DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NEW ORLEANS DISTRICT
7400 LEAKE AVENUE
NEW ORLEANS, LOUISIANA 70118

REPLY TO
ATTENTION OF

02/12/2018

Operations Division
Regulatory Branch
Project Manager: Stephen Pfeffer
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(504) 862-2099

SUBJECT: MVN 2016-01564-MS

PUBLIC NOTICE

Public Notice Purpose: Pursuant to Section 10 of the Rivers and Harbors Act of March 3, 1899 (30 Stat. 1151; 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 is 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 BLOUIN MITIGATION BANK IN LAFOURCHE PARISH

NAME OF APPLICANT: Raceland 330, LLC c/o Natural Resource Professionals, LLC Attention: Mr. Gregg Fell, 10621 North Oak Hills Parkway, Suite A, Baton Rouge, LA 70810

LOCATION OF WORK: The 220.3 acre proposed site is located in Sections 44, 100, 110 and 113, Township 15 South, Range 17 East north of LA Highway 308 between Thibodaux and Raceland. The site is centered on the point 29.765418° N, -90.691591° W, located in Hydrologic Unit Code 08090301, as shown in the attached prospectus.

CHARACTER OF WORK: Site restoration shall be accomplished through hydrological restoration and afforestation of the native vegetative community. This includes abandoning farming operations, gapping the interior perimeter levee, plugging field drains, removing or plugging culverts, backfilling ditches, site preparation, elimination of invasive species, and replanting of appropriate species in order to generate bottomland hardwood and cypress-tupelo swamp credits that could be used as compensation for unavoidable impacts to wetlands associated with Department of the Army (DA) permits authorized under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Additional details of the mitigation plan are included in the attached prospectus.
The Corps of Engineers is soliciting written comments from the public; federal, state,

and local agencies and officials; Indian Tribes; and other interested parties. 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 thereof, are being solicited from anyone having interest in this prospectus. Letters must reference the applicant's name and the subject number, be addressed and mailed to the above address,
ATTENTION: REGULATORY BRANCH.

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

Enclosure

Prospectus for the Proposed Blouin Mitigation Bank

Lafourche Parish, Louisiana

January 16, 2018

Sponsor:

Raceland 330, LLC
PO Box 25
Des Allemands, LA 70030

Agent:

Natural Resource Professionals, LLC
North Oak Hills Parkway, Suite A
Baton Rouge, LA 70810

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1.0 Introduction

Raceland 330, LLC (Sponsor), submits this Prospectus to the US Army Corps of Engineers, New Orleans District (CEMVN), Louisiana Department of Natural Resources (DNR), and the Interagency Review Team (IRT), to initiate evaluation of the proposed Blouin Mitigation Bank (Bank) in accordance with 33 CFR §332.8 (d)(2) and LAC 43:724. The 220.3-acre Bank will provide compensatory mitigation for unavoidable, permitted impacts to "Waters of the United States" and coastal wetlands if deemed appropriate per 33 CFR §332.3(1) (a) and 33 CFR §332.3 (1)(b) and LAC 43:724. The details pertaining to the use of this site as a mitigation bank will be specified in the subsequent Mitigation Banking Instrument (MBI).

The 220.3-acre Bank is located near Lake Boeuf in the Louisiana Coastal Zone. It is located approximately 6 miles upstream of Raceland along Bayou Lafourche in Lafourche Parish, LA. It is within the Louisiana Department of Environmental Quality (DEQ) Barataria River Basin and the United States Geological Survey (USGS) Hydrologic Unit Code #08090301.

The Bank currently consists of sugarcane fields, herbaceous wetlands, an abandoned crawfish pond, and forested wetland habitat, with elevations ranging from -5' – 8' NAVD 88 12B. The Bank is approximately 1,502 feet Wide and 9,400 feet long. The Bank is ecologically suitable for wetland mitigation activities due to the presence of hydric soils and existing wetland hydrology. The Sponsor proposes to execute a perpetual conservation servitude, conduct wetland restoration and enhancement activities, facilitate the establishment of a self-sustaining wetland ecosystem, and provide long-term management in order to maximize the wetland functional capacity of the Bank.

1.1 Site Location

The Bank is located at -90.691591 W and 29.765418 N (Approximate Centroid) and within Sections 44, 100, 110 and 113, Township 15 South and Range 17 East. The 220.3-acre Bank is located between Thibodaux and Raceland, Louisiana within the Barataria Basin (Figure 1 and 2). The southernmost boundary of the Bank is located approximately 2,800 feet from Bayou Lafourche and the northernmost boundary is located approximately 12,000 feet from Lake Boeuf.

2.0 Project Goals and Objectives

The goal of the project is to re-establish, rehabilitate, enhance and preserve 77.3 acres of Coastal Bottomland Hardwoods (BLH) and 119.6 acres of Coastal Cypress Swamp (SWP) Habitat. Additionally, approximately 7.7 of upland areas will be restored and/or preserved

Tables 1 and 2 below summarize the mitigation features of the Bank (Figure 3).

Table 1 – Coastal BLH Mitigation Features

Mitigation Type	Acreage
BLH Preservation	35.7 acres
BLH Re-establishment	21.7 acres
BLH Rehabilitation	19.9 acres
Total BLH Mitigation Features	77.3 acres

Table 2 – Coastal SWP Mitigation Features

Mitigation Type	Acreage
SWP Enhancement	32.5 acres
SWP Preservation	16.2 acres
SWP Re-establishment	4.9 acres
SWP Rehabilitation	66.0 acres
Total SWP Mitigation Features	119.6 acres

In order to improve the aquatic resource area, functions, and values of this BLH and SWP ecosystem, the Sponsor will meet the following objectives.

1. Restore and improve historic/natural surface hydrology by plugging/filling/removing ditches, removing culverts/pipes, removing/gapping roads/berms, and leveling surface elevations;
2. Remove ongoing agricultural/aquaculture activities in order to improve water quality and facilitate natural vegetative growth;
3. Conduct vegetative plantings of BLH and SWP species and improve vegetative composition of existing forested habitat;
4. Ensure initial, interim and long-term success through the implementation of a monitoring, management and maintenance program;
5. Establish appropriate financial mechanisms to ensure the successful completion of the proposed construction, establishment and long-term management activities; and
6. Ensure long-term protection through the execution of a perpetual conservation servitude in accordance with 33 CFR §332.7.

Bottomland Hardwood Forests

As defined by *The Natural Communities of Louisiana* published in 2009 by the Louisiana Department of Wildlife and Fisheries (LDWF) and the Louisiana Natural Heritage program (LNHP), BLH forests are forested, alluvial wetlands occupying broad floodplain areas that flank large river systems. These forests are the predominant natural community type of the Mississippi River Alluvial Plain, and are characterized and maintained by a natural hydrologic regime of alternating wet and dry periods generally following seasonal flooding events.

These forests support distinct assemblages of plants and animals associated with particular landforms, hydric soils, and hydrologic regimes. They are important natural communities for maintenance of water quality, providing a very productive habitat for a variety of fish and wildlife species, and are important in regulating flooding and stream recharge. Bottomland hardwoods are extremely productive areas due in part to periodic flood-transported and deposited particulate and dissolved organic matter and nutrients (LNHP 1986-2004). Further, these forests act as buffers for low-elevation urban areas, absorbing and dissipating the physical energy of river systems. The strength of these attributes is influenced by the composition and species density in these forests (DeWeese et al 2007).

Baldcypress Swamp

As defined by *The Natural Communities of Louisiana* published in 2009 by the Louisiana Department of Wildlife and Fisheries (LDWF) and the Louisiana Natural Heritage (LNHP) program, Baldcypress Swamps are forested, alluvial swamps growing on intermittently exposed soils most commonly along rivers and streams but also occurring in backswamp depressions and swales. The soils are inundated or saturated by surface water or groundwater on a nearly permanent basis throughout the growing season except during periods of extreme drought. However, all swamps – even deepwater swamps with almost continuous flooding – experience seasonal fluctuations in water levels.

SWP Forests generally occur on mucks and clays, and also silts and sands with underlying clay layer. They contain relatively low floristic diversity, and associate species may vary widely from site to site. Undergrowth is often sparse because of low light intensity and long hydroperiods. Swamps tend to be even-aged stands since the environmental conditions favorable for germination and establishment of saplings occur very infrequently. Swamps provide important ecosystem functions including maintenance of water quality, productive habitat for a variety of fish and wildlife species, and regulation of flooding, and stream recharge. Many aquatic food webs depend on the input of allochthonous material in the form of leaf litter or other organic debris that the wetland forest provides. Net primary productivity of swamp forests seems to be increased by periodic flooding or increased water flow and decreased by slow water movement or stagnation.

Wetland Functions and Values

The restored, enhanced, and preserved BLH and SWP will regulate the movement of water within the watershed as well as in the global water cycle (Richardson 1994; Mitsch and Gosselink 1993). Wetlands store precipitation and surface water and then slowly release the water into associated surface water resources, groundwater, and the atmosphere (Taylor et al 1990). Following surface hydrology improvements and the removal of artificial impediments, the Bank will reflect that of a seasonally saturated/inundated habitat. This will allow chemical functions such as organic

compound breakdown, decomposition, nutrient assimilation, oxidation/reduction potential, and denitrification to be more representative of natural BLH and SWP habitats.

The planting of BLH and SWP species within the Bank will provide improved habitat, structure, and nesting/breeding grounds for a variety of wildlife species. Following the implementation of the habitat work plan, these habitats, along with existing BLH and SWP habitat will be protected under a perpetual conservation servitude. These actions by the Sponsor will allow these functions to be realized over the long term.

The wetland values that will be provided will occur at the following three levels (Mitsch and Gosselink, 2000):

- Population – Animals harvested for pelts and/or food; wildlife observation/recreation; endangered/threatened species habitat
- Ecosystem – Flood mitigation; storm abatement; aquifer recharge, water quality improvement; aesthetics
- Biosphere – Nitrogen cycle; sulfur cycle; carbon cycle; phosphorus cycle

3.0 Ecological Suitability of the Site

The Bank is ecologically suitable to achieve the goals and objectives of the project. This is concluded from the fact that the Bank was formed under wetland conditions as evident in hydric soils throughout the site. The Bank is located within the Barataria Basin, an important watershed in the Louisiana Coastal Zone. Groundwater data collected during the past year shows that wetland hydrology already exists within the Bank. Additionally, surface water data collected during the past 6 months shows areas where hydrology can be improved by removing artificial drainage features and impediments. Following the hydrology improvements and vegetative plantings and invasive species control, the Bank will be returned to a highly functioning BLH and SWP ecosystem

3.1 Land Use

3.1.1 Historical Land Use

Louisiana

Native Americans probably first inhabited portions of Louisiana 10,000-12,000 years ago (Kniffen et al. 1987) with the original inhabitants of Lafourche Parish being members of the Chitmach, Washa, and Chawash Native American Tribes (SCS 1984). The natural levee ridges offered the highest and best-drained ground for building homes and fields (McKenzie et al. 1995), and with the abundance of food found along the natural levees and back swamps, populations were strongly concentrated along these waterways (Kniffen and Hilliard 1988).

Europeans came to live in Louisiana in approximately 1700. They used the same Native American water highways and trails along levee ridges, and their towns grew on the sites of or near Native American villages located on the natural levees (McKenzie et al. 1995). Throughout early settlement of Louisiana, land plots were established perpendicular to the shoreline of the River creating “pie shaped” plots. These lots extended back 40 or more arpents (192 feet) onto the heavy clay soils of the poorly drained swamp. Land was cleared, timber was sold, and parallel ditches were then dug the length of the property from levee to back swamp (McKenzie et al. 1995).

Lafourche Parish

Lafourche Parish was founded in 1807 as one of the original nineteen parishes in the state. With fertile land and a navigable bayou, there was little difficulty in attracting settlers who arrived in the 1700’s from Germany, France, Spanish, and Acadia (ULL 2017). The soils of Lafourche Parish have always been used for farming even during Native American habitation. Trappers and traders likely came to the region first, but farmers soon followed. Cotton, corn, and sweet potatoes were grown on the natural levees even before 1700 with indigo also being an important crop for a short time. Cotton was the main crop for many years; however, sugarcane increased significantly in 1794 after sugar granulation procedures were successfully developed. By 1861, sugarcane became the principal crop in the Lafourche Parish (SCS 1984).

Blouin Mitigation Bank

Being relatively close to the natural shoreline of Bayou Lafourche, it is likely that the Bank served as a source of food and transportation base for Native Americans. After European settlement, evidence of clearing and draining the Bank for timber/agriculture is seen in the 1892 USGS Topographic Map (Figure 4). Additionally, the railroad traversing the site is seen at this time.

Figure 5 illustrates the land use of the Bank in 1940. At this time, evidence of sugarcane/agricultural production is seen in the higher elevations with forested wetland habitat in the lower elevations. Drainage features are seen in addition to the primary access road which extends beyond the limits of the property into the swamp.

Figure 6 illustrates the land use of the Bank in 1957. Sugarcane and agriculture is primarily limited to land areas between Bayou Lafourche and the railroad, although some agriculture is seen further away from the railroad likely due to soils and/or hydrologic conditions. The 40/80 Arpent Canal and associated spoil bank are also constructed at this time, in addition to the powerline ROW.

Figure 7 illustrates the land use of the Bank in 1977. Sugarcane and agriculture is primarily limited to land areas between Bayou Lafourche and the railroad. Beyond the railroad evidence of crawfish farming is seen along with small areas of agricultural development. There is also a powerline constructed through the crawfish pond area as well as a pipeline in the portion of the property beyond the 40/80 Arpent Canal.

Figure 8 illustrates the land use of the Bank in 1998. Sugarcane and agriculture is primarily limited to land areas between Bayou Lafourche and the railroad. The crawfish farming area has increased with the features that are still visible today.

3.1.2 Existing/Current Land Use

General land use within one mile of the Bank includes Developed-Agriculture (1,499.1 acres), Developed- Non-Agriculture (317.8 acres), Open Water areas (42.6 acres) and a majority Undeveloped (2,638.0 acres). Developed- Agricultural areas consist mainly of sugarcane, Developed Non-Agricultural areas consist of both commercial and residential areas, Open Water areas include Bayou Lafourche and smaller canals/ditches and Undeveloped areas consist mainly of BLH and cypress swamp habitats. Figure 9 illustrates the current land-use within a 1-mile radius of the Bank.

3.2 Soils

Soils mapped within the boundary of the proposed Bank are illustrated in Figure 10 and include Schriever clay, 0 to 1 percent slopes (Sk); Fausse - Shriever association (FA); Cancienne silty clay loam, 0-1 percent slopes (Co); and Cancienne silt loam, 0-1 percent slopes (Cm), according to the Natural Resources Conservation Service (NRCS), Web Soil Survey.

The Shriever Series (Sk) consists of very deep, poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are on the lower parts of natural levees and in backswamp positions on the lower Mississippi River alluvial plain. Slope is dominantly less than 1 percent but ranges up to 3 percent (USDA 2013). According to the USDA Hydric Soil Webpage, the Sk soil type is hydric within Lafourche Parish.

The Fausse Series (FA) consists of very deep, very poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in low, ponded backswamp areas of the lower Mississippi River alluvial plain. Slopes are less than 1 percent (USDA 2013). According to the USDA Hydric Soil Webpage, the FA soil type is hydric within Lafourche Parish.

The Cancienne Series (Co and Cm) consists of very deep, level to gently undulating, somewhat poorly drained mineral soils that are moderately slowly permeable. These soils formed in loamy and clayey alluvium. They are on high and intermediate positions on natural levees and deltaic fans of the Mississippi River and its distributaries. Slopes range from 0 to 3 percent. According to the USDA Hydric Soil Webpage, both the Co and Cm soil types are hydric within Lafourche Parish.

3.3 Hydrology

3.3.1 Historical Hydrology and Drainage Patterns

Historical Barataria Basin Hydrology

The Bank is located along Bayou Lafourche within the Barataria Basin, an inter-distributary estuarine-wetland system located between the natural levees of the active Mississippi River and the abandoned Bayou Lafourche distributary (Conner and Day 1987). The wide natural levees of Bayou Lafourche indicate that the bayou was once a channel of the Mississippi River (SCS 1981). By the early 1800's, Bayou Lafourche was 15-20 feet deep and 200 yards wide and carried roughly 12% of the total Mississippi River Discharge (Lafourche Parish Game and Fish Commission). During this time the Mississippi River and historic Bayou Lafourche would periodically overflow its banks, depositing sediments, nutrients, and freshwater throughout the Barataria Basin, including the lands within the Bank.

Human induced activities greatly affected the hydrologic regime of the Barataria Basin. Beginning in 1814, Andrew Jackson ordered the obstruction of Bayou Lafourche by cutting shoreline trees in various locations to prevent access by British troops. These obstructions increased siltation and reduced water depths of the Bayou. In 1904, the local levee district constructed an earthen dam across Bayou Lafourche at the Mississippi River in Donaldsonville for flood protection (Lafourche Parish Fish and Game Commission), which was followed by the completion of the modern Mississippi River Levee System in the 1930-1940's (Conner and Day 1987). Following this series of events,

sedimentation and riverine flooding within the Barataria Basin was essentially eliminated, with rain, runoff from the Bayou Lafourche shoreline, and tides being the primary sources of water for the Basin and lands within the Bank.

Figure 11 illustrates the historic/natural Barataria Basin Hydrology within the vicinity of the Bank.

Historical Bank Hydrology

The lands within the Bank were historically hydrologically influenced by riverine flooding and meandering, rainfall, and tides. In addition to the basin-wide hydrology modifications described above, the Bank also experienced local hydrologic modifications beginning in approximately 1700, when the first European settlers arrived in the Basin, settling along the natural levees of Bayou Lafourche (Conner and Day 1987). At this time, extensive agricultural development began within the Bank which resulted in hydrology impacts such as channelization, reduced retention, and disruption of natural tidal input.

The 1892 Map (Figure 4), although a low resolution topographic map, shows the bank being cleared and developed for agriculture as evident in the ditches/canals dug perpendicular to Bayou Lafourche. This was done to improve drainage from the natural levee of the bayou into the swamps and Lake Boeuf. Although this image was made prior to Bayou Lafourche being severed from the Mississippi River, evidence of roads/levees along Bayou Lafourche are seen which likely eliminated overbank flooding during certain high water events. The railroad track is also constructed which likely affected natural sheet flow and tidal influx; however, it appears that the ditches/canal had conveyance through the railroad through the primary drainage canal alongside the primary access road.

The 1940 Map (Figure 5) and 1957 Map (Figure 6) show details of the extent of agricultural development within the Bank and immediate area. Evident in this image are rows, primary drains, and minor cross drains, all designed to facilitate channelized flow to the primary ditch/canal that crosses beneath the railroad and towards the backswamp and 40/80 Arpent Canal.

The 1977 Map (Figure 7) shows details of agricultural drainage improvements as well as impounded water within the newly constructed crawfish ponds. The dimensions of the crawfish pond increases with the 1998 Map (Figure 8).

3.3.2 Existing/Current Hydrology and Drainage Patterns

Area Hydrology

In general, primary hydrologic influences are rainfall runoff and tidal flux. Surrounding hydrologic features include Bayou Lafourche, Grand Bayou, Bayou Boeuf, Bayou Des Allemands, Lake Boeuf, and Lac des Allemands (Figure 12).

Bank Hydrology

The Bank hydrology is characterized into four major categories based on existing topography (Figures 13-14)

1. Channelized flow which inhibits natural sheet flow in active and abandoned agricultural areas.
2. Increased and unnatural inundation in abandoned crawfish pond. Natural sheet flow is blocked by a ring levee surrounding the habitat. The main hydrologic influences include rainfall and input/output through pipes/culverts.
3. Disruption of sheet flow cause by primary access road.
4. Flow beneath the railroad through an 8x8 box culvert (primary connection) and a 36” culvert that is partially filled and provides minimal conveyance.
5. Seasonal and semi-permanent inundation in existing BLH and SWP habitats, respectively.

In winter 2016-2017, four groundwater wells and three surface water meters were installed to document existing hydrology within the Bank Appendix A shows the location of the wells/meters and illustrates representative hydrographs of current Bank hydrology from November 2016 to December 2017.

The groundwater wells on the southern half of the property display saturation within the upper 12 inches of the soil surface for a minimum of two weeks during the growing season in areas with an elevation of approximately ≤3.0’ NAVD. This reinforces the existence of wetland hydrology throughout the Bank. The data indicates surface water drains from south to north through a box culvert under the railroad and eventually into the 40/80 Arpent Canal. In contrast, the data indicates groundwater drains north to south and into Bayou Lafourche. The data shows groundwater levels draining well below the surface water levels of 40/80 Arpent Canal confirming the groundwater is draining elsewhere.

The surface water meters on the northern half of the property show the existing habitats are well connected with 40/80 Arpent Canal when water levels are above the 1.0' NAVD88 elevation. The water meters located in the abandoned crawfish pond (HOBO Logger 1) and Degraded Swamp (HOBO Logger 2) follow a similar pattern with 40/80 Arpent Canal (HOBO Logger 3) until the water level drops below 1.0' NAVD88. During seasonally dry periods as the water is draining, the crawfish pond and degraded swamp drain at a much slower rate below the 1.0' and 0.8' NAVD88 elevation, respectively, compared to 40/80 Arpent Canal. This indicates a reduced connection or disconnect of these areas from the canal. Once the water level drops below this connection point, it is impounded. The degraded swamp is allowed to drain east through cuts in the berm adjacent to the Blouin access road and into the primary drainage canal and west into a drainage ditch all leading to 40/80 Arpent Canal. When water levels drop below 1.0' it no longer has access to the cuts in the berm. Additionally, the drainage canal to the west, which runs through a ridge before connecting with 40/80 Arpent Canal, becomes disconnected at the ridge when water levels drop below 1.0'. All of this prevents these habitats within the Bank from draining naturally.

As a quality check of the data collection, the surface water elevations and trends of 40/80 Arpent Canal align closely with the nearby Coastwide Reference Monitoring System (CRMS) data which is representative of the larger area hydrology of the surrounding BLH and cypress swamps.

Contributing Watershed

Figure 15 illustrates the contributing watershed for the Bank, which is approximately 785.3 acres. Excess rainfall runoff drains north away from Bayou Lafourche, under the railroad, and into 40/80 Arpent Canal. Gulf of Mexico tidal flux influences the area (2700 sq miles) via Barataria Bay, Lake Salvador, Lac des Allemands, Lake Boeuf, and 40/80 Arpent Canal.

Elevation and Slope

Elevations of the Bank range from -5' – 8' NAVD 88 12B (Figure 16). Slopes of the Bank range from 0 – 1%. Appendix B describes how these elevations were determined.

Climate

In Lafourche Parish, summers are hot and humid and winters are warm and only occasionally interrupted by incursions of cool air from the north. Rains occur throughout the year with an average annual precipitation of

59.35 inches. Of this, 33 inches, or 60 percent usually falls in April through September (SCS 1984).

3.3.3 Jurisdictional Wetlands

A Jurisdictional Determination (JD) for the Bank and other land areas owned by the Sponsor was issued on May 8, 2017 (MVN-2016-01564-SG). Appendix C contains the JD and Figure 17 illustrates the existing Jurisdictional Wetlands and Waters of the US within the Bank.

3.4 Vegetation

3.4.1 Historical Plant Community

Historic BLH Communities

According to the Natural Communities of Louisiana (LDWF 2009) the Bank would likely have consisted of the "Overcup Oak – Water Hickory," "Hackberry-American Elm-Green Ash" and/or the "Sweetgum-Water Oak" BLH Associations.

The Overcup Oak – Water Hickory association occur in low-lying poorly drained flats, sloughs in the lowest backwater basins, and on low ridges with clay soils that are subject to inundation. Semi-permanently indundated or saturated soils are generally present for major portion of the growing season. Co-dominant species include *Quercus lyrata* (overcup oak) and *Carya aquatica* (water hickory), while associate species include *Fraxinus pennsylvanica* (green ash), *Celtis laevigata* (hackberry), *Cornus foemina* (swamp dogwood), Forestiera acuminata (swamp privet), *Planera aquatica* (planertree), *Cephalanthus occidentalis* (buttonbush) and vines. This community type has a long successional stage.

The Hackberry-American Elm-Green Ash association occurs in floodplains of major rivers on low ridges, flats and sloughs in first bottoms. Soils are seasonally inundated or saturated periodically for 1 to 2 months during the growing season. In addition to *Celtis laevigata* (hackberry), *Ulmus americana* (American elm), and *Fraxinus pennsylvanica* (green ash) other species include *Carya aquatica* (water hickory), *Quercus texana* (nuttall oak), *Q. phellos* (willow oak), *Q. nigra* (water oak), *Q. lyrata* (overcup oak), *Liquidambar styraciflua* (sweetgum), *Acer negundo* (box elder), *Ulmus alata* (winged elm), *Acer rubrum* (red maple), *Gleditsia aquatica* (water locust) and *Plantanus occidentalis* (American sycamore). Understory species include *Cornus foemina* (swamp dogwood), *Crataegus* spp. (hawthorn), and *Morus rubra* (red mulberry). Many vines and herbaceous plants are present.

The Sweetgum-Water Oak association occurs in alluvial floodplains, extensively in the Mississippi alluvial valley on well drained first bottom ridges. The community dominants are *Liquidambar styraciflua* (sweetgum) and *Quercus nigra* (water oak). Major associates are *Celtis laevigata* (hackberry), *Fraxinus pennsylvanica* (green ash), *Ulmus americana* (American elm), and *Q. texana* (Nuttall oak). Associated species are *Acer rubrum* (red maple), *Morus rubra* (red mulberry), *Smilax* spp. (greenbrier), *Sabal minor* (dwarf palmetto), *Ilex decidua* (deciduous holly), *Crataegus viridis* (green hawthorn), *Ampelopsis arborea* (peppervine), *Campsis radicans* (trumpet creeper), and *Toxicodendron radicans* (poison ivy).

Historic SWP Communities

According to the Natural Communities of Louisiana, the historic SWP species present would have included *Taxodium distichum* (baldcypress), *Nyssa aquatica* (tupelo gum), Nyssa biflora (swamp blackgum), *Fraxinus pennsylvanica* (green ash), Acer rubrum var. drummondii (swamp red maple), *Gleditsia aquatica* (water locust), *Cephalanthus occidentalis* (buttonbush), *Fraxinus profunda* (pumpkin ash), *Salix nigra* (black willow) *Planera aquatica* (water elm), and *Itea virginica* (Virginia willow).

3.4.2 Existing Plant Community

The bank currently consists of a mixture of herbaceous and forested vegetative communities. The location, extent and composition of these communities are a result of historic and current agricultural activities which were in turn driven by the influence of surface water within the site.

Figure 18 illustrates the location and extent of the vegetative communities within the Bank which are described below. Appendix D details observed species, percent cover and max diameter at breast height (DBH) of all vegetative layers.

(1) Non-Wet Active Agricultural Fields (4.2 acres)

This non-wetland community is currently farmed for sugarcane. The sugarcane is planted on elevated rows and sparse vegetation is found at lower elevation in between rows.

(2) Non-Wetland Abandoned Agricultural Fields (14.6 acres)

This non-wetland community is composed of a layer of herbaceous vegetation. Agricultural rows are still prominent within the field.

(3) Wetland Abandoned Agricultural Fields (20.0 acres)
This wetland community is composed of a thick herbaceous layer with some small areas containing a sparse layer of young willow. The fields are occasionally mowed during dry seasons and remnant agricultural rows still stand.

(4) Non-Wetland Upland Ridge (7.0 acres)
This non-wetland community is composed of an herbaceous layer of upland vegetation dotted with mature shade trees.

(5) Non-Wetland Forested Berms (9.8 acres)
This non-wetland community is found at the eastern edge of the property as well as surrounding the abandoned crawfish pond and partially along the degraded swamp border. It is composed of sparse layers of trees, saplings/shrubs and herbaceous vegetation.

(6) Wetland Herbaceous Field (26.8 acres)
This wetland community is composed of a thick layer of herbaceous vegetation. Sparse shrub, sapling and tree layers are found in certain areas within the habitat.

(7) Mature BLH (15.8 acres)
This wetland community is composed of mature BLH species with a prominent tree, sapling, shrub and herbaceous layer.

(8) Abandoned Crawfish Ponds (39.3 acres)
This wetland community is characterized by two vegetative communities. The first community is mainly herbaceous with some open water areas and makes up approximately 60% of the habitat. The second contains a thick layer of herbaceous vegetation with thin to thick stands of young willow. This vegetation type comprises approximately 40% of the abandoned crawfish pond area.

(9) Wetland Forested Baffle Levees (5.2 acres)
This fractured wetland community is found within the boundary of the abandoned crawfish pond. It is composed of a sparse layer of trees and herbaceous vegetation.

(10) Young BLH (12.8 acres)
This wetland community is composed of a young stand of BLH tree species with a prominent sapling and shrub layer.

(11) Degraded Swamp (32.2 acres)

This wetland community is composed of sparse layers of trees, saplings and shrubs with a layer of herbaceous vegetation. Many of the trees are dying/showing signs of stress due to almost permanent inundation. Observed natural regeneration is minimal.

(12) Cypress Swamp (15.9 acres)

This wetland community is continuous with the existing cypress swamp adjacent to the northern areas of the Bank. Mature and sapling/shrub cypress dominate.

(13) Organic Floating Mat (0.4 acres)

This wetland community is dominated by a thick herbaceous layer that makes up a floating organic mat. There is normally 2-3 feet of water below the mat.

3.5 General Need for the Project in this Area

The Bank is located in the Deltaic Plain, within HUC #08090301 (Figure 19), which is in the larger Central Louisiana Accounting Unit and Lower Mississippi Subregion (USGS). This area is also referred to as the Barataria – Terrebonne Estuary System.

Wetland losses in the northern Gulf Coast Region of the United States are so extensive that they represent critical concerns to government environmental agencies and natural resource managers. In Louisiana, almost 1,158 square miles of low-lying wetlands converted to open water between 1956 and 2004 (USGS 2013), and the Barataria – Terrebonne Estuary is experiencing between 50 and 61 percent of the land loss for the entire state (BTNEP). Within the Barataria Basin alone, wetland losses averaged nearly 5,700 acres per year between 1974 and 1990 (lacoast.gov).

Wetland loss within the Barataria Basin is attributed to the combination of natural erosional processes of sea-level rise, subsidence, wind, tides, currents, and herbivory, and the human activities of channelization, levee construction, and development, which is significant in Coastal Louisiana. In 2006, over 2 million residents lived in Louisiana Coastal Parishes (US Census Bureau 2007). Among the 50 states, Louisiana ranks 1st and 2nd in crude oil and natural gas production (including Outer Continental Shelf Production), respectively (LDNR 2007). In 2005, Louisiana's coastal wetlands provided storm protection for ports that carried 457 million tons of waterborne commerce. Five of the top fifteen largest ports in the US are in Louisiana (USACE 2007). In 2006, Louisiana's Commercial Fishing accounted for 21% of the total catch by weight in the lower

48 states (USDOC 2007), and annual expenditures from recreational fishing can amount up to $1.2 Billion (Gentner et al. 2007).

Bottomland hardwood forests were once a prominent feature of the southeastern United States landscape at the time of European settlement (Allen 1997). These forests extended along nearly the entire lower Mississippi River alluvial valley (LMRAV). During the last century, approximately 24 million acres of bottomland hardwoods were reduced to approximately 5 million acres (MacDonald et al. 1979). The primary cause of this loss is contributed to agriculture. Based on historical records and aerial photography, agricultural activities were the primary cause of the loss and degradation of bottomland hardwoods within the Bank.

Swamp forests represent a unique and important ecosystem in the southeastern United States, with bald cypress being the dominant tree in the coastal plain of Louisiana when settlers first arrived in the state. Early estimates of the area of bald cypress forests range from 0.67-3.64 million ha, but following intensive timber harvesting activities from 1890-1925, this number was reduced drastically to only 0.14 million ha. In addition to timber harvesting, other causes of decline include hydrology modifications, invasive species, and natural subsidence (Conner and Toliver 1990).

In order to reverse the historic and current trends of wetland loss within Louisiana and the Terrebonne River Basin, wetland restoration, enhancement, and preservation projects - such as the proposed Bank -must be conducted, maintained, and managed for the long term. However, to support the socioeconomic values that exist due to the presence of these wetlands, a sustainable approach to land use must also take place. The following organizations have formed to develop plans to address the needs of the watershed:

- ***Lafourche Parish Coastal Zone Management –*** Lafourche Parish has developed a coastal zone management division which recognizes the “value in natural coastal ecosystems and coastal-dependent commercial activity,” and seeks to “balance these values in Lafourche Parish to allow current and future residents the opportunity to enjoy the multiple benefits and cultural values associated with a healthy coastal zone,” which will “foster the public safety, health, and welfare of Lafourche Parish residents” (Lafourche Parish Government 2017).

- ***Barataria-Terrebonne National Estuary Program (BTNEP) –*** Some of the goals of the BTNEP include: preserving and restoring wetlands and barrier islands, promoting environmentally responsible economic activities

that sustain estuarine resources, realistically supporting diverse, natural biological communities, and developing and maintaining comprehensive watershed planning.

Perhaps the most important programs to ensure a sustainable approach to land-use in the Terrebonne Basin are the Section 404 and Coastal-Use Permitting Programs. As unavoidable impacts to wetlands are authorized in order to satisfy the public need of a particular project, compensatory mitigation must be secured prior to the impact occurring. The Bank will provide this mitigation, in effect allowing the benefit of the project to be realized while at the same time meeting the public need of restoring, enhancing and preserving BLH and SWP. This will certainly expand on the efforts of the Lafourche Parish Coastal Zone Management Division and the BTNEP.

The Bank will address the needs of the watershed by contributing to the economy of Louisiana by facilitating the issuance of Section 404 and Coastal-Use Permits. It will also contribute to the environment of Louisiana by providing a variety of biotic and physical functions to the watershed. Providing these functions will then allow the values of these wetlands to be realized.

4.0 Establishment of the Mitigation Bank

4.1 Site Restoration Plan

4.1.1 Soils and Hydrology Work Plan

The Soils and Hydrology Work Plan (Figures 20-21, Appendix E) involves utilizing heavy machinery (i.e. bull dozers, tracked/pontoon excavators, dump trucks) to remove agricultural rows, drainage canals/ditches, and to remove and/or gap elevated berms/roads described below:

- Culverts/Pipes-the Sponsor will remove 18 existing culverts that are located throughout the property. These culverts will be removed as part of larger excavation of elevated berms/roads and/or replaced with cuts.
- Ditches-ditches will be filled and reshaped, resulting in broader, more gradual swales that will be planted in vegetation
- Berms-berms will be lowered and filled into adjacent ditches
- Primary Access Road-the primary access road will be degraded in select locations to allow for sheet flow. The material will be deposited into adjacent drainage ditches.
- Primary Drainage Canal-the primary drainage canal is a deep channel, with bottom elevations of approximately -4 feet NAVD 88

to the south of the railroad and approximately -5 feet NAVD 88 north of the railroad. During excavation activities, the Sponsor will fill this ditch to a max elevation of approximately -2.5 feet NAVD, which will still allow for proper drainage and tidal flux.

Following the implementation of the Soils and Hydrology Work Plan sheet flow and tidal influx will be improved and will reflect that of a natural wetland system (Figures 22 and 23). The 8x8 foot box culvert will remain in place; and its large dimensions/conveyance capacity will allow for proper drainage from the upper portions of the Bank and will allow for tidal influx to reach the upper portions of the bank during high water events.

4.1.2 Habitat Work Plan

The Habitat Work Plan (Figure 24) consists of site preparation, removal and/or chemical treatment of Chinese tallow (*Triadica sebifera*) and black willow (*Salix nigra*), and vegetative plantings. The Sponsor will plant BLH species above 1.0 ft NAVD and SWP species below 1.0 ft NAVD, with planting methods summarized below:

Bottomland Hardwood Habitat Work Plan

Areas of the Bank above 1.0 ft NAVD currently consisting of sugarcane, herbaceous wetland, and upland buffer will be planted with three BLH types. Areas between 1.0 – 1.5 ft NAVD will be planted with an Overcup Oak-Water Hickory BLH type (Table 3), areas above 1.5 ft NAVD will be planted with a Sugarberry-American Elm-Green Ash BLH type (Table 4), and the upland buffer area will be planted with an upland BLH type (Table 5).

Planting will take place in late winter/early spring. In the preceding summer the Sponsor will “bush hog” the fields and chop/disk where needed to obtain a level surface. The Sponsor will also rip the fields to facilitate root growth, but will wait until the fall, preferably while the soil is dry and long enough before planting to ensure soil settling. Plantings will then take place with the proposed species, densities and percentages in coordination with the USACE, DNR, and IRT. A pre-emergent herbicide (Oust) will be applied shortly after planting following a rain event and before the first buds appear on the trees.

Table 3: BLH Area I: Overcup Oak-Water Hickory (22.8 acres)

BOTTOMLAND HARDWOOD SPECIES	SOFTMAST	HARDMAST	COMPOSITION
Overcup Oak (Quercus lyrata)		X	≤20%
Nuttal Oak (Quercus nuttallii)		X	≤20%
Willow Oak (Quercus phellos)		X	≤20%
Water Hickory (Carya aquatica)		X	≤20%
Baldcypress (Taxodium distichum)	x		≤10%
Sugarberry (Celtis laevigata)	X		≤10%
Drummond Red Maple (Acer rubrum var. drummondii)	X		≤10%
Green Ash (Fraxinus pennsylvanica)	X		≤10%
Eastern Swamprivet (Forestiera acuminata)	x		≤10%

Table 4: BLH Area II: Sugarberry-American Elm-Green Ash (18.6 acres)

BOTTOMLAND HARDWOOD SPECIES	SOFTMAST	HARDMAST	COMPOSITION
Overcup Oak (Quercus lyrata)		X	≤20%
Nuttal Oak (Quercus nuttallii)		X	≤20%
Willow Oak (Quercus phellos)		X	≤20%
Water Hickory (Carya aquatica)		X	≤20%
Water Oak (Quercus nigra)		X	≤10%
Sweetgum (Liquidambar styraciflua)	X		≤10%
Sugarberry (Celtis laevigata)	X		≤10%
American Elm (Ulmus americana)	X		≤10%
Drummond Red Maple (Acer rubrum var. drummondii)	X		≤10%
Green Ash (Fraxinus pennsylvanica)	X		≤10%
Persimmon (Diospyros virginiana)	X		≤10%
Red Mulberry (Morus rubra)	X		≤10%

Table 5: BLH Area III: Upland BLH (4.7 acres)

BOTTOMLAND HARDWOOD SPECIES	SOFTMASS	HARDMAST	COMPOSITION
Water Oak (Quercus nigra)		X	≤20%
Willow Oak (Quercus phellos)		X	≤20%
Laurel Oak (Quercus laurifolia)		X	≤20%
Pecan (Carya illinoinensis)		X	≤20%
Sweetgum (Liquidambar styraciflua)	X		≤10%
Sugarberry (Celtis laevigata)	X		≤10%
American Elm (Ulmus americana)	X		≤10%
Persimmon (Diospyros virginiana)	X		≤10%
Red Mulberry (Morus rubra)	X		≤10%

Baldcypress Swamp Habitat Work Plan

Areas of the Bank below 1.0 ft NAVD will be planted with SWP species. While all SWP areas will be planted with the same species composition (Table 6), four work plans will be used in separate SWP areas. Below is a summary of the SWP Habitat Work Plans:

SWP Area I – Wetland Herbaceous Field (24.7 acres)

The sponsor will conduct SWP plantings along with necessary site preparation. In the preceding summer and fall the Sponsor will prepare the pasture by bushogging and ripping, respectively. Plantings will then take place with the proposed species, densities, and percentages in coordination with the USACE, DNR, and IRT. A pre-emergent herbicide (Oust) will be applied shortly after planting following a rain event and before the first buds appear on the trees.

SWP Area II – Degraded Swamp (33.7 acres)

The Sponsor will conduct SWP plantings within the areas currently containing degraded forested wetlands. No site preparations will be necessary, and plantings will take place in late winter/early spring.

SWP Area III – Abandoned Crawfish Pond (39.3 acres) The Sponsor will conduct SWP plantings along with willow removal/management within the abandoned crawfish pond. During the preceding fall, the Sponsor will apply a basal herbicide (hack and squirt) to existing willows. Willow trees that are greater than 6” DBH will not receive basal herbicide treatment.

SWP Area IV – Reshaped berm within abandoned crawfish pond (5.2 acres) The sponsor will conduct SWP plantings after reshaping the cuts to be made in the berm within the abandoned crawfish pond.

Table 6: SWP Areas 1, 2, 3, and 4 (102.9 acres)

BALDCYPRESS SWAMP SPECIES	SOFTMAST	HARDMAST	COMPOSITION
Baldcypress (Taxodium disctichum)	X		50-80%
Swamp Tupelo (Nyssa biflora)	X		≤20%
Drummond Red Maple (Acer rubrum var. drummondii)	X		≤10%
Carolina Ash (Fraxinus caroliniana)	X		≤10%
Pumpkin Ash (Fraxinus profunda)	X		≤10%

4.2 Technical Feasibility

The activities proposed to restore and enhance the wetlands within the Bank are routine in nature and represent well established techniques that have resulted in successful mitigation projects in other areas of Louisiana. The removal of agricultural drainage features will increase retention time and improve natural sheet flow while the removal and gapping of artificial impediments will eliminate impoundments and facilitate tidal influx. Water data and existing site condition indicate favorable planting conditions for BLH and SWP Plantings. In combination with the hydric soils and the Banks location within the Barataria Basin, the proposed surface hydrology improvements, vegetative plantings, along with proper management will facilitate the establishment of a self-sustaining BLH and SWP ecosystem.

4.3 Current Site Risks/Encumbrances

There are known rights of way/servitudes within and around the Bank. These are illustrated in Figure 25 and summarized below:

Burlington Northern Santa Fe/Union Pacific Railroad

This railroad (BNSF) was constructed prior to 1892 according to aerial photography. According to an affidavit (Appendix F) by Mr. Phillip Richard (seller of property to Sponsor), the landowners of the Bank have continuously used the primary access road (“Blouin Street”) to cross over the railway, and that the landowner of retains ownership of the land beneath the actual railroad.

According to aerial photography as early as 1940, the primary access road and adjoining primary drainage canal/ditch and box culvert have been in place allowing both access and drainage over and under the railroad, respectively. Additionally, Louisiana law, “Natural Servitude of Drain” states that “an estate situated below is bound to receive surface waters that flow naturally from an estate situated above,” which means the box culvert cannot be removed by the railroad company, especially since the Sponsor currently has ownership of the land beneath the railroad.

The ground water and surface water collected during the past year by the Sponsor indicate that the box culvert is sufficient for conveyance of rainfall runoff and tidal influx. Although the BNSF railway will not be included within the conservation servitude, the Sponsor views this feature as a low risk to the Bank because it has essentially been unchanged since at least before 1982 and according to Mr. Richard, the landowners of the property have all used and possessed this railroad crossing peacefully and without interruption for at least 66 years.

According to aerial photography and a survey map dated September 23, 2015 (Appendix G), the BNSF railway opening is 67.78 feet wide. Although maintenance activities are limited to this ~70’ opening, the Sponsor will provide a 30’ buffer (15’ on either side). As the owner of the primary ditch/canal, the Sponsor will ensure this hydrologic connection remains in place.

Entergy Powerline

The Entergy Powerline ROW is approximately 100’ wide and has been in place since approximately 1950. Typical maintenance activities consist of bush hogging/clearing 1-2 times/year to prevent the growth of woody species. However, this area remains a functioning herbaceous wetland habitat. To provide a buffer and allow maintenance of the ROW during the establishment and management of the Bank, the Sponsor will maintain a 50’ buffer (25’ on either side). The ROW will remain within the limits of the bank and although will not be planted with woody species, it will remain herbaceous wetlands and will provide habitat diversity/edge habitat for wildlife.

40/80 Arpent Canal

The 40/80 Arpent Canal adjoins the northernmost boundary of the Bank. To accommodate any projects undertaken by the Parish associated with this canal, the Sponsor will maintain a 100’ buffer from the centerline of the canal. Recent conversations with representatives from the Parish have been favorable in terms of developing a cooperative relationship to minimize impacts to the Bank. The

Sponsor will, however, place this area under the protection of the conservation servitude but this area will not be proposed as mitigation credit.

4.4 Long-Term Sustainability of the Site

The Bank will be sustainable for the long-term and will maintain wetland hydrology due to hydrology influences from the Gulf of Mexico and its position in the landscape. The soils are suitable for the establishment of BLH and SWP species and through active and adaptive management techniques and appropriate monitoring activities, the habitat should develop into a self-sustaining ecosystem. Additionally, the Sponsor is also the landowner of the Bank and will have full authority to monitor and maintain the Bank for the long term.

5.0 Proposed Service Area

The Sponsor proposes to use the Barataria River Basin (HUC #08090301) as the primary service area and the Terrebonne River Basin (HUC #08090302 and #08070300) as the secondary service area. As impacts to SWP and BLH occur within this area, securing credits from the Bank will result in a no-let loss of wetland/aquatic resources within the watershed and larger Barataria-Terrebonne Estuary. Use beyond these service areas/habitat types will be determined by CEMVN and DNR on a case-by-case basis.

6.0 Operation of the Mitigation Bank

6.1 Project Representatives

Sponsor/Landowner
Raceland 330, LLC
C/O Mike Bernard
PO Box 25
Des Allemandes, LA 70030
225.450.5921

Agent:
Natural Resource Professionals, LLC
C/O Gregg Fell, Senior Permitting Analyst
10621 North Oak Hills Parkway, Suite A
Baton Rouge, Louisiana 70808
Gregg.Fell@wetlandsreport.com
225.928.5333

6.2 Qualifications of the Sponsor

Raceland, 330, LLC is owned and operated by Mr. Kelly Candies and Mr. Michael D. Bernard.

Mr. Candies currently manages over 18,000 acres of land owned by Otto Candies, LLC. Mr. Candies has been in the land management business for over 20 years, has been involved with mitigation issues involving land owned by Otto Candies, LLC, and is fully qualified to perform the duties of a sponsor and mitigation bank owner.

Mr. Benard has sponsored 2 other mitigation banks during the past several years, including the Upper Bayou Folse Mitigation Bank and the Laurel Oak Bottomland Hardwood Ecosystem Mitigation Bank. Bayou Folse is currently sold out of its third credit release and Laurel Oak is currently in its second credit release. Mr. Bernard is a retired Professional Land Surveyor and has been in the land business for over 30 years, and is fully aware of the responsibilities assocated with being the owner and sponsor of the Bank.

6.3 Proposed Long-Term Ownership and Management Representatives

Raceland 330, LLC will serve as the Sponsor and Owner of the Bank, but will reserve the option of appointing a long-term steward which must be approved by the USACE, DNR, and IRT. The Sponsor anticipates that the long-term management requirements will be boundary control, trash/debris cleanup, invasive species control, general maintenance, and monitoring.

6.4 Site Protection

The Bank will be protected in perpetuity by a conservation servitude pursuant to Louisiana Revised Statute 9:1271 *et seq*. The servitude will be held by Mississippi River Trust, a conservation-oriented 501(c) (3) organization. The servitude will inure and run with the property title. The servitude will prohibit activities, such as clear cutting, fill discharges, cattle grazing, or other commercial surface development that would diminish the quality or quantity of restored wetlands. Figure 26 illustrates the land areas (220.3 acres) that will be protected by the Conservation Servitude.

6.5 Long-Term Strategy

The Sponsor will provide long-term management of the Bank in accordance with 33 CFR §332.7. The Sponsor will provide site protection by establishing conservation servitude over the Bank, which will be held by a third-party non-profit corporation. Following the establishment period, the Bank would only require long term management activities such as invasive species control, boundary maintenance, and general site inspections. However, the Sponsor - through coordination with the USACE, DNR, and the IRT - will employ an Adaptive Management Plan if monitoring or other information indicates that the Bank is not progressing towards meeting its anticipated performance standards. The Sponsor will also establish a long-term management fund to ensure that monies are available to perform any anticipated management and maintenance needs.

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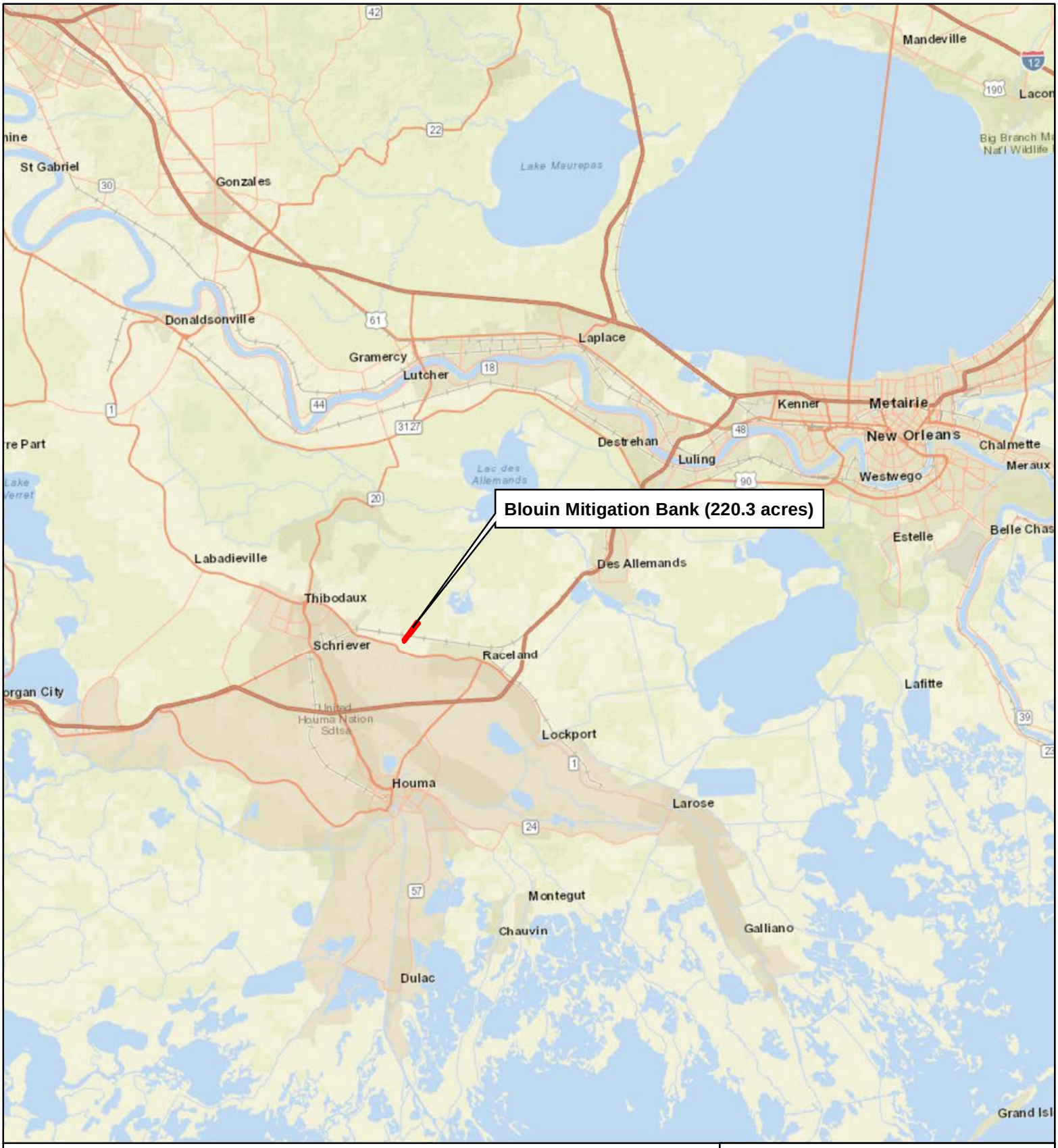
Figures



Legend

Mitigation Area (220.3 acres)

9 4.5 0 9 Miles

N

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

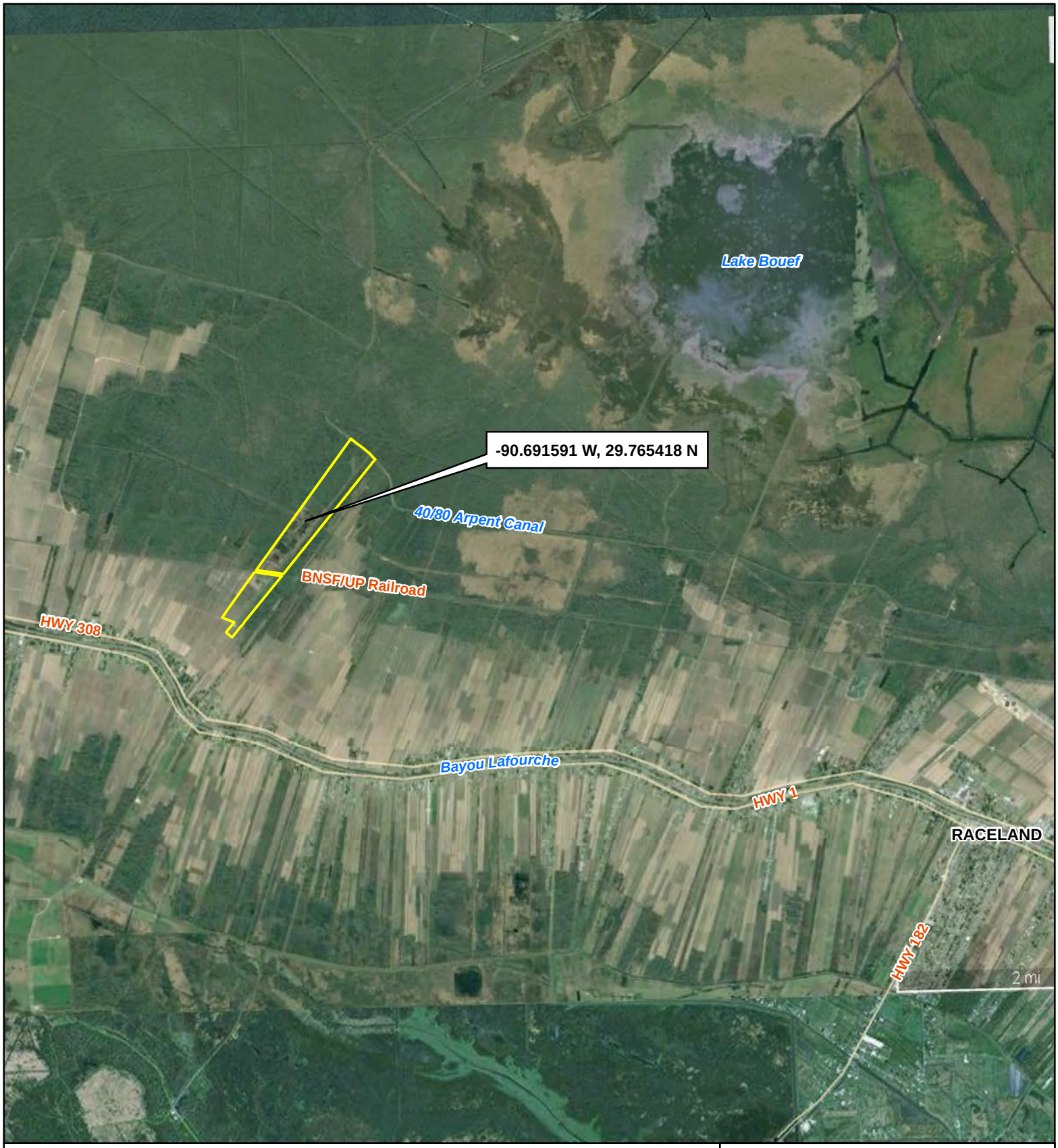
Des Allemands, LA

VICINITY MAP

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 1



Legend

Mitigation Area (220.3 acres)

5,000 2,500 0 5,000 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. Imagery sourced from April 2016 GoogleEarth

Raceland 330, LLC

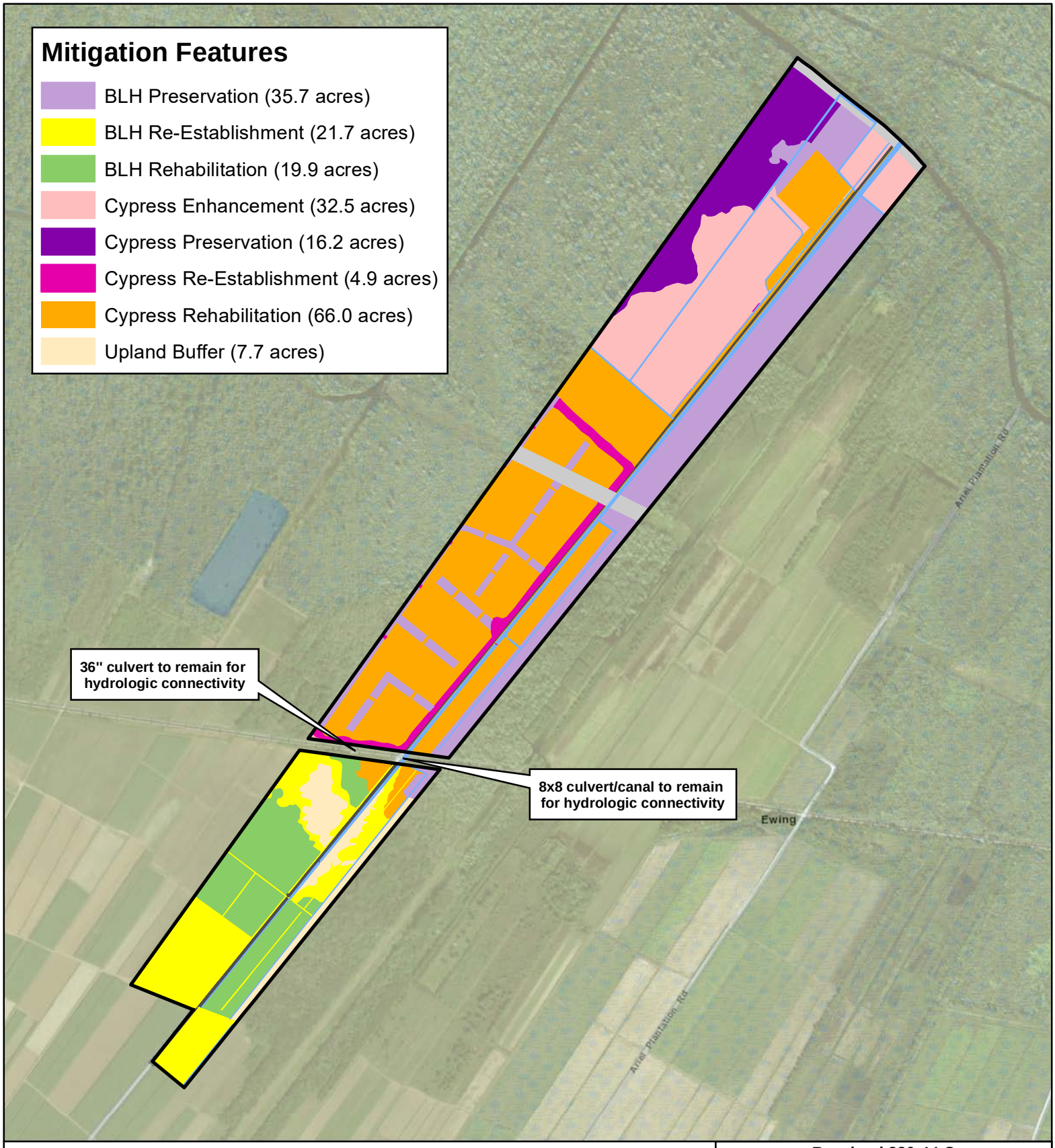
Des Allemands, LA

AERIAL LOCATION MAP

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/12/2018
Map No. :	

FIGURE 2



Legend

- Mitigation Area (220.3 acres)
- Waterways (6.1 acres)
- ROWs/Buffer (5.2 acres)
- Road (4.4 acres)

1,000 500 0 1,000 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

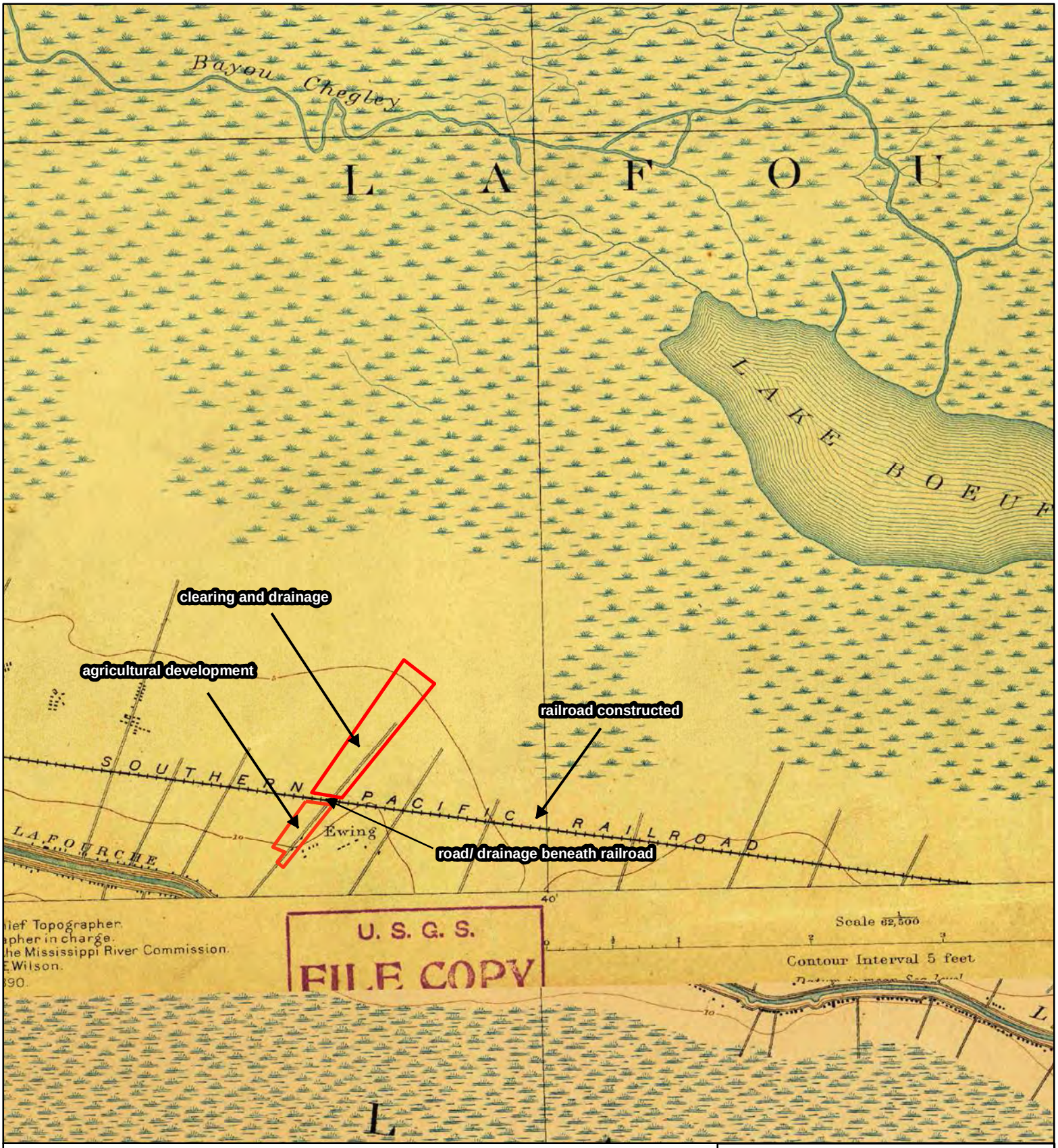
Des Allemands, LA

MITIGATION FEATURES

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 3



Legend

Mitigation Area (220.3 acres)

1 0.5 0 1 Mile

N

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. Topographic map from historic USGS maps

Raceland 330, LLC

Des Allemands, LA

1892 MAP

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 4

Legend

Mitigation Area (220.3 acres)

1,000 500 0 1,000 Feet

N

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. Historic Imagery from Louisiana State University Cartographic Information Center

Raceland 330, LLC

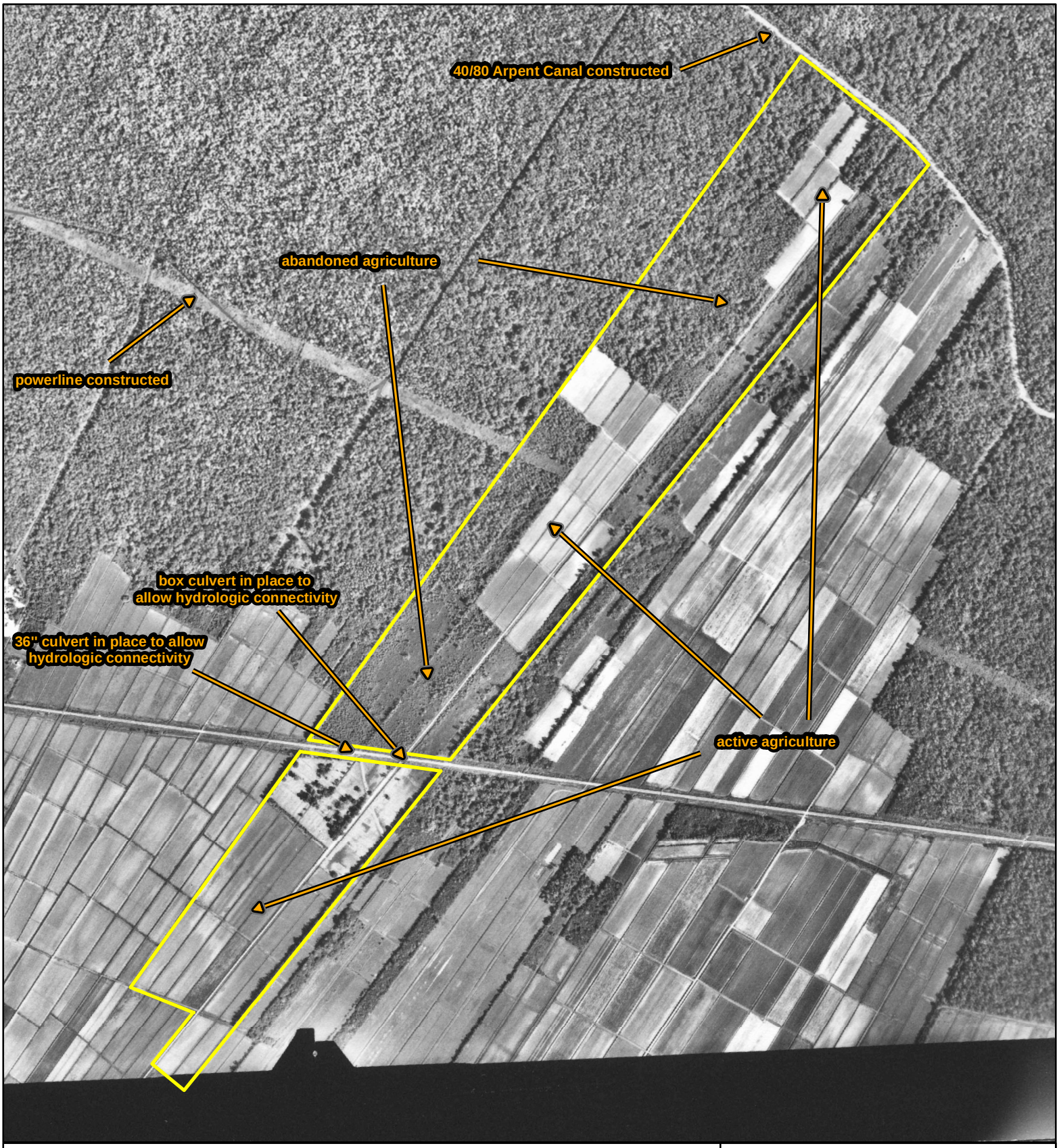
Des Allemands, LA

1940 MAP

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 5



Legend

Mitigation Area (220.3 acres)

1,000 500 0 1,000 Feet

N

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. Historic Imagery from Louisiana State University Cartographic Information Center

Raceland 330, LLC

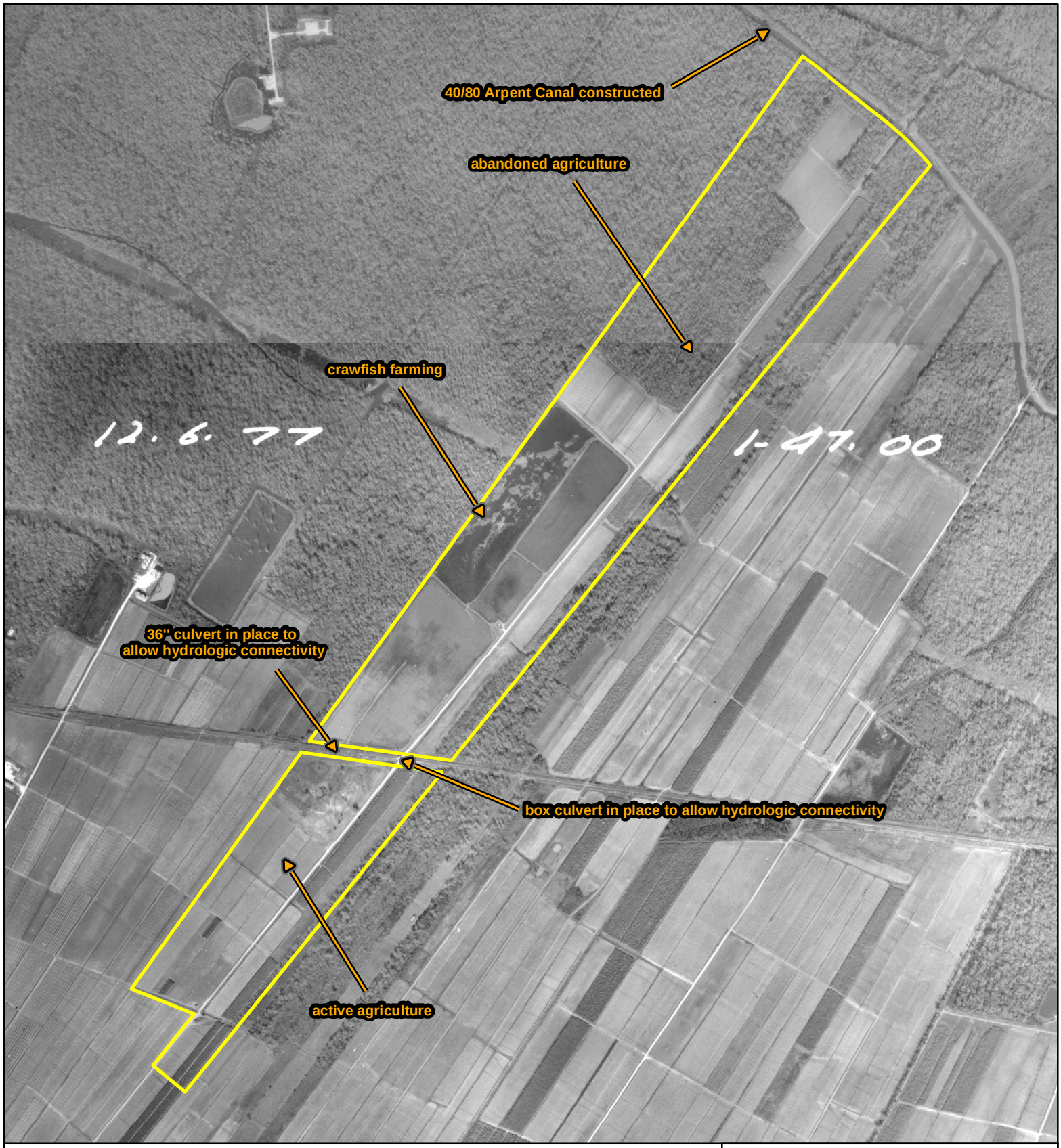
Des Allemands, LA

1957 AERIAL MAP

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 6



Legend

Mitigation Area (220.3 acres)

1,000 500 0 1,000 Feet

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. Historic imagery from Louisiana State University Cartographic Information Center

NRP

N

Raceland 330, LLC

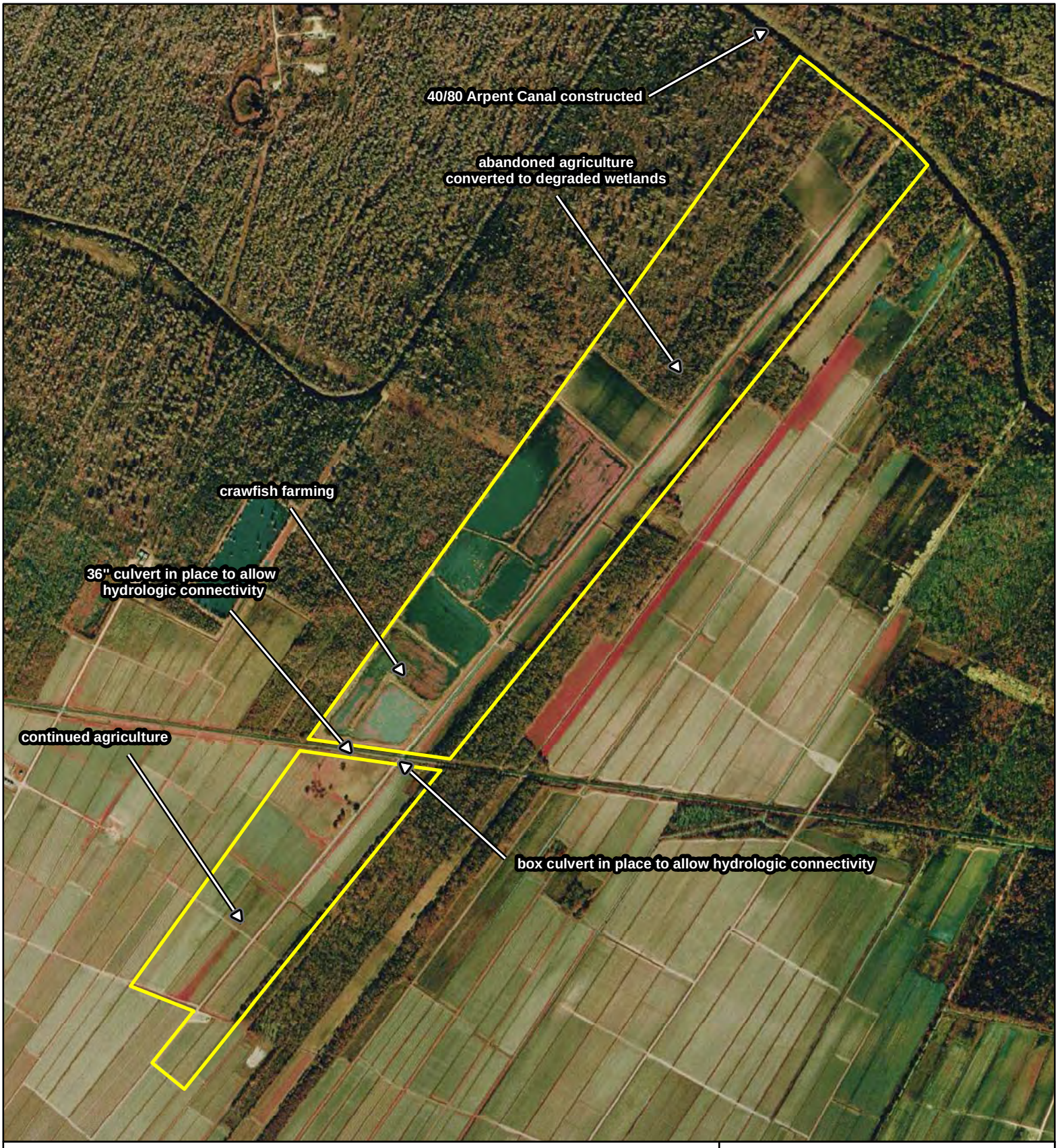
Des Allemands, LA

1977 AERIAL MAP

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 7



Legend

Mitigation Area (220.3 acres)

1,000 500 0 1,000 Feet

N

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

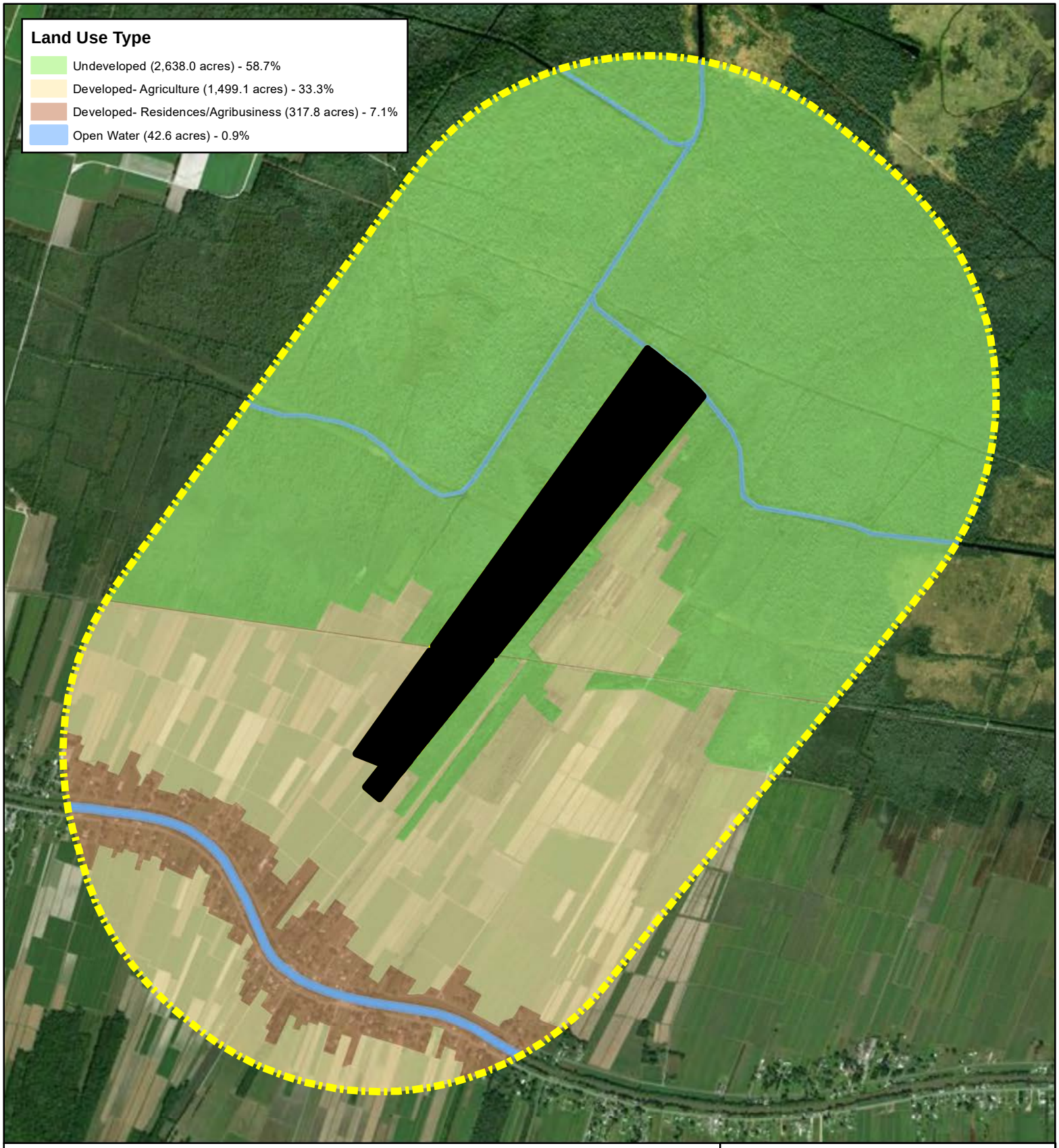
Des Allemands, LA

1998 COLOR INFRARED

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 8



Legend

1 Mile Radius (4,946.9 acres)

Mitigation Area (220.3 acres)

3,000 1,500 0 3,000 Feet

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

NRP

N

Raceland 330, LLC

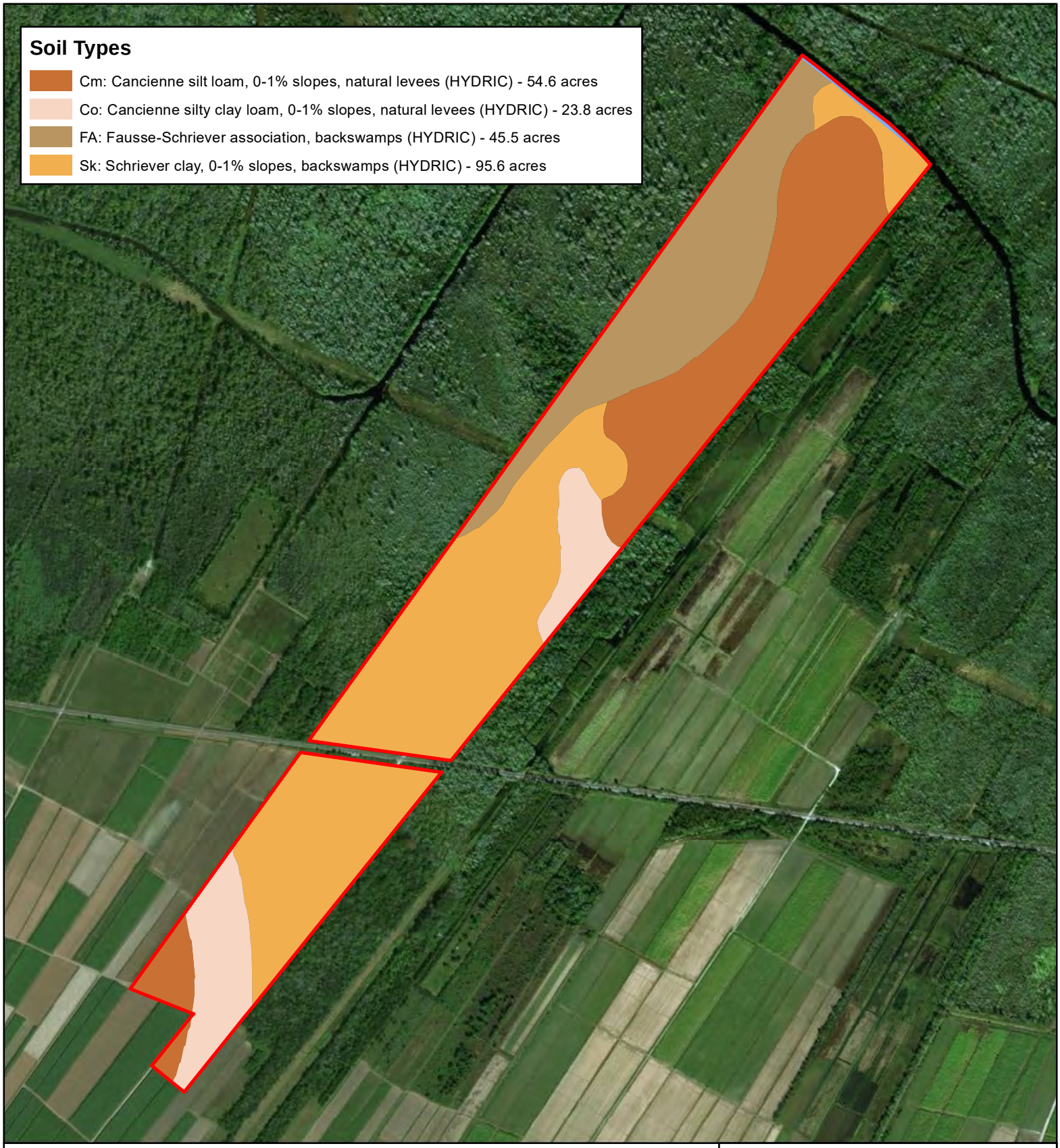
Des Allemands, LA

ADJACENT LAND USE MAP

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 9



Legend

Mitigation Area (220.3 acres)

Water (0.8 acres)

1,000 500 0 1,000 Feet

N

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

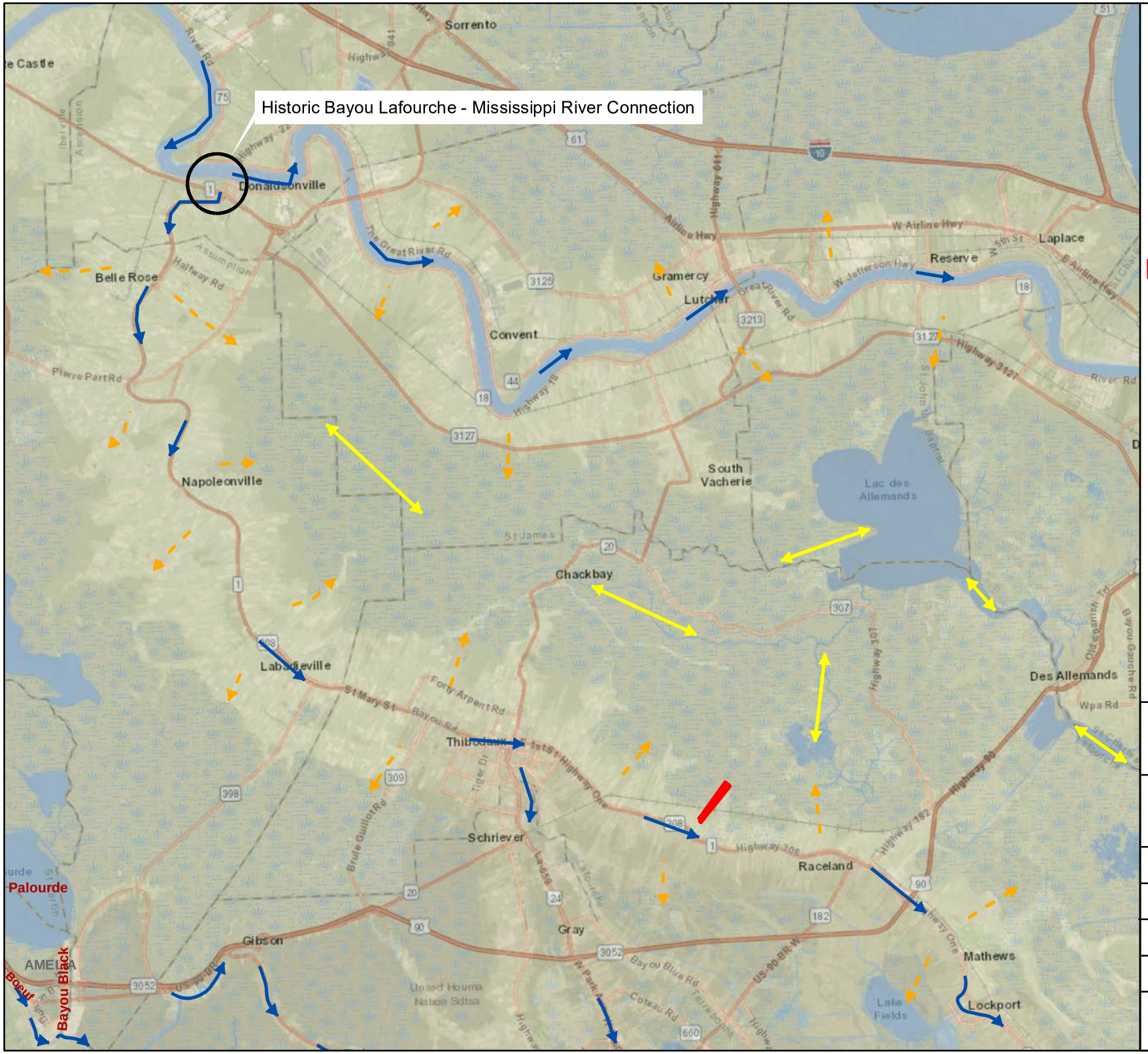
Des Allemands, LA

SOIL MAP

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 10



NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

Des Allemands, LA

HISTORIC HYDROLOGY

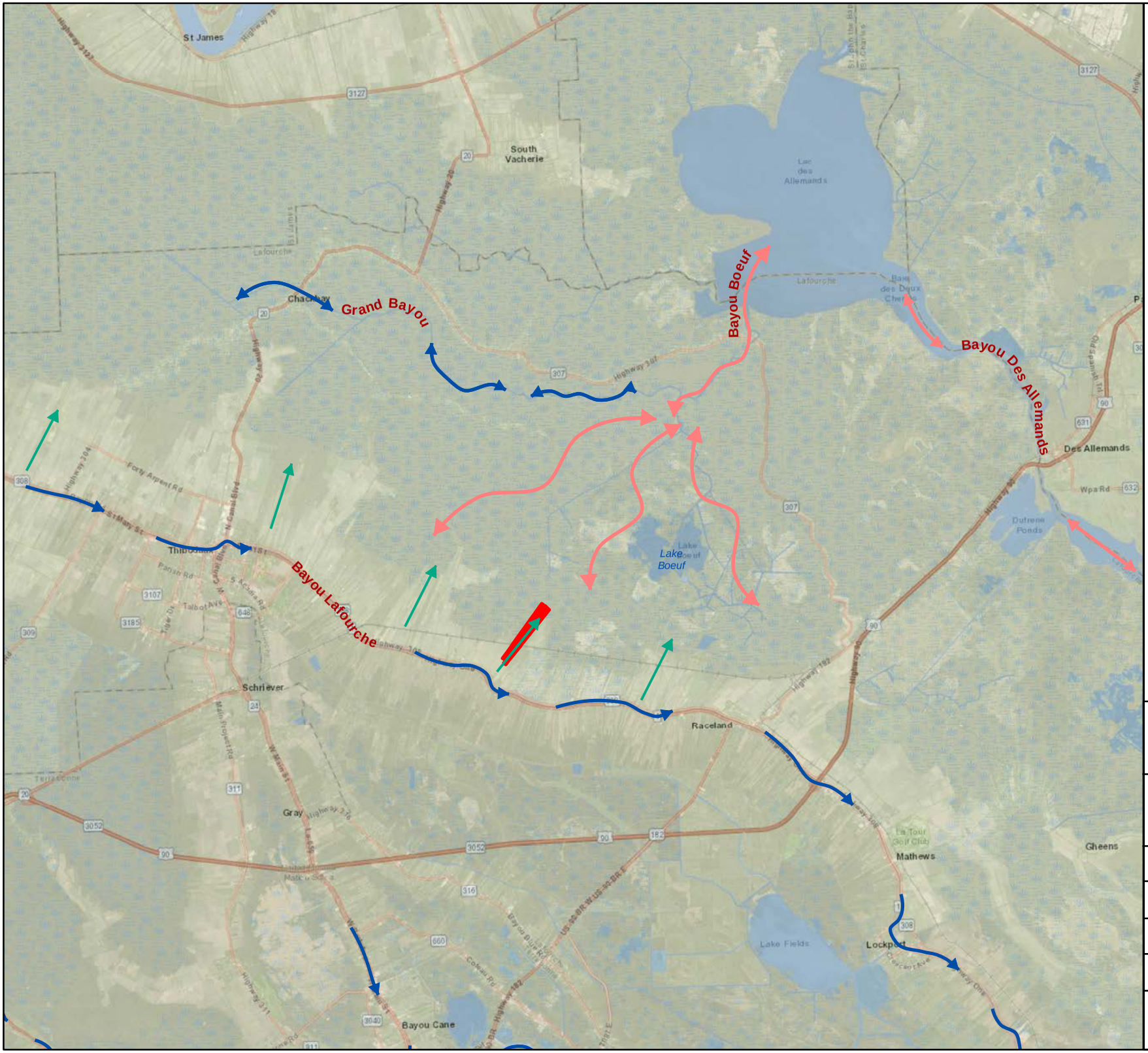
LAFOURCHE PARISH, LA

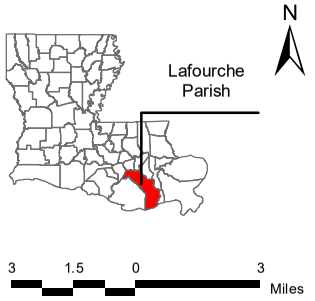
Created: TSB/ArcView

Approved: GLF

Date: 01/11/2018

FIGURE 11





Legend

- Mitigation Area (220.3 acres)
- Tidal Flux
- Channelized Flow
- Rainfall Runoff

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

Des Allemands, LA

AREA HYDROLOGY

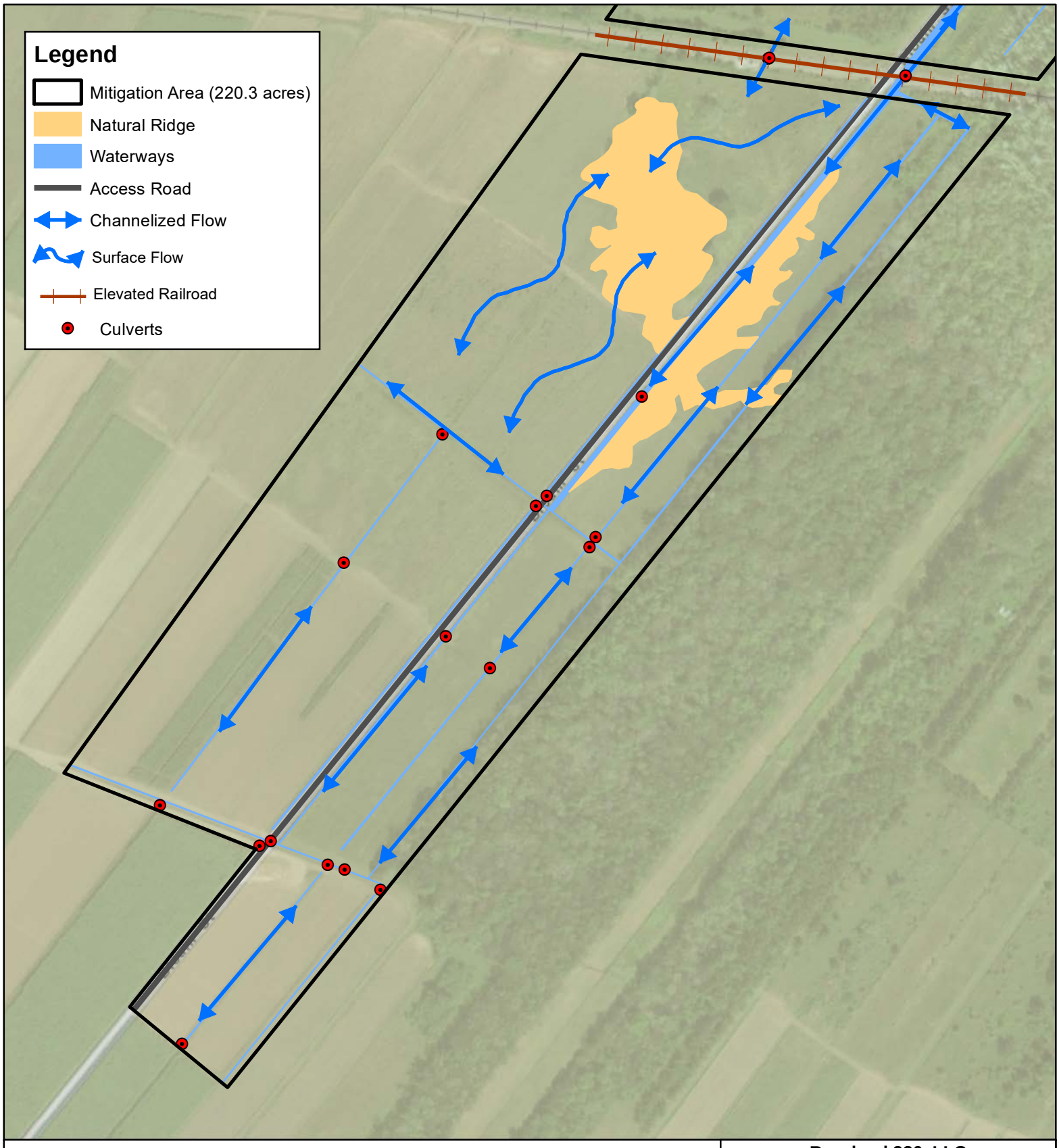
LAFOURCHE PARISH, LA

Created: JLW/ArcView

Approved: GLF

Date: 01/11/2018

FIGURE 12



300 150 0 300 Feet

NRP

N

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

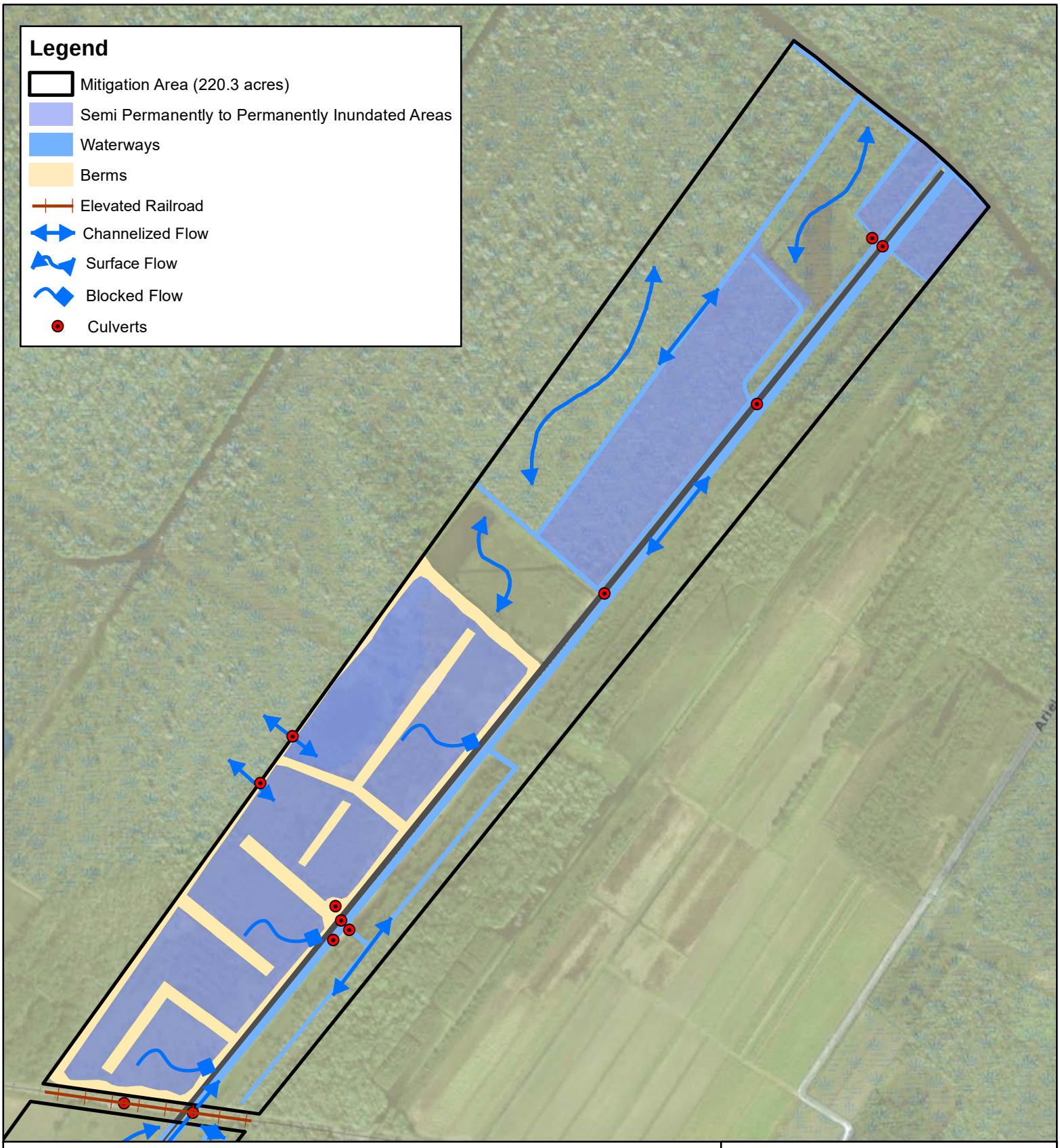
Des Allemands, LA

CURRENT HYDROLOGY: SOUTH

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 13



800 400 0 800
Feet

NRP

N

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

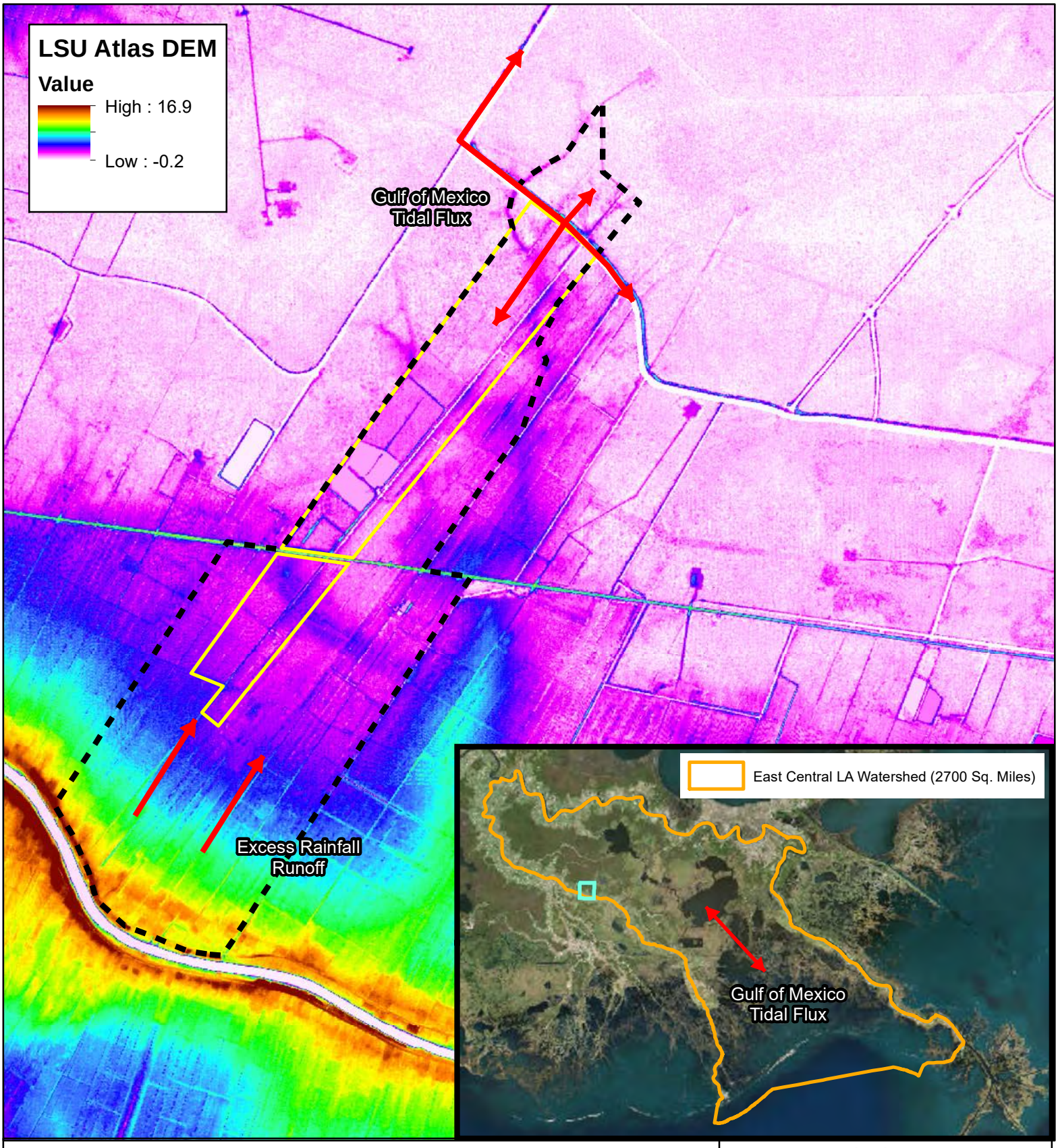
Des Allemands, LA

CURRENT HYDROLOGY: NORTH

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 14



Legend

Contributing Drainage Area (785.3 acres)

Mitigation Area (220.3 acres)

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

NRP

N

Raceland 330, LLC

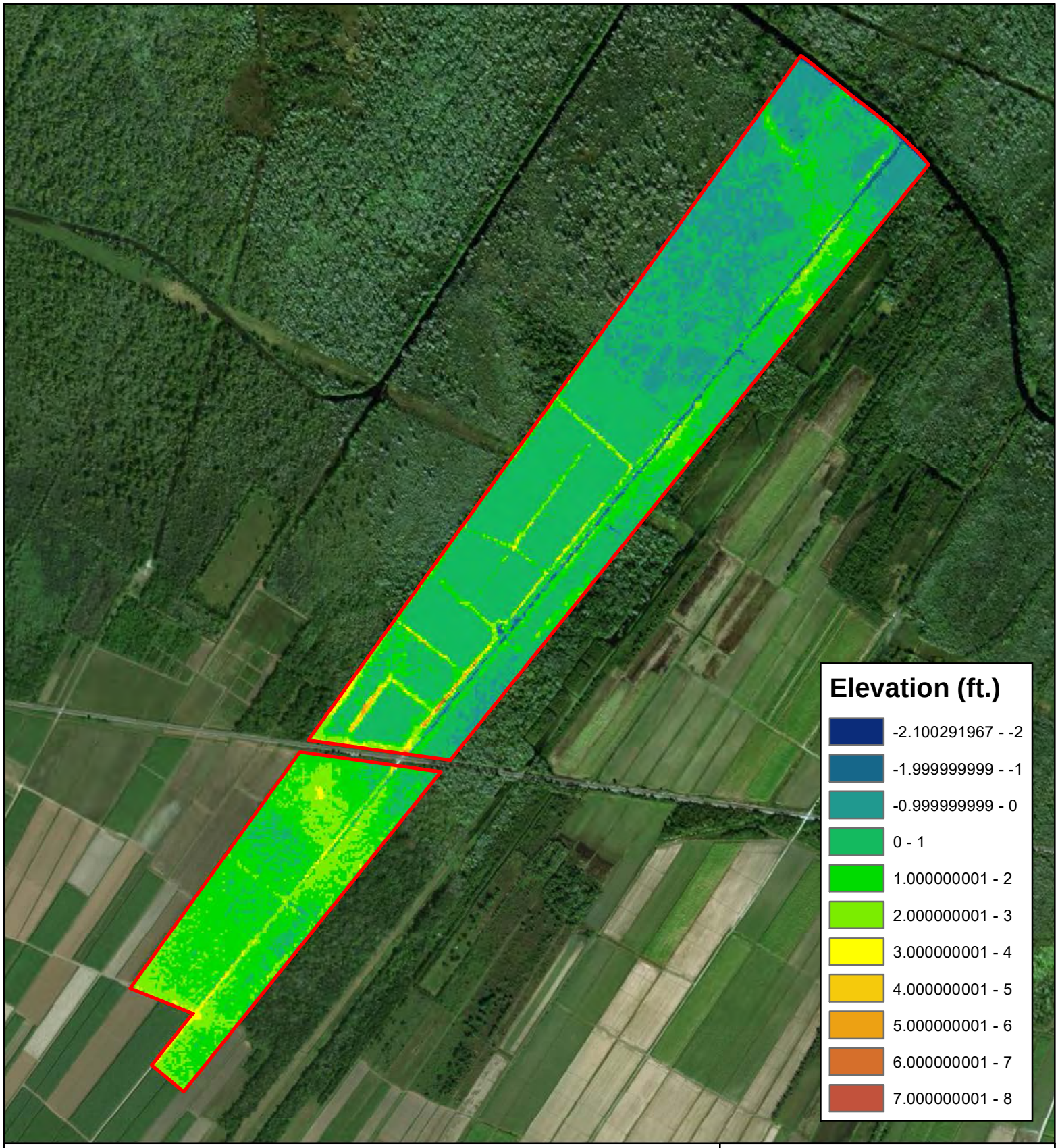
Des Allemands, LA

CONTRIBUTING DRAINAGE AREA

LAFOURCHE PARISH, LA

Created :	TSB/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 15



Legend

Mitigation Area (220.3 acres)

1,000 500 0 1,000 Feet

N

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

Des Allemands, LA

ELEVATION MAP

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 16

Legend

- Mitigation Area (220.3 acres)
- Wetlands (172.8 acres)
- Non Wetlands (40.7 acres)
- Other Waters (6.8 acres)

2,000 1,000 0 2,000 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

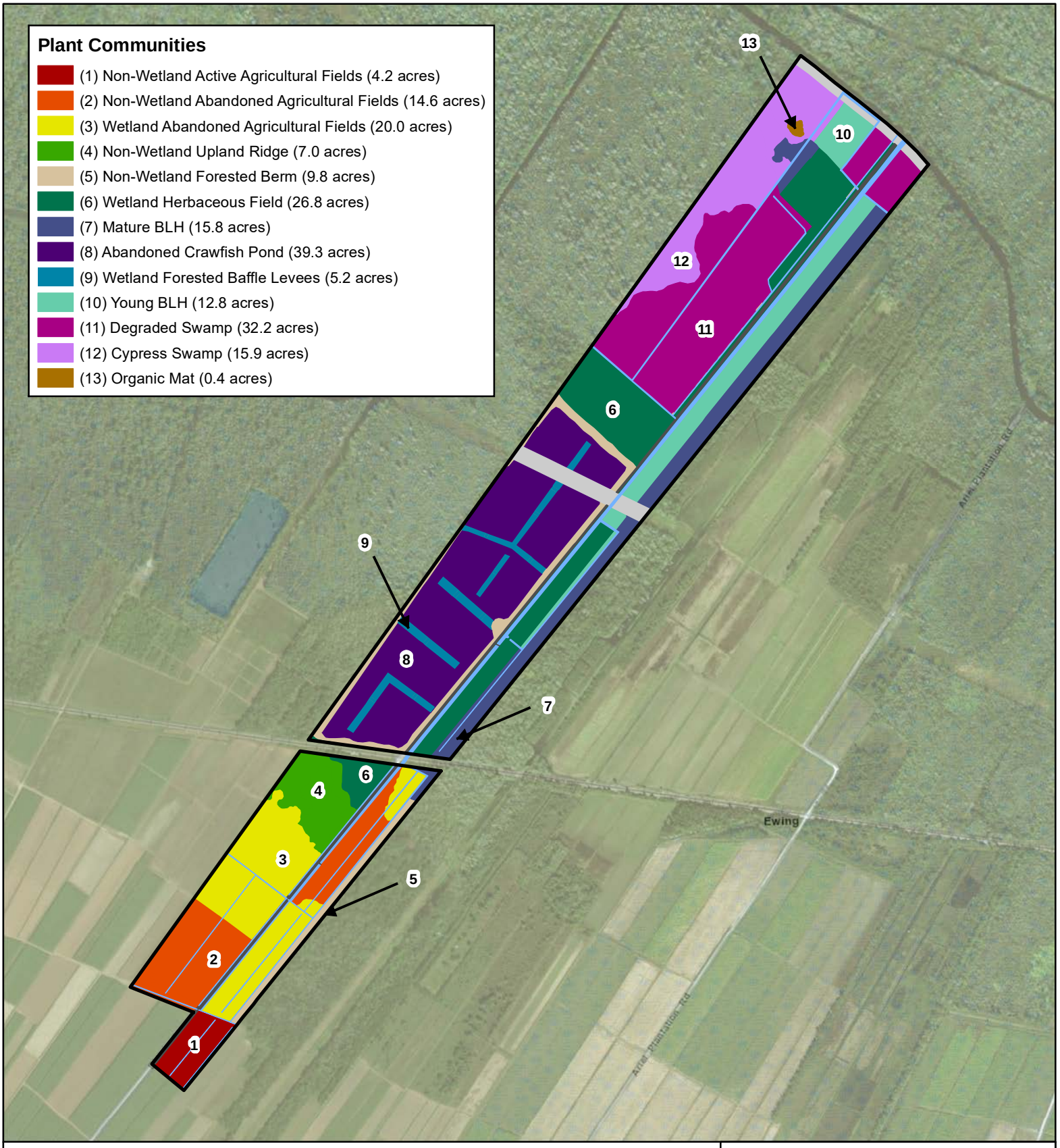
Des Allemands, LA

WETLAND MAP

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 17



Legend

- Mitigation Area (220.3 acres)
- Waterways (6.7 acres)
- ROWs/Buffer (5.2 acres)
- Road (4.4 acres)

1,000 500 0 1,000 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

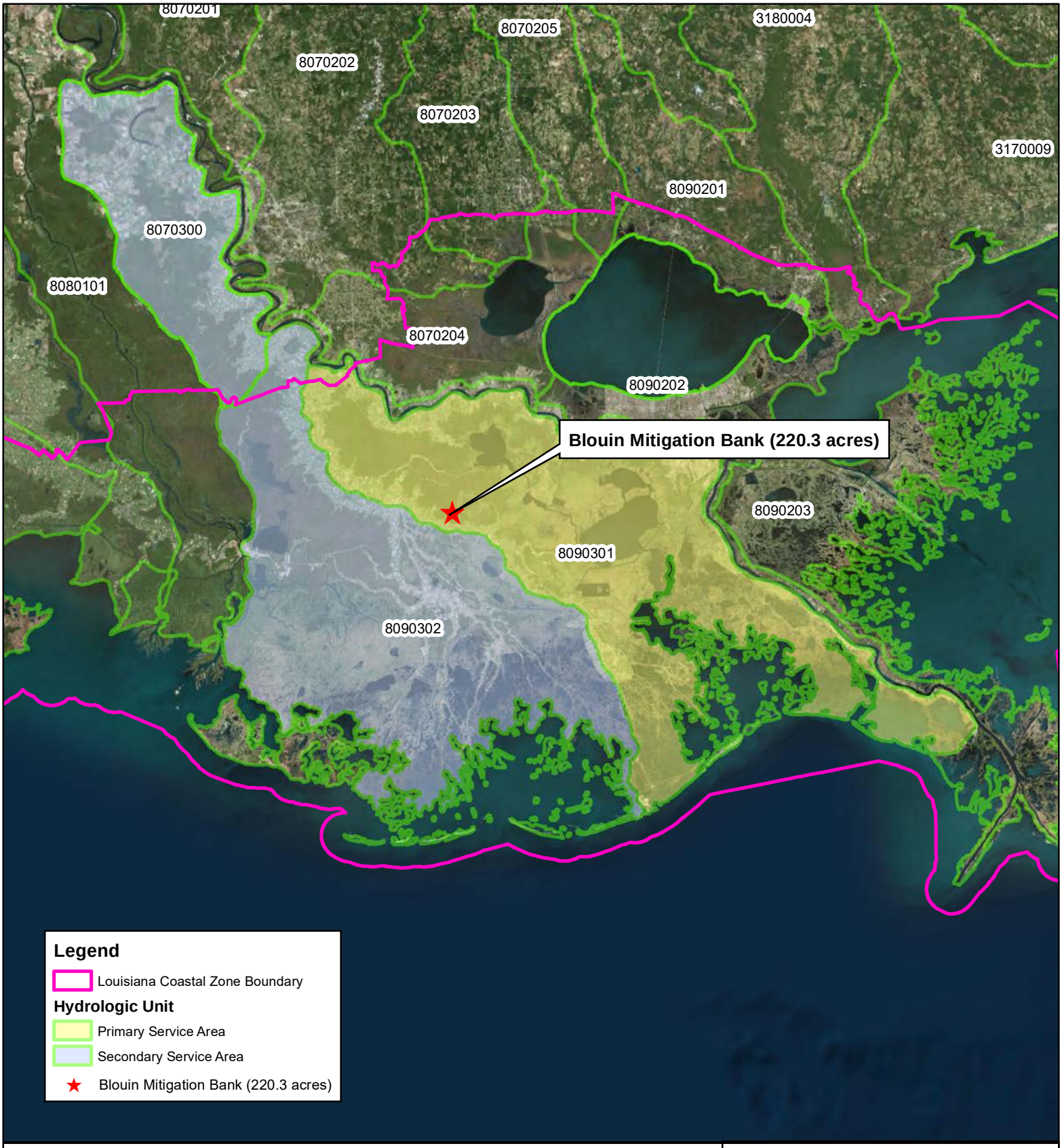
Des Allemands, LA

PLANT COMMUNITIES

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 18



20.0 10.0 0 20.0 Miles

N

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

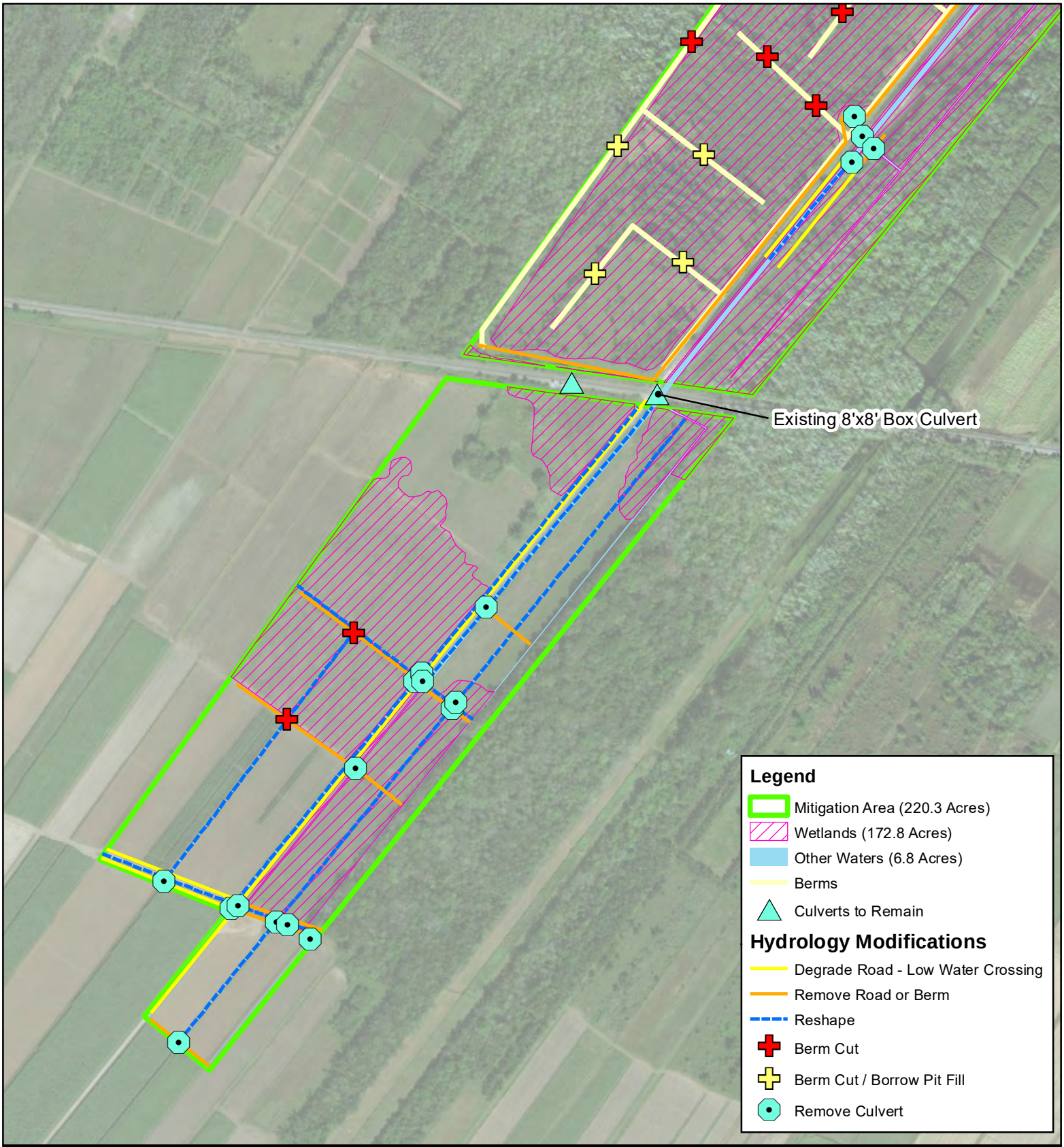
Des Allemands, LA

WATERSHED MAP

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 19



500 250 0 500 Feet

N

NRP

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

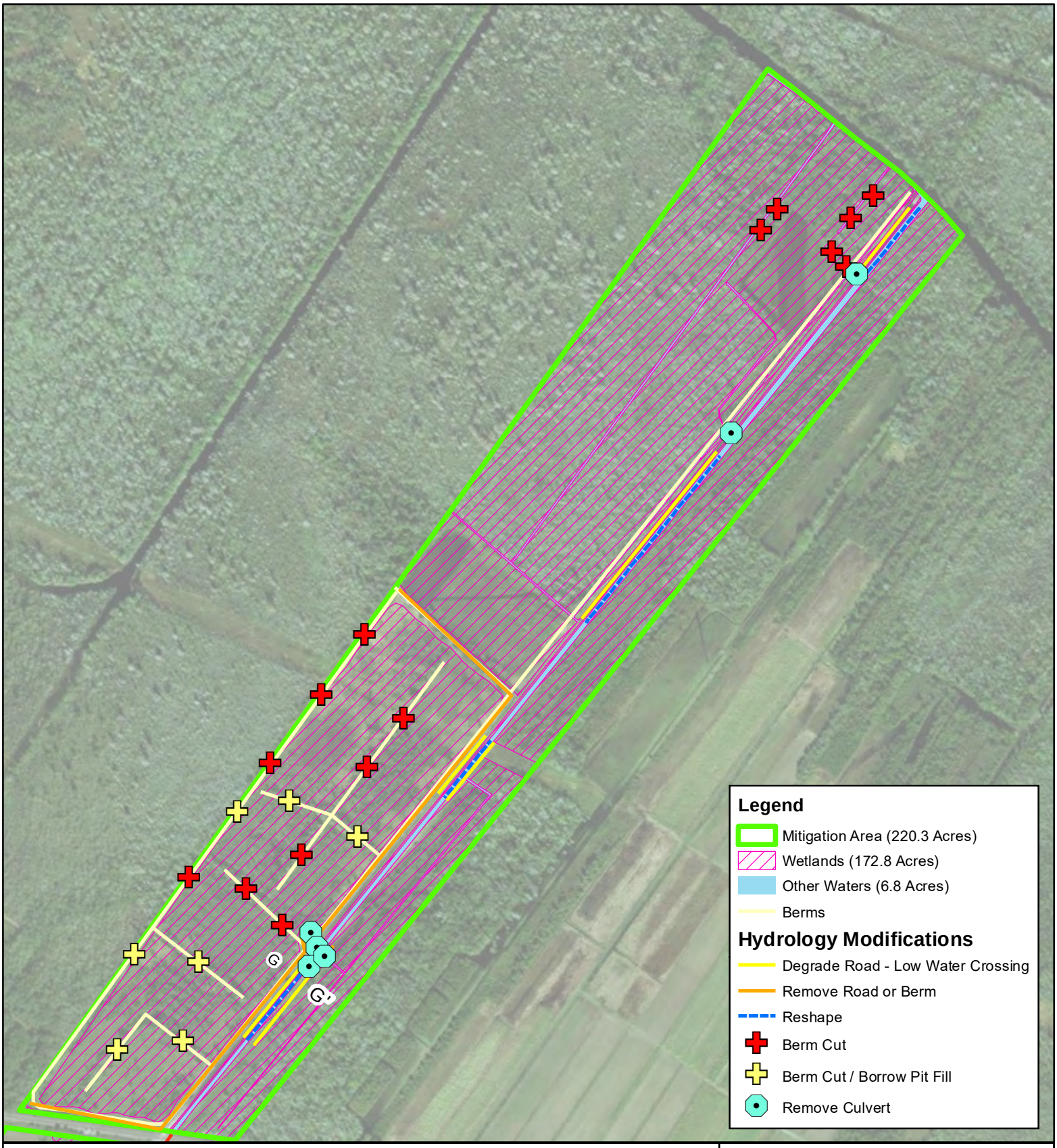
Des Allemands, LA

POTENTIAL HYDROLOGY IMPROVEMENTS

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 20



500 250 0 500 Feet

N

NRP

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

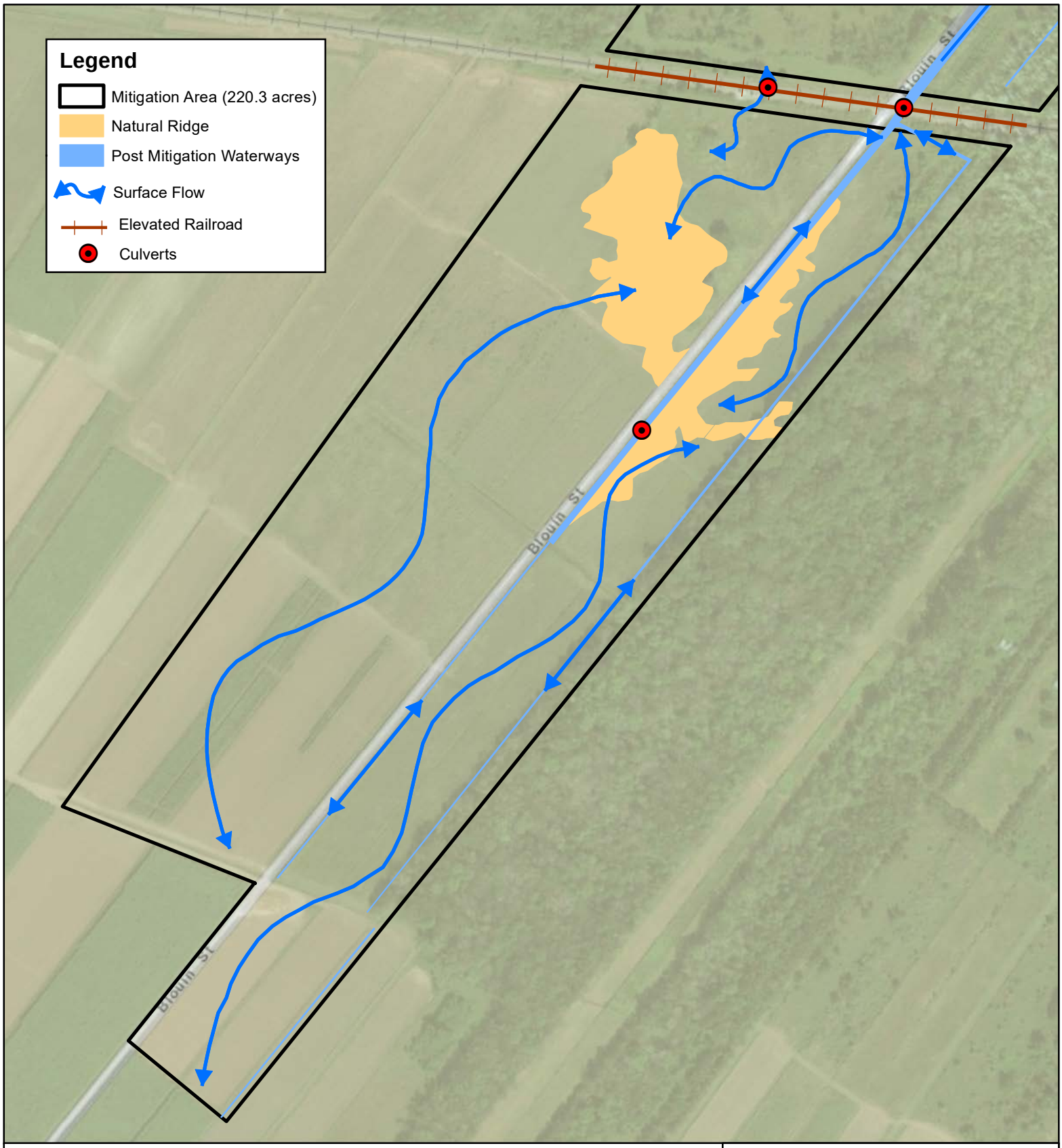
Des Allemands, LA

POTENTIAL HYDROLOGY IMPROVEMENTS

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 21



300 150 0 300
Feet

N

NRP

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

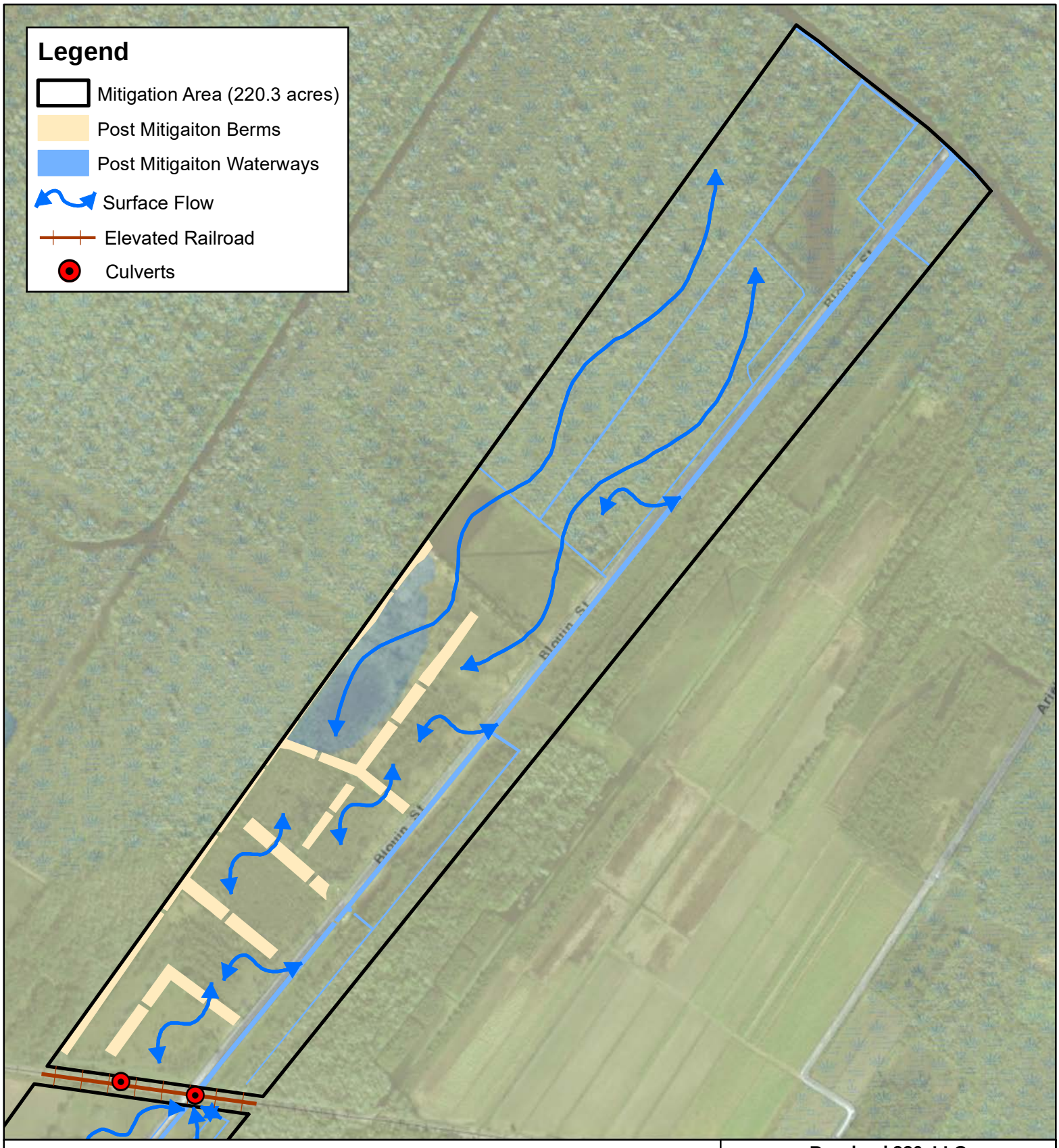
Raceland 330, LLC

Des Allemands, LA

POST MITIGATION HYDROLOGY: SOUTH LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 22



300 150 0 300
Feet

NRP

N

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

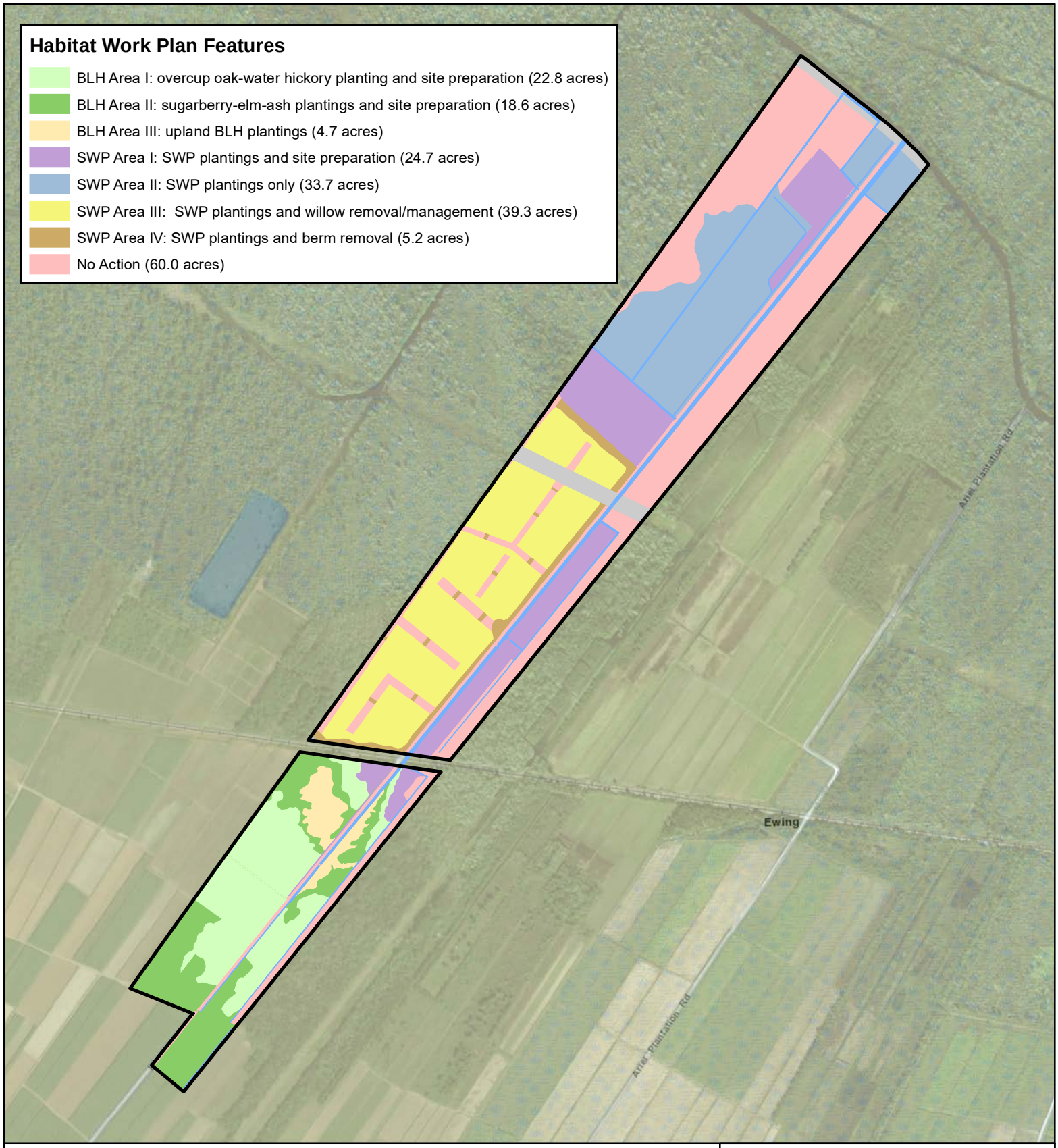
Des Allemands, LA

POST MITIGATION HYDROLOGY: NORTH

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 23



Legend

- Mitigation Area (220.3 acres)
- Waterways (6.1 acres)
- ROWs/Buffer (5.2 acres)

1,000 500 0 1,000 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. SWP= Swamp
4. BLH= Bottomland Hardwood

Raceland 330, LLC

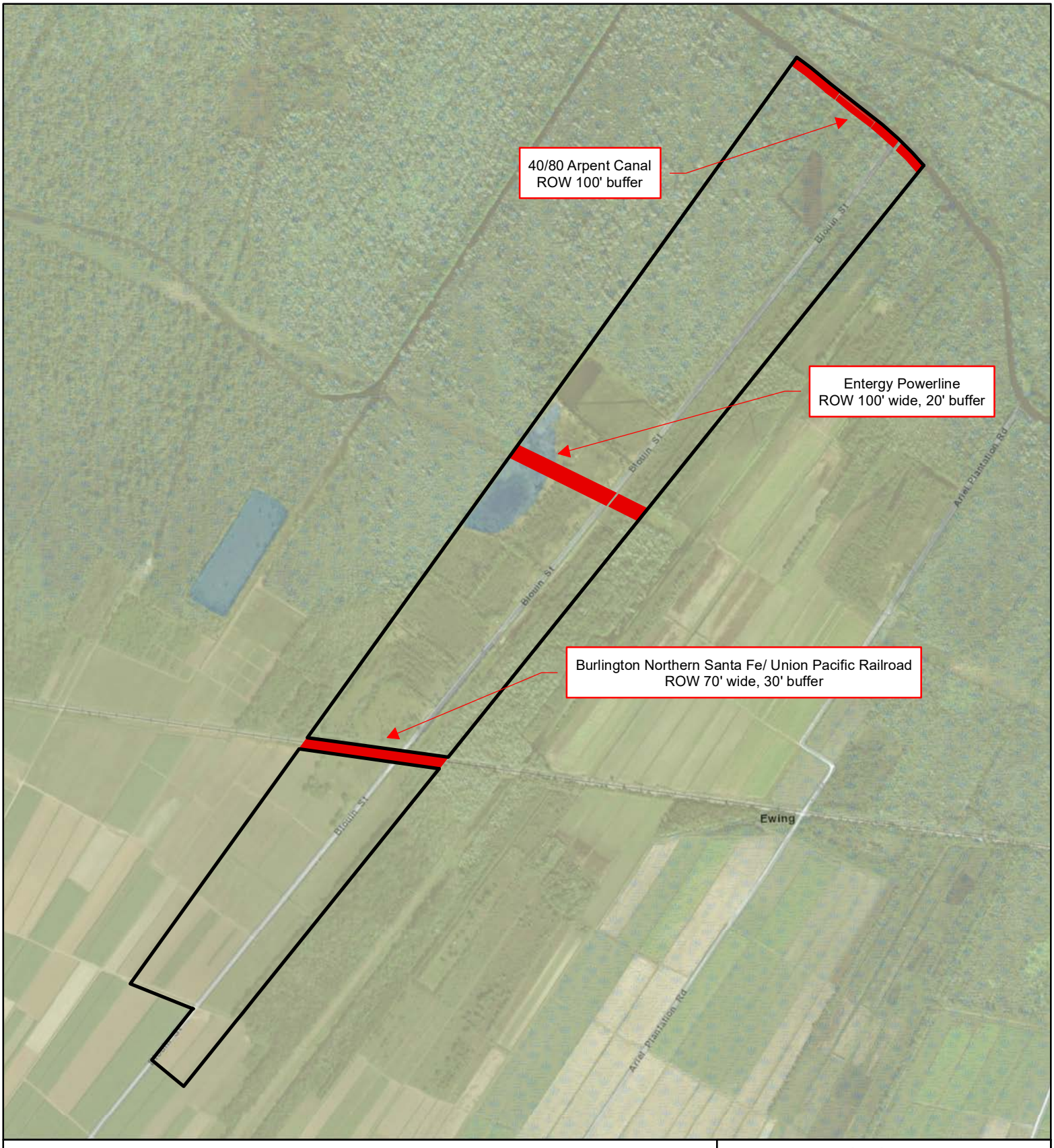
Des Allemands, LA

HABITAT WORK PLAN

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 24



Legend

- Mitigation Area (220.3 acres)
- ROWs/Buffer (7.9 acres)

1,000 500 0 1,000 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.
3. ROW= Right of Way
4. All ROW widths include a 10' buffer

NRP

Raceland 330, LLC

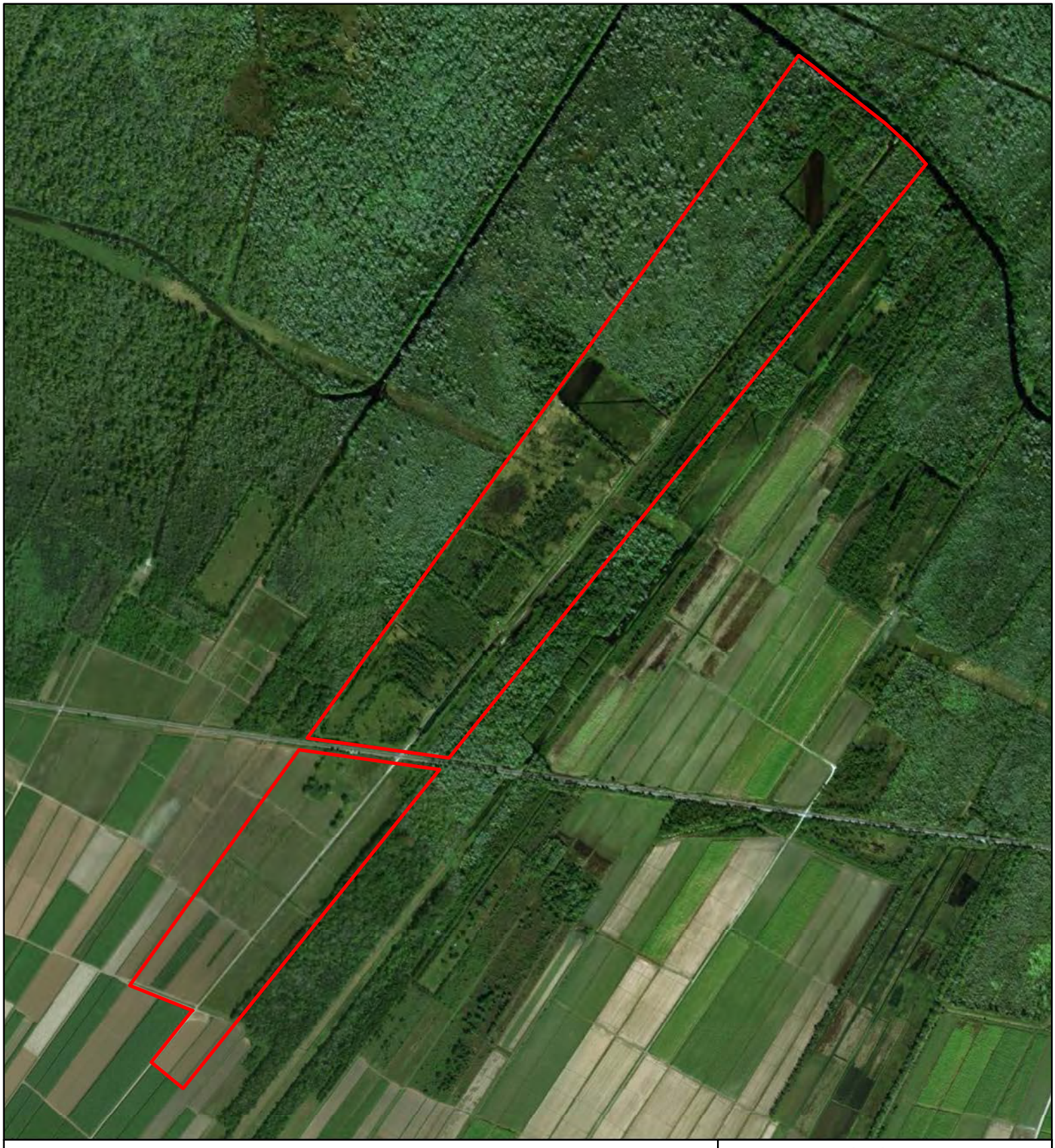
Des Allemands, LA

EXISTING ROWS

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 25



Legend

Mitigation Area (220.3 acres)

1,000 500 0 1,000 Feet

N

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

Des Allemands, LA

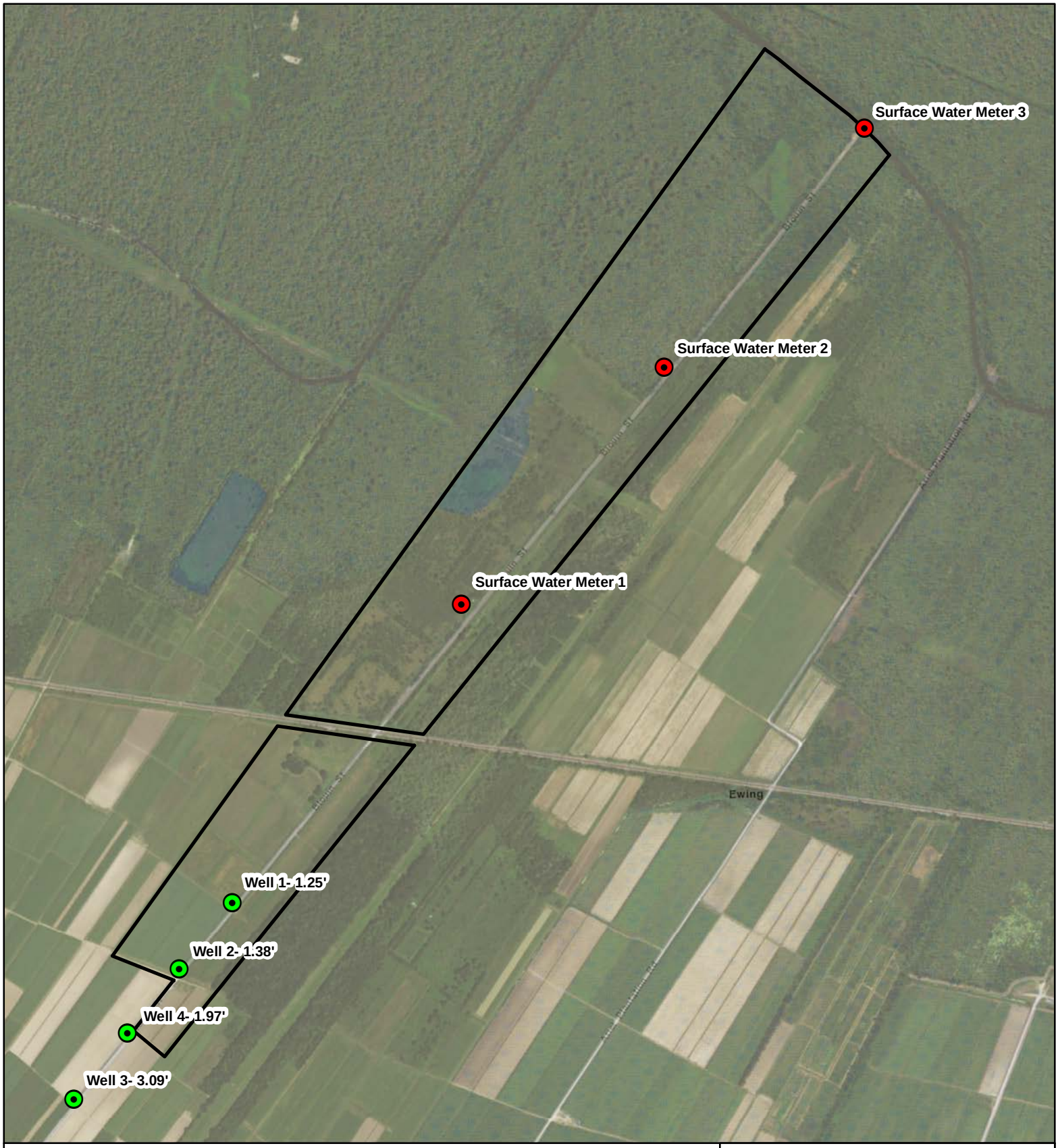
BANK BOUNDARIES

LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	GLF
Date :	01/11/2018
Map No. :	

FIGURE 26

Appendix A – Hydrology Data



Legend

- Mitigation Area (220.3 acres)
- Groundwtaer Wells
- Surface Water Meters

1,000 500 0 1,000 Feet

N

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

Des Allemands, LA

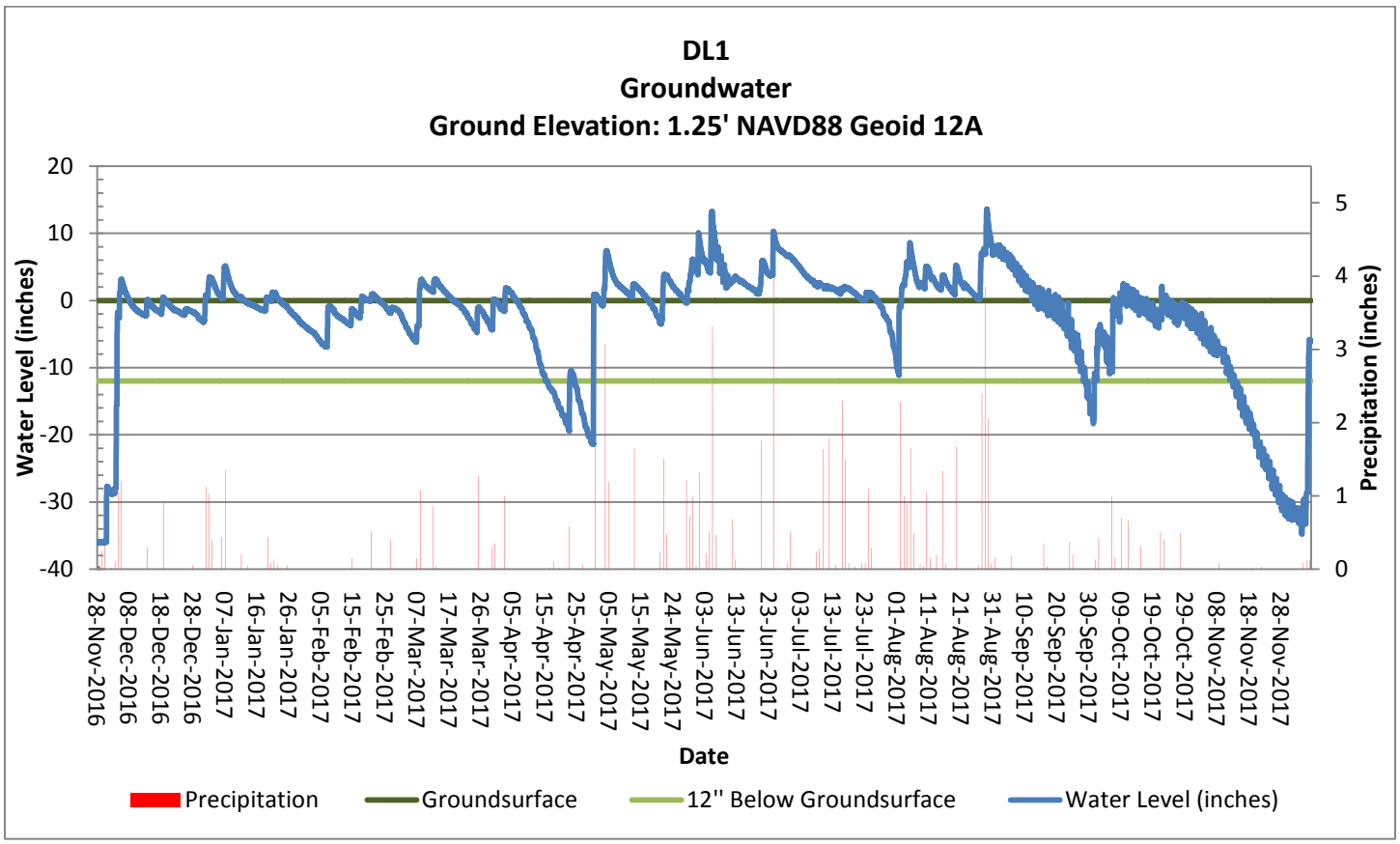
WATER METER LOCATIONS

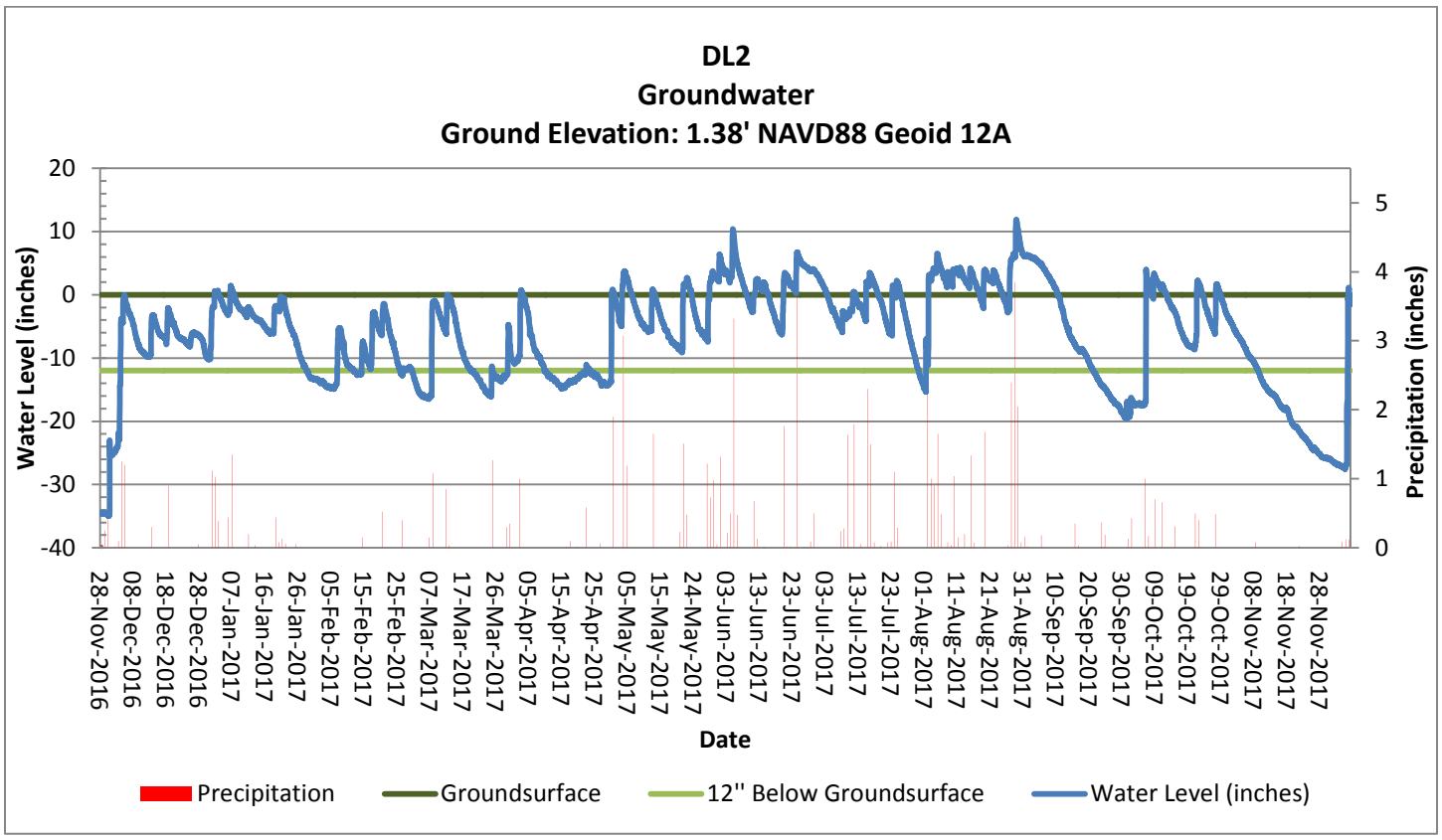
LAFOURCHE PARISH, LA

Created :	JLW/ArcView
Approved :	
Date :	12/19/2017
Map No. :	

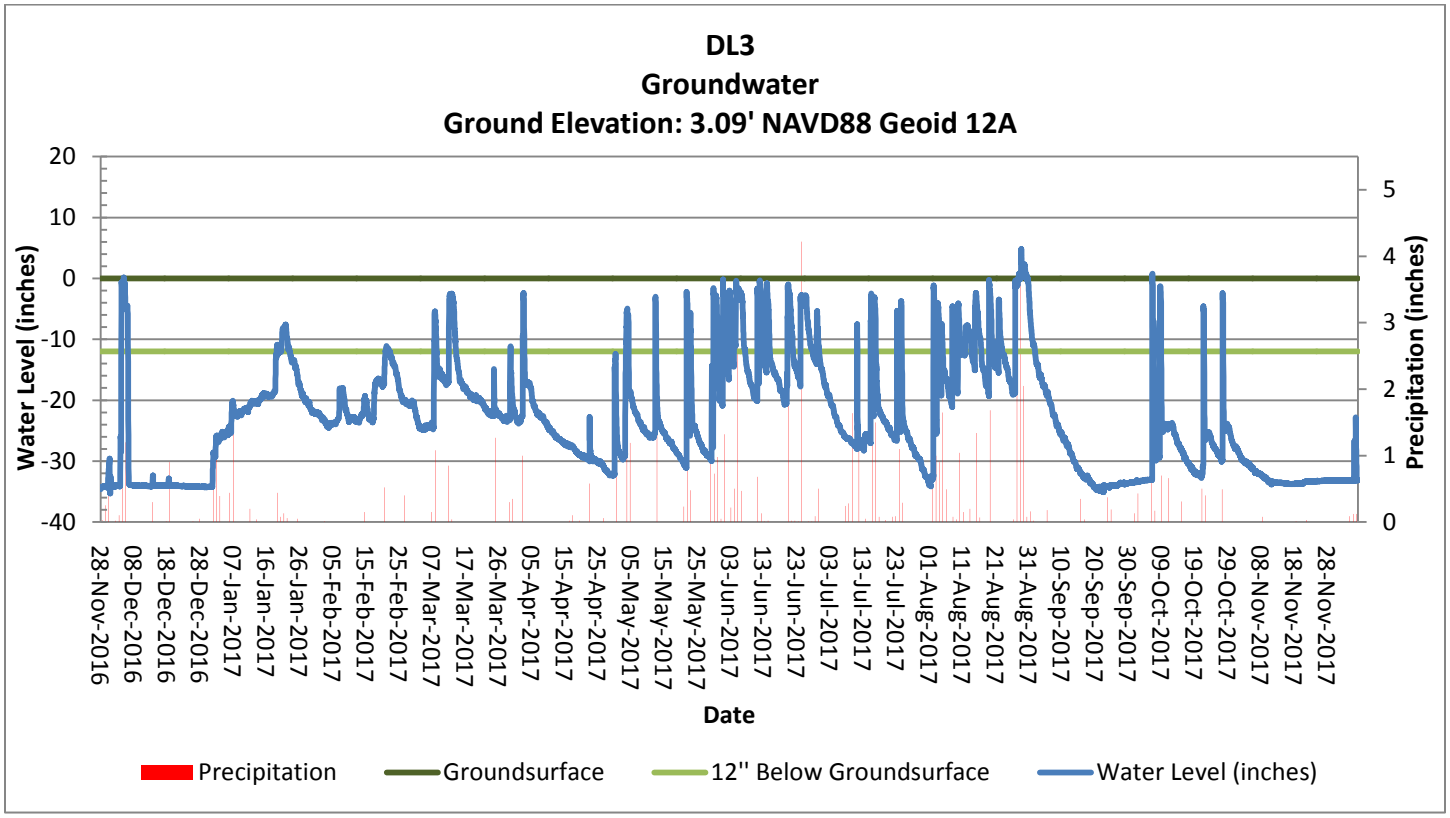
APPENDIX A

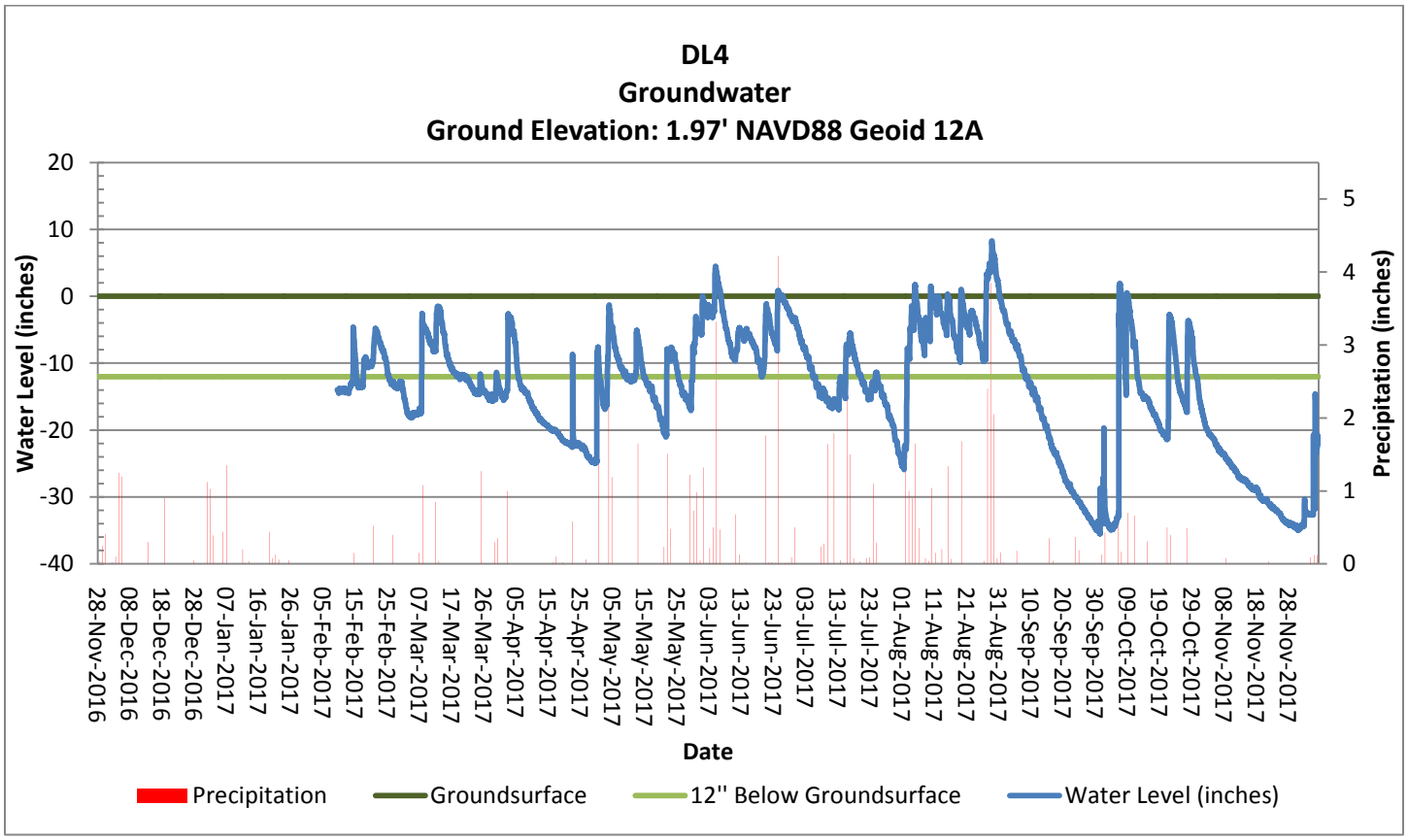
Raceland 330, LLC Mitigation Bank- Appendix A
Hydrology Data



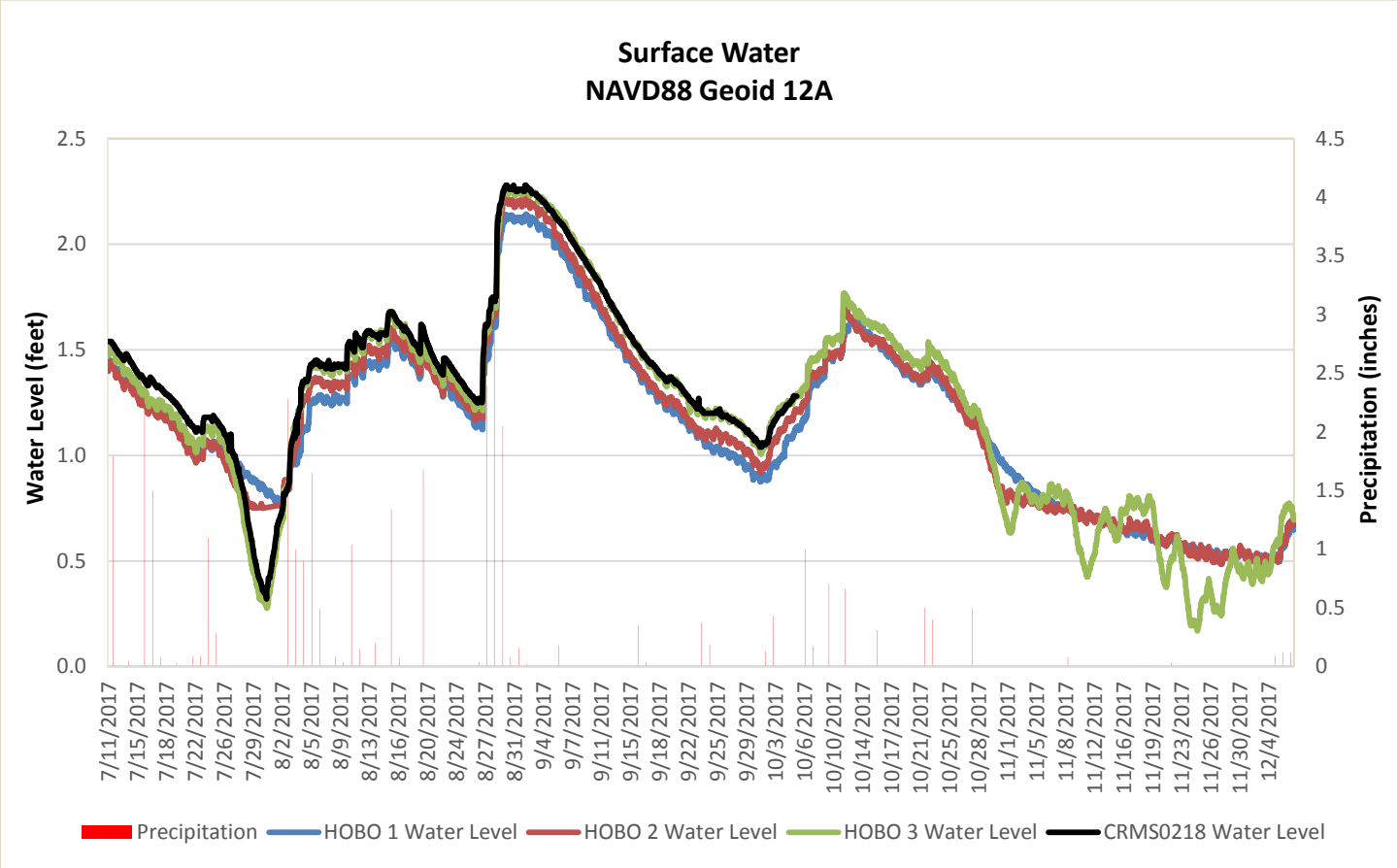


Raceland, 330 LLC Mitigation Bank- Appendix A
Hydrology Data





Avoca Island Mitigation Bank- Appendix A
Hydrology Data



Appendix B – Elevation Report

RACELAND 330, LLC
Digital Elevation Model (DEM) Elevation Correction
Based on Land Elevation Survey
May 30, 2017

Introduction

The purpose of this report is to describe the data, methodology and results of correcting elevations from the Digital Elevation Model (DEM) using surveyed land elevations.

Data Sources

Digital Elevation Models (DEMs) for the Kraemer SW, Kraemer SE, and Savoie NW USGS quarter quads were obtained from Atlas: The Louisiana Statewide GIS[1]. The horizontal resolution of the data is 5 meters by 5 meters (16.4 feet by 16.4 feet) with a vertical accuracy (Root Mean Square Error (RMSE)) of 0.45 feet. The data was collected in 2002 with elevations referenced to the North American Vertical Datum of 1988 (NAVD88) and an unknown geoid.

Surveyed land elevations were collected on January 10, 2017 by All South Consulting Engineers (ASCE). Elevation were referenced to NAVD88 Geoid12B. Portions of the area surveyed were agricultural lands with prominent rows. In these areas, an elevation was surveyed at the crest and trough of the row. In areas with no prominent rows, one elevation was surveyed at ground level.

Figure 2 in the appendix shows the survey points and DEM data.

Methods

Since the DEM data was collected in 2002, the area has been subject to regional subsidence. Additionally, the elevations were referenced to an unknown geoid. In order to bring the DEM data to current elevations referenced to a more recent datum/geoid, the DEM elevations were compared to the survey data and an adjustment was calculated.

The elevation corresponding to each survey point was extracted from the DEM and the difference between the survey elevation and DEM elevation was recorded. The DEM provides one elevation for a 16.4-foot square plot. This single elevation is the average of all elevations within this plot. The higher the variation in elevations within the plot, the larger the potential difference when comparing a very specific surveyed elevation. Figure 1 shows a plot of these differences separated by surveyed row tops, row bottoms and none-rowed elevation shots. The average of the differences was negative 1.6 feet. Therefore, the DEM elevations are on average 1.6 feet higher than the surveyed elevation.

[1] "Atlas: The Louisiana Statewide GIS." LSU CADGIS Research Laboratory, Baton Rouge, LA, 2009. http://atlas.lsu.edu

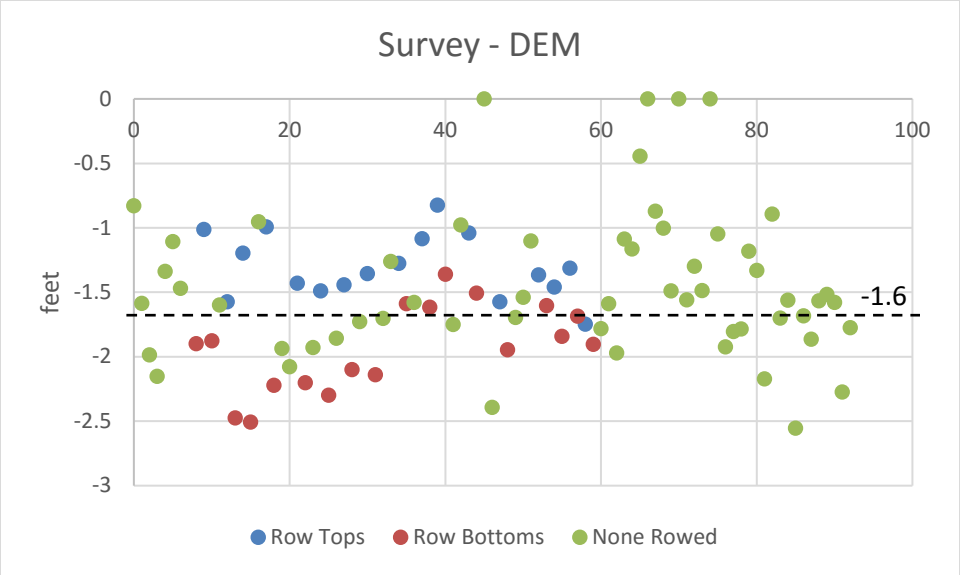
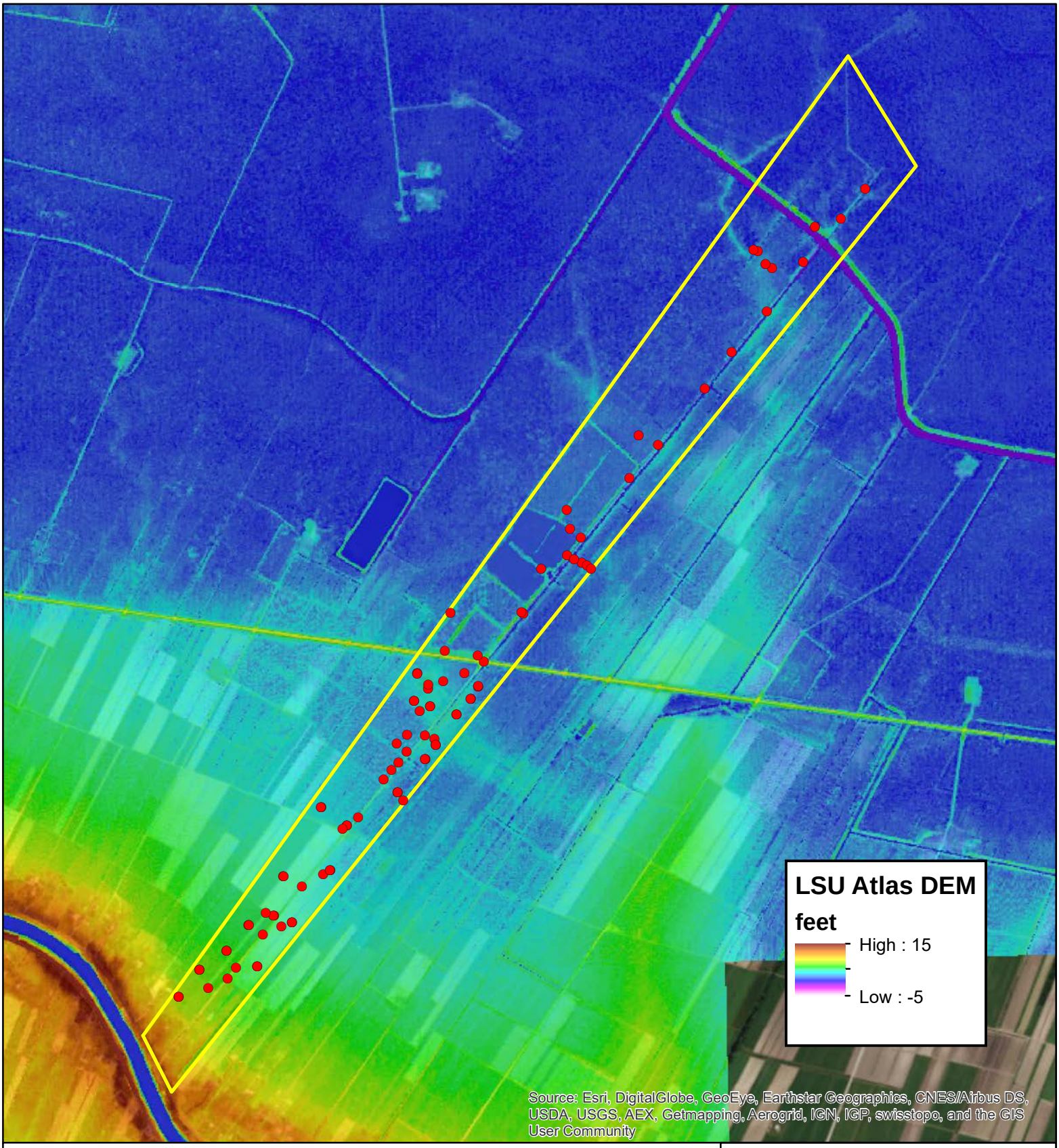


Figure 1: Scatter Plot of the differences between surveyed and DEM data

Results

The DEM data was shifted down by a spatially constant value of 1.6 feet based on comparisons with the survey data.



Legend

- ASCE Survey Points
- Project Area (328.4 acres)

1000 500 0 1000 Feet

N

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

Raceland, LA

CANOPY COVER LOCATIONS

LAFOURCHE PARISH, LA

Created :	TSB/ArcView
Approved :	GLF
Date :	05/30/2017
Map No. :	

FIGURE 2

Appendix C – Jurisdictional Determination

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NEW ORLEANS DISTRICT
7400 LEAKE AVENUE
NEW ORLEANS, LOUISIANA 70118

REPLY TO ATTENTION OF

May 8, 2017

Operations Division
Surveillance and Enforcement Section

Mr. Michael Rabalais
Natural Resource Professionals, LLC
7478 Highland Rd.
Baton Rouge, LA 70808

Dear Mr. Rabalais:

Reference is made to your request, on behalf of Raceland 330, LLC, for a U.S. Army Corps of Engineers' (Corps) jurisdictional determination on property located in Section 44, Township 15 South, Range 17 East, Lafourche Parish, Louisiana (enclosed map). Specifically, this property is identified as a 328 acre tract in Raceland, LA.

Based on review of recent maps, aerial photography, and soils data, we have determined that part of the property may be wetland and subject to Corps' jurisdiction. The approximate limits of the wetland are designated in red on the map. A Department of the Army permit under Section 404 of the Clean Water Act will be required prior to the deposition or redistribution of dredged or fill material into wetlands that are waters of the United States. Additionally, a DA permit will be required if you propose to deposit dredged or fill material into other waters subject to Corps' jurisdiction. Other waters that may be subject to Corps' jurisdiction are indicated in blue on the map.

You are advised that this approved jurisdictional determination is valid for a period of 5 years from the date of this letter unless new information warrants revision prior to the expiration date or the District Commander has identified, after public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.

This delineation/determination has been conducted to identify the limits of the Corps' Clean Water Act jurisdiction for the particular site identified in your request. This delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If the property owner or tenant is a USDA farm participant, or anticipates participation in USDA programs, a certified wetland determination should be requested from the local office of the Natural Resources Conservation Service prior to starting work.

Please be advised that this property is in the Louisiana Coastal Zone and a Coastal Use Permit may be required prior to initiation of any activities on this site. For additional information, contact Ms. Christine Charrier, Office of Coastal Management, Louisiana Department of Natural Resources at (225) 342 7953.

Should there be any questions concerning these matters, please contact Mr. Jon Barmore at (504) 862 1704 and reference our Account No. MVN-2016-01564-SG. If

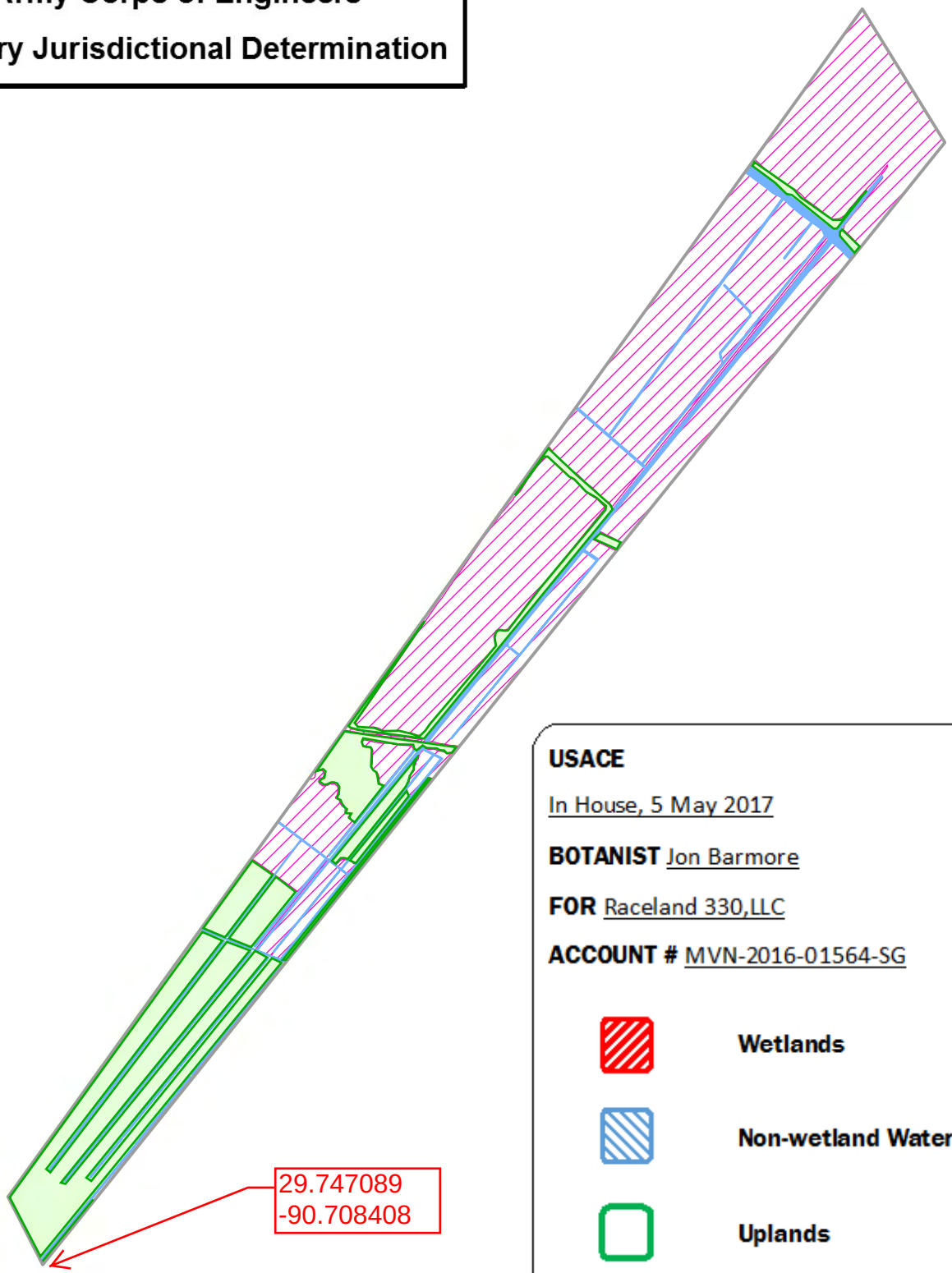
you have specific questions regarding the permit process or permit applications, please contact our Central Evaluation Section at (504) 862 1581.

Sincerely,

for Martin S. Mayer
Chief, Regulatory Branch

Enclosures

US Army Corps of Engineers
Preliminary Jurisdictional Determination



USACE

In House, 5 May 2017

BOTANIST Jon Barmore

FOR Raceland 330,LLC

ACCOUNT # MVN-2016-01564-SG

Wetlands

Non-wetland Waters

Uplands

1500 750 0 1500
Feet

NRP

N

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

RACELAND 330, LLC

RACELAND, LA

POTENTIAL WETLANDS MAP

LAFOURCHE PARISH, LA

Created :	MRR/ArcView
Approved :	GLF/ArcView
Date :	05/05/2017
Map No. :	

FIGURE 15

Appendix D – Vegetative Communities

(1) Non-Wetland Active Agricultural Fields

	% Cover
Trees	**0**
none observed	
Sapling	**0**
none observed	
Shrub	**0**
none observed	
Herbaceous	**100**
Saccharum officianarum	80
Dichanthelium commutatum	25
Echinocholoa colona	25
Commelina communis	20

(2) Non-Wetland Abandoned Agricultural Fields

	% Cover
Trees	**0**
none observed	
Sapling	**0**
none observed	
Shrub	**0**
none observed	
Herbaceous	**100**
Paspalum urvillei	60
Verbena brasiliensis	25
Annual marsh elder	25

(3) Wetland Abandoned Agricultural Fields

	% Cover
Trees	**0**
none observed	
Sapling	**0**
none observed	
Shrub	**0**
none observed	
Herbaceous	**100**
Paspalum urvillei	60
Symphyotrichum subulatum	50
Polygonum hydropiperoides	15
Andropogodon virginicus	10
Rhynchospora corniculata	10

(4) Non-Wetland Upland Ridge

	% Cover
Trees	**0**
none observed	
Sapling	**0**
none observed	
Shrub	**0**
none observed	
Herbaceous	**100**
Paspalum urvillei	50
Acmella repens	25
Paspalum notatum	25
Iva annua	10

(5) Non-Wetland Forested Berm

	% Cover	Max DBH (in.)
Trees	**80**	
Celtis laevigata	40	10.2
Ulmus americana	35	5.2
Ligustrum lucidum	20	
Sapling	**15**	
Quercus nigra	15	
Shrub	**5**	
Ligustrum lucidum	5	
Herbaceous	**40**	
Panicum virgatum	30	
Sabal minor	10	

(6) Wetland Herbaceous Field

	% Cover
Trees	**10**
Salix nigra	5
Triadica sebifera	5
Sapling	**25**
Acer rubrum var. drummondii	20
Triadica sebifera	4
Salix nigra	1
Shrub	**0**
none observed	
Herbaceous	**100**
Andropogodon glomeratus	50
Cyperus virens	**25**
Typha latifolia	25
Juncus effusus	20
Polygonum hydropiperoides	20

(7) Mature BLH

	% Cover	Max DBH (in.)
Trees	**90**	
Quercus nigra	60	19.5
Ulmus americana	50	8.5
Acer rubrum var. drummondii	5	10.7
Celtis laevigata	5	10
Liquidambar styraciflua	5	21.5
Sapling	**50**	
Acer rubrum var. drummondii	10	
Fraxinus sp.	10	
Liquidambar styraciflua	10	
Quercus nigra	10	
Cornus drummondii	2	
Shrub	**5**	
Liquidambar styraciflua	5	
Herbaceous	**60**	
Sabal minor	60	

(8) Abandoned Crawfish Pond

	% Cover	Max DBH (in.)
Trees	**30**	
Salix nigra	30	9.2
Sapling	**10**	
Salix nigra	10	
Shrub	**10**	
Salix nigra	10	
Herbaceous	**100**	
Panopyrum gymnocarpon	100	

(9) Wetland Forested Baffle Levees

	% Cover
Trees	**30**
Celtis laevigata	20
Acer rubrum var. drummondii	10
Sapling	**0**
none observed	
Shrub	**0**
none observed	
Herbaceous	**50**
Rhychospora corniculata	25
Dichondria carolinensis	25

(10) Young BLH

	% Cover	Max DBH (in.)
Trees	**75**	
Fraxinus sp.	40	4.6
Acer rubrum var. drummondii	35	4.5
Liquidambar styraciflua	10	8
Salix nigra	10	17.4
Ulmus americana	5	
Sapling	**75**	
Acer rubrum var. drummondii	65	
Fraxinus sp.	5	
Ulmus americana	5	
Shrub	**25**	
Acer rubrum var. drummondii	25	
Morella cerifera	2	
Herbaceous	**0**	
none observed		

(11) Degraded Swamp

	% Cover	Max DBH (in.)
Trees	**35**	
Salix nigra	25	9.8
Acer rubrum var. drummondii	5	3.8
Fraxinus sp.	5	6
Sapling	**15**	
Acer rubrum var. drummondii	15	
Shrub	**10**	
Cephalanthus occidentalis	10	
Acer rubrum var. drummondii	5	
Herbaceous	**40**	
Rhychospora corniculata	15	
Cyperus virens	15	
Ludwigia sp.	5	
Polygonum hydropiperoides	5	

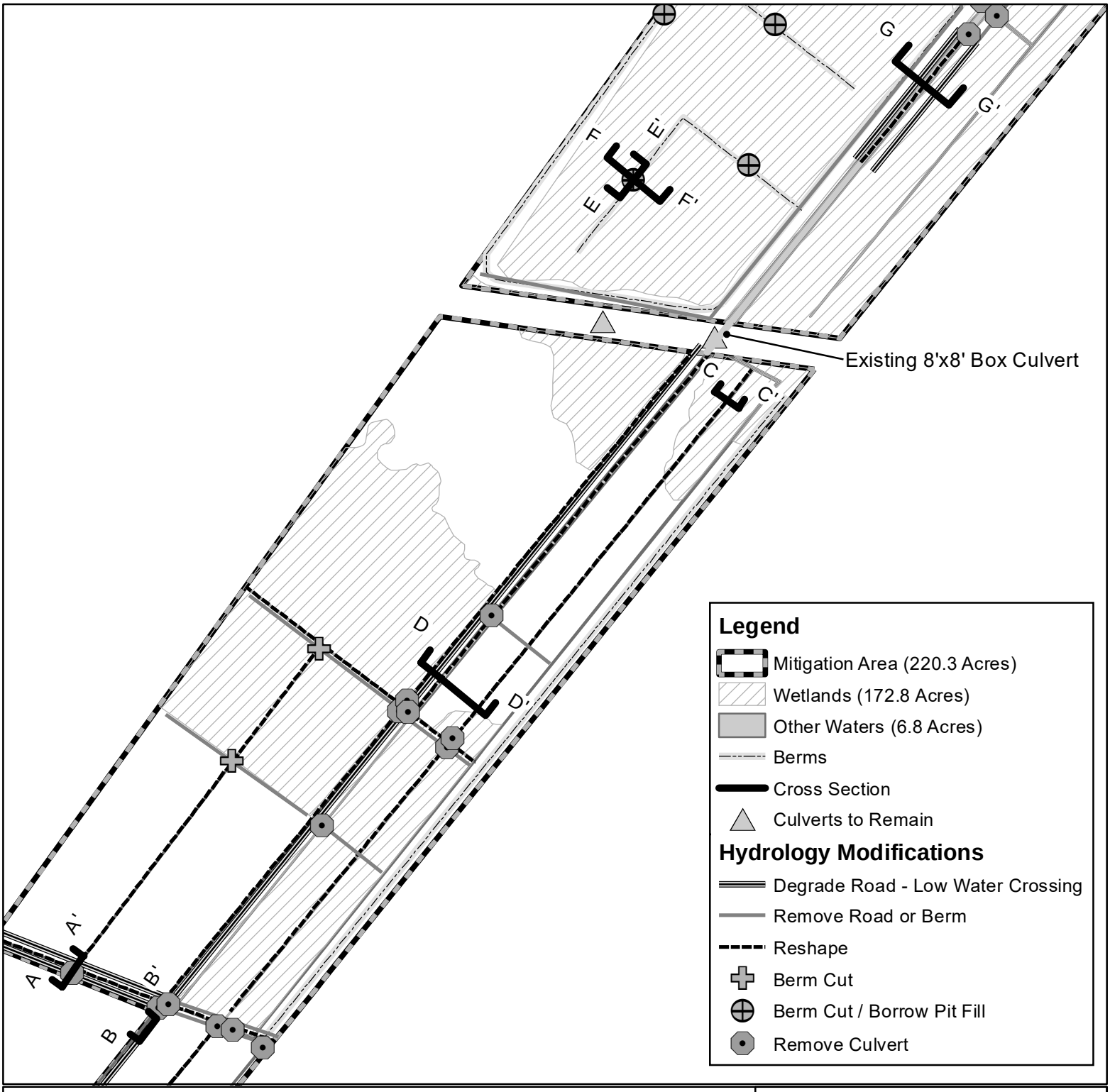
(12) Cypress Swamp

	% Cover	Max DBH (in.)
Trees	**50**	
Taxodium distichum	40	27
Acer rubrum var. drummondii	5	3.8
Fraxinus sp.	5	3.6
Sapling	**50**	
Taxodium distichum	20	
Acer rubrum var. drummondii	15	
Fraxinus sp.	15	
Shrub	**30**	
Cephalanthus occidentalis	30	
Herbaceous	**10**	
Sabal minor	10	

(13) Organic Mat

	% Cover
Trees	**0**
none observed	
Sapling	**0**
none observed	
Shrub	**0**
none observed	
Herbaceous	**100**
Thelypteris palustris	100
Bidens laevis	15
Boltonia asteroides	5

Appendix E – Soils and Hydrology Work Plan Detail



400 200 0 400 Feet

N

NRP

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

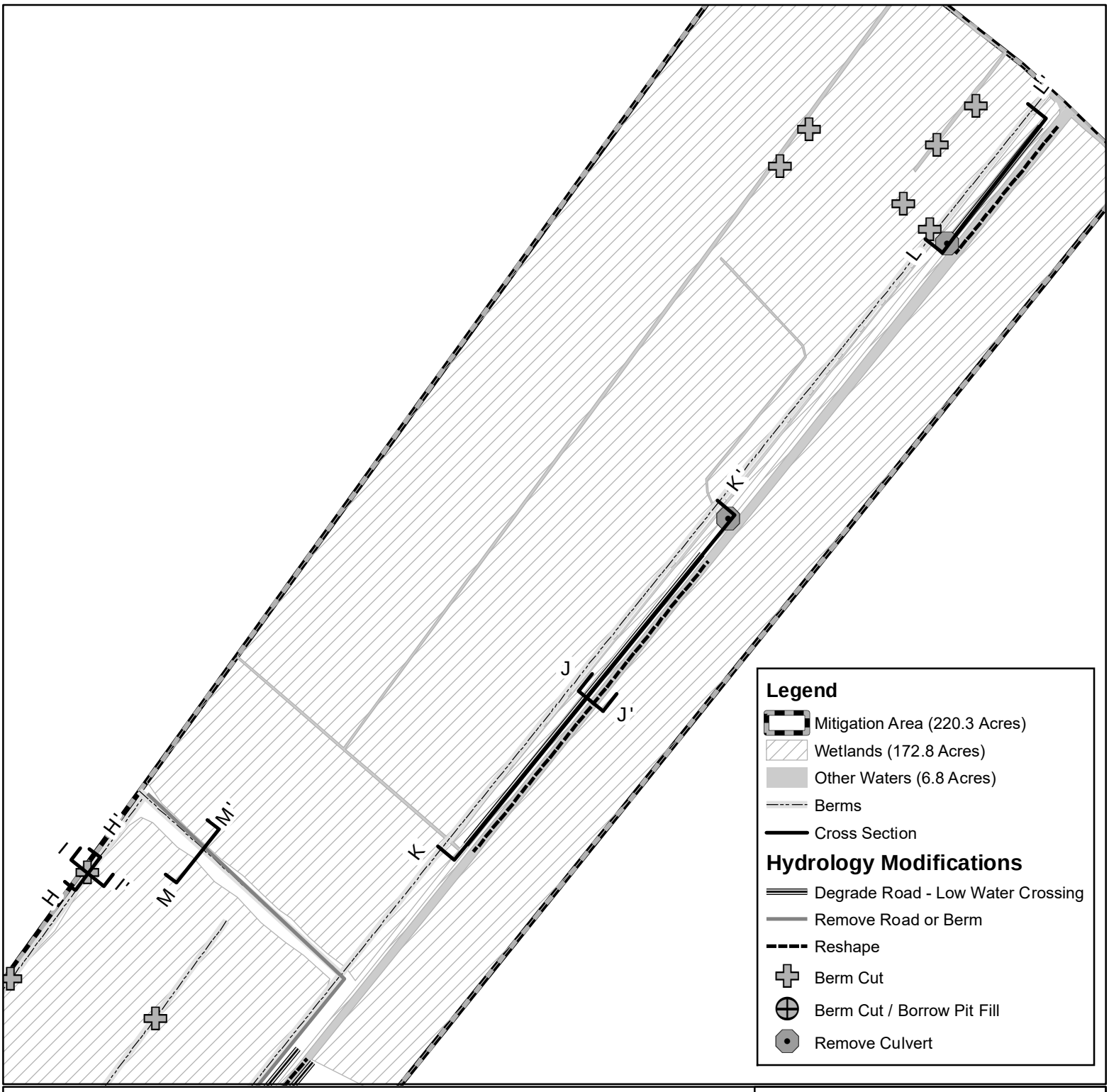
Thibodaux, LA

CROSS SECTIONS 1

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	
Date :	12/18/2017
Map No. :	

FIGURE E-1



400 200 0 400
Feet

N

NRP

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

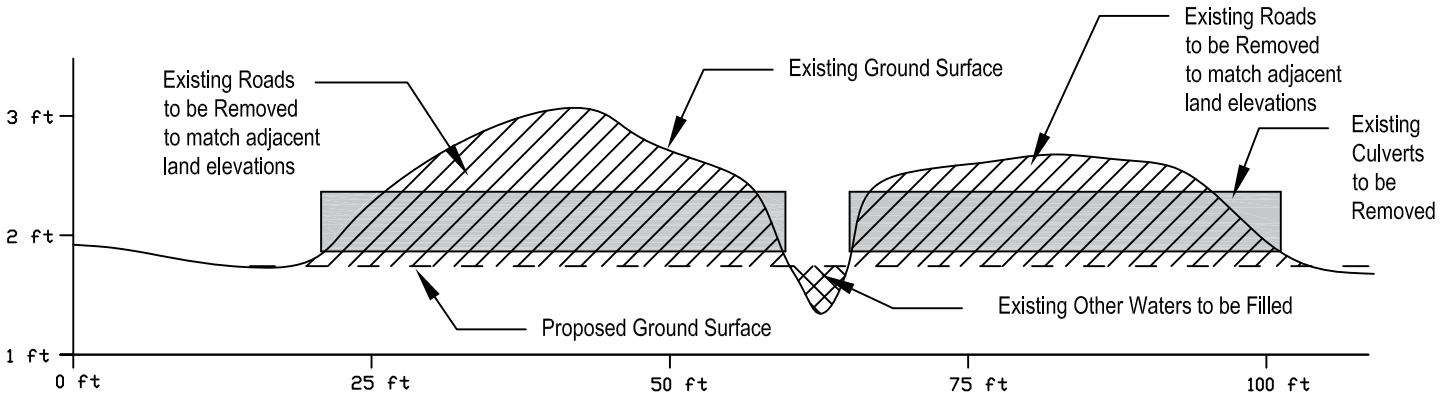
Thibodaux, LA

CROSS SECTIONS 2

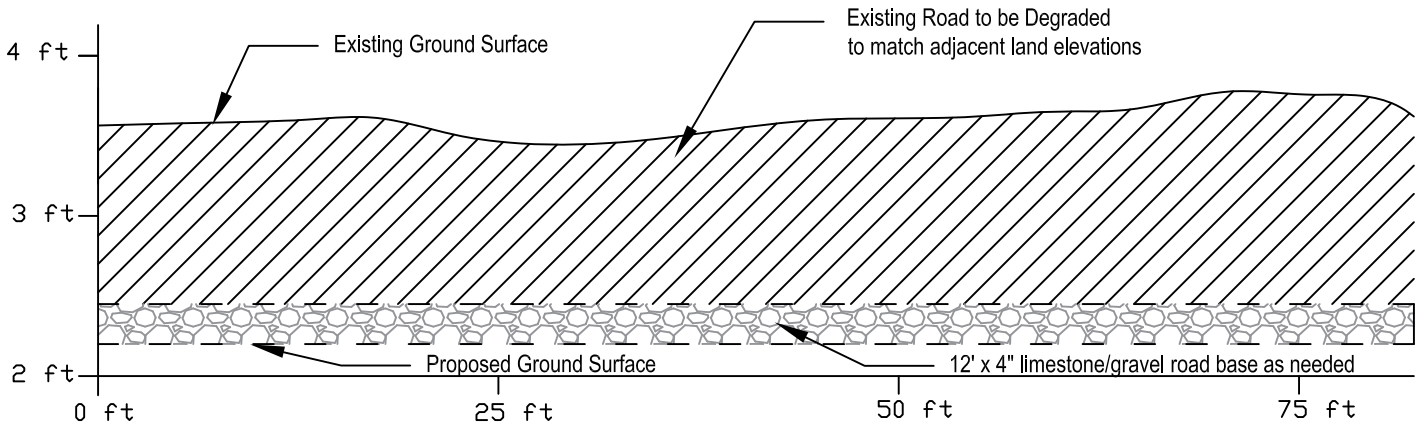
LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	
Date :	12/18/2017
Map No. :	

FIGURE E-2



Section A-A': Existing Roadway to be Degraded and Culverts to be Removed
10:1 Vertical Exaggeration



Section B-B': Existing Roadway to be Degraded
10:1 Vertical Exaggeration

Fill

Excavation

Note: Excess fill generated from excavation will be deposited in a non-wetland location. (See Figure E-9)

NRP

N

Raceland 330, LLC

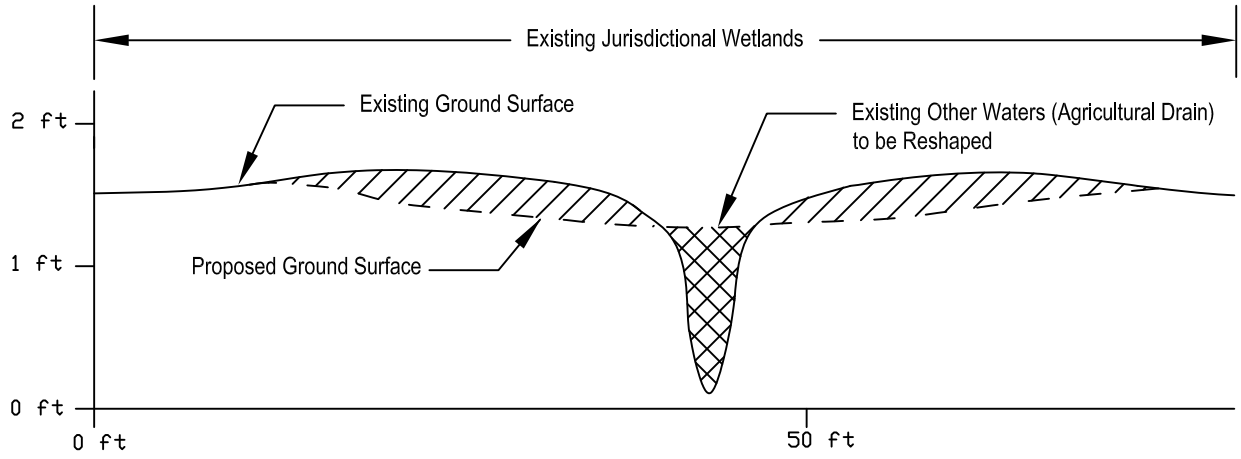
Thibodaux, LA

CROSS SECTIONS A & B

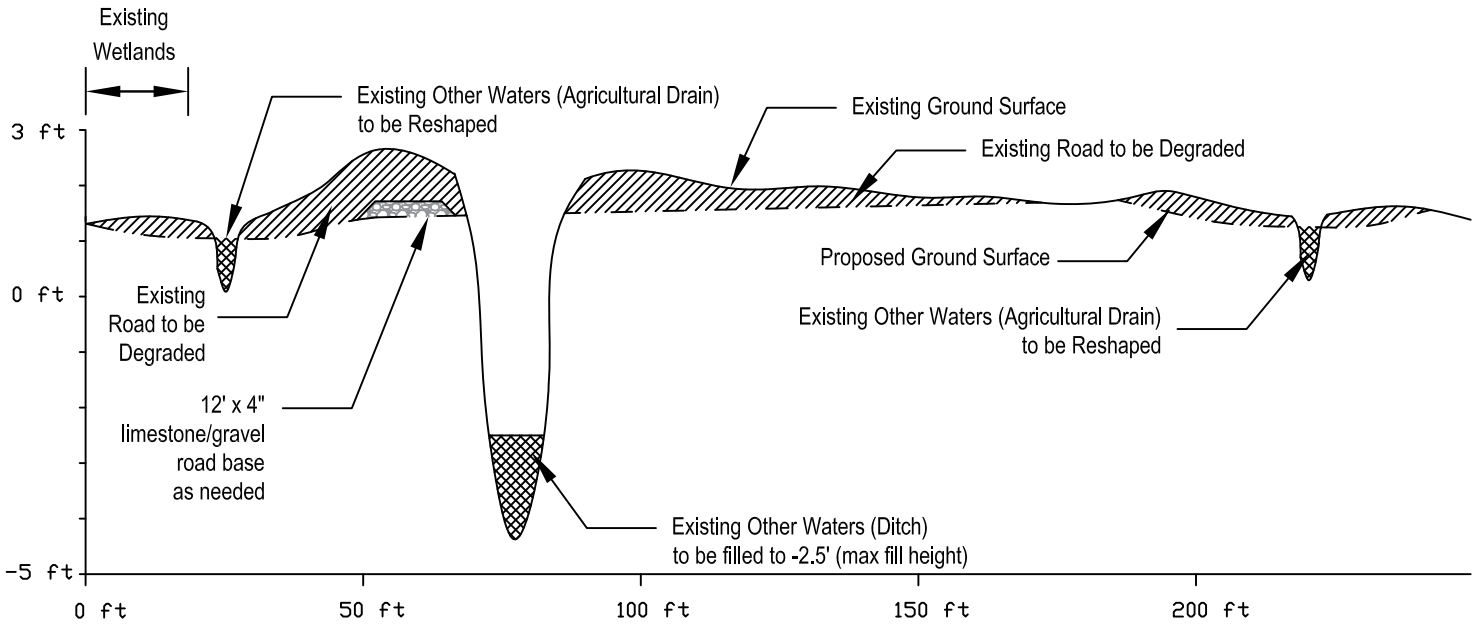
LAFOURCHE PARISH, LA

Created: AGB
Approved: GLF
Date: 12/18/2017
Map No.:

FIGURE E-3



Section C-C': Existing Agricultural Drain to be Reshaped
10:1 Vertical Exaggeration



Section D-D': Existing Road to be Degraded and Agricultural Ditches to be Reshaped
10:1 Vertical Exaggeration

Fill

Excavation

Note: Excess fill generated from excavation will be deposited in a non-wetland location. (See Figure E-9)

NRP

N

Raceland 330, LLC

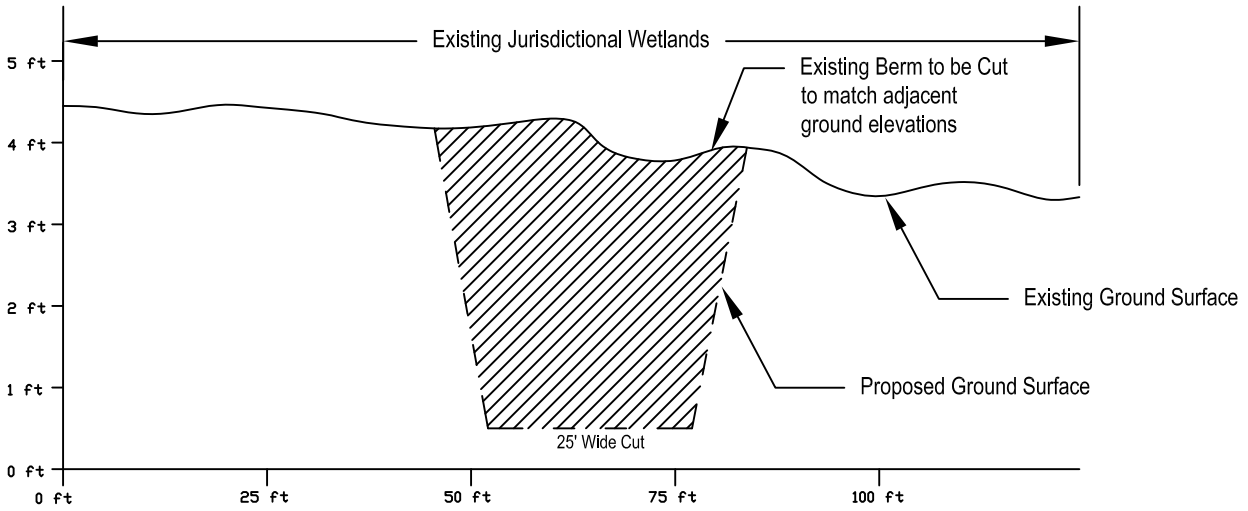
Thibodaux, LA

CROSS SECTIONS C & D

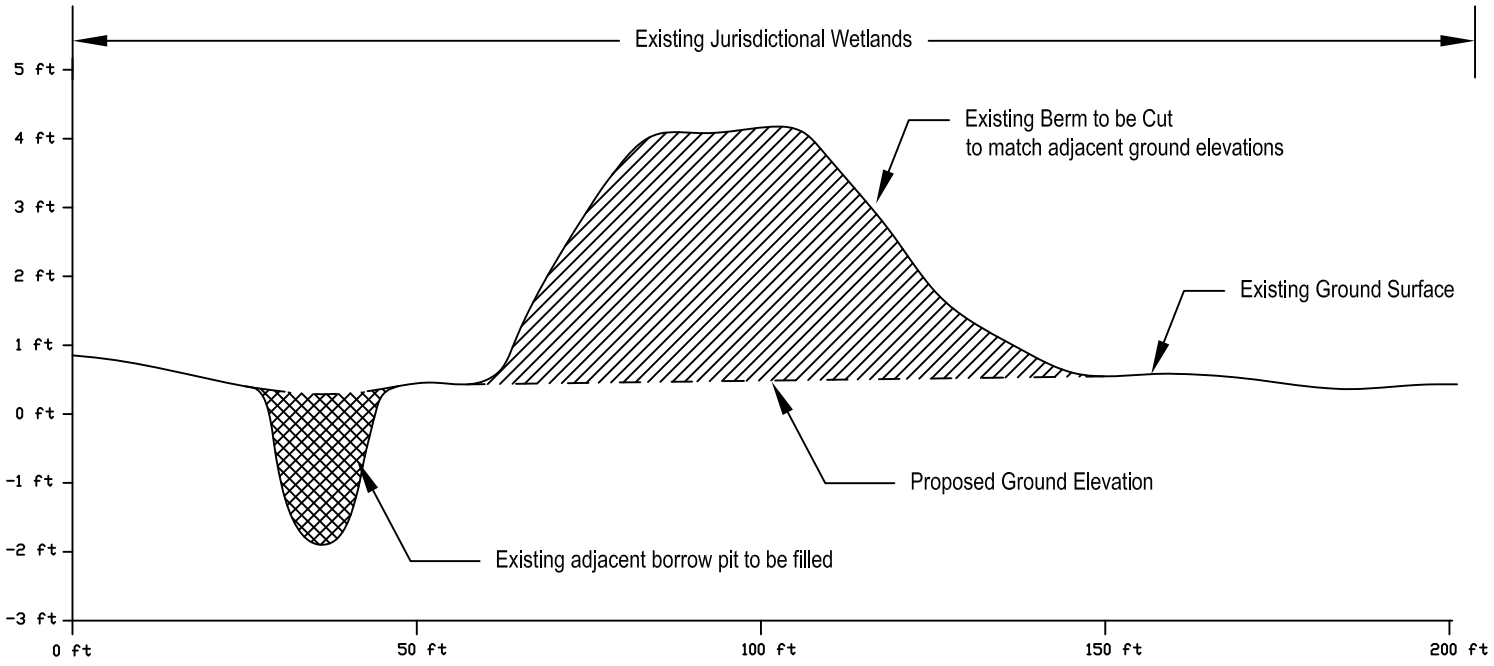
LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	12/18/2017
Map No.:	

FIGURE E-4



Section E-E': Existing Berm to be Cut
10:1 Vertical Exaggeration



Section F-F': Existing Berm to be Cut
10:1 Vertical Exaggeration

Fill

Excavation

Note: Excess fill generated from excavation will be deposited in a non-wetland location. (See Figure E-9)

NRP

N

Raceland 330, LLC

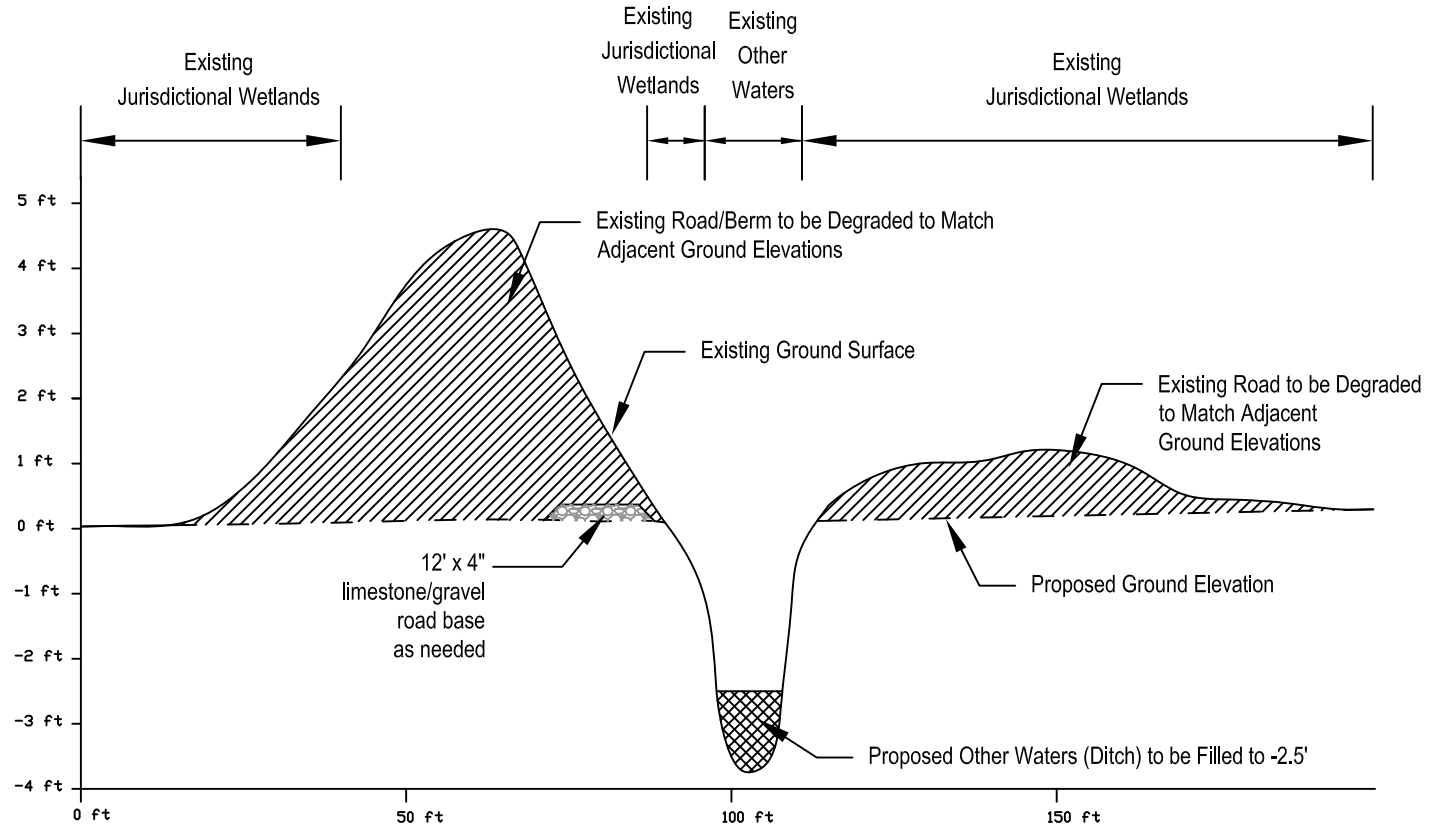
Thibodaux, LA

CROSS SECTIONS E & F

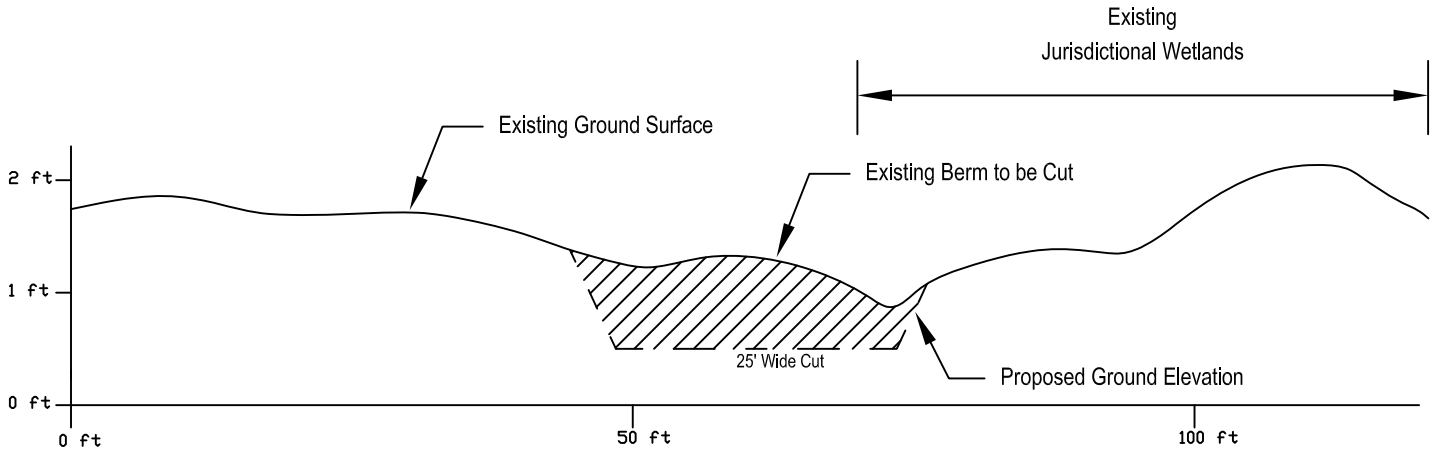
LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	12/18/2017
Map No.:	

FIGURE E-5



Section G-G': Existing Berm to be Cut / Road to be Removed
10:1 Vertical Exaggeration



Section H-H': Existing Berm to be Cut
10:1 Vertical Exaggeration

Fill

Excavation

Note: Excess fill generated from excavation will be deposited in a non-wetland location. (See Figure E-9)

N

Raceland 330, LLC

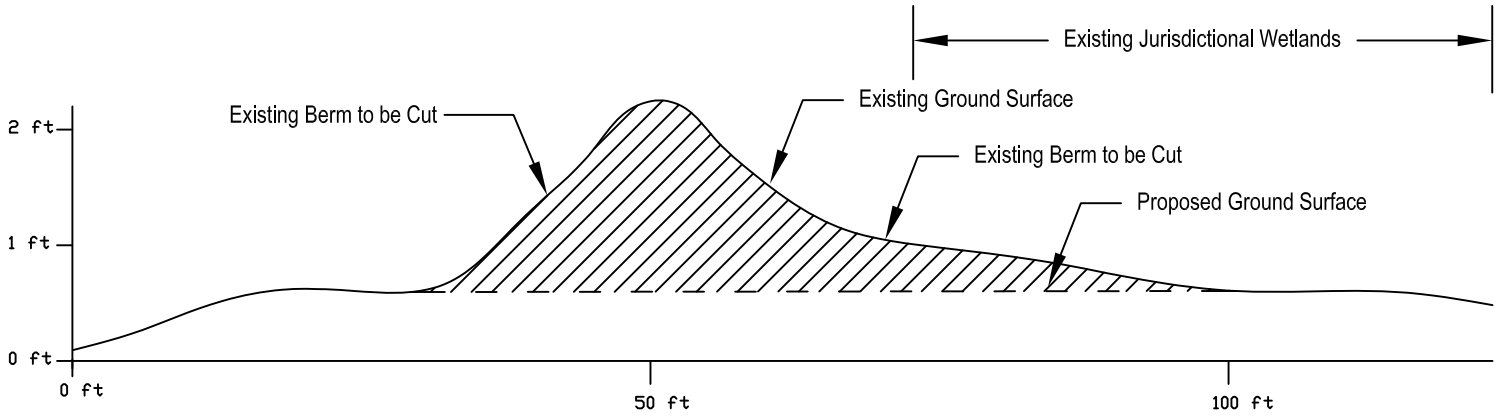
Thibodaux, LA

CROSS SECTIONS G & H

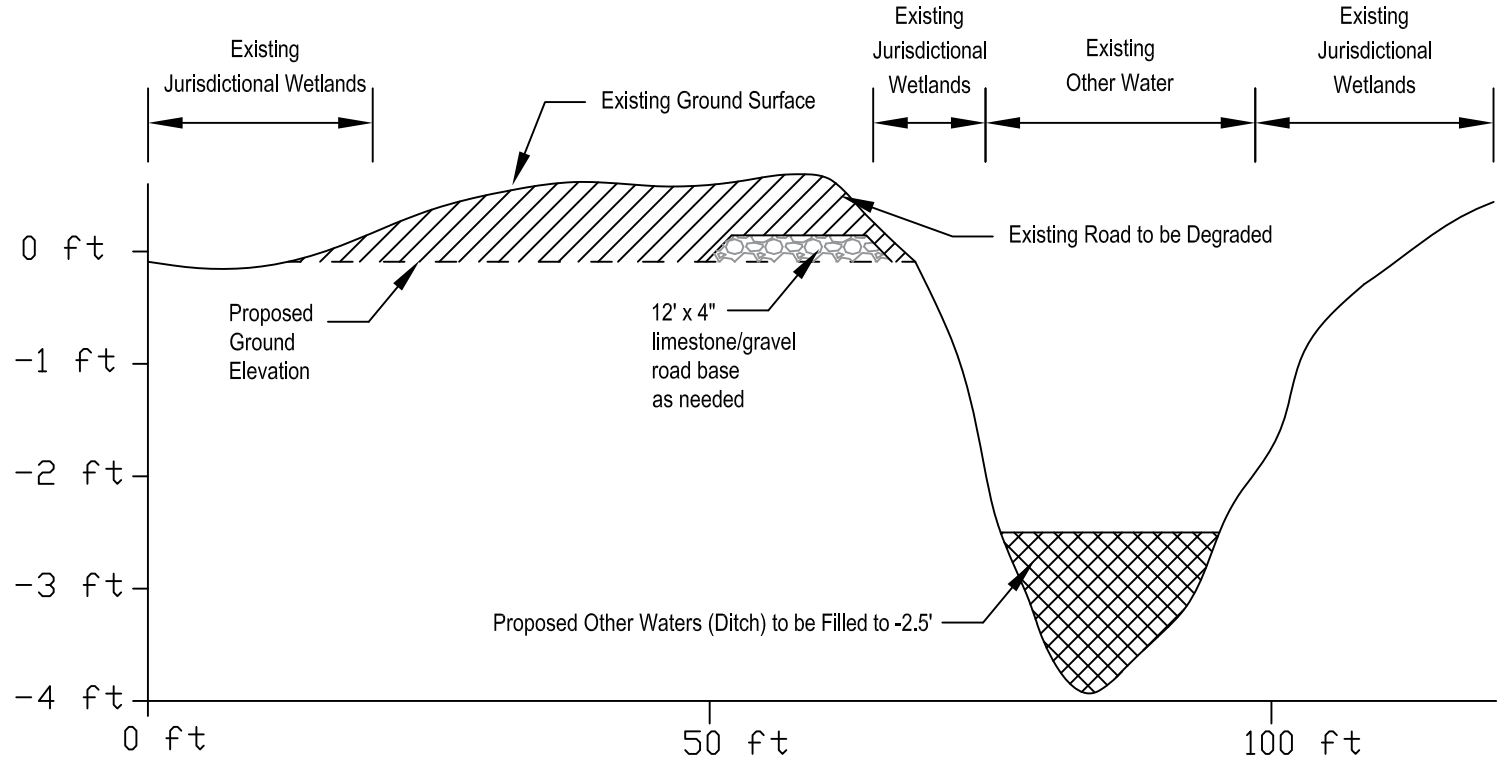
LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	12/18/2017
Map No.:	

FIGURE E-6



Section I-I': Existing Berm to be Cut
10:1 Vertical Exaggeration



Section J-J': Existing Road to be Degraded
10:1 Vertical Exaggeration

Fill

Excavation

Note: Excess fill generated from excavation will be deposited in a non-wetland location. (See Figure E-9)

NRP

N

Raceland 330, LLC

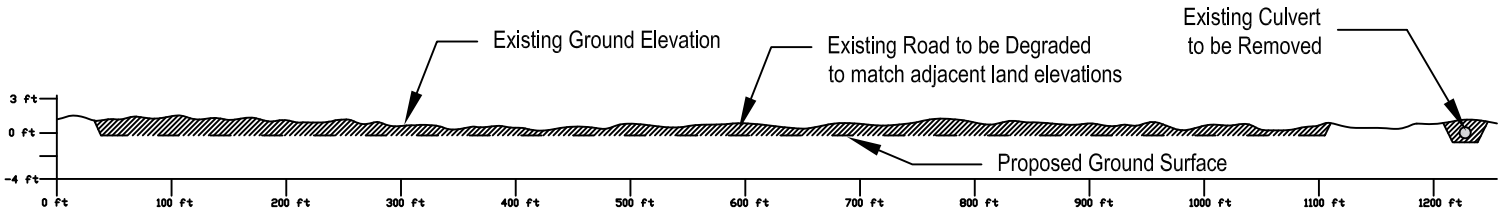
Thibodaux, LA

CROSS SECTIONS I & J

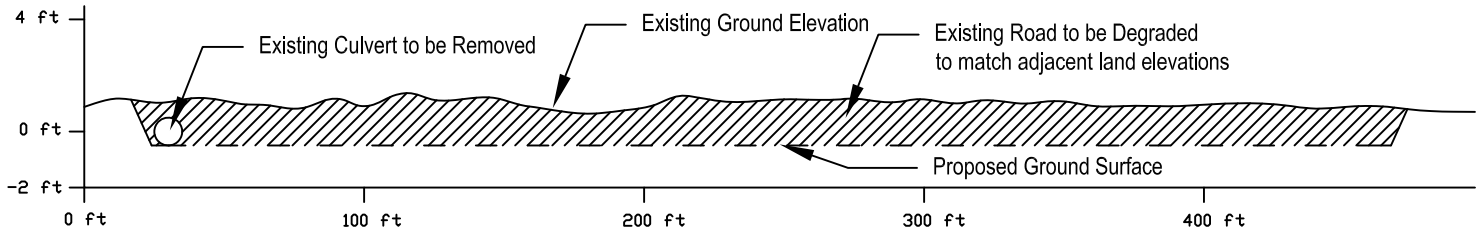
LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	12/18/2017
Map No.:	

FIGURE E-7



Section K-K': Existing Berm to be Cut / Road to be Degraded
10:1 Vertical Exaggeration



Section L-L': Existing Culvert to be Removed / Road to be Degraded
10:1 Vertical Exaggeration

Fill

Excavation

Note: Excess fill generated from excavation will be deposited in a non-wetland location. (See Figure E-9)

NRP

N

Raceland 330, LLC

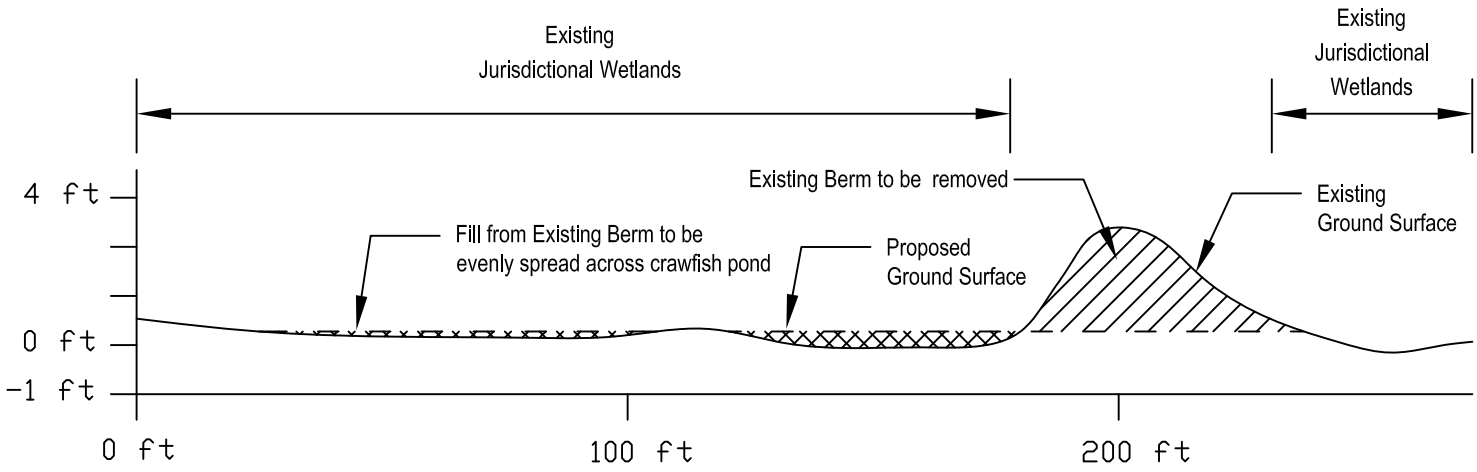
Thibodaux, LA

CROSS SECTIONS K & L

LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	12/18/2017
Map No.:	

FIGURE E-8



Section M-M': Existing Berm to be Removed / Fill Placed within Existing Crawfish Pond
10:1 Vertical Exaggeration

Fill

Excavation

Note: Excess fill generated from excavation will be deposited in a non-wetland location. (See Figure E-10)

N

Raceland 330, LLC

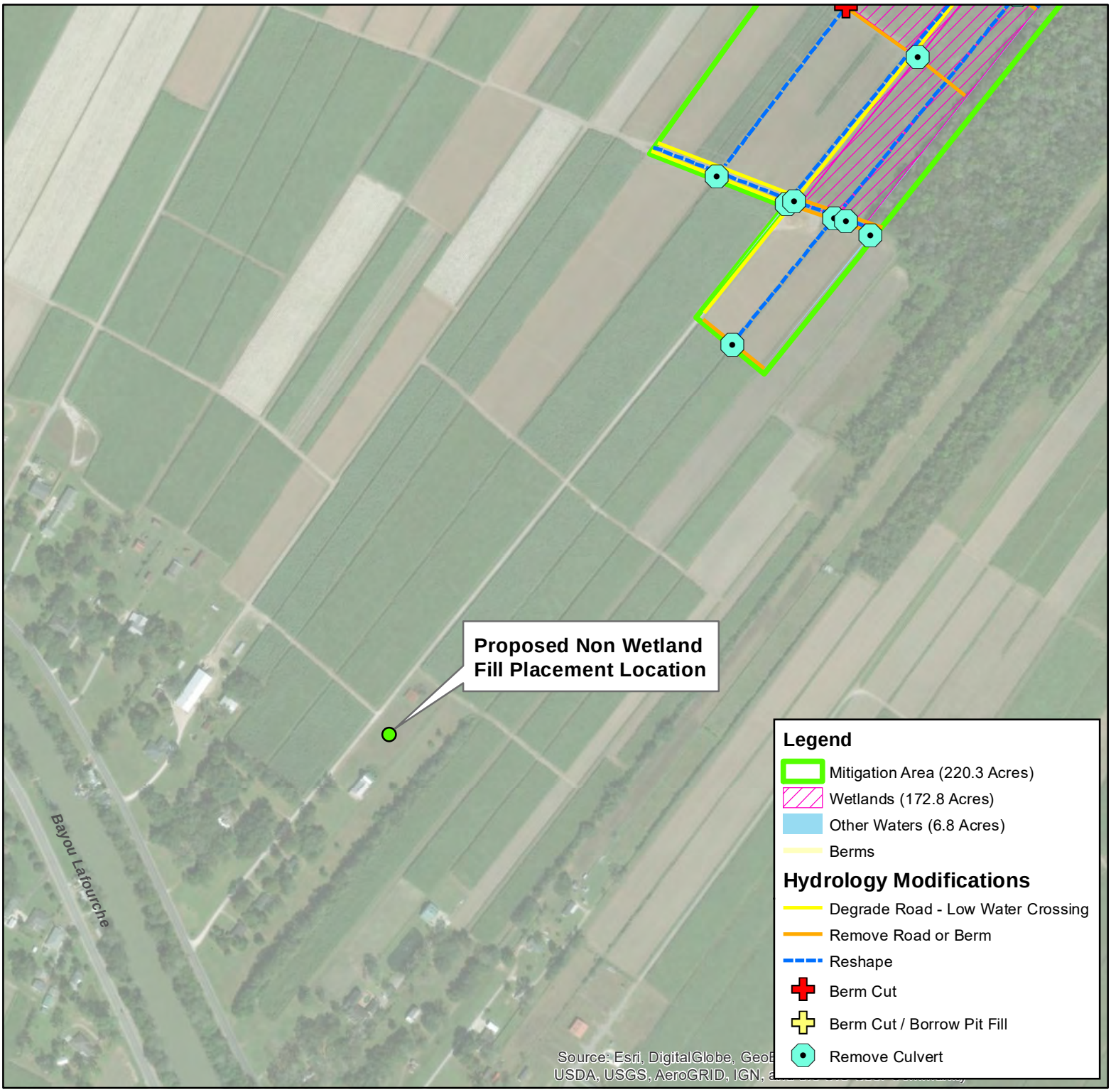
Thibodaux, LA

CROSS SECTIONS M

LAFOURCHE PARISH, LA

Created:	AGB
Approved:	GLF
Date:	12/18/2017
Map No.:	

FIGURE E-9



500 250 0 500 Feet

N

NRP

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

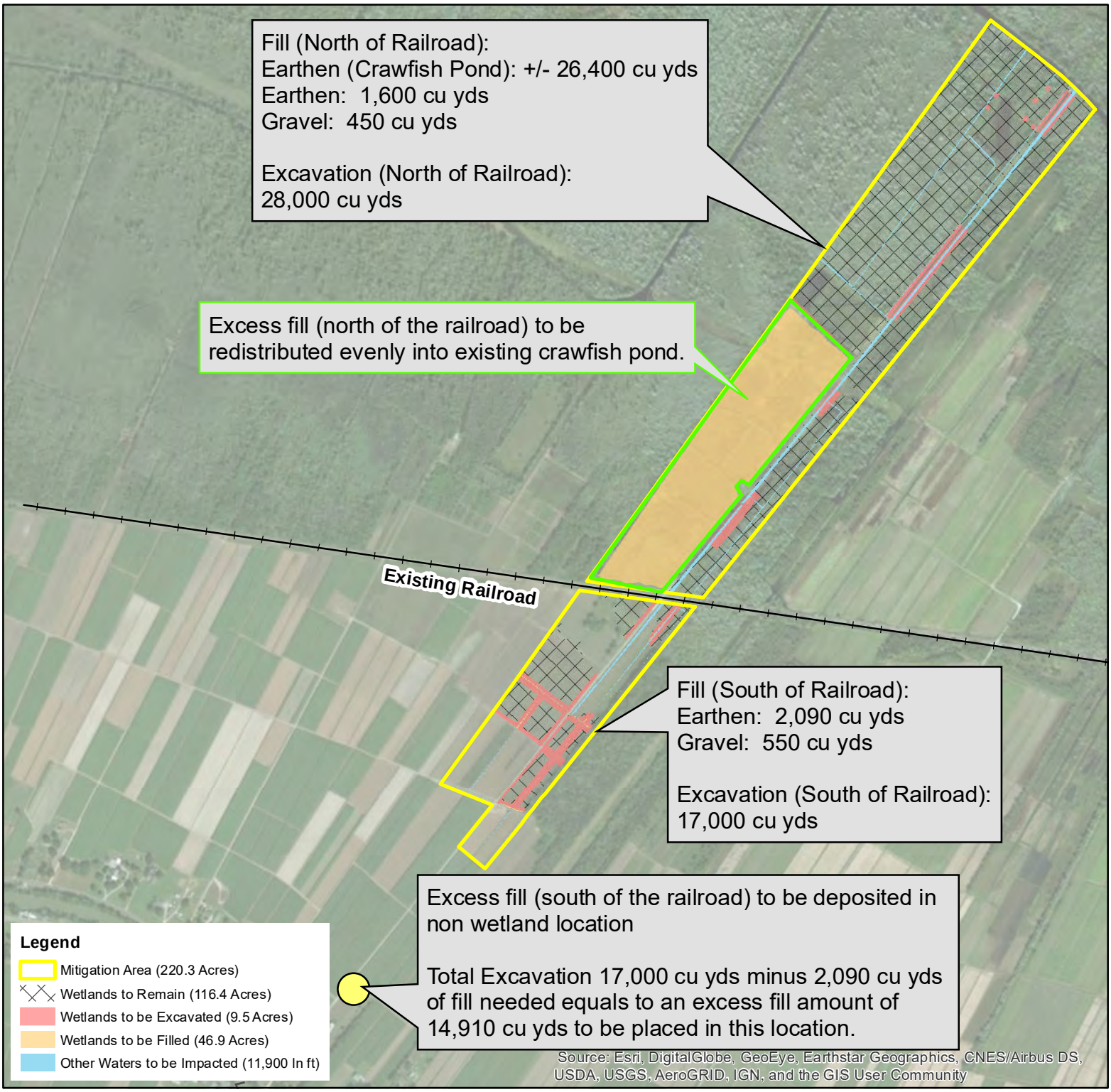
Thibodaux, LA

FILL PLACEMENT LOCATION MAP

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	
Date :	12/18/2017
Map No. :	

FIGURE E-10



1,300 650 0 1,300 Feet

N

NRP

Map Notes:
1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

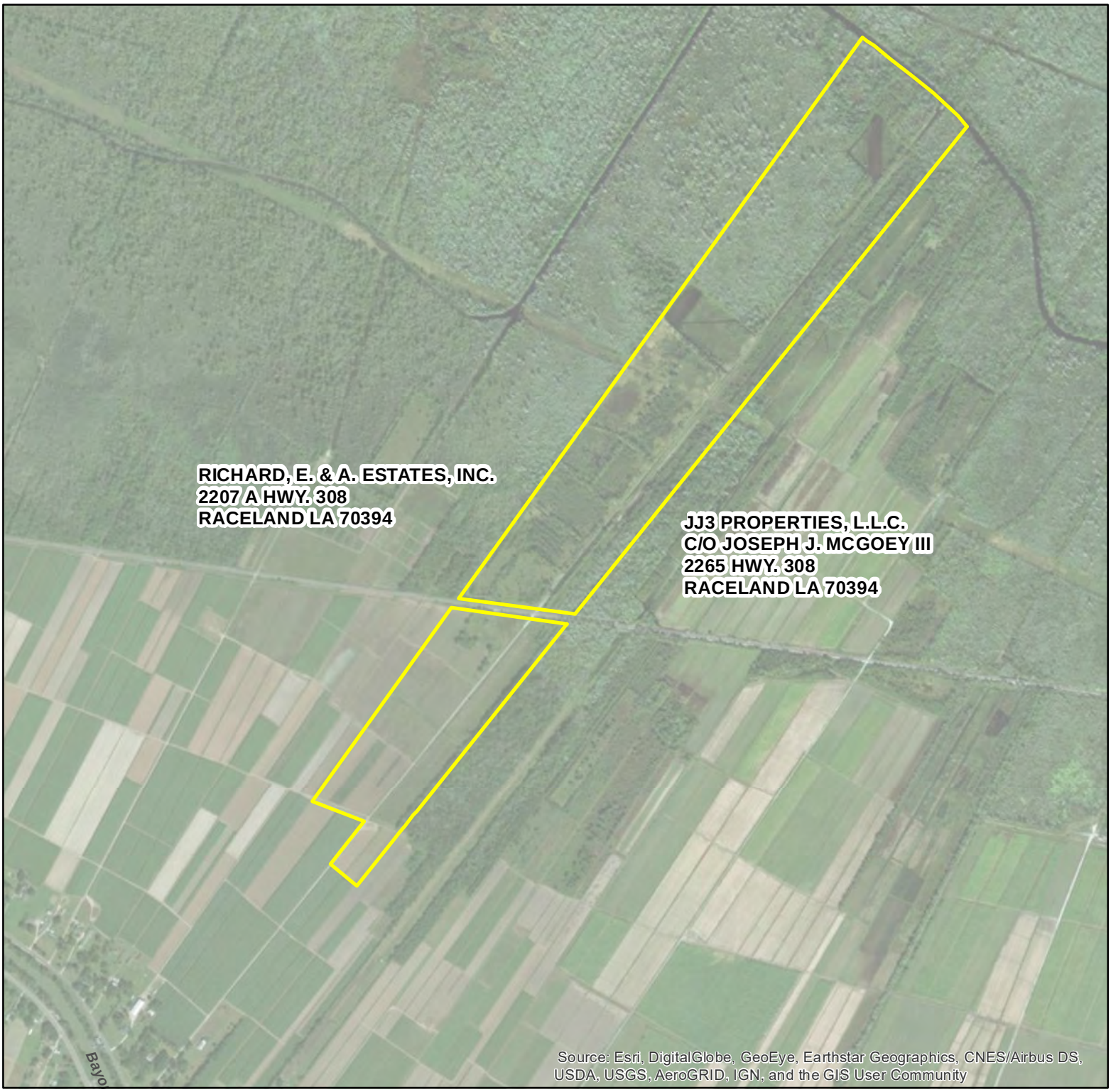
Raceland 330, LLC

Thibodaux, LA

EXCAVATION/FILL/ WETLAND IMPACT MAP LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	
Date :	12/18/2017
Map No. :	

FIGURE 11



Legend

Mitigation Area (220.3 Acres)

1,300 650 0 1,300 Feet

N

NRP

Map Notes:

1. The boundary shown is based on the boundary survey provided by the client.
2. Map projected to NAD83 UTM Zone 15.

Raceland 330, LLC

Thibodaux, LA

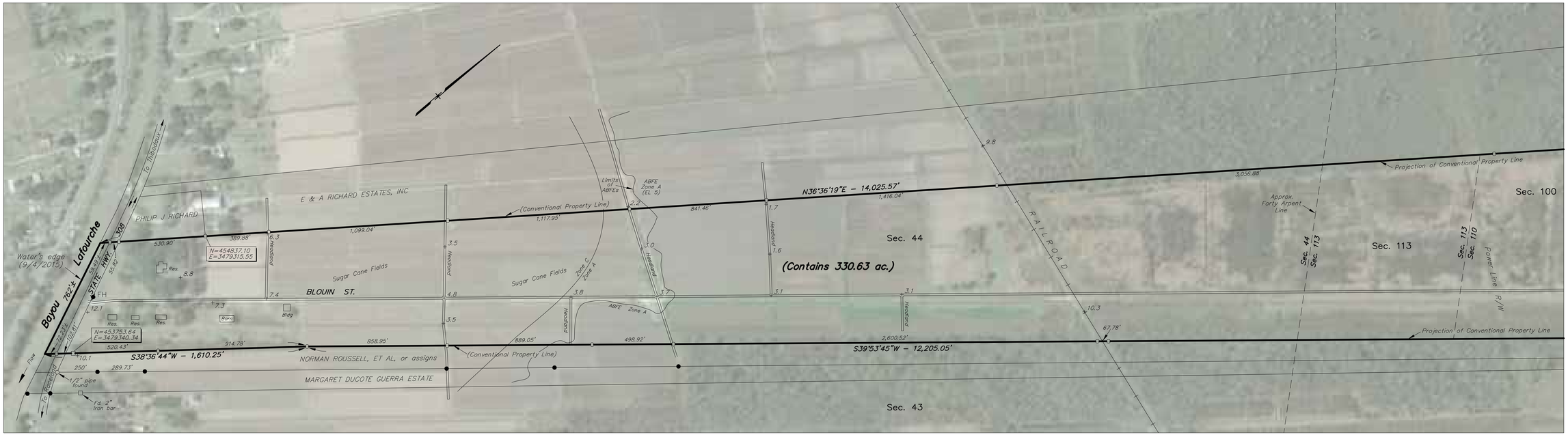
ADJACENT PROPERTY OWNERS

LAFOURCHE PARISH, LA

Created :	AGB/ArcView
Approved :	
Date :	01/03/2018
Map No. :	

FIGURE 12

Appendix G – Property Survey Map



Flood Zone Information:

This property is situated within Zones "C" & "A" (EL 6) as shown on the FEMA Flood Insurance Rate Map dated April 17, 1985. (Map No's. 225202 0165 C, 225202 0170 C & 225202 0280 C) The FEMA Advisory Base Flood Elevation (ABFE) maps LA-W103, LA-W104 & V103 dated 2/23/2106 shows a portion of this property within ABFE Zone A (EL 5) and a portion outside of the "Limit of ABFEs".

Reference Maps:

Government Land Office survey of T15S–R17E dated September 17, 1872.

Government Land Office survey of T15S–R18E dated April 24, 1848.

Survey by Charles L. McDonald, Land Surveyor, Inc. entitled "MAP SHOWING THE REDIVISION OF PROPERTY BELONGING TO ESTATES E. AND A. RICHARD, INC., LOCATED IN SECTION 44, T15S–R17E, LAFOURCHE PARISH, LOUISIANA" dated 11 July 2007.

Survey by David A. Waitz, Engineering and Surveying, Inc. entitled "SURVEY OF PROPERTY BELONGING TO MARGARET DUCOTE GUERRA, ET AL AND TO BE PURCHASED BY JOSEPH J. McGOEY, III AND JEANNE CUSIMANO McGOEY and recorded at entry #1186486.

MAP SHOWING SURVEY OF PROPERTY BELONGING TO THE BLOUIN FAMILY, et al LOCATED IN SECTIONS 44, 100 & 113, T15S–R17E & SECTION 110, T15S–R18E LAFOURCHE PARISH, LOUISIANA

SCALE: 1" = 300' 23 SEPTEMBER 2015

CHARLES L. McDONALD
LAND SURVEYOR, INC.
P O BOX 1390 ~ GRAY, LA 70359
TELE (985)876-4412

I CERTIFY THAT THIS SURVEY WAS DONE UNDER MY DIRECT SUPERVISION IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR PROPERTY BOUNDARY SURVEYS AND THAT THE ACCURACY STANDARDS ARE IN ACCORDANCE WITH CLASS "c" (SUBURBAN) SURVEYS AS INDICATED IN THE ABOVE STANDARDS.
APPROVED:

_____ REG. P.L.S. No. 4850

Notes:

Bearings shown hereon are based on GPS observations via GulfNet.

This map does not purport to show any servitudes, rights of way, pipelines, or improvements that may affect this property. Title information was provided by the owner. No additional title research was performed by the surveyor.

Boundary lines shown hereon were not monumented on the ground east of the line between Sec. 44 & Sec. 113.

Legend:

- ● Indicates 3/4" rod found
- ○ Indicates 1/2" pipe set
- □ Indicates Grate Bar

0 300 600 900 1200
Scale in Feet

DATE	REVISION	BY

The Blouin Family, et al

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DRAWN BY: GFB
CHECKED: C.L.M.
SCALE: 1" = 300'
DATE: 23 SEPT 15

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