One of five waterfowl hunting blinds observed on the property.

Water level control valve in northern portion of the levee.

Facing north along main levee along the western boundary of the property.

Recommendations

Based upon the results of this archaeological survey, the property surveyed contains no cultural resources that meet the criteria for listing on the National Register of Historic Places. Neither of the two historic sites meet the 50 year age requirement for consideration as an archaeological site. Clearance to proceed with the project should be granted. All construction personnel should be made aware of the possibility of encountering cultural resources in the process of disturbing the soils. If any cultural resources are encountered in the course of disturbing soil, work should immediately cease until a determination of their significance can be made. A finding of No Properties is warranted based upon the results of this study.

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Appendix 1: Shovel Test Pit Results

STP#	Easting Z14	Northing	Width	Depth	Description and Comments
1	687594	3946478	51	34	On knoll, below historic site. Entire depth red fine sandy clay with red stone cobbles. Sandstone at base. GSV 50%
2	687773	3947138	50	52	Along natural river levee. Red sandy clay with roots entire depth. Stopped at 50 cm due to position on levee.
3	687792	3947034	50	53	Between the river bank and levee. Red sandy clay entire depth.
4	687811	3946947	52	65	Soft red sandy clay entire depth. Fine roots located at 30, 41, and 49 cm.
5	687895	3946855	54	56	Red sandy clay. Moisture and density change at 19 cm. likely due to good drainage with the adjacent creek.
6	688117	3946334	52	63	0-33 cm: red sandy clay; 33-37: dry red sandy clay; 37-40 cm buff sand; 40-63: mixture of red sandy clay and buff sand.
7	687683	3946333	50	52	0-28 cm: red sandy clay; 28-52: durable red clay with fine sand.
8	687580	3946344	54	62	0-34 cm: red sandy clay; 34-62: durable red clay with fine sand.
9	687798	3946323	51	65	0-41 cm: red sandy clay; 41-65 durable red clay with fine sand.
10	687706	3947290	51	63	Red fine sandy clay entire depth. Roots in soil column due to forest location.

11	687709	3947163	52	61	Red fine sandy clay entire depth. Roots in soil column due to forest location.
12	687706	3947085	53	60	Red fine sandy clay entire depth. Roots in soil column due to forest location.
13	687640	3947095	50	62	Red fine sandy clay entire depth. Roots in soil column due to forest location.
14	687726	3947003	51	60	Red fine sandy clay entire depth. Roots in soil column due to forest location.
15	687689	3946962	50	66	Red fine sandy clay entire depth. Roots in soil column due to forest location.
16	687741	3946871	50	64	Red fine sandy clay entire depth. Roots in soil column due to forest location.
17	687792	3946812	51	63	Red fine sandy clay entire depth. Roots in soil column due to forest location.

APPENDIX G

LEGAL DESCRIPTION & PLAT:

NW Corner NW/4–NW/4 (Lot 1)
Section 31–T14N–R4E

N 89°45'19" E
1285.47'

NE Corner NW/4–NW/4 (Lot 1)
Section 31–T14N–R4E

NE Corner NE/4–NW/4
Section 31–T14N–R4E

Section Line

1329.42'
S 89°45'19" W

P.O.B. Lot 1

1252.10'
N 89°45'19" E

33' Right–of–Way

33' Right–of–Way

N 00°39'24" W
1328.40'

1295.40'
N 00°39'24" W

A Part Of
Lot 1
37.02 Acres

Present River Channel

S 00°01'24" E
1295.13'

1/16 Section Line

Lot 5

S 00°04'29" W
1327.87'

SW Corner NW/4–NW/4 (Lot 1)
Section 31–T14N–R4E

Section Line

Previously Acquired
Property Line

SE Corner NW/4–NW/4 (Lot 1)
Section 31–T14N–R4E

S 89°44'38" W
1237.78'

S 89°44'38" W
1327.15'

1237.78'
N 89°44'38" E

P.O.B. North–Half Lot 2

233.15'
S 00°01'24" E

S 68°15'30" W
145.61'

27.94'
S 61°54'39" W

Previously Acquired
Property Line

1/4 Section Line

N 00°39'24" W
666.21'

666.21'
N 00°39'24" W

A Part Of
North–Half
Lot 2
18.46 Acres

S 45°44'48" E
223.37'

S 45°44'48" E
286.42'

209.48'
S 00°01'24" E

S 89°42'58" W
1230.42'

1230.42'
N 89°42'58" E

Ancient River Channel

Lot 10

S 00°04'29" W
1329.91'

33'

FT. SMITH

A Part Of
South–Half
Lot 2
18.75 Acres

S 20°42'43" E
706.19'

A Part Of
Lot 10
5.61 Ac.

(ABANDONED)

AND

SW Corner SW/4–NW/4 (Lot 2)
Section 31–T14N–R4E

N 00°39'24" W
666.22'

666.20'
N 00°39'24" W

S 00°01'24" E
665.59'

P.O.B South–Half Lot 2

S 89°41'17" W
1223.05'

1/4 Section Line

S 89°41'17" W
461.83'

S 30°56'01" E
14.15'

863.05'
S 89°41'17" W

123.28'
N 89°41'17" E

P.O.B Part of Lot 3

137.73'
N 00°13'12" E

1132.77'
N 89°41'17" E

83.74'
N 75°06'49" E

N 00°01'24" W
148.81'

WESTERN

R= 7254.04'
L= 657.97'

A Part Of
Lot 12
8.41 Acres

606.90'
S 30°56'01" E

Lot 11

N 00°39'24" W
690.00'

531.31'
N 00°39'24" W

A Part Of
North 690.00'
Lot 3
18.92 Acres

S 00°01'24" E
690.00'

544.59'

1

2.20 Ac.

S 89°45'08" W
370.99'

S 89°45'08" W
505.35'

40.00'

S 89°40'59" W
1208.42'

RAILROAD

1333.82'
S 00°04'29" W

A Part Of
South–Half
Lot 3

Previously Acquired
Property Line

N 00°39'24" W
642.43'

S 00°01'24" E
639.69'

2

3

1/16 Section Line

N 89°43'09" E
1241.32'

S 89°43'09" W
1322.60'

Lot 14

6

5

4

7

ORIGINAL

8

9

10

Lot 19

TOWN OF

N 00°39'24" W
1332.43'

Lot 4

S 00°01'24" E
1333.08'

15

14

13

1333.81'
S 00°04'29" W

MIDLOTHIAN

16

17

18

19

N 89°45'01" E
1226.58'

N 89°45'01" E
1320.32'

SW Corner SW/4–SW/4 (Lot 4)
Section 31–T14N–R4E

Section Line

SE Corner SE/4–SW/4
Section 31–T14N–R4E

N M.N.

W E

Scale 1"=400'

R 4 E

T 14 N

31

DEEP

RAILROAD

GRADE

Midlothian

Not To Scale

LOCATION MAP

The Bearings Shown Hereon Are Based On A Section Closure Of Section 31, Township 14 North, Range 4 East Of The Indian Meridian, Lincoln County, Oklahoma And Are Geodetic.

Total = 109.37 Acres

No investigation or independent search foreasements of record, encumbrances,restrictive covenants, ownership title evidence,or any other facts which an accurate andcurrent title search may disclose, was made.

Environmental and subsurface conditions were not examined as a part of this survey.

(SEE SHEET 2 FOR LEGAL DESCRIPTIONS)

This drawing or plat does not represent a current land boundary survey, it is based on a survey dated October 1, 2015. The legal descriptions provided on sheet 2 are solely for the purpose of relinquishing the ownership of the statutory rights–of–way along the North line of Lot 1, and the West line of Lot 1 and Lot 2.

CA 2261 LS Expires June 30, 2017

PROJECT:
DEEP FORK MITIGATION BANK

GREEN COUNTRY WETLAND MITIGATION, LLC

Section 31, Township 14 North, Range 4 East, IM, Lincoln County, Okla.

Surveying & Mapping By
MARSHALL & ASSOCIATES
P.O. Box 1221 Seminole , Oklahoma 74868 (405) 382–4488

Drawn By: JLA	Checked By: JBM	Date: Oct. 12, 2015
SHEET 1 OF 2	Job No. 23215	Revised: 06/27/2016

LEGAL DESCRIPTIONS

Lot 1
Commencing the Northwest Corner of said Lot 1; thence S 00°39'24" E along the West line of said Lot 1 for a distance of 33.00 feet to the South Right-of-Way line of the North line of Lot 1; thence N 89°45'19" E along said South Right-of-Way line for a distance of 33.00 feet to the Point of Beginning said point also lying on the East Right-of-Way line of the West line of said Lot 1; thence N 89°45'19" E along said South Right-of-Way line for a distance of 1252.10 feet to the East line of said Lot 1, said point being 33.00 feet South of the Northeast Corner of said Lot 1; thence S 00°01'24" E along said East line of Lot 1 for a distance of 1295.13 feet to the South line of said Lot 1; thence S 89°44'38" W along said South line for a distance of 1237.78 feet to the East Right-of-Way line of the West line of Lot 1; thence N 00°39'24" W along said East Right-of-Way line for a distance of 1295.40 feet to the Point of Beginning, containing 37.02 acres more or less.

N/2 - Lot 2
A tract of land lying in the North-Half (N/2) of Lot 2 (N/2-SW/4-NW/4) of fractional Section 31, Township 14 North, Range 4 East of the Indian Meridian, Lincoln County, Oklahoma and further described as Commencing at the Northwest Corner of said N/2 of Lot 2; thence N 89°44'38" E along the North line of said N/2 of Lot 2 for a distance of 33.00 feet to the Point of Beginning, said point also lying on the East Right-of-Way line of the West line of said N/2 of Lot 2; thence N 89°44'38" E along said North line of N/2 of Lot 2 for a distance of 1237.78 feet to the East line of said N/2 of Lot 2; thence S 00°01'24" E along said East line for a distance of 233.15 feet to the Original West Meander line of the Ancient Deep Fork Channel; thence meandering along said West Original Meander line of the Ancient Deep Fork Channel for a distance 27.94 feet; thence meandering along the West Original Meander line of said West bank of the Ancient Deep Fork Channel for a distance of 145.61 feet to a point were the West Bank of the Ancient Deep Fork Channel intersects the Center Line of the Present Deep Fork Channel; thence S 45°44'48" E along said Present Center Line of the Deep Fork Channel for a distance of 223.37 feet to the East line of said N/2 of Lot 2; thence S 00°01'24" E along said East line of the N/2 of Lot 2 for a distance of 209.48 feet to the South Line of said N/2 of Lot 2; thence S 89°42'58" W along said South line for a distance of 1230.42 feet to the East Right-of-Way line of the West line of said N/2 of Lot 2; thence N 00°39'24" W along said East Right-of-Way line for a distance of 666.21 feet to the Point of Beginning, containing 18.46 acres more or less.

S/2 - Lot 2
A tract of Land lying in the South-Half (S/2) of Lot 2 (S/2-SW/4-NW/4) of fractional Section 31, Township 14 North, Range 4 East of the Indian Meridian, Lincoln County, Oklahoma and further described as Commencing at the Southwest Corner of said S/2 of Lot 2; thence N 89°41'17" E along the South line of said S/2 of Lot 2 for a distance of 33.00 feet to the East Right-of-Way line of the West line of said S/2 of Lot 2; thence N 00°39'42" W along said East Right-of-Way line for a distance of 666.20 feet to the North line of said S/2 of Lot 2; thence N 89°42'58" E along said North line for a distance of 1230.42 feet to the East line of said S/2 of Lot 2 ; thence S 00°01'24" E along said East line for a distance of 665.59 feet to the South line of said S/2 of Lot 2; thence S 89°41'17" W along said South line for a distance of 1223.05 feet to the Point of Beginning, containing 18.75 acres more or less.

Lot 3
A tract of land lying in the Lot 3 (NW/4-SW/4) of fractional Section 31, Township 14 North, Range 4 East of the Indian Meridian, Lincoln County, Oklahoma and further described as Commencing at the Northwest Corner of said Lot 3; thence N 89°41'17" E along the North line of said Lot 3 for a distance of 123.28 feet to the Point of Beginning; thence N 89°41'17" E along said North line for a distance of 1132.77 feet to the East line of Lot 3; thence S 00°01'24" E along said East line for a distance of 690.00 feet; thence S 89°40'59" W for a distance of 1208.42 feet to a point lying 40.00 feet East of the East line of said Lot 3; thence N 00°39'24" W and parallel to the West line of said Lot 3 for a distance of 531.31 feet; thence N 75°06'49" E for a distance of 83.74 feet; thence N 00°13'12" E for a distance of 137.73 feet to the Point of Beginning, containing 18.92 acres more or less.

Lot 10
All that part of Lot 10 of fractional Section 31, Township 14 North, Range 4 East of the Indian Meridian, Lincoln County, Oklahoma lying West of the Present Deep Fork Channel.

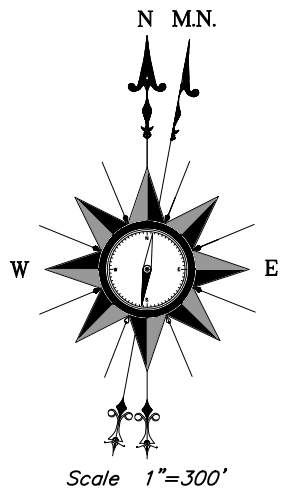
Lot 12
All that part of Lot 12 of fractional Section 31, Township 14 North, Range 4 East of the Indian Meridian, Lincoln County, Oklahoma lying West of the Present Deep Fork Channel.

Block 1
All of that part of Block One (1) of the Original Town of Midlothian lying West of the Present Deep Fork Channel.

James B. Marshall 06/27/2016
James B. Marshall Date
Professional Land Surveyor LS 113

CA 2261 LS Expires: June 30, 2017
MARSHALL & ASSOCIATES
P.O. Box 1221 Seminole, Oklahoma 74818-1221 405-382-4488

Client: GREEN COUNTRY WETLAND MITIGATION, L.L.C.
Drawn By: JLA | Book File | Job No. 23215
Date: June 27, 2016 | Sheet 2 of 2



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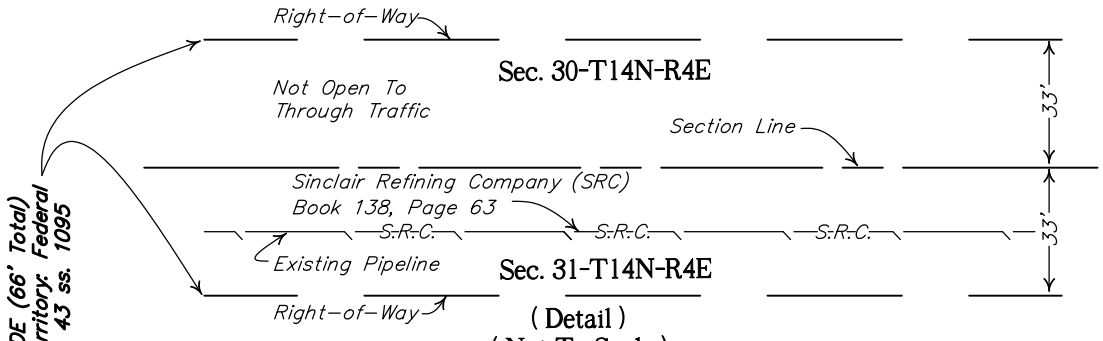
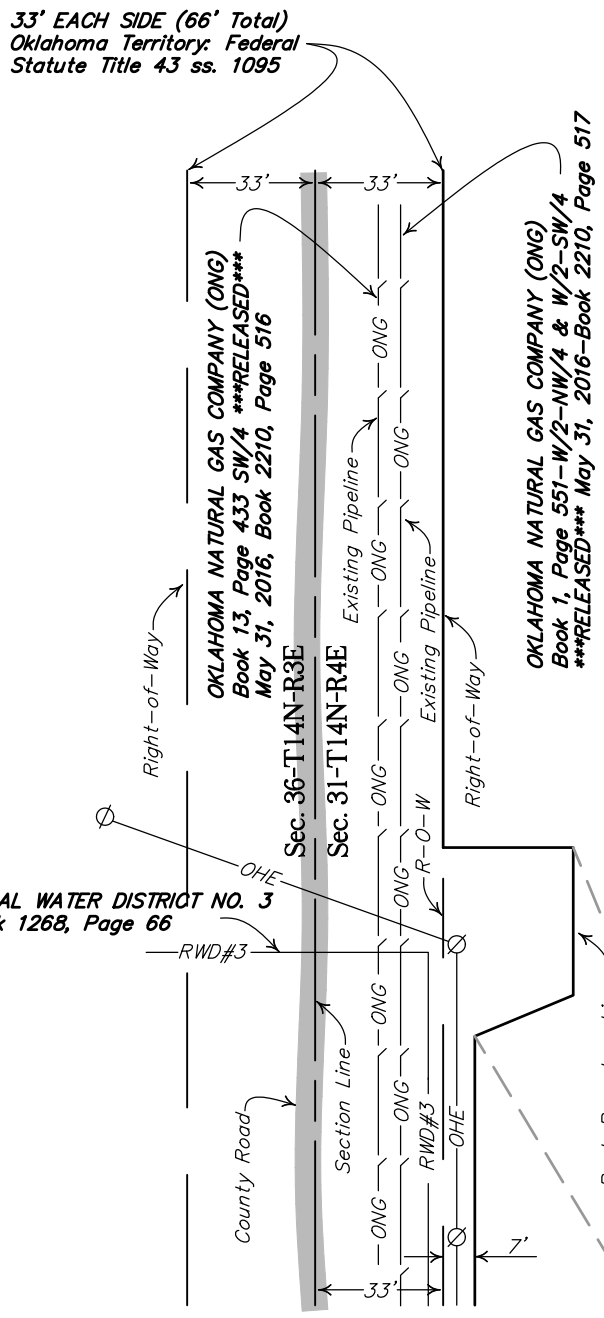


(Detail)
(Not To Scale)



(Detail)
(Not To Scale)

Commitment No. 2015-5247

Old Republic National Title Ins. Co.

Special Exceptions

1 Congressional Ease. 33' Each Side Of Section Line (66' TOTAL) Oklahoma Territory: Federal Statute Title 43 ss. 1095

2 OKLAHOMA NATURAL GAS COMPANY
Book 1, Page 551
W/2-NW/4 & W/2-SW/4

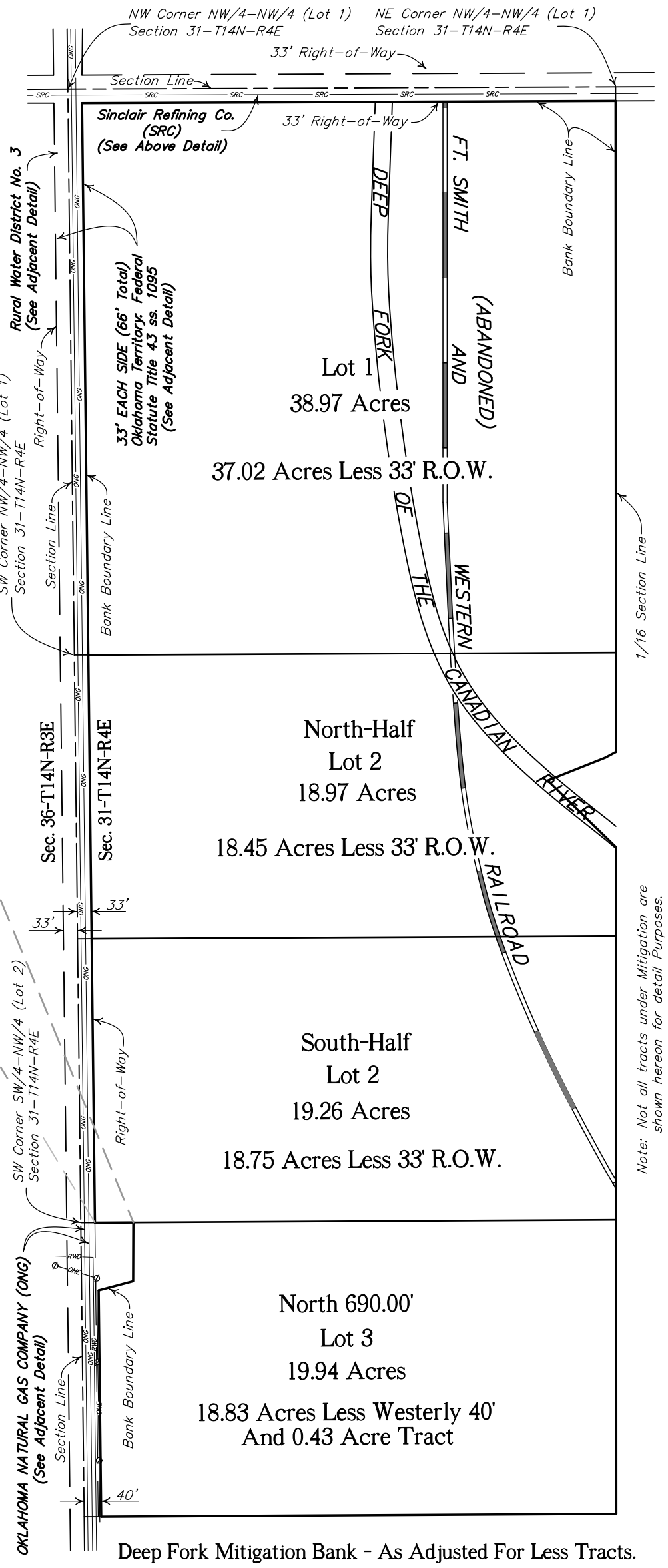
RELEASED May 31, 2016
Book 2210, Page 517

3 OKLAHOMA NATURAL GAS COMPANY
Book 13, Page 433
SW/4

RELEASED May 31, 2016
Book 2210, Page 516

4 SINCLAIR REFINING COMPANY
Book 138, Page 63
Lot 1 (NW/4-NW/4)

5 RURAL WATER DISTRICT NO. 3
Book 1268, Page 66



Deep Fork Mitigation Bank - As Adjusted For Less Tracts.
Total 109.37 Acres

Project:

DEEP FORK MITIGATION BANK

Company:

GREEN COUNTRY WETLAND MITIGATION, LLC

Section 31, Township 14 North, Range 4 East, I.M.
Lincoln County, Oklahoma

Drawn By DLA	Bk. GPS-File	Job Name. EXCEL
Date: Oct. 12, 2016	Sheet 1 of 2	

MARSHALL AND ATKINSON MAPPING CO.
P.O. Box 1221 Seminole, Oklahoma 74818-1221 405-382-4488