



DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P. O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

November 25, 2013

REPLY TO
ATTENTION OF:

Operations Division
Regulatory Branch
Brian Breaux
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(504) 862-1938

SUBJECT: MVN 2012-01428-MB

PUBLIC NOTICE

Public Notice Purpose: Pursuant to Section 10 of the Rivers and harbors Act of March 3, 1899 (30 Stat. 11512; 33 USC 403) and Section 404 of the Clean Water Act (86 Stat. 816; 33 USC 1344), the U.S. Army Corps of Engineers, New Orleans District, Regulatory Branch is soliciting comments from all interested parties on the development, utilization, and long-term management of a proposed mitigation bank. The purpose of this mitigation bank would be to provide compensatory mitigation for unavoidable impacts to wetland resources, including other waters of the United States, that result from projects authorized through the department of the Army permit program.

PROPOSED MARSH MITIGATION BANK IN JEFFERSON PARISH

NAME OF APPLICANT: Mitigation Bank of Louisiana, LLC, P. O. Box 903, Belle Chasse Louisiana 70037, ATTN: Thomas Carrere.

LOCATION OF WORK: In Section 15, T15S-R23E and Section 37, T15S-R24E, near Crown Point, Louisiana, in Jefferson Parish, as shown on the attached prospectus. (Lat. 29.75278, Long. -89.9206)

CHARACTER OF WORK: The proposed bank lands total approximately 272.2 acres. The applicant/sponsor proposes to remove spoil banks and backfill canals, construct earthen plugs, plant woody and herbaceous vegetation, and install flap-gated culverts in the Town of Lafitte levee all to restore marsh and forested wetlands and promote sufficient hydrologic alterations to support a conversion from a brackish system to a fresh/intermediate system. Attached for review, is the mitigation banking prospectus.

The comment period will close **30 days** from the date of this public notice advertisement. Written comments, including suggestions for modifications or objections to the proposed work, stating reasons therefore, are being solicited from anyone having interest in this permit request. Letters must reference the applicant's name and the subject number, be addressed and mailed to the above address, ATTENTION: REGULATORY BRANCH.

The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit that reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the people.

The Corps of Engineers is soliciting comments from the public; federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

No properties listed in the National Register of Historic Places are near the proposed work. The possibility exists that the proposed work may damage or destroy presently unknown archeological, scientific, pre-historical or historical sites or data. Copies of this notice are being sent to the State Archeologist and the State Historic Preservation Officer.

Our initial finding is that the proposed work would neither affect any species listed as endangered by the U.S. Department of Interior nor affect any habitat designated as critical to the survival and recovery of any endangered species.

This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnus-Stevens Fishery Conservation and Management Act. The applicant's proposal would result in the destruction or alteration of 272.2 acres of EFH utilized by various life stages of red drum and penaeid shrimp. Our initial determination is that the proposed action would not have a substantial adverse impact on EFH or federally managed fisheries in the Gulf of Mexico. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the National Marine Fisheries Service.

If the proposed work involves deposits of dredged or fill material into navigable waters, the evaluation of the probable impacts will include the application of guidelines established by the Administrator of the Environmental Protection Agency and certification that the proposed activity will not violate applicable water quality standards will be required from the Louisiana Department of Environmental Quality before a permit is issued.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing.

The applicant has certified that the proposed activity described in the application complies with and will be conducted in a manner that is consistent with the Louisiana Coastal Resources Program. The Department of the Army permit will not be issued unless the applicant received approval or a waiver of the Coastal Use Permit by the Department of Natural Resources.

You are requested to communicate the information contained in this notice to any other parties whom you deem likely to have interest in the matter.

Martin S. Mayer
Chief, Regulatory Branch

Attachments

**Prospectus for the Proposed Estuary Mitigation Bank
Jefferson Parish, Louisiana**

October 2013

Sponsor:

Mitigation Bank of Louisiana, LLC

P. O. Box 903

Belle Chasse, Louisiana 70037

Agent:

Mitigation Bank of Louisiana, LLC

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Belle Chasse, Louisiana 70037

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ACRONYMS AND ABBREVIATIONS

BB	Barbary Muck
BCR	Bird Conservation Region
BLH	Bottomland Hardwood Forest
BTNEP	Barataria-Terrebonne National Estuary Program
CCMP	Comprehensive Conservation and Management Plan
CEMVN	United States Army Corps of Engineers – New Orleans District
cfs	cubic feet per second
CPRA	Coastal Protection and Restoration Authority (Louisiana)
CRMS	Coast-wide Reference Monitoring Station
CWA	Clean Water Act
EEM	Estuarine Emergent Wetland
EFO	Estuarine Forested Wetland
EM	Ecological Management Action Plan
EMB	Estuary Mitigation Bank
EPA	Environmental Protection Agency
ESS	Estuarine Intertidal Scrub-Shrub Wetland
FAC-	Facultative (most likely not found in a wetland)
FACW	Facultative Wetland Plant
FEMA	Federal Emergency Management Agency
GIWW	Gulf Intracoastal Waterway
HU	Hydrologic Unit
IRT	Interagency Review Team
JD	Jurisdictional Determination of Waters of the United States
KE	Kenner Muck
LA	Louisiana
LSU	Louisiana State University
MBI	Mitigation Banking Instrument
MBL	Mitigation Bank of Louisiana, LLC.
LDWF	Louisiana Department of Wildlife and Fisheries
LIDAR	Light Detection and Ranging
NABCI	U.S. North American Bird Conservation Initiative
NAD83	1983 North American Datum
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	Obligate Wetland Plant
OW	Open water
PEPC	Planning, Environment, and Public Comment
ppt	parts per thousand
RSL	Relative sea level rise
Sh	Schriever silty clay loam

SSURGO	Soil Survey Geographic Database
UPL	Upland
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
W	Water

1.0 INTRODUCTION

The Mitigation Bank of Louisiana, LLC. (MBL) respectfully submits this prospectus to the United States Army Corps of Engineers, New Orleans District (CEMVN) and the Interagency Review Team (IRT) for the proposed Estuary Mitigation Bank (EMB). The proposed EMB goal is to be a compensatory mitigation solution to the regulated community for their development activities that will require mitigation to offset unavoidable impacts (33 U.S.C. 401 and 403; Sections 9 and 10 of the Rivers and Harbor Act of 1899) to “waters of the United States” as defined by section 404 of the Clean Water Act (33 U.S.C. 328; EPA and USACE 2011). Impacts are defined as projects requiring Clean Water Act of 1972 Section 404 Dredge and Fill permits.

The proposed EMB consists of 272.2 acres in Jefferson Parish, Louisiana, east of Jean Lafitte Highway (SR45), south of Jean Lafitte Road (SR303) and west of the Mississippi River near the town of Jean Lafitte (Appendix A, Figure 1). The proposed EMB generally consists of a degraded mix forested wetlands and marsh habitats as well oil and gas access canals, and slips. These ecosystems have been impacted by man-made activities such as ditching and draining associated with oil and gas exploration, saltwater intrusion as result of the oil and gas canals, and relative sea level rise (RSL) over the past several decades. A small flood protection levee that serves as the northern boundary of the proposed EMB was constructed sometime between 1964 and 1979 further impacting the hydrological regime.

1.1 Site Location

The EMB is located in Section 15, Township 15 South, Range 23 East and Section 37, Township 15 South, Range 24 East. It is located on the south of Bayou Baratavia (Gulf Intracoastal Waterway, GIWW) at Crown Point in Jefferson Parish, Louisiana. The center point of the EMB is at approximately latitude 29 degrees, 45 minutes and 14.142 seconds North, longitude 90 degrees, 05 minutes and 01.331 seconds West (Appendix A, Figure 2). The EMB area is located within the Bertrandville and Lafitte Quadrangles, Louisiana, U.S. Geological Survey (USGS 2012) 7.5 minute topographic maps. MBL currently owns the surrounding property totaling 1,434.2 acres (including the proposed mitigation bank; Appendix A, Figure 2). MBL reserves the right to include all or part of the surrounding acreage it owns, as well as additional acreage in the area, into the proposed EMB either in a phased approach or as part of an umbrella mitigation bank.

The proposed EMB is located within the USGS Hydrologic Unit (HU) 08090301 – East Central Louisiana Coastal Watershed (USGS 2013). The HU contains 1,567,039.5 acres. The proposed EMB is located in the eastern portion of the HU and primarily receives water via Bayou Baratavia/GIWW that is a conduit for the capture of water from the portion of the HU to the northwest (see Appendix A, Figure 22 “Service Area Map”). Actual drainage area is unknown.

2.0 PROJECT GOALS AND OBJECTIVES

The project goal is to rehabilitate the proposed EMB to a viable, sustainable, fully functioning freshwater estuarine emergent marsh. The proposed project is consistent with goals and objectives outlined in Louisiana's Coastal Master Plan (CPRA 2012). The project will be accomplished by rehabilitating/mimicking

historical hydrologic and chemical conditions and rehabilitating vegetation communities existing prior to the dredging of oil and gas access channels and other anthropogenic alterations, per the guidelines outlined in *PART 332--COMPENSATORY MITIGATION FOR LOSSES OF AQUATIC RESOURCES* (The Final Rule). These alterations have led to degradation and loss of wetland area, functionality, and resistance and resilience to change.

The proposed project objectives are to rehabilitate natural hydrology and vegetation to pre-canal conditions by filling dredged canals, removing the majority of spoil banks associated with the dredge canals, modifying the existing Town of Lafitte’s levee with passive uni-directional flow pipes (flap gates) and to utilize natural hydrological flow patterns through existing natural drainages. The result will be an effort to increase overbank flooding and sheetflow and lessen the impact of the canals and bayous to the south that act as conduits for saltwater intrusion. This will allow the re-establishment and enhancement of Cypress/Tupelo Gum Swamp and Freshwater/Intermediate Marsh and “natural” ridges where indigenous species such as live oak and wax myrtle can be established and exotic species such as Chinese tallow (*Triadica sebifera*) are removed.

The objectives will be met by removing the majority of the spoil banks associated with the open water canals with the exception of two acres that have established upland natural ridge vegetation (dominated by live oaks); filling the canals and planting with EEM plants; Rehabilitating 106.5 acres of EEM outside the Canal Marsh Re-establishment by planting typical native EEM plants; and Rehabilitation EFO2 (Cypress/Tupelo Gum Swamp) by planting appropriate native tree and shrub species. Invasive and non-indigenous vegetation will be removed and controlled. Although ESS is not a target of the restoration plan, it is expected that ESS will naturally regenerate in areas that typically support ESS communities.

Table 1.0 – Pre- and post-restoration acreages within the proposed EMB

PRE-RESTORATION ACREAGE		PROPOSED POST-RESTORATION ACREAGE	
OW*	68.3	OW*	0.0
EEM1**		EEM1**	
	0.0	(F/I MARSH)	125.0
EEM2**		EEM2**	
(BRACKISH MARSH)	169.6	(F/I MARSH)	106.5
EFO1 (BLH)	9.2	EFO1 (BLH)	0.0
EFO2 (CYP/TUP)	0.3	EFO2 (CYP/TUP)	38.3
ESS	16.2	ESS	0.0
UPLAND	8.6	UPLAND	2.4
TOTAL	272.2	TOTAL	272.2

*Greater than 1.5ft depth
**EEM1 = Canal Marsh; EEM2 = Fresh/Intermediate Marsh

Completion of the proposed EMB will re-habilitate conditions necessary for a self-sustaining, functional wetland system that is resistant and resilient to both anthropogenic and natural changes in the watershed. Improving fresh water storage, sediment retention, nutrient attenuation, and wildlife habitat for indigenous species, including waterfowl, are examples of improved functions that would be provided by rehabilitating this area to historical conditions.

3.0 ECOLOGICAL SUITABILITY OF THE MITIGATION BANK

3.1 Historical Ecological Characteristics and Land Use of the Site

Historical ecological characteristics of the EMB were derived from comparing historic aerial maps from 1945, 1967, and 1979 to the most current aerial photography (Appendix A, Figure 2); comparing historical topographic maps from 1972, 1983, 1992, and 1999 to the most current; and by interviewing local, long-time residents. With the exception of access canals established for the production of oil and gas, historically the proposed EMB and surrounding property have not been used for any purpose other than wildlife tours and hunting.

3.1.1 Historical Aerial Maps

Based on the historical aerial maps and interviews, it appears that the Vendome Canal and other pipeline and oil and gas exploration access canals were originally dredged before 1945 with additional oil and gas activity on the property prior to 1951. The small flood protection levee that serves as the northern boundary of the proposed EMB was installed sometime between 1964 and 1979 and enclosed most of the forested habitat adjacent to Bayou Barataria. Loss of the forest south of the levee in the proposed EMB is apparent by comparing 1945 to 1979 aerial maps. The extension of LA Highway 45/3134 (Lafitte-Larose Highway) is also first noted on the 1979 aerial. It appears there have been previous efforts to plug some of the canals and smaller bayous on or adjacent to the proposed EMB. The historical aerial photographs also suggest that marsh degradation (conversion of marsh to open water) is an ongoing process in the proposed EMB.

3.1.2 USGS Topographic Maps

Review of the historical topographic maps gives less insight into the historical ecological characteristics of the proposed EMB. The Lafitte, LA quadrangle maps suggest there was little change in the area between 1973 and 1995. Reviews of the historical Bertrandville, LA quadrangle maps suggest that anthropogenic changes have significantly altered the area of the proposed EMB. Changes such as the construction of a small flood protection levee to the north, extension of LA Highway 45/3134 (Lafitte-Larose Highway), dredging of the Vendome Canal prior to 1951, and a number of oil and gas access canals disrupted the natural hydrology of the area and allowed saltwater intrusion from the south, changing historical vegetative communities of the proposed EMB area. The roadway extension and the levee on the surrounding property outside of the proposed EMB area appear to have encouraged some increased residential/commercial development and degradation of the forest to the south of the levee in the proposed EMB.

3.2 Current Ecological Characteristics of the Site

The proposed EMB area generally consists of degraded mixed forested wetlands, much of which is dominated by Chinese tallow along the spoil banks and degraded marsh predominated by salt tolerant species such as broad-leaf cattail (*Typha latifolia*) & marshhay cordgrass (*Spartina patens*) primarily due to disruption of natural hydrology and saltwater intrusion via the canals to the south. Much of the area has been impacted by man-made activities such as ditching and draining activities associated with oil and gas exploration, as well as saltwater intrusion via the Vendome Canal.

The proposed EMB is located within the EPA's Deltaic Coastal Marshes and Barrier Islands Level IV Ecoregion of Louisiana (730) (Daigle et al. 2006). According to Daigle et al. (2006), the physiographic characteristics of the ecoregion are flat, deltaic, and coastal plain with fresh-water and saline marshes including rivers, lakes, bayous, tidal channels, canals, and barrier islands. Elevation ranges from sea level to 10-15 ft above sea level. Geology of the area consists of Quaternary (Holocene) alluvial, deltaic, interdeltic coastal, and shallow marine sediments of sand, silt, and clay of comparatively high organic content, including peat deposits in places. Soils are generally Histosols (Haplosaprists) and Entisols (Hydraquents). The natural vegetation of the Deltaic Coastal Marshes consists of freshwater to saltwater marsh vegetation of grasses, sedges, and rushes with few to no trees.

Topography surrounding the proposed EMB is relatively flat and dissected by low gradient streams and bayous (Appendix A, Figure 3). Relief is provided by spoil banks associated with man-made canals and natural ridges associated with bayous. Based on FEMA Floodplain maps, the proposed EMB and surrounding property are located in the 100-year Floodplain.

Characteristic hydroperiod parameters are also unknown. There are no Coastwide Reference Monitoring Stations (CRMS) in proximity to the proposed EMB. It is expected that the hydroperiod of the proposed EMB is similar to most wetlands in the area in that it is dependent upon the rise and fall of the Mississippi River (even though connectivity is interrupted by levees and man-made structures) and activity in Barataria Bay such as tides influenced by south to southeast winds, tropical storms, and hurricanes. According to the landowner and long-time residents, tidal amplitude is small and affected by wind speed and direction, seasonal depth is dependent primarily on Bayou Barataria/GIWW, the primary source of water flowing into the proposed EMB, and rainfall from tropical storms and hurricane surges flooding the area.

During field investigations, the potential reference marsh habitat outside the proposed EMB to the east, south and west contained vegetation consistent with naturally functioning Fresh/Intermediate Marsh. These areas contained a diverse mix of species which included: coastal water hyssop (*Bacopa monnieri*), maidencane (*Panicum hemitomon*), spike sedge (*Eleocharis* sp.), common threesquare (*Schoenoplectus americanus*), bull tongue (*Sagittaria lancifolia*), Drummond red maple (*Acer rubrum* var. *drummondii*) and camphor weed (*Pluchea camphorata*) to name a few. The area inside the spoil piles within the bank boundary is significantly different. The Estuarine emergent wetland (EEM) inside the spoil piles is currently dominated (as determined by the total number of species encountered per vegetation community) by broad-leaf cattail (*Typha latifolia*) and marshhay cordgrass (*Spartina patens*) (Figures 5-10). The Estuarine scrub/shrub (EES) is dominated by groundsel bush (*Baccharis halimifolia*), wax myrtle (*Morella cerifera*), and Chinese tallow (*Triadica sebifera*). Estuarine forested wetland (EFO) is currently dominated by Chinese tallow and water oak (*Quercus nigra*).

Twenty-two (22) species were identified during the wetland delineation in the upland (UPL) portion of the proposed EMB. Pepper vine (*Ampelopsis arborea*), water oak, Chinese tallow, blackberry (*Rubus* sp.) and live oak (*Q. virginiana*) made up the majority of species encountered.

3.2.1 Habitat and Vegetation

The proposed EMB is an Estuarine System per Cowardin et al. 1979. An Estuarine System consists of “deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. Along some low energy coastlines there is appreciable dilution of sea water. The system extends: (1) upstream and landward to where ocean-derived salts measure less than 0.5 ppt during the period of average annual low flow; (2) to an imaginary line closing the mouth of a river, bay, or sound; and (3) to the seaward limit of wetland emergents, shrubs, or trees where they are not included in (2)” (Cowardin et al. 1979).

The proposed EMB fits the description of “Intertidal Subsystem as substrate is exposed and flooded by tides”. Although the tidal amplitude is minimal, wind-driven tides are the prevailing force moving freshwater into the area during the winter months with predominantly north winds and moving saltwater during the summer months with predominantly south winds.

Habitat types encountered in the field include estuarine wetlands (as previously described and in Table 2.0 and Appendix A, Figures 4-10). A proposed Jurisdictional Determination of Waters of the United States (JD) was completed in March 2013 and a draft JD report is included in Appendix B. Predominant species in each of the habitat types are listed in the JD report (Appendix B: Tables 4.2.2; 4.2.3; 4.2.4; and 4.2.5). The Sponsor plans to submit the JD Report to the CEMVN for official consideration after the prospectus is reviewed and subsequently approved by the IRT.

In addition, the United States Fish and Wildlife (USFWS) National Wetlands Inventory (NWI) Mapper (USFWS 2013) was accessed to confirm findings during the jurisdictional wetland determination. Most of the aboveground area of the proposed EMB is classified as E2EM1P6 (estuarine [E]; intertidal [2]; emergent [EM]; persistent [1]; irregularly flooded [P]; and oligohaline [6]) with the exception of small areas in the northwest portion of the proposed EMB that is classified as PFO2T (palustrine [P]; forested [FO]; needle-leaved deciduous [2]; and semipermanent-tidal [T]) and PFO1Rs (palustrine [P]; forested [FO]; broad-leaved deciduous [1]; seasonal-tidal [R]; and spoil material [s]). The Vendome canal is classified as R1UBVx (riverine[R]; tidal [T]; unconsolidated bottom [UB]; permanent tidal [V]; and excavated by artificial means [x]). Although man-made, the other dredged waterways as well as bayous within the proposed EMB are classified as E1UBL (estuarine [E]; subtidal [1]; and unconsolidated bottom [UB]). The NWI Mapper confirms the findings of the jurisdictional wetland determination.

3.2.2 Soils

Mapped Soils: The Project area is covered by the Soil Survey of Jefferson Parish, Louisiana (NRCS, 1980). Multiple NRCS soil survey resources were utilized to establish the geomorphological setting and soil types present. Detailed soil map unit descriptions and soil characteristics were derived from information available

in the online NRCS Web Soil Survey (NRCS, 2012a), and soil series locations were determined from information available in the on-line NRCS Soil Survey Geographic (SSURGO) database (NRCS, 2012b). The NRCS National Hydric Soils List was also used to identify the limits of mapped hydric soils (NRCS, 2012c) within the Project area. The soil mapping units identified in the proposed EMB area include: Barbary Muck (BB); Kenner Muck (KE); and Schriever Silty Clay Loam (Sh) (Appendix A, Figure 11). General characteristics of each soil mapping unit are identified in Table 2.0.

Observed Soils: Soil samples were collected from soil pits approximately 16 inches deep during field data collection for the JD (Appendix B). Samples collected confirmed the hydric nature of the mapped soils with the exception of soils encountered on the spoil banks and upland areas.

Table 2.0 Characteristics of Soil Mapping Units within the Proposed EMB

Soil Name ¹	Taxonomic Class	Soil Characteristics				
		Percent Slopes	Drainage Class	Permeability	Depth of Water Table (feet)	Subsidence Potential
Barbary Muck*	Typic Hydraquents	<1%	Very poor	Very slow	-0.5 to -1 ft	Moderate
Kenner Muck*	Fluvaquentic Haplosaprists	<0.5	Very poor	Rapid in organic layers and very slow in clayey layers	+1ft to -0.5 ft	Very High
Schriever Silty Clay Loam*	Chromic Epiaquerts	<1%	Very poor	Slowly permeable	~0 to 2 ft	Low
¹ Soil Survey Geographic (SSURGO) Database (NRCS, 2012b) * Listed as hydric according to the National Hydric Soils List (NRCS, 2012c)						

3.2.3 Hydrology

Hydrology in the proposed EMB is currently influenced by four sources: fresh waters of the GIWW being delivered from the north and flowing south; saline waters of the Gulf of Mexico being pushed north through tidal action and storm surge; intermittent fresh water being delivered from the town of Jean Lafitte through two pumping stations; and through rainfall. The two drainage pumps are owned and operated by Jefferson Parish. The pumps have a total discharge capacity of forty-one cubic feet per second (41cfs) and thirty-three cubic feet per second (33cfs). Pumps are operated sporadically based on rainfall events.

During the JD field investigation (Appendix B), the Vendome Canal and other man-made canals, bayous, and tidal creeks were inspected by airboat. One or more of the primary hydrologic indicators of wetland hydrology (such as surface water, high water table, saturated soils, inundation visible on aerial imagery, aquatic fauna, and water marks) were recorded at the wetland communities examined during the course of this investigation. During the field effort, no indicators of wetland hydrology were observed in the 8.64 acres of upland habitat within the Project area. In addition, salinity levels were recorded in the open water

canals as well as soil pits to determine if a salinity gradient existed in the proposed EMB. Salinity levels ranged from 0.1 to 5.5 parts per thousand (ppt). There was a slight trend of increasing salinity levels from north to south. A salinity gradient would most likely be more evident during the summer months. Interestingly, the highest recorded salinities were between the Vendome Canal to the east, the canal to the west and the levee to the north (Appendix A, Figures 2 and 7). A possible explanation is that this area receives higher salinity waters during storms or periods of high tides and since this area is impounded, the water is trapped. Evaporation eventually results in higher salinity levels.

3.3 General Need for the Project in this Area

The proposed EMB will offset historical progression of coastal land loss, restore current areas of land loss, and protect important areas against further degradation. Louisiana loses nearly 25 square miles of coastal wetlands every year. In the past 75 years, Louisiana has lost more than 2,300 square miles of coastal wetlands as a result of human activities and natural processes. As this landscape disappears, it takes with it vital ecological functions, as well as communities, culture, economic security, and the future of Louisiana. The restoration and protection of coastal Louisiana wetlands is vital to the survival of natural fisheries and ecological resources. The deltaic and chenier plains contain approximately 40% of our nation's wetlands and account for 80% of wetland loss nationwide (CPRA 2013). Coastal forests and marshes are major components that make up our coastal line of defense against natural events, such as tropical storms and hurricanes. They act as water storage systems and affect water quality through the retention, removal, and transformation of nutrients. Information from CPRA sums it best by putting into perspective the importance of the Louisiana Coast:

- Coastal Population: over 2 Million Residents
- Coastal Fisheries: Top Fisheries Producer in Lower 48; over \$3 Billion Annually
- Coastal Energy: Top Producer of Domestic Oil; over \$70 Billion Annually
- Coastal Ports: Largest Port Complex in the World, \$35 Billion Annually & nearly 300,000 jobs
- Louisiana's Unique Heritage and Culture – No \$\$\$

In addition, the Barataria-Terrebonne National Estuary Program (BTNEP) is an organization charged with protecting the environment and cultural heritage of the watershed region that includes the area of the proposed EMB. BTNEP has identified 7 priority problems affecting the Barataria and Terrebonne basins: 1) hydrologic modification; 2) reduced sediment flows; 3) habitat loss/modification; 4) changes in living resources; 5) eutrophication; 6) pathogen contamination; and 7) toxic substances (BTNEP2013). Development of all Comprehensive Conservation and Management Plans (CCMP), action plans, projects, studies and demonstration projects have as their foundation the seven priority problems. The proposed EMB addresses and shares many of the Ecological Management Action Plans of BTNEP in the Barataria Basin such as EM-1 Hydrologic Restoration; EM-4 Beneficial Use of Dredged and Non-Indigenous Material; EM-7 Marsh Management; EM-12 Storm Water Management; EM-15 Protection of Habitat for Migratory and Resident Birds; and EM-16 Reduction of Impacts from Exotic Vegetation (Moore and Rivers 1996) leading to synergistic restoration of coastal Louisiana.

The EMB is located in the U.S. North American Bird Conservation Initiative (NABCI) Bird Conservation Region (BCR) 26 – Mississippi Alluvial Valley. According to the NABCI (2013), the Mississippi Alluvial Valley was once largely a bottomland hardwood forest. Today, less than 25 percent of the region remains forested, and flooding has been reduced by about 90 percent. Despite these changes, the region still supports large numbers of winter waterfowl, estimated at about 9 percent of the continental duck population. Many shorebird species also use managed wetlands for migration stopover sites and remnant forests harbor populations of threatened and endangered neotropical migrants and other birds. The region also provides excellent colonial waterbird habitat, particularly to the south where large numbers of White Ibis (*Eudocimus albus*), Yellow-crowned Night-Heron (*Nyctanassa violacea*), and other herons and egrets nest. Rehabilitation and protection of the proposed EMB area will support the goals of the NABCI.

The proposed project has received a letter of support from the Lafitte Area Independent Levee District which includes a Resolution passed on September 12, 2013 (Appendix C, Letters of Support). Additional Letters of Support are expected and will be made available to the IRT upon receipt.

3.4 Technical Feasibility

The engineering and construction work required to remove spoil banks, plug and fill canals, modification of man-made hydrologic control structure (levee along northern boundary) to restore flow and restore the landscape so it is conducive to wetland rehabilitation and sustainability is feasible. The survey map and cross-sections (Appendix A, Figures 12 and 13) illustrate the feasibility of filling the canals based on the depth leading to rehabilitation of natural hydrology. Vegetative plantings will contribute to rehabilitation efforts. Subsequent monitoring of post-rehabilitation conditions will document the “success” of the proposed EMB.

A number of studies have documented successful estuarine restoration. A joint venture conducted between the Jean Lafitte National Historical Park and Preserve and Louisiana State University (LSU) in the Barataria Preserve Area (NPS 2013) involved backfilling approximately two miles of canals using similar methodology being proposed by the EMB. Vegetative coverage of over 20% was achieved by natural recruitment after four years. Due to the success of the project, approval has been obtained by the Department of the Interior to continue the activity in other open canals within the Park. By the year 2011, the Park had backfilled an additional six miles of canals. To date, approximately 65% of these canals have been backfilled. Currently, the Park is augmenting the natural recruitment of the backfilled canals with marsh vegetation to accelerate marsh recovery.

Additionally, a thesis by Joseph Baustian (LSU) conducted in May 2005 studied the restoration results of backfilling 30 canals in the state of Louisiana. The results of the thesis concluded that up to 95% of the spoil area was returned to marsh when the spoil banks were adequately removed, but only five percent of the spoil area was restored at sites where spoil removal was poor. Twenty years after spoil was properly removed, backfilling had restored 80% of the organic matter and 94% of the soil’s typical bulk density. Canals backfilled in areas of more intact marsh showed greater restoration success than canals backfilled in highly degraded marshes. This study indicates that the benefits of backfilling continue to increase over time. Improving the completeness of spoil removal, coupled with appropriate site selection, could speed up the restoration process and enhance the success of future backfilling projects.

Turner et al. (1994) conducted studies of backfilled canals and concluded that over 33 canals showed varying degrees of success. Major factors determining success include the depth of the canal, soil type, canal dimensions, locale, dredge operator skill, and permitting conditions. Depth of the canals that showed varying degrees of success was within the range of the canals in the proposed EMB. They concluded that backfilling is a technique to manage canals and spoilbanks in coastal Louisiana that demonstrates stability over decades. It is a reasonably short management action, requiring existing well-proven equipment and no on-site maintenance.

4.0 ESTABLISHMENT OF THE MITIGATION BANK

4.1 Site Restoration Plan

The Re-establishment and Rehabilitation of the EMB is proposed to be accomplished by: 1) plugging and backfilling 68.3 acres of canals that were created by private oil and gas companies; 2) removing all but 2.0 acres of spoil banks adjacent to the canals; 3) planting and fostering natural regeneration of vegetation typical of the target marsh and forested habitats; and 4) modification of the man-made water control structure along the northern boundary to allow more natural flow patterns. These actions will facilitate rehabilitation of: 1) natural hydrologic sheet flow patterns; 2) Freshwater and Intermediate Marsh communities that were lost as a result of the canal construction; 3) surrounding marsh area that have been degraded due to salt water intrusion; and 4) water movement that was lost due to the establishment of the spoil banks which influenced the amount and direction of historical water flow patterns (Appendix A, Figures 14-20). In addition, the outfall from the two existing pump stations referenced in Section 3.2.3 has the potential to enhance ecological response by increasing the success of vegetative regeneration by modifying the man-made levee along the northern boundary. Re-establishment of natural hydrologic patterns of flooding and draw-down are keys to the success of the proposed EMB. Establishment of the proposed EMB will result in conversion of open water and changes to the vegetative communities as shown in Table 2.0.

4.1.1 Canal Marsh Re-establishment

The spoil banks that were created as a result of the dredging of access canals will be used to backfill the canals. The spoil bank material will be pushed into the adjacent canals by use of a backhoe or small bull dozer, which will be barged to the proposed EMB. Should additional backfill material be needed to achieve the required elevation, additional, suitable material will be brought to the proposed EMB. Dredge material from the GIWW will be used as an additional source of fill material. Backfill material will be stabilized and contained within the canal area by installing a ditch plug at both ends of the fill area (Appendix A, Figure 21). Ditch plugs may be established by the use of sand bags, sheet piling, rock baskets or other suitable material. Ditch plugs will be installed to a height that prevents free flow of water from the GIWW and canals/bayous to the south but, allows tidal exchange. Backfilled canals will be reworked so that small depressions of open water less than 1.5 to 3 feet deep and connected via meandering rivulets are present to provide habitat for waterfowl and growth of submerged aquatic vegetation. Backfilled canals will be planted with obligate (OBL) and facultative wet (FACW) marsh plants from a certified grower.

4.1.2 Marsh Rehabilitation

The objectives for the marsh rehabilitation of the EMB are to: 1) increase the diversity of the vegetation and its structure with vegetation consistent with a Freshwater/Intermediate Marsh; 2) improve the water quality by reducing the salinity; and 3) return more natural sheet flows to the marsh habitat. Once natural sheet flow patterns and seasonal water levels are re-established, it is expected that natural regeneration from seed and rhizomes of Fresh and Intermediate Marsh wetland plants will occur. In addition to removal of the spoil banks from the canal marsh re-establishment, the existing water control structure (levee) on the northern boundary will be modified to more closely mimic natural flow patterns. A series of flap gates (uni-directional passive flow gates) will be installed along the levee on the northern boundary every 100-150 meters, as required, to restore wetland hydrology (i.e., sheet flow) to the site. This will aid in flushing the salinity from the marsh area. These flow gates are passive and require little to no maintenance. The elevated salinity of the marsh habitat cannot be decreased without the removal of the spoil banks along the surrounding canals. These spoil banks prevent natural flows from moving across the site. High storm surges and southern prevailing winds push saline water into the marsh and the spoil banks act as a basin, trapping the higher saline water. Regeneration of a Fresh/Intermediate Marsh habitat will be supplemented by planting, as needed, to achieve at least 80% cover. Species will be selected based on the JD species list of OBL and FACW wetland plants. Species being considered include, but are not limited to, California bulrush (*Schoenoplectus californicus*) and other *Schoenoplectus* species, common rush (*Juncus effusus*), pickerelweed (*Pontederia cordata*), bulltongue (*Sagittaria lancifolia*), goldenrod (*Solidago sempervirens*), sawgrass (*Cladium jamaicense*) and roseau cane (*Phragmites australis*).

4.1.3 Cypress/Tupelo Gum Swamp Forest Rehabilitation

The objectives for the swamp forest rehabilitation of the EMB are to: 1) increase the diversity and coverage of the vegetation consistent with a Cypress/Tupelo Gum Swamp forest; 2) improve the water quality by reducing the salinity; and 3) return more natural flows to the swamp forest habitat. Once natural sheet flow patterns and seasonal water levels are restored, the elevation and slope of area to be planted with Cypress/Tupelo Gum Swamp forest species will be evaluated to determine if conditions are conducive to rehabilitation of a Cypress/Tupelo Gum Swamp forest. In addition to removal of the spoil banks from the canal rehabilitation, a series of flap gates (uni-directional passive flow gates) will be installed along the levee on the northern boundary to provide more natural flow patterns. This will aid in flushing the salinity from the marsh area. These flow gates are passive and require little to no maintenance. Tree species that may be planted to establish the Cypress/Tupelo Gum Swamp forest and improve the value of the property for wildlife include baldcypress (*Taxodium distichum*), swamp blackgum (*Nyssa biflora*), Drummond red maple (*Acer rubrum* var. *drummondii*), tupelo gum (*Nyssa aquatica*), green ash (*Fraxinus pennsylvanica*), and pumpkin ash (*Fraxinus profunda*). It is anticipated that natural recruitment of tree and shrub species will occur following the rehabilitation activities. Planting will employ a random mixture of appropriate species selected to accommodate terrain and edaphic conditions. Single species planting will generally be avoided. Acceptable planting criteria may require a mix of bare-root seedlings and four to eight inch (4"-8") plugs planted on nine-foot by nine-foot (9'x 9') centers to obtain initial stand densities that correspond with site conditions in accordance with the New Orleans District's Performance Standards for Cypress/Tupelo Gum Swamp.

4.1.4 Natural Ridges

Approximately 2.0 acres of spoil bank will be left in place to function as “natural” ridges where indigenous species such as live oak, black willow, and wax myrtle have established (Appendix A, Figures 14-20; see areas designated as oak and cypress). These areas will be cleared of exotic vegetation and it is expected that scrub/shrub habitat will regenerate also. Additional native forest species will be planted on the natural ridges.

4.1.5 Exotic Vegetation

Exotic vegetation areas (primarily Chinese Tallow) will be identified and treated for removal. Control of Chinese tallow will likely involve a combination of chemical (herbicides such as Arsenal AC, Garlon 3A, Garlon 4 Ultra and Clearcast) and mechanical (bush hogging, logging, etc.) means and will require a long-term commitment to ensure success. Typically, “success” will require that on average, exotic species abundance (number of stems, cover, basal area, etc.) will not exceed 1% of overall vegetation abundance per acre. The treated areas will be replanted with native marsh species to stabilize the soil and ensure that the areas will be colonized by appropriate marsh species, unless the areas have a sufficient amount of native marsh plants that will colonize the area. These areas will be monitored to ensure the areas are not re-colonized by the exotic species and appropriate measures taken to prevent reinfestation.

4.1.6 Monitoring and Adaptive Management

The Sponsor and Agent will work in concert with the LDWF and the CEVMN to ensure success of the establishment of the proposed EMB. Monitoring will comply with targets set forth in the mitigation plans for the habitats proposed.

Monitoring of the proposed EMB will use permanent monitoring stations/plots and transects based on habitat acreage. Data collected in Cypress/Tupelo Gum Swamp forest areas will include woody species identification, number of species, tree species height, and tree species diameter. Fresh and Intermediate Marsh surveys will include data on dominant vegetation species; coverage assessment; number and species rated FAC+ or wetter growing in wetlands (total and #/acre); percentage of dominant species of FAC+ and wetter and an invasive/noxious species assessment. Data will also be collected regarding other colonizing plant species and the wetland plant status of the colonizing species. Hydrologic data will be collected as necessary to document evidence of restored Freshwater/Intermediate Marsh wetland hydrology.

Documentation will include descriptions of the upper 12 inches of the soil profile sufficient to demonstrate hydric properties.

Based on the results of milestone monitoring efforts, edaphic and vegetative conditions will be evaluated, compared to requirements set forth based on length of time since establishment, and adaptive management techniques applied to meet requirements. This process will be done after each required monitoring event.

4.2 Current Site Risks

The risk of restoring natural hydrologic conditions using ditch plugs, pump stations, rainfall, and possibly enhancement by using water from Bayou Barataria/GIWW is low based on available technology, modeling capabilities of the Agent, and previous successes in the area. Based on the review of the literature and the amount of canals that have been successfully backfilled and marsh re-established, the risk of the proposed

marsh re-establishment and rehabilitation is very low. Restoration of these systems have been a goal in the lower Mississippi River Alluvial Valley since the 1970's. Literature on success and failure abounds and provides a template for establishment of Cypress/Tupelo Gum Swamp forest in the proposed EMB so the risk is low. In addition, the Sponsor owns the surrounding property so risk of development is currently nonexistent. Additionally, the proposed EMB is bordered by a levee and existing roadways owned by the Sponsor, however, easements have been granted to Jefferson Parish and the town of Jean Lafitte for access and maintenance.

4.3 Long-Term Sustainability of the Site

Hydrologic control structures, e.g., canal and ditch plugs, will be designed and built for the long-term and low maintenance. By restoring natural wetland hydrology and native vegetation, controlling exotic species, milestone monitoring, adaptive management, and the non-existent risk of development of surrounding property, long-term sustainability of the proposed EMB is a viable, low risk endeavor leading to long-term sustainability.

5.0 PROPOSED SERVICE AREA

The proposed EMB is located within the USGS Hydrologic Unit (HU) 08090301 – East Central Louisiana Coastal Watershed (USGS 2013). The deltaic plain in the watershed and the area of the proposed EMB are interconnected with a web of natural bayous and man-made canals and water control structures. Because of the connectivity within the watershed, HU 08090301 is the proposed primary service area for mitigation (Appendix A, Figure 22). It is bordered by the Mississippi River to the north and east, Bayou Lafourche to the west, and Barataria Bay to the south and contains 1,567,039.5 acres. The secondary service area is to the west in HU 08090302 – West Central Louisiana Coastal Watershed and contains 276,747.3 acres.

6.0 OPERATION OF THE MITIGATION BANK

6.1 Project Representatives

Sponsor and Owner: Mitigation Bank of Louisiana, LLC.
P. O. Box 903
Belle Chasse, Louisiana 70037
Principal - Thomas A. (Tac) Carrere
taccarrere@gmail.com
504.723.5871

Agent: Mitigation Bank of Louisiana, LLC.
P. O. Box 903
Belle Chasse, Louisiana 70037
Principal - Thomas A. (Tac) Carrere
taccarrere @ gmail.com
504.723.5871

Local Point of Contact: Brad Humber
brad@tnrig.com
228.263.0644

6.2 Qualifications of the Sponsor

Thomas A. (Tac) Carrere

Thomas A. (Tac) Carrere has thirty (30) plus years of entrepreneurial and leadership experience in operating a variety of companies in the south Louisiana area. Mr. Carrere is the Managing Member and Chief Executive Officer of the Mitigation Bank of Louisiana, LLC. and Barrier Resources, LLC. He is involved in multifaceted development, mitigation and ecosystem banking and coastal habitat restoration and preservation in south Louisiana. Mr. Carrere continues to be active in and has experience in private real estate asset management including: nine (9) years as president of land holding/development and mineral development company responsible for land planning and regulatory compliance on interest in 20,000 plus owned acres; eleven (11) years as managing member of a real estate development company implementing a multifaceted land use development plan on six hundred (600) owned acres subsequently procuring the federal, state and local entitlements for certification of material being used to fortify the Hurricane Risk Reduction System being constructed by the U. S. Army Corps of Engineers and local and state sponsors; and twenty (20) years as a partner and five (5) years as president of real estate brokerage, insurance brokerage and property management firm. He also served four (4) years as president of a company that developed, owned and operated a FM radio station in New Orleans licensed with the Federal Communication Commission. He served one (1) year as member of Regional Planning Board -Post Katrina Task Force and two (2) years on Plaquemines Parish development board chairing the committee redrafting the development code of ordinances. Mr. Carrere has organized and co-chaired a Charrette at the James A. Baker Institute for Public Policy, Rice University, Houston, Texas to develop Federal Public Policy recommendations that would result in efficiencies in the regulatory processes to allow the expediting of restoration, reclamation and maintenance projects along the northern coast line of the Gulf of Mexico. Mr. Carrere also served four (4) years as managing member of a development company representing land owners and a south Louisiana Indian tribe in negotiations with the United States Department of Interior's Bureau of Indian Affairs and various congressional offices in Washington, DC. He negotiated settlements of land disputes between tribal council and Louisiana Land and Exploration Co. and assisted in the drafting and in securing sponsors of federal legislation.

Skip Coffman

Mr. Coffman is President/CEO of The Natural Resources Investment Group, LLC headquartered in Little Rock, AR. He specializes in the acquisition, finance, development, management and resale of real estate land properties. He provides overall strategic planning, marketing, and credit sales management for The NRI Group. Mr. Coffman's professional experience includes certified public accountancy, investment banking, syndicating, investing, developing and managing real estate properties throughout the states of AR, NC, LA, OK, MS, and TX.

Brad Humber

Mr. Humber is the Regional Manager – Gulf Coast and a Restoration Ecologist for The NRI Group. Brad is the lead for Mississippi and Louisiana endeavors and the Project Manager for our Big Cedar Creek (BCC) and proposed Pascagoula River (PR) Mitigation Banks. As Project Manager, Brad is the primary author of the BCC and PR Mitigation Banking Instruments and the lead on stream gauging, surveys, burns, invasive species removal, RT&E species surveys, and extensive pre-project biological monitoring. He has extensive experience in stream and wetland biological and hydrological assessments and surveys, baseline biological surveys and monitoring, and water quality sampling. He is knowledgeable in wetland delineation, wetland planning, wetland impact assessments, and permitting. He also has experience in stream and wetland restoration project development and mitigation, land management and invasive species control, bioengineering implementation, reforestation, and restoration construction oversight. Prior to joining The NRI Group, he played key roles in the design and completion of several stream and wetland mitigation banks with The Nature Conservancy and as an environmental consultant in North Carolina. He is our specialist on RT&E species habitat mitigation. He has completed Rosgen Courses I-IV.

Robert Stainton

Mr. Stainton is the Senior Engineer for The NRI Group, specializing in hydrologic and hydraulic modeling. Robert oversees all aspects of mitigation back development from site selection, project identification and planning, stream and wetland design, interfacing with clients and regulatory bodies, and reviews and provides engineering critique on all project designs, surveying, construction, and monitoring. He has extensive experience in hydrologic, hydraulic, groundwater, surface water, sedimentologic, and contaminant modeling. He has also performed fluvial geomorphic investigations, stream and wetland mitigation and restoration, project design, construction, and management. Prior to coming to The NRI Group, Robert was a Senior Hydraulic Engineer at the U.S. Army Corps of Engineers, Little Rock District. Before that he was an environmental consultant in Memphis, TN. He has been a volunteer for The Nature Conservancy and voluntarily assisted in various hydrology studies and large scale soils mapping operations for riverine wetland mitigation banks in Tennessee and North Carolina. Robert holds Professional Engineer licenses in Arkansas, Mississippi and Kentucky. He has completed Rosgen Courses I-IV.

Kenneth Colbert

Kenneth is a Wetlands Scientist and Forester for The NRI Group. He oversees wetland determinations and plays a key role in site selection and development. He is the Project Manager for the Lower Cutoff Creek Mitigation Bank and is the primary author of the LCC Prospectus and Mitigation Banking Instrument. LCCMB is the first stream restoration bank in the state of Arkansas. It includes over six miles of stream restoration. He came to The NRI Group via the Arkansas Natural Resources Commission. While at ANRC Kenneth served as the Environmental Program Manager. He has over 13 years of experience in wetland forestry, ecosystem assessment and restoration, 404 permitting, environmental review, as well as mitigation banking. He currently serves on the Wetlands Technical Advisory Committee for the State Mitigation Banking Program. He has completed Rosgen Course I.

6.3 Proposed Long-Term Ownership and Management Representatives

6.3.1 Proposed Long-Term Ownership

The sponsor and landowner, Mitigation Bank of Louisiana, LLC, will retain long-term ownership of the proposed EMB and the surrounding property. In the event that the proposed EMB is sold, all requirements of the mitigation bank including the conservation easement will be transferred to the new owner.

6.3.2 Management Representatives

The NRI Group is an Arkansas based company specializing in stream and wetland restoration used for compensatory mitigation. They have created, or have pending, mitigation banks in Arkansas, Mississippi, and Alabama, and sell compensatory mitigation credits to clients so they may offset unavoidable impacts to the aquatic environment. Compensatory mitigation, as defined by the EPA and the U.S. Army Corps of Engineers (USACE), is the “restoration, creation, enhancement, or in certain circumstances, preservation of wetlands and/or other aquatic resources for the purpose of compensating for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved”.

The NRI Group offers an extremely qualified and experienced group of environmental and business professionals dedicated to providing the highest quality services and technical expertise in the fields of stream and wetland restoration. Through their extensive experience in wetland restoration, stream restoration, environmental planning, restoration ecology, and natural resource management, they can provide their clientele with superior results. They come from the regulatory, non-profit, and commercial sides of the mitigation equation.

6.4 Site Protection

Upon its implementation as a mitigation bank, MBL will enter into a conservation easement “to protect in perpetuity the ecological values of private land as a public benefit while allowing for the personal enjoyment of that property by its owners.” (LDWF 2013). A perpetual conservation easement (pursuant to the Louisiana Conservation Servitude Act, F.S.9:1271 *et seq.*) will be placed on the 272.2 acres of re-established and rehabilitated marsh and Cypress/Tupelo Gum Swamp to ensure long-term protection. This easement

will be held by MBL and is binding to and runs with the title of the property to ensure any heirs/transferees associated with the EMB must adhere to any and all provisions set forth in the approved Mitigation Banking Instrument (MBI).

6.5 Long-Term Strategy

The long-term strategy of the EMB will be to restore and protect the wetlands and their functions within the bank boundaries in perpetuity. To assist in accomplishing the long-term strategy, an endowment or trust fund will be established at the time the EMB's MBI approval by the CEMVN, State of Louisiana, and the IRT. A Conservation Easement will be placed on the bank property. Once the IRT agrees that that the goals and objectives of the proposed EMB have been met, the Sponsor will supplement the initial endowment or trust fund to a Long-Term Trustee to ensure the ecological restoration performed by the Sponsor will be maintained.

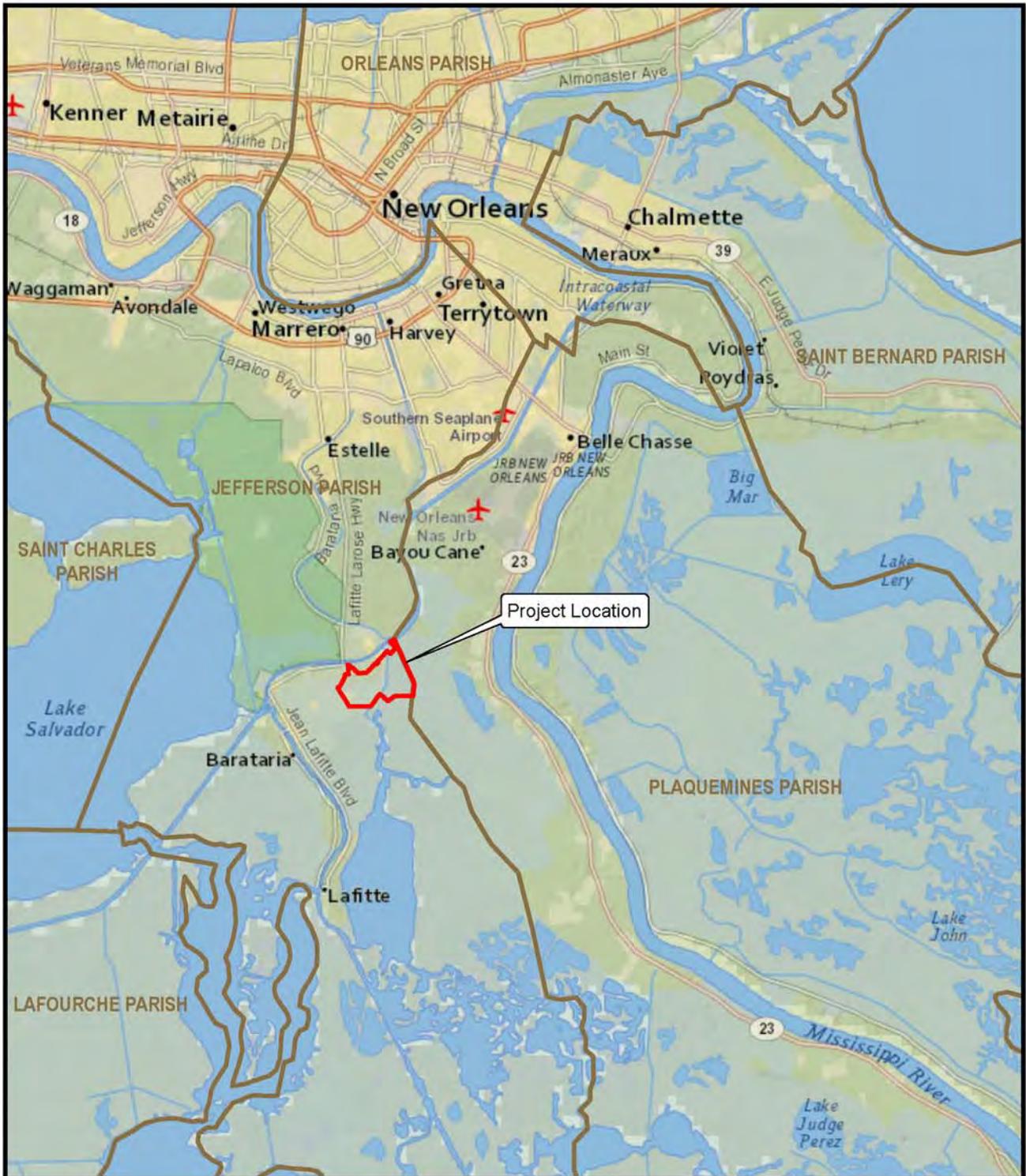
Prior to the Sponsor assigning the bank ecological responsibilities to the Long -Term Trustee and providing the endowment or Trust Fund, the Sponsor, Trustee representative and the IRT will conduct an on-site visit after the review of the bank's MBI and construction permits. The on-site visit is to ensure that the Trustee understands maintenance activities needed, understands engineered structures' routine inspection and required maintenance (if any). The Sponsor will ensure that the Trustee has the resources or access to the resources to ensure the maintenance activities and the regulatory compliance requirements will be met.

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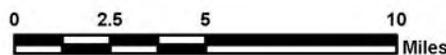
Appendix A – FIGURES



 Property Ownership



Datum: NAD 83
 Projection: UTM
 Zone: 15N
 Unit: Meters



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Figure 1
 Project Vicinity Map
 Estuary Mitigation Bank
 Jefferson Parish, Louisiana
 Mitigation Bank of Louisiana, LLC

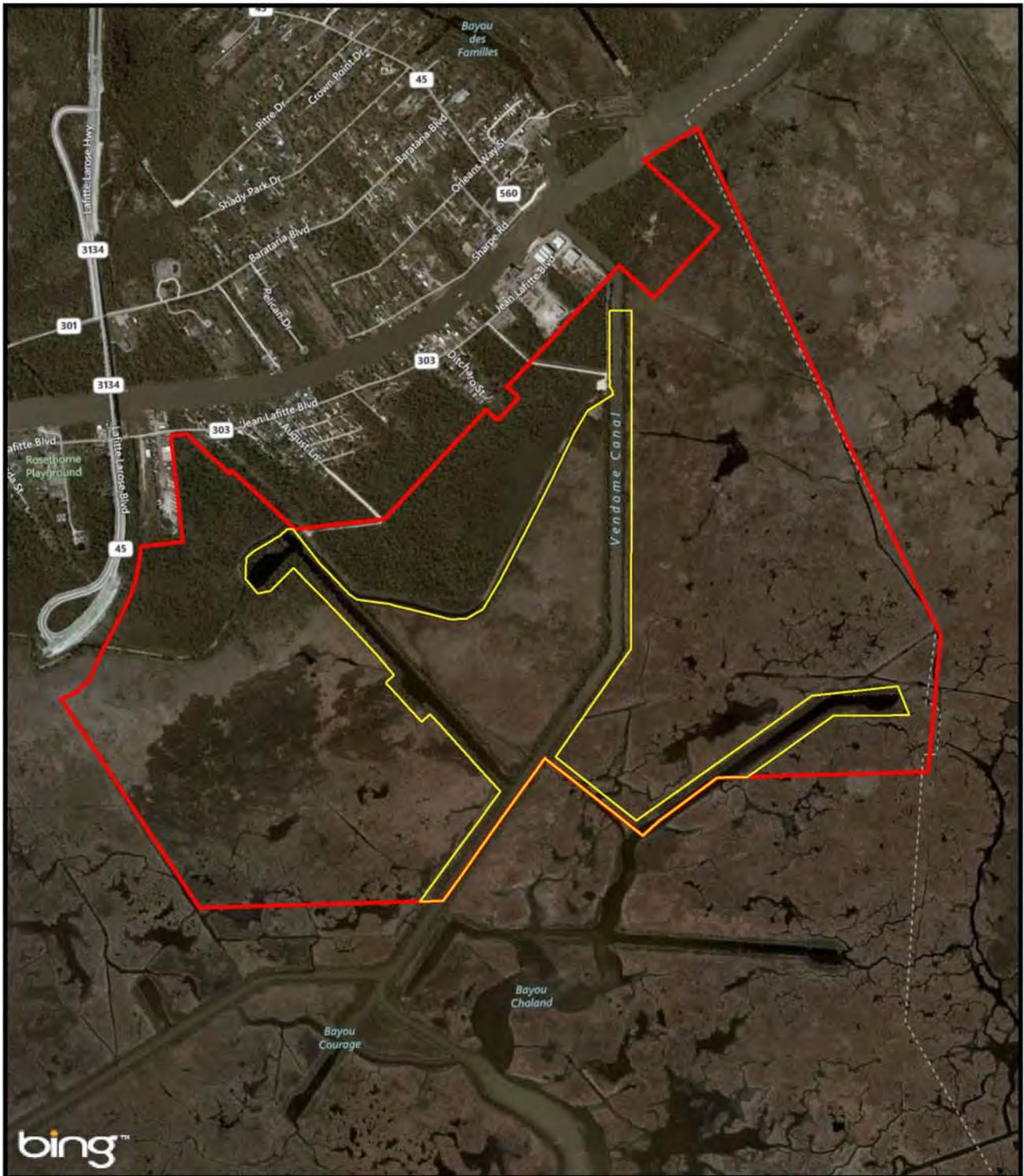
Prepared By: ATKINS/14923

Scale: 1" = 5 miles

Job No.: 100032503

Date: Apr 09, 2013

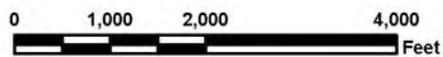
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bing™



- Bank Property
- Property Ownership



Aerial: Bing Maps 2012

ATKINS

Figure 2
 2012 Aerial Project Location Map
 Estuary Mitigation Bank
 Jefferson Parish, Louisiana
 Mitigation Bank of Louisiana, LLC

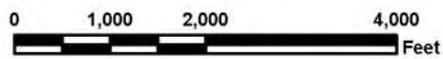
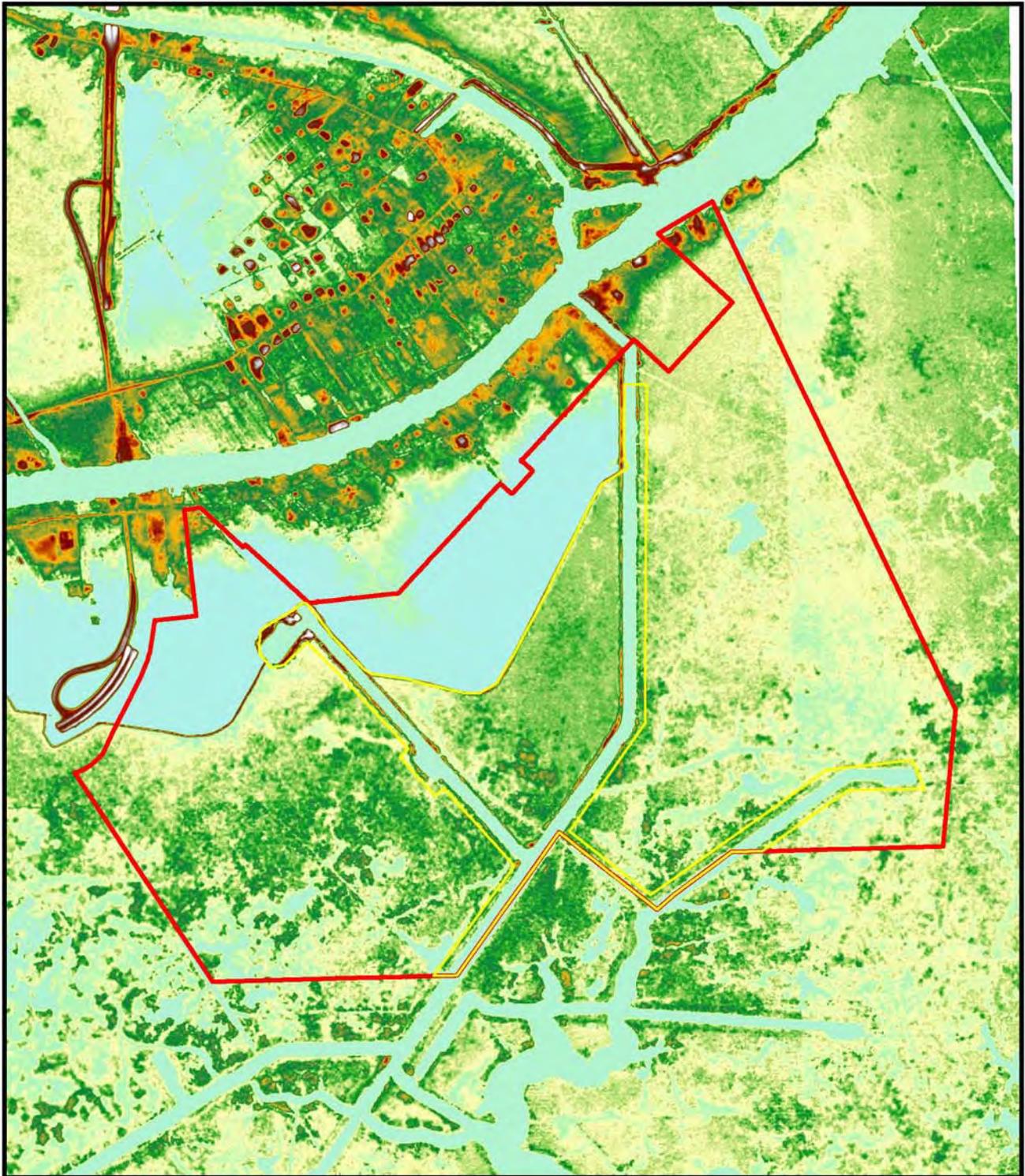
Prepared By: ATKINS/14923

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Job No.: 100032503

Date: Jun 10, 2013

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LIDAR: Louisiana ATLAS, 2002

ATKINS

Figure 3
 LIDAR Elevation Map
 Estuary Mitigation Bank
 Jefferson Parish, Louisiana
 Mitigation Bank of Louisiana, LLC

Prepared By: ATKINS/14923

Scale: 1" = 2,000'

Job No.: 100032503

Date: Jun 10, 2013

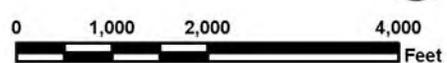
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bing™



- Bank Property
- Property Ownership
- Sheet Index



Aerial: Bing Maps 2012

ATKINS

Figure 4
 Delineation Sheet Index Map
 Estuary Mitigation Bank
 Jefferson Parish, Louisiana
 Mitigation Bank of Louisiana, LLC

Prepared By: ATKINS/14923	Scale: 1" = 2,000 feet
Job No.: 100032503	Date: Apr 09, 2013

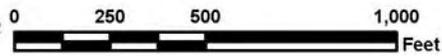
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- Property Ownership
- Bank Property
- Salinity Reading
- Oak
- Cypress
- EEM Wetland
- EFO Wetland
- ESS Wetland
- Open Water
- Upland



Wetland Delineation: ATKINS, 2012
Aerial: Bing Maps 2012



ATKINS

Figure 5
Aerial Wetland Delineation Map
Estuary Mitigation Bank
Jefferson Parish, Louisiana
Mitigation Bank of Louisiana, LLC

Bertrandville Quadrangle
Sheet 1 of 6

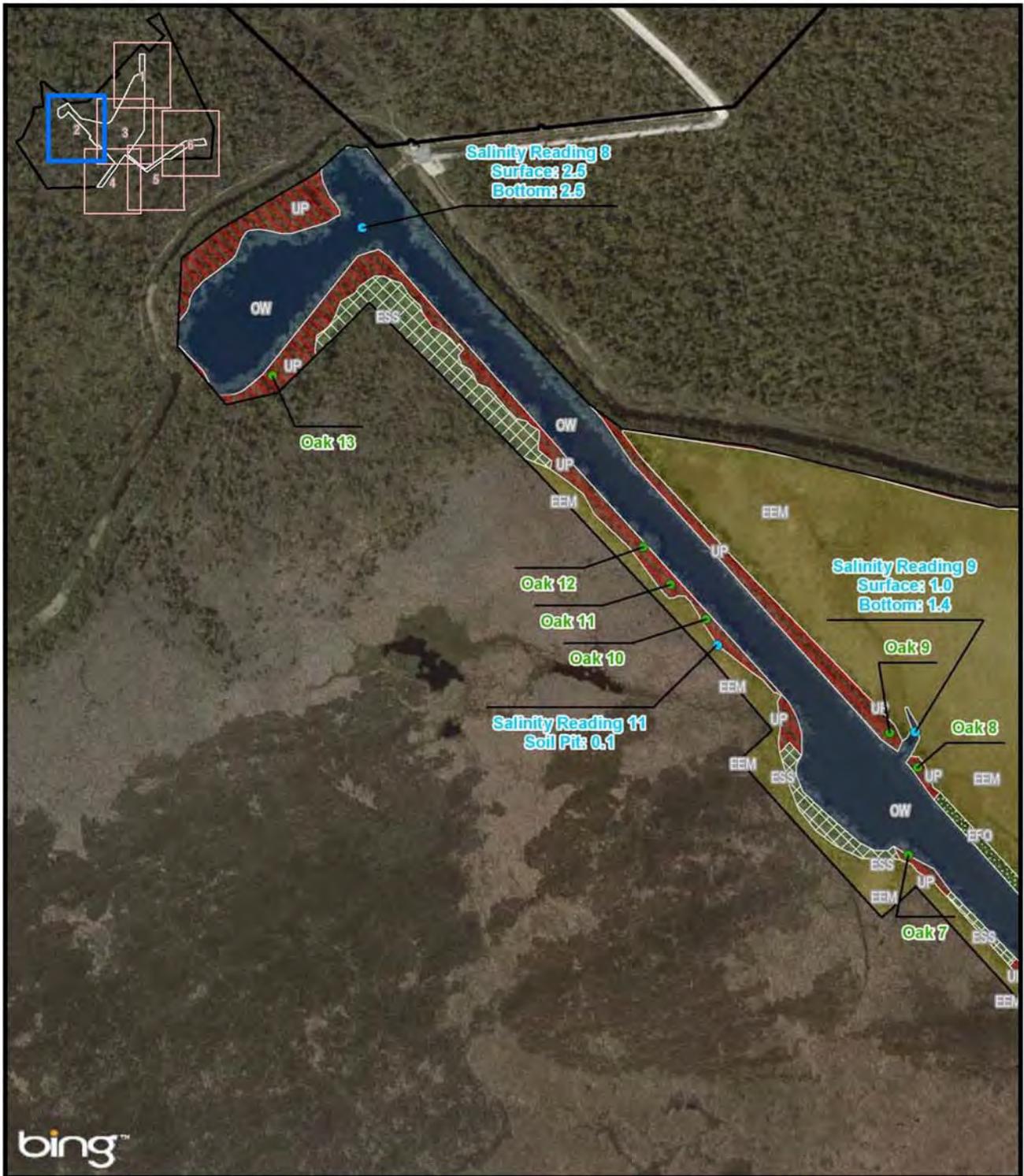
Prepared By: ATKINS/14923

Scale: 1" = 500 feet

Job No.: 100032503

Date: Apr 09, 2013

File: N:\Clients\W_Mitigation_Bank_of_Louisiana_LLC\100032503_LaEstuary\geofinal_report\9_aerial_field.mxd



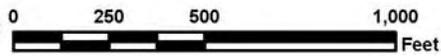
bing™



- Property Ownership
- Bank Property
- Salinity Reading
- Oak
- Cypress
- EEM Wetland
- EFO Wetland
- ESS Wetland
- Open Water
- Upland



Wetland Delineation: ATKINS, 2012
Aerial: Bing Maps 2012



ATKINS

Figure 6
Aerial Wetland Delineation Map
Estuary Mitigation Bank
Jefferson Parish, Louisiana
Mitigation Bank of Louisiana, LLC
Bertrandville & Lafitte Quadrangles
Sheet 2 of 6

Prepared By: ATKINS/14923

Scale: 1" = 500 feet

Job No.: 100032503

Date: Apr 09, 2013

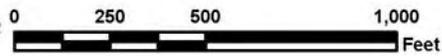
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- Property Ownership
- Bank Property
- Salinity Reading
- Oak
- Cypress
- EEM Wetland
- EFO Wetland
- ESS Wetland
- Open Water
- Upland



Wetland Delineation: ATKINS, 2012
Aerial: Bing Maps 2012



ATKINS

Figure 7
Aerial Wetland Delineation Map
Estuary Mitigation Bank
Jefferson Parish, Louisiana
Mitigation Bank of Louisiana, LLC
Bertrandville & Lafitte Quadrangles
Sheet 3 of 6

Prepared By: ATKINS/14923

Scale: 1" = 500 feet

Job No.: 100032503

Date: Apr 09, 2013

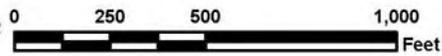
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- Property Ownership
- Bank Property
- Salinity Reading
- Oak
- Cypress
- EEM Wetland
- EFO Wetland
- ESS Wetland
- Open Water
- Upland



Wetland Delineation: ATKINS, 2012
Aerial: Bing Maps 2012



ATKINS

Figure 8
Aerial Wetland Delineation Map
Estuary Mitigation Bank
Jefferson Parish, Louisiana
Mitigation Bank of Louisiana, LLC

Lafitte Quadrangle
Sheet 4 of 6

Prepared By: ATKINS/14923

Scale: 1" = 500 feet

Job No.: 100032503

Date: Apr 09, 2013

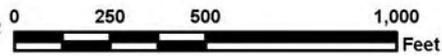
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- Property Ownership
- Bank Property
- Salinity Reading
- Oak
- Cypress
- EEM Wetland
- EFO Wetland
- ESS Wetland
- Open Water
- Upland



Wetland Delineation: ATKINS, 2012
Aerial: Bing Maps 2012



ATKINS

Figure 9
Aerial Wetland Delineation Map
Estuary Mitigation Bank
Jefferson Parish, Louisiana
Mitigation Bank of Louisiana, LLC

Lafitte Quadrangle
Sheet 5 of 6

Prepared By: ATKINS/14923

Scale: 1" = 500 feet

Job No.: 100032503

Date: Apr 09, 2013

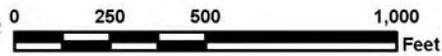
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- Property Ownership
- Bank Property
- Salinity Reading
- Oak
- Cypress
- EEM Wetland
- EFO Wetland
- ESS Wetland
- Open Water
- Upland



Wetland Delineation: ATKINS, 2012
Aerial: Bing Maps 2012



ATKINS

Figure 10
Aerial Wetland Delineation Map
Estuary Mitigation Bank
Jefferson Parish, Louisiana
Mitigation Bank of Louisiana, LLC
Bertrandville & Lafitte Quadrangles
Sheet 6 of 6

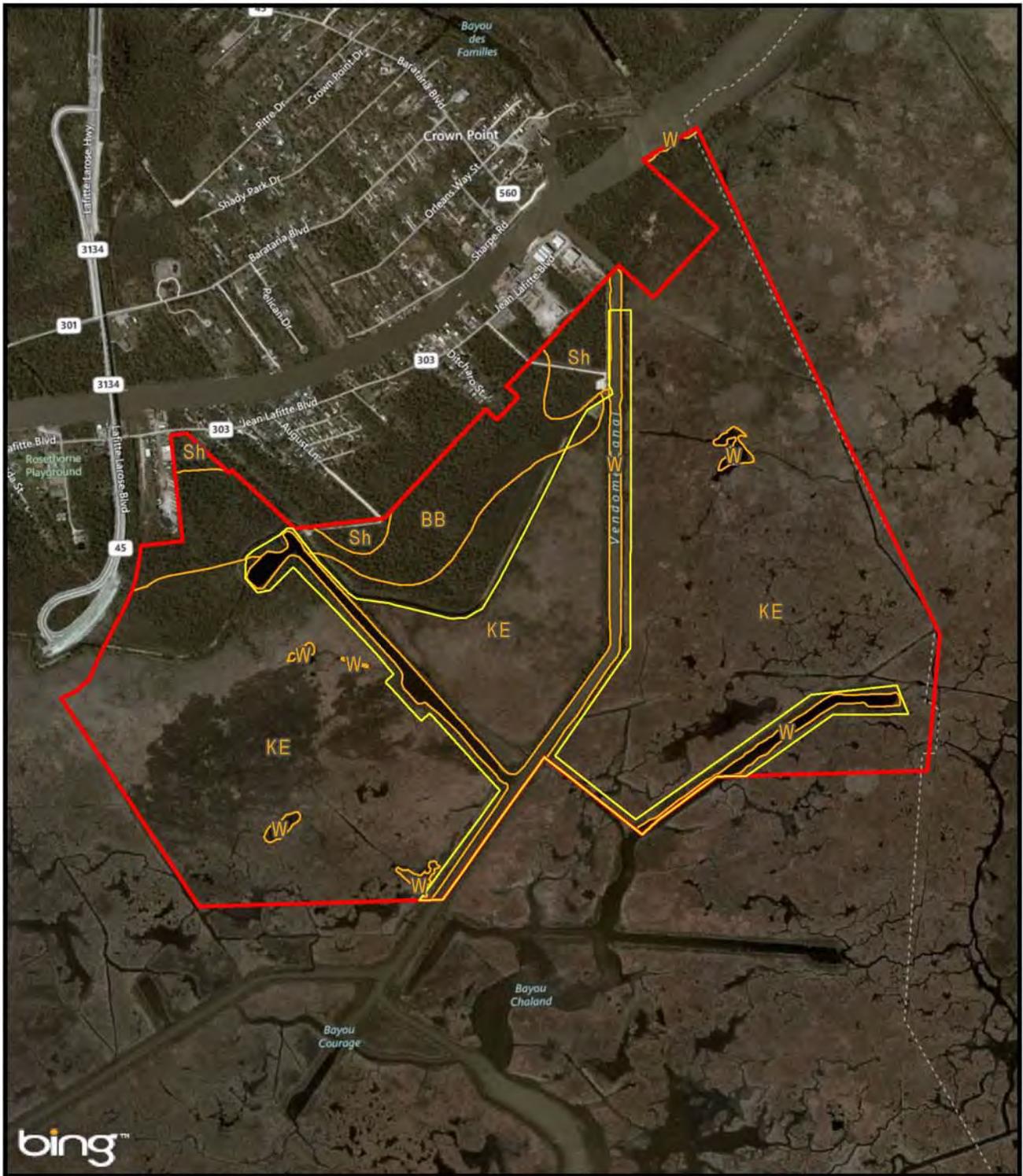
Prepared By: ATKINS/14923

Scale: 1" = 500 feet

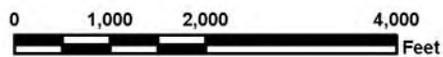
Job No.: 100032503

Date: Apr 09, 2013

File: N:\Clients\W_Mitigation_Bank_of_Louisiana_LLC\100032503_LaEstuary\geofinal_report\9_aerial_field.mxd



- Bank Property
- Property Ownership
- Soil (NRCS)
- BB - Barbary muck
- KE - Kenner muck
- Sh - Schriever silty clay loam
- W - Water



Aerial: Bing Maps 2012
Soils: NRCS Database

ATKINS

Figure 11
Soil Designation Map
Estuary Mitigation Bank
Jefferson Parish, Louisiana
Mitigation Bank of Louisiana, LLC

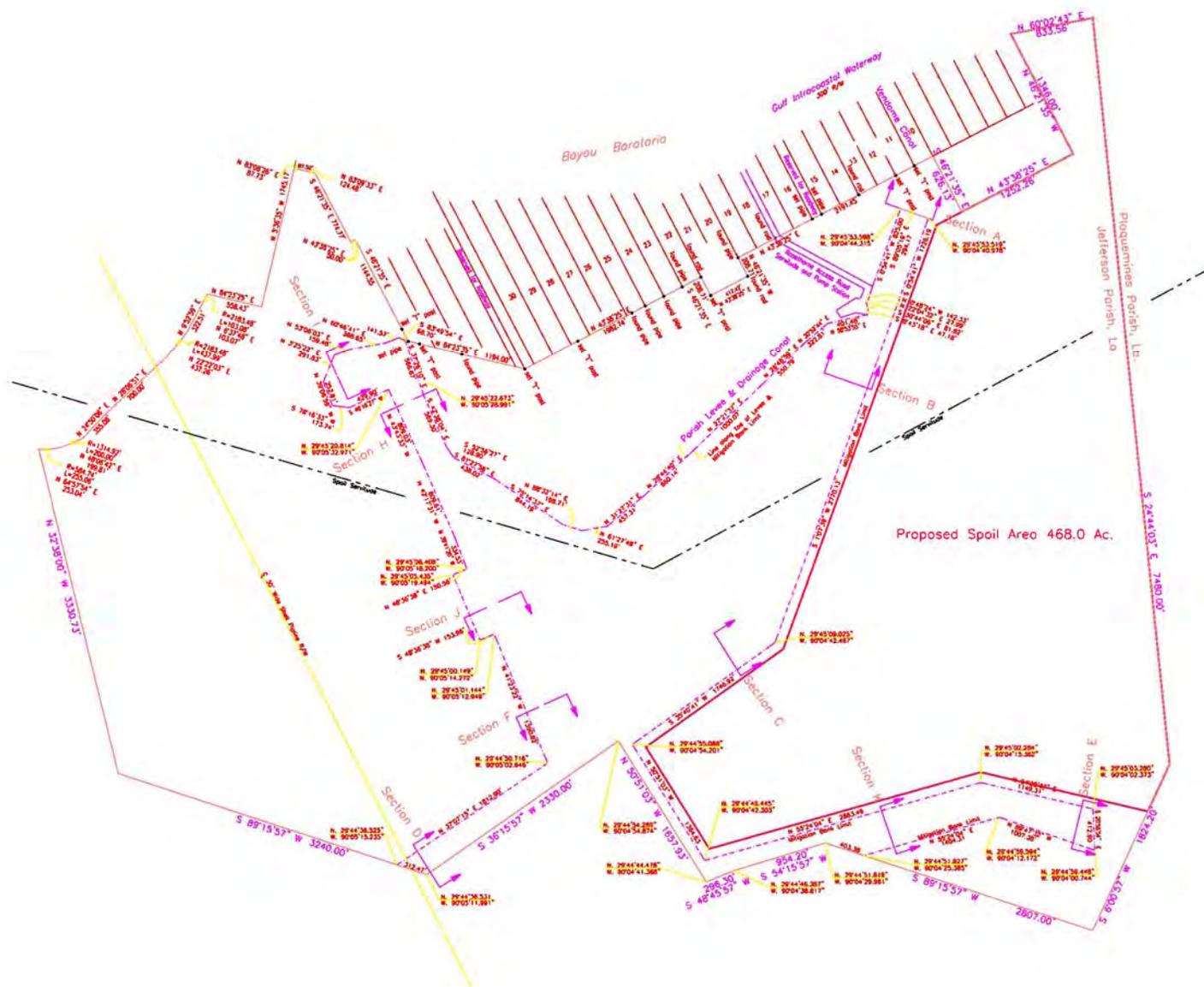
Prepared By: ATKINS/14923

Scale: 1" = 2,000'

Job No.: 100032503

Date: Apr 09, 2013

File: N:\Clients\W_N\Mitigation_Bank_of_Louisiana_LLC\100032503_LaEstuary\geofinal_report\Figure12_Soil.mxd



Area Tabulation
 Total Area 1403.3 Ac.
 Spoil Area 271.8 Ac.
 Spoil Servitude Area 481.4 Ac.

Proposed Spoil Area 468.0 Ac.

This survey meets the requirements of
 a Marsh Land Class O Survey.

Certified Correct to:
 February 13, 2013



PROFESSIONAL LAND SURVEYOR

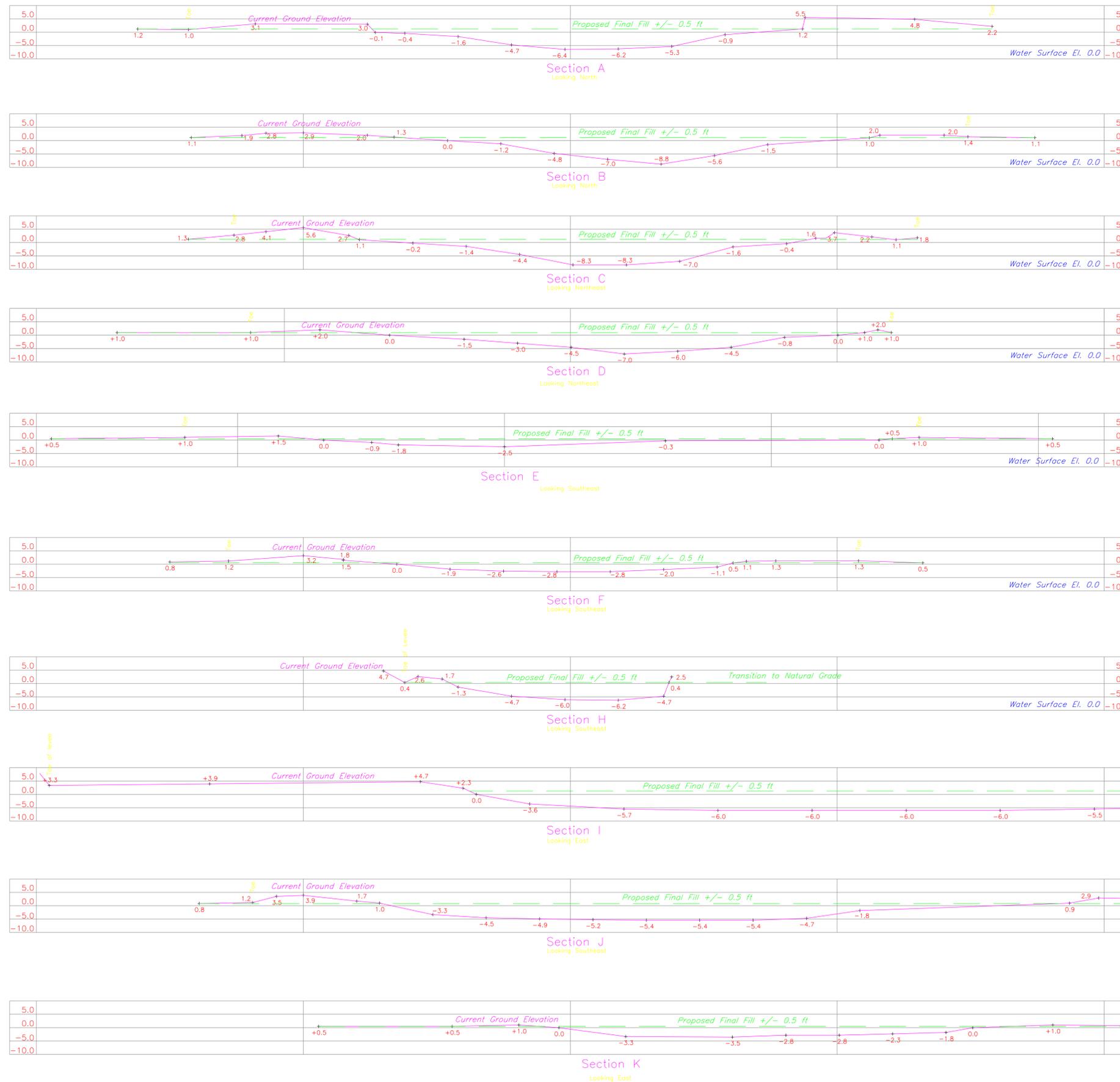
Figure 12
 Map of Survey
 Estuary Mitigation Bank

1" = 500'



The NRI Group, LLC
The Natural Resources Investment Group, LLC

Figure 13
Surveyed Cross-Sections with
Proposed Conditions
Jefferson Parish, LA
Mitigation Bank of Louisiana, LLC



1" = 20'

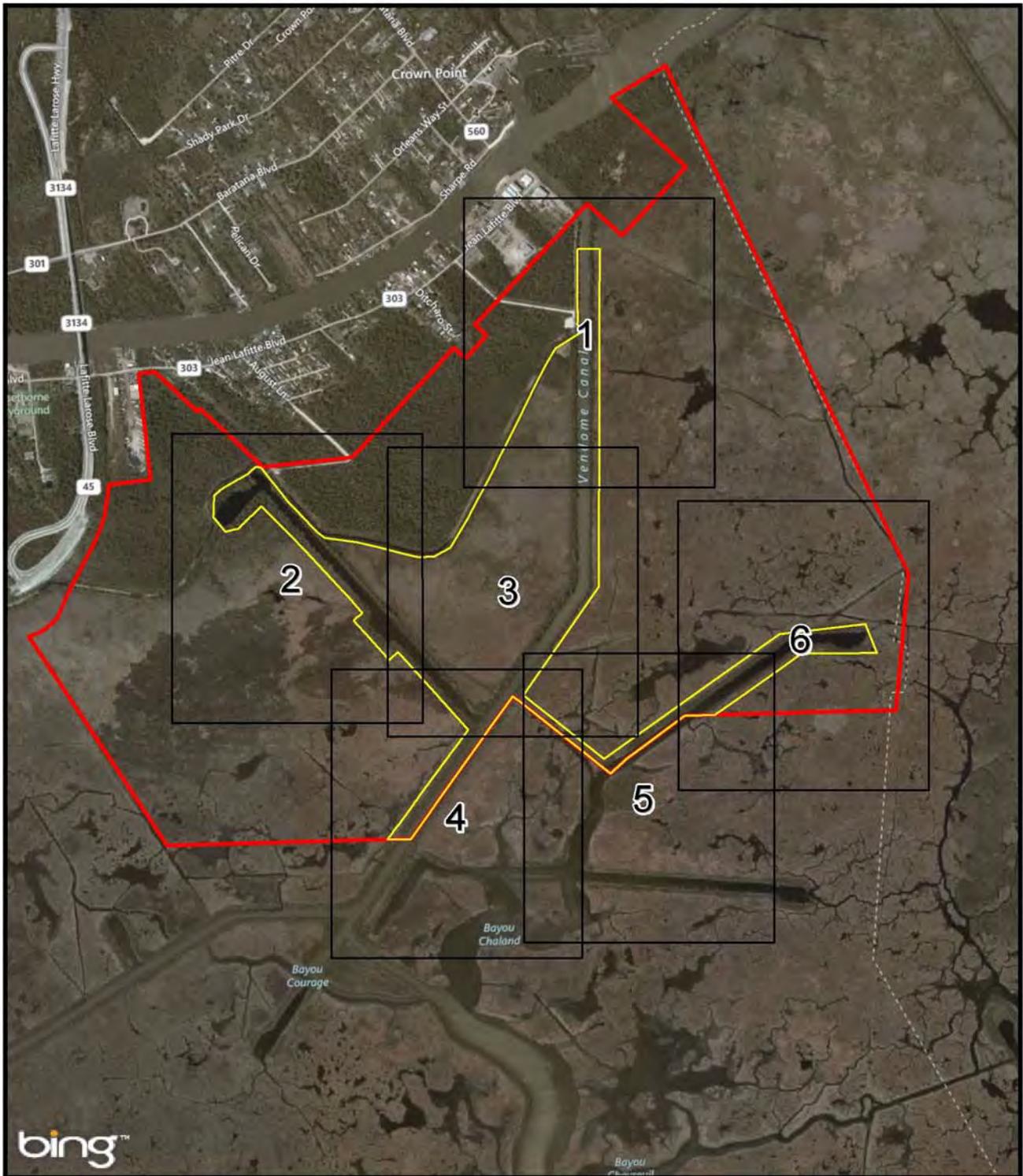
Elevations shown hereon are N.A.V.D.'88 in feet.

Sections

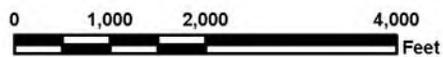
Sheet 2 of 2
See Sheet 1 of 2 for Section Locations

Prepared at the request of Estuary Mitigation Bank

OFFICE OF
Hugh McCurdy III, PLS
(504) 391-2835
P.O. Box 43 Belle Chasse, La. 70037



- Bank Property
- Property Ownership
- Sheet Index



Aerial: Bing Maps 2012

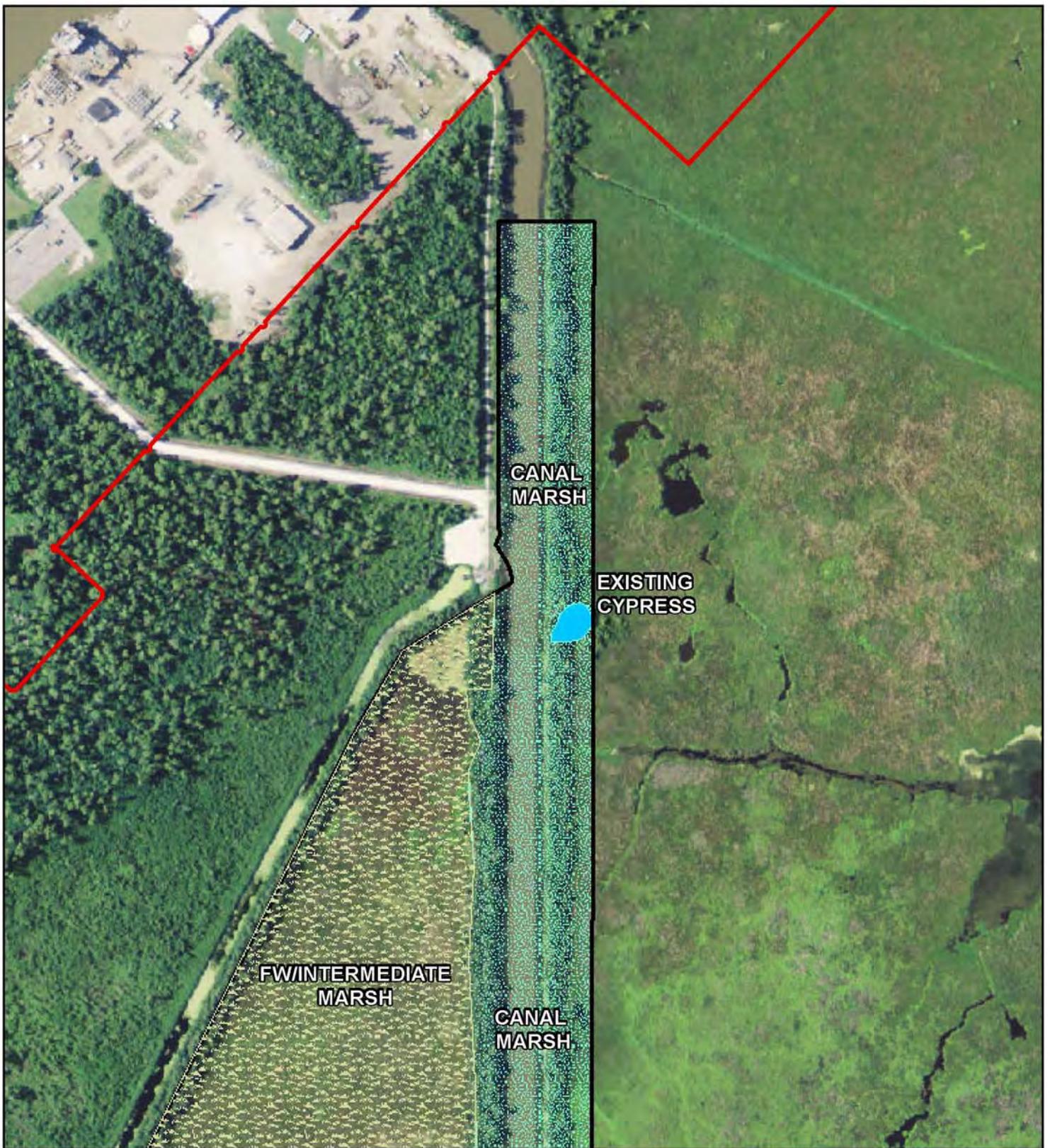
ATKINS

Figure 14
 Restoration Sheet Index Map
 Estuary Mitigation Bank
 Jefferson Parish, Louisiana
 Mitigation Bank of Louisiana, LLC

Prepared By: ATKINS/14923 Scale: 1" = 2,000 feet

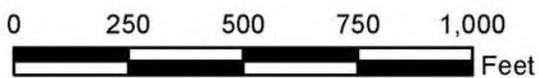
Job No.: 100032503 Date: Apr 09, 2013

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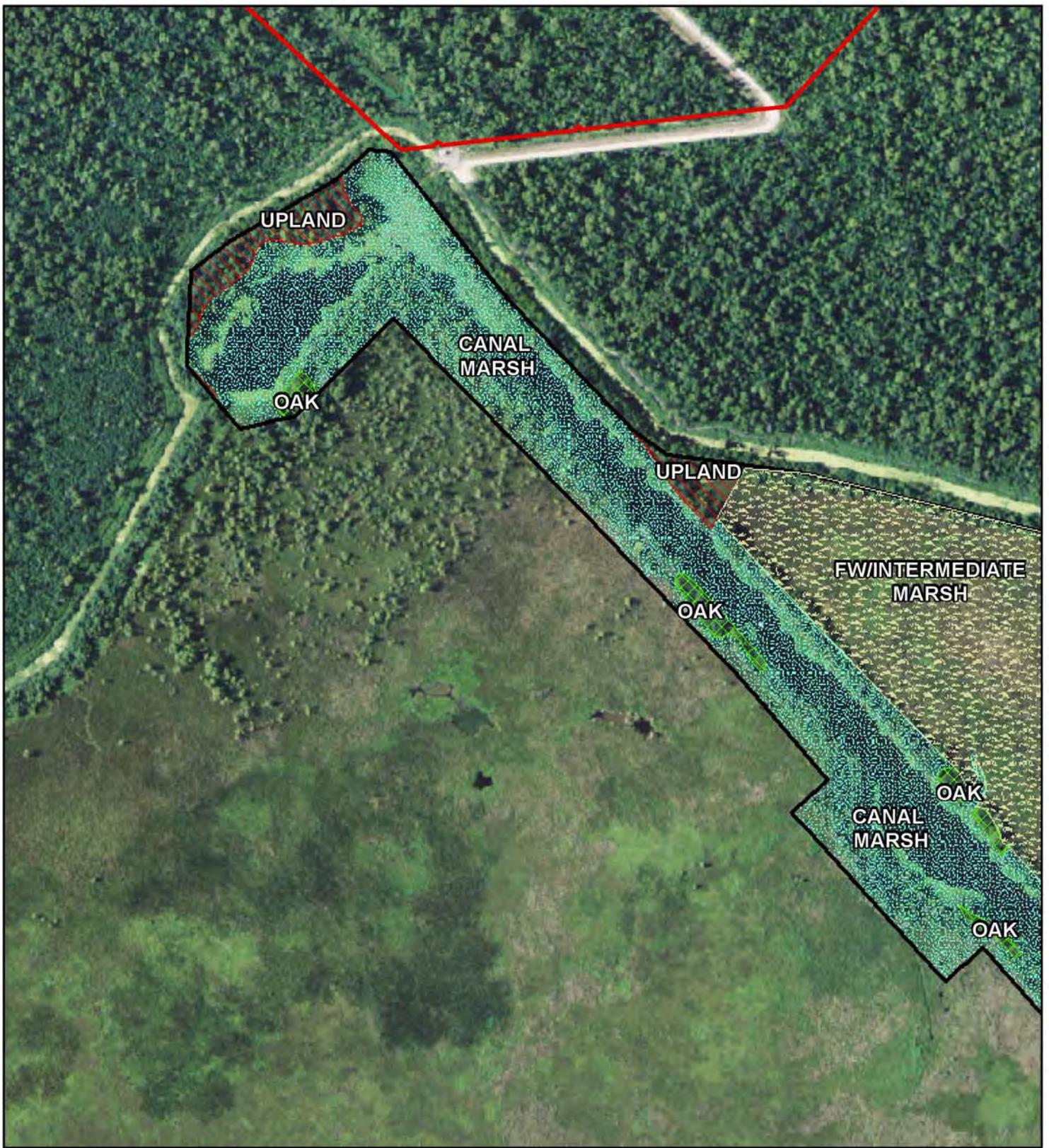
- | | |
|---|--|
|  Property Ownership |  Existing Cypress |
|  Bank Property |  Canal Marsh Re-establishment |
|  Oak |  Cypress/Gum Swamp Rehabilitation |
|  Upland |  Marsh Rehabilitation |

Figure 15
 Mitigation Bank of Louisiana, LLC
 Estuary Mitigation Bank
 Jefferson Parish, LA
 Bertrandville Quadrangle
 Sheet 1 of 6



September 25, 2013

Scale: 1" = 500 feet



- | | |
|---|--|
|  Property Ownership |  Existing Cypress |
|  Bank Property |  Canal Marsh Re-establishment |
|  Oak |  Cypress/Gum Swamp Rehabilitation |
|  Upland |  Marsh Rehabilitation |

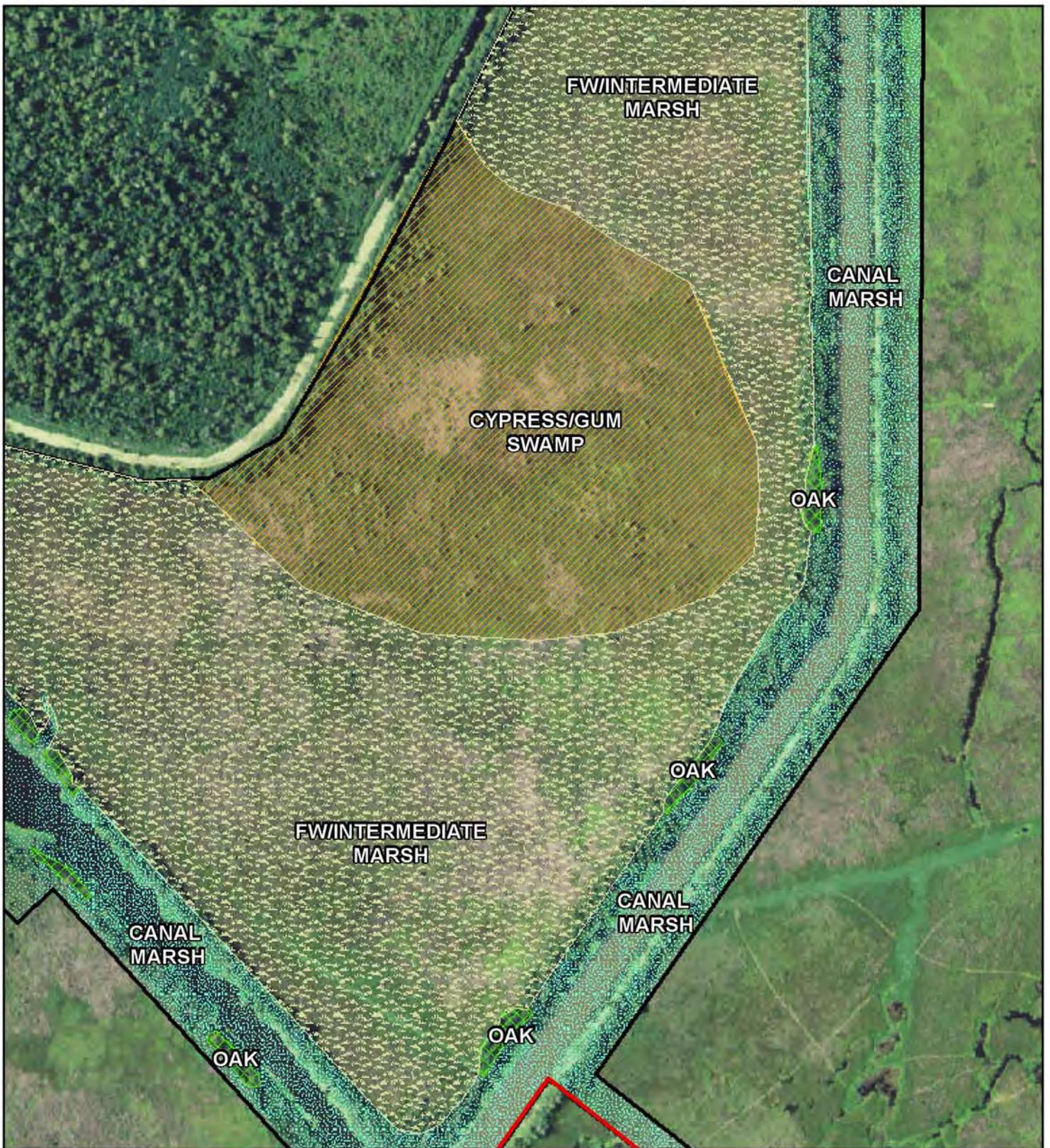
Figure 16
 Mitigation Bank of Louisiana, LLC
 Estuary Mitigation Bank
 Jefferson Parish, LA
 Bertrandville Quadrangle
 Sheet 2 of 6

0 250 500 750 1,000
 Feet



September 25, 2013

Scale: 1" = 500 feet



- | | |
|---|--|
|  Property Ownership |  Existing Cypress |
|  Bank Property |  Canal Marsh Re-establishment |
|  Oak |  Cypress/Gum Swamp Rehabilitation |
|  Upland |  Marsh Rehabilitation |

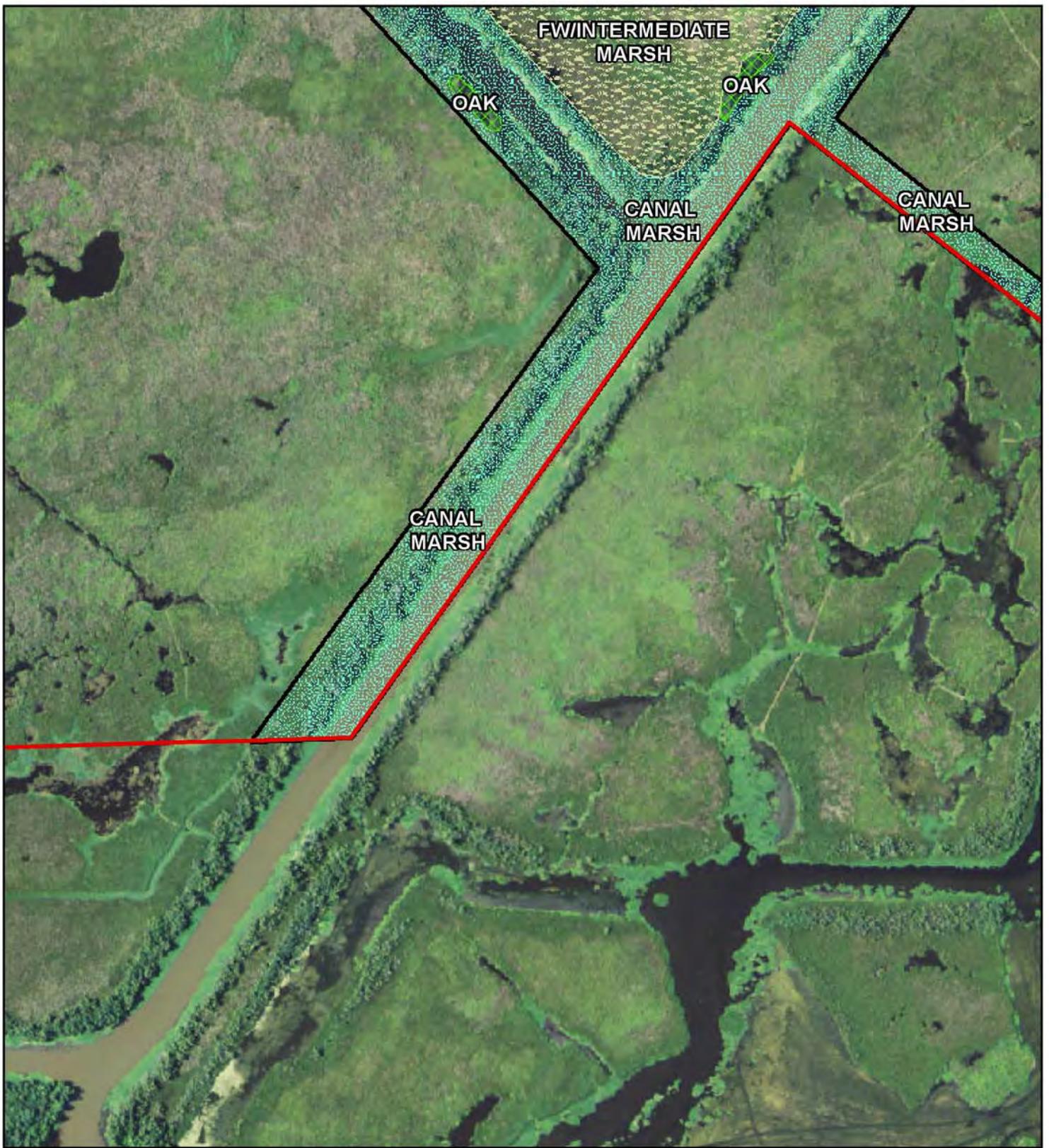
Figure 17
 Mitigation Bank of Louisiana, LLC
 Estuary Mitigation Bank
 Jefferson Parish, LA
 Bertrandville Quadrangle
 Sheet 3 of 6

0 250 500 750 1,000
 Feet



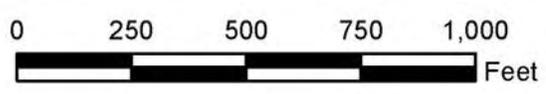
September 25, 2013

Scale: 1" = 500 feet

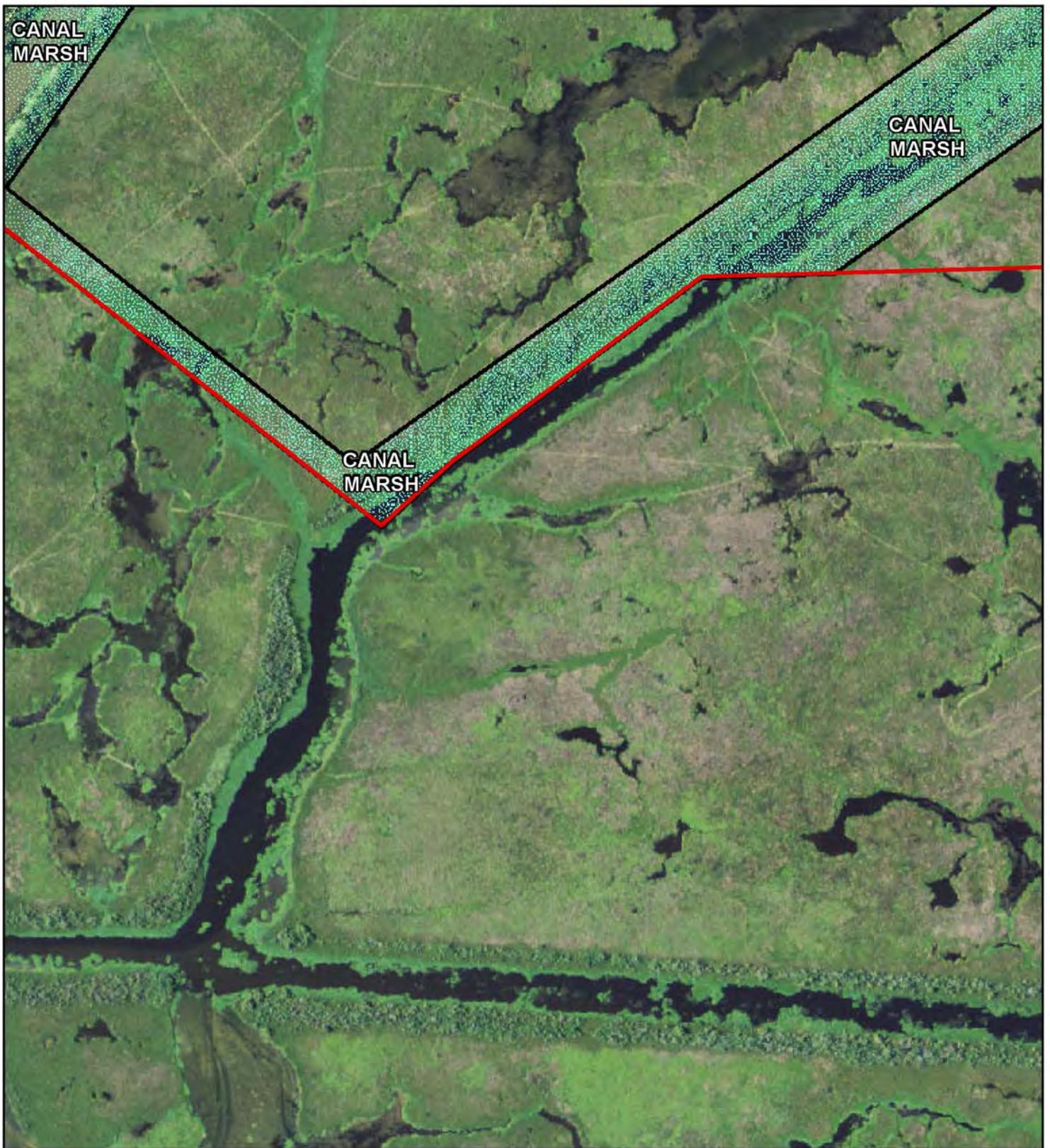


- | | |
|---|--|
|  Property Ownership |  Existing Cypress |
|  Bank Property |  Canal Marsh Re-establishment |
|  Oak |  Cypress/Gum Swamp Rehabilitation |
|  Upland |  Marsh Rehabilitation |

Figure 18
 Mitigation Bank of Louisiana, LLC
 Estuary Mitigation Bank
 Jefferson Parish, LA
 Bertrandville Quadrangle
 Sheet 4 of 6

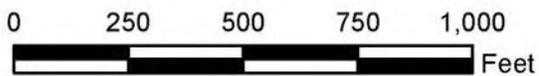


September 25, 2013
 Scale: 1" = 500 feet



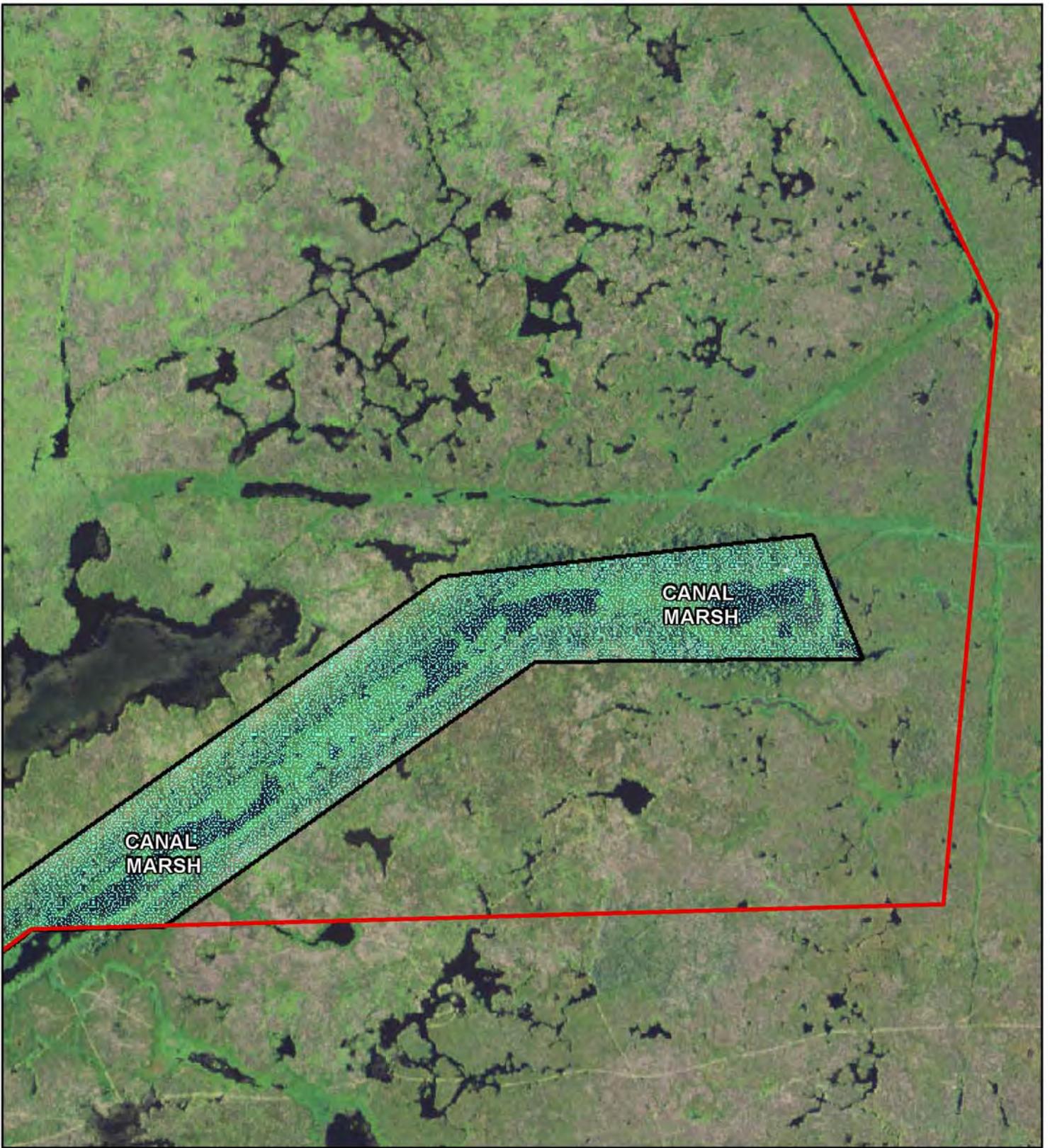
- | | |
|---|--|
|  Property Ownership |  Existing Cypress |
|  Bank Property |  Canal Marsh Re-establishment |
|  Oak |  Cypress/Gum Swamp Rehabilitation |
|  Upland |  Marsh Rehabilitation |

Figure 19
 Mitigation Bank of Louisiana, LLC
 Estuary Mitigation Bank
 Jefferson Parish, LA
 Bertrandville Quadrangle
 Sheet 5 of 6



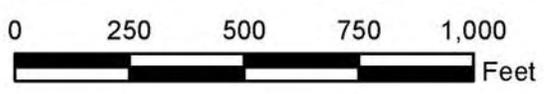
September 25, 2013

Scale: 1" = 500 feet

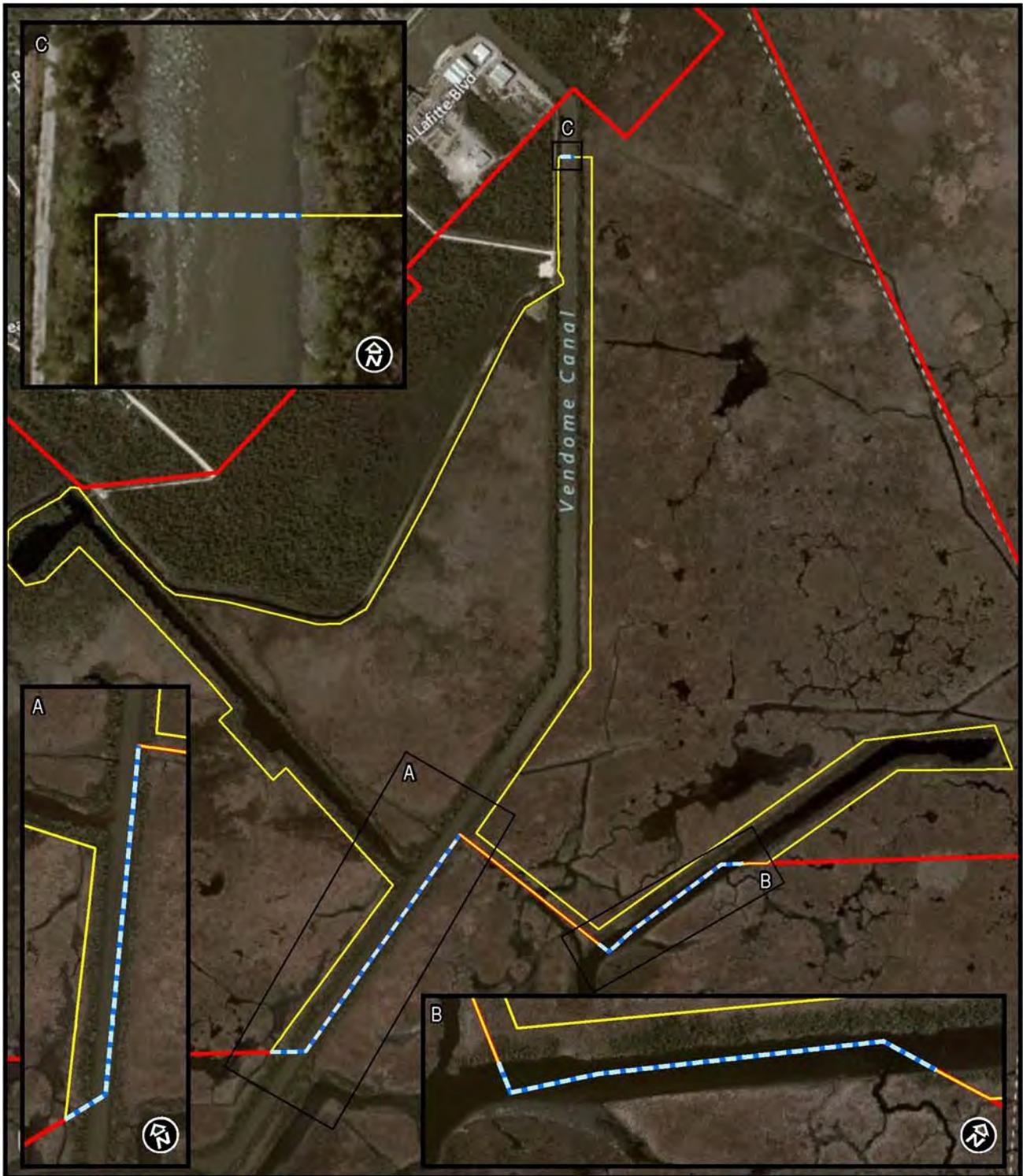


- | | |
|---|--|
|  Property Ownership |  Existing Cypress |
|  Bank Property |  Canal Marsh Re-establishment |
|  Oak |  Cypress/Gum Swamp Rehabilitation |
|  Upland |  Marsh Rehabilitation |

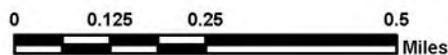
Figure 20
 Mitigation Bank of Louisiana, LLC
 Estuary Mitigation Bank
 Jefferson Parish, LA
 Bertrandville Quadrangle
 Sheet 6 of 6



September 25, 2013
 Scale: 1" = 500 feet



- Bank Property
- Property Ownership
- Ditch Plug



Aerial: Bing Maps 2012

ATKINS

Figure 21
 Ditch Plug Location Map
 Estuary Mitigation Bank
 Jefferson Parish, Louisiana
 Mitigation Bank of Louisiana, LLC

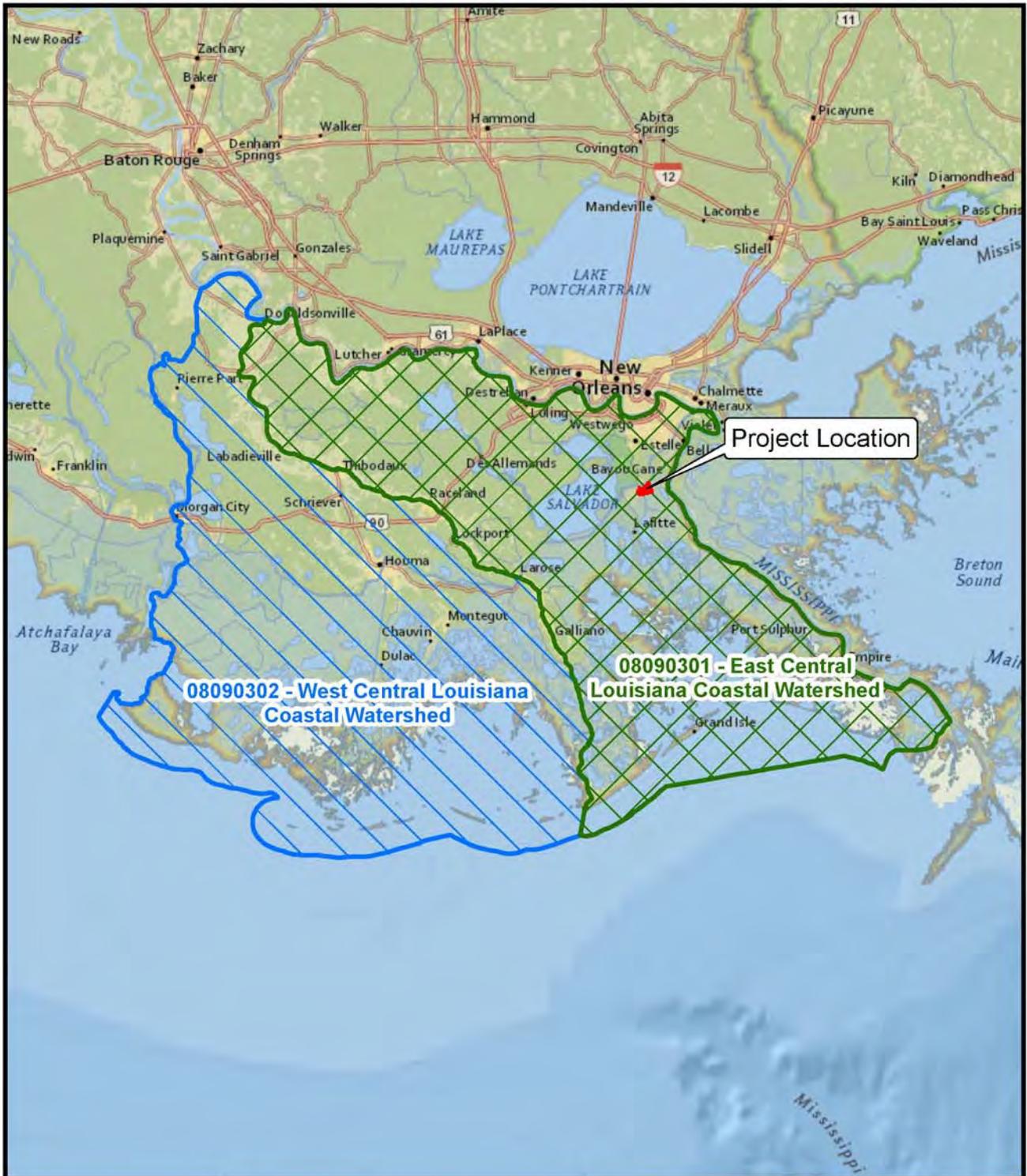
Prepared By: ATKINS/14923

Scale: 1" = 0.25 miles

Job No.: 100032503

Date: Jun 10, 2013

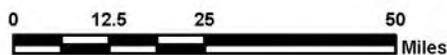
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- Property Ownership
- Proposed Primary Service Area
- Proposed Secondary Service Area



Datum: NAD 83
 Projection: UTM
 Zone: 15N
 Unit: Meters



ATKINS

Figure 22
 Service Area Map
 Estuary Mitigation Bank
 Jefferson Parish, Louisiana
 Mitigation Bank of Louisiana, LLC

Prepared By: ATKINS/14923

Scale: 1" = 25 miles

Job No.: 100032503

Date: Jun 10, 2013

File: N:\Clients\JM_N\Mitigation_Bank_of_Louisiana_LLC\100032503_LaEstuary\geofinal_report\Figure14_ServiceArea.mxd



USACE
 FSV 1 IH ^{10/15} Date: 8/19/13
 Botanist: WINDHAM
 Requestor: SPALDING
 # MVN-2013-01870-SK

APPROVED
 JURISDICTIONAL DETERMINATION



- Data Sheet Point
- ▭ Bank Property
- ▭ Property Ownership
- ▨ Wetland - 195.3 ac (10/404)
- ▭ Open Water - 68.3 ac (10/404)
- ▭ Upland

ATKINS

Data Sheet Collection Points
 Estuary Mitigation Bank
 Jefferson Parish, Louisiana
 Mitigation Bank of Louisiana, LLC

Prepared By: ATKINS/14923	Scale: 1" = 1,500 feet
Job No.: 100032503	Date: Sep 17, 2013



Aerial: Bing Maps 2012

Service Layer Credits: Image courtesy of USGS © 2013 Microsoft Corporation © 2010 NAVTEQ © AND

File: N:\Client\13\Mitigation_Bank_of_Louisiana_LLC\100032503_LaEstuary\geotitles\report\figure_Points.mxd

LAFITTE AREA INDEPENDENT LEVEE DISTRICT

2654 Jean Lafitte Blvd
Lafitte, Louisiana 70067
(504) 233-1109
Fax: (504) 689-7801

September 10, 2013

Mr. Thomas A. Carrere, CEO
Mitigation Bank of Louisiana, LLC
P.O. Box 903
Belle Chasse, LA 70037

RE: Estuary Mitigation Bank

Dear Mr. Carrere,

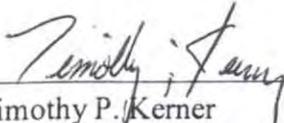
I am writing to express my support for your company's Estuary Mitigation Bank proposal near the town of Jean Lafitte.

I appreciate and welcome the benefits of restoring the ecological functions of the degraded mix forested wetlands and marsh habitats in our area that have been impacted by man-made activities in the past.

We appreciate the contributions that your mitigation bank will make towards protecting our fragile coastline from further erosion as well as the residual benefit of storm surge protection for the citizens of our area.

Please let me know if I can be of assistance.

Very truly yours,



Timothy P. Kerner
Levee District President

Moved by Mr. Burmaster and seconded by Mr. Rawle approving the Lafitte Area Independent Levee District to support the Mitigation Bank of Louisiana's Estuary Mitigation Bank near the Town of Jean Lafitte.

RESOLUTION 180

WHEREAS, the area will receive the benefits of restoring the ecological functions of the degraded mix forested wetlands and marsh habitats in our area that have been impacted by man-made activities in the past.

NOW THEREFORE, BE IT RESOLVED, that the Lafitte Area Independent Levee District Board of Commissioners, acting authority of the Lafitte Area Independent Levee District, supporting the Mitigation Bank of Louisiana's Estuary Mitigation Bank near the Town of Jean Lafitte.

The foregoing resolutions, having been submitted to a vote, the vote thereon was as follows:

YEAS: 4

NAYS: 0

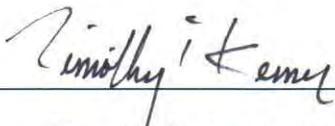
ABSENT: 1

The resolution was declared to be adopted on this 12th day of September 2013.

CERTIFICATE

I hereby certify that the forgoing is a true and exact copy of the resolution adopted at the board meeting held on September 12, 2013, at which a meeting quorum was present and voting.

Lafitte, Louisiana, this 12th day of September, 2013.



Timothy P. Kerner, President