



## Draft Permittee Responsible Mitigation Plan

### Project TIDE – SWG-2016-01025

Texas City, Galveston County, Texas

July 2017

#### PREPARED FOR:

**Oiltanking Texas Independent Deepwater Expansion, LLC**

Houston, Texas

SPIRIT PROJECT: 17305.00F

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# 1.0 Introduction

## 1.1 Proposed Impacts

Oiltanking Texas Independent Deepwater Expansion, LLC (“Oiltanking”) proposes to impact jurisdictional wetlands located in the West Galveston Bay watershed, Hydrology Unit Code (“HUC”) 12040204, in order to construct an industrial facility and marine terminal. The proposed impacts are located on a 209-acre tract of land located in Texas City, Galveston County, Texas. On behalf of Oiltanking, Spirit Environmental, (“Spirit”), completed a wetland delineation of the proposed impacts site in October 2016 and submitted a request for an approved jurisdictional determination (“AJD”) to the United States Army Corps of Engineers (“USACE”) on December 7, 2016. On April 7, 2017, Oiltanking received the USACE’s determination that 49.56 jurisdictional wetlands occur within the wetland delineation boundary. These wetlands include Section 404 palustrine emergent (“PEM”) wetlands, Section 404 palustrine scrub-shrub (“PSS”) wetlands, Section 404 estuarine emergent (“EEM”) wetlands, and Section 10 EEM wetlands. The table below summarizes the jurisdictional wetlands.

**Table 1-1 Summary of USACE-Determined Jurisdictional Wetlands at Proposed Impact Site**

<b>Resource Type</b>	<b>Size (acres)</b>
Section 404 PEM Wetlands	16.99
Section 404 PSS Wetlands	30.08
<b><i>Total Jurisdictional Palustrine Wetlands</i></b>	<b><i>47.07</i></b>
Section 404 EEM Wetlands	0.14
Section 10 EEM Wetlands	2.35
<b><i>Total Jurisdictional Estuarine Wetlands</i></b>	<b><i>2.49</i></b>
<b><i>Total Jurisdictional Wetlands</i></b>	<b><i>49.56</i></b>

The proposed impact site where the jurisdictional wetlands are located is a tract of land that operated as a wastewater treatment facility beginning in 1963, nine (9) years before the passage of the Clean Water Act (“CWA”). The facility was utilized as a “flow through/retention time” basin to contain dredge spoils generated from dredging of the adjacent industrial ship channel and turning basin. The proposed impact site operated as a wastewater treatment plant until 1983. As

a part of the construction of the wastewater treatment facility, a levee was constructed around the perimeter of the property. The PEM and PSS wetlands located within the wastewater treatment facility established over time within the man-made impoundment by natural recruitment of vegetation into low and normally wet areas that were suitable for the establishment of wetland conditions. The wetlands that established via anthropogenic means within the perimeter levees are not hydrologically connected to tidal waters outside of the levees. The EEM wetlands are located outside of the levee walls and are hydrologically connected to tidal waters.

The table below summarizes the proposed impacts to jurisdictional wetlands based on project plans. Only a small portion of the EEM wetlands are proposed to be impacted.

**Table 1-2 Summary of Proposed Wetland Impacts**

<b>Resource Type</b>	<b>Acres</b>
Section 404 PEM Wetlands	16.99
Section 404 PSS Wetlands	30.08
<b>Total Palustrine Impacts</b>	<b>47.07</b>
Section 404 EEM Wetlands	0.06
Section 10 EEM Wetlands	0.45
<b>Total Estuarine Impacts</b>	<b>0.51</b>
<b>Total Proposed Wetland Impacts</b>	<b>47.58</b>

## 1.2 Proposed Mitigation

Based upon a review of the United States Army Corps of Engineers' ("USACE") Regulatory In-Lieu Fee and Bank Information Tracking System ("RIBITS"), it was determined that the service area for one (1) mitigation bank with the appropriate types of wetland credits covers the proposed impact site (the secondary service area of the Gulf Coastal Plains Mitigation Bank ["GCPMB"]). GCPMB is far removed from the proposed impact location (i.e., approximately 38 miles to the northeast) and is located within a different 8-digit HUC watershed (East Galveston Bay, HUC 12040202) than the proposed impact location.

Per Title 33 of the Code of Federal Regulations, Part 332.3(a)(1), *"When evaluating compensatory mitigation options, the district engineer will consider what would be **environmentally preferable**."*

*In making this determination, the district engineer must assess the likelihood for ecological success and sustainability, the location of the compensation site relative to the impact site and their significance within the watershed, and the costs of the compensatory mitigation project.”*

With these factors taken into consideration, Oiltanking has identified an environmentally preferable mitigation alternative to purchasing PEM and PSS credits from GCPMB for offering compensatory mitigation. Oiltanking proposes to complete Permittee-Responsible Mitigation (“PRM”) for the proposed PEM and PSS wetland impacts within the same watershed (HUC 1204024) on land located approximately nine (9) miles to the west-southwest of the impact site in Hitchcock, Galveston County, Texas. Due to the small quantity of the impacts to EEM wetlands, Oiltanking has determined mitigation would be more successful and environmentally preferable to purchase credits from GCPMB for the proposed impacts to the Section 404 EEM and Section 10 EEM wetlands.

This PRM Plan details all actions proposed to compensate for the unavoidable impacts to wetlands and waters of the US resulting from construction activities in accordance with the 2008 Final Mitigation Rule (Title 33 Code of Federal Regulations [“CFR”] 332) (2008 Final Compensatory Mitigation Rule).

### **1.3 Ownership and Sponsorship**

Oiltanking will serve as the Property Owner and Sponsor. The Sponsor will oversee the establishment of the mitigation project and will serve as the long-term manager and steward. The anticipated long-term management will consist of activities such as monitoring, invasive species control, and boundary maintenance and protection. As a conservation area, the project site will be protected by a deed restriction (restrictive covenant) described in Section 4.0.

## 2.0 Goals and Objectives

The goal of this PRM Plan is to restore<sup>1</sup> (re-establish<sup>2</sup> and rehabilitate<sup>3</sup>) PSS and PEM wetlands associated with the unavoidable proposed impacts described in Section 1.0. The restoration of PSS and PEM wetlands will provide additional wetland functions<sup>4</sup> and values not currently realized under the existing conditions and land use of the proposed PRM site (e.g. flood storage and attenuation, migratory wildlife, habitat for threatened and endangered species or priority conservation species, pollutant removal, etc.).

Wetland restoration will improve localized and downstream water quality by retiring the land from existing and future agricultural uses (i.e. livestock grazing) and increase surface-water retention. In addition, habitat will improve for native and migratory wildlife through increased biodiversity in native herbaceous vegetation.

The goal of this project is to restore lost physical, chemical, and biological functions of PEM and PSS wetlands within the West Galveston Bay watershed that are proposed to be lost as a result of implementation of the proposed industrial development in Texas City. Historic livestock grazing on the proposed PRM site has altered the natural hydrology, degrading the historic ecological value and functions of the natural wetlands that preceded agricultural activities. Implementation of the PRM Plan will help restore the physical structure of the vegetation within the on-site wetland, decrease stormwater runoff velocity, and thereby increase water detention time, increase sediment accretion, and decrease nutrient loads. Re-established PEM and PSS communities will increase floral and faunal biodiversity, increase overall species richness, improve habitat connectivity, decrease fragmentation within the watershed, and restore nutrient cycles that have been disrupted by agricultural practices and urbanization in the surrounding areas. The expected

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<sup>1</sup> Restore is defined in 33 CFR § 332.2 as the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource areas, restoration is divided into two categories: re-establishment and rehabilitation.

<sup>2</sup> 33 CFR § 332.2 states that re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

<sup>3</sup> 33 CFR § 332.2 states that rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

<sup>4</sup> Wetland function is defined in 33 CFR § 332 as the physical, chemical, and biological processes that occur in ecosystems.

result of this project will be improved overall ecological functions within the West Galveston Bay watershed.

## 3.0 Site Selection

When evaluating properties that could be utilized for this PRM Plan, the applicant's preference was to identify agricultural land within the same watershed as the impact site that had historically functioned as coastal wetland prairie. Coastal wetland prairie is important habitat for migratory birds, reptiles, amphibians; however, historic land cover conversion throughout the region has led to fragmentation and the loss of large expanses of these ecosystems<sup>5</sup>.

The applicant chose a coastal agricultural field located in Hitchcock, Galveston County for the proposed PRM site. Currently, the proposed PRM site is used as livestock pasture within a landscape of other pasture. Based on a review of historic and current aerial imagery, the proposed PRM site and the surrounding landscape exhibit aerial signatures indicative of a coastal wetland prairie system from the earliest available image (1952) to the most recently available image (2014). In the 1952 aerial image, aerial signatures indicative of mima mounds and prairie potholes are visible throughout the proposed PRM site. Historic aerial photographs of the proposed PRM site can be found in Attachment 1 of this Plan.

In addition to this proposed PRM project, based on personal conversations with the landowner of property adjacent to the east of the proposed PRM site, additional wetland preservation and restoration activities are planned on approximately 2,500 acres of land adjacent to the proposed PRM site. By returning the agricultural pastureland on the proposed PRM site to its historic state, this PRM Plan provides an opportunity to significantly re-establish habitat connectivity and increase lost biodiversity within the West Galveston Bay watershed.

### 3.1 Mitigation Site Description

The proposed mitigation site is approximately 89.60 acres in size and located in the same HUC8 watershed and Level III Ecoregion (Western Gulf Coastal Plain<sup>6</sup>) as the proposed impacts site. Attachment 2 contains figures depicting the location, topography, National Wetland Inventory ("NWI") data, land use, NRCS soils data, elevation profile, and flood zones of the proposed PRM

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<sup>5</sup>Texas A&M Agrilife Extension. Texas Coastal Wetlands. Accessed June 29, 2017. <http://texaswetlands.org/wetland-types/prairie-pothole-and-marsh-wetlands/>

<sup>6</sup>U.S. Environmental Protection Agency, 2013, Level III ecoregions of the continental United States: Corvallis, Oregon, U.S. EPA - National Health and Environmental Effects Research Laboratory, map scale 1:7,500,000, [http://www.epa.gov/wed/pages/ecoregions/level\\_iii\\_iv.htm](http://www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm).

site. A wetland delineation of the proposed PRM site was conducted in June 2017 to evaluate the presence of existing wetlands onsite. The wetland delineation determined that 48.84 acres of PEM wetlands, as defined in the USACE 1987 Wetlands Delineation Manual, are located within the proposed PRM site. One (1) linear man-made drainage ditch 0.92 acres in size is located in the middle of the PRM site flowing to the east towards West Galveston Bay. A copy of the wetland delineation report is included as Attachment 3 of this PRM Plan. Photographs depicting the condition of the proposed PRM site are included in the wetland delineation report. Additional baseline information about the existing environmental conditions of the proposed mitigation site is included in Section 5.0.

## **3.2 Driving Directions to the Site**

From the USACE Galveston District office, take Broadway Avenue J to I-45 North and continue north for seven (7) miles. Take exit 7B towards Highway 6 North and turn left onto Highway 6 North. Continue for 6 miles and turn left onto FM 2004 South. Continue on FM 2004 South for 2 miles and turn left onto Avenue G. At the end of Avenue G, head south towards the end of the large parking lot. A gate to enter the PRM site will be located on the right at the end of the parking lot. The gate is locked with a combination lock; therefore, it will be necessary to obtain an escort from an Oiltanking representative in order to pass through the locked gate.

## 4.0 Site Protection Instrument

Oiltanking proposes to protect the PRM site with a deed restriction (restrictive covenant). A restrictive covenant is a condition in a deed limiting or prohibiting certain uses of real property. The restrictive covenant will be written and recorded in a chain of title to “run with the land”<sup>7</sup> and will be enforceable by and against later owners or occupiers of the land and the public. Additionally, provisions will be included in the deed restriction for periodic re-recording in order to ensure that the restrictions are not subject to sunset. Language and maps detailing the aquatic resources that are a protected interest on the property will be filed as documentation with the deed. As property owner, Oiltanking will be responsible for enforcing the restrictive covenant. Draft deed restriction language can be found in Attachment 4.

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<sup>7</sup> Wood, C. and Martin, S. 2016, Compensatory Mitigation Site Protection Instrument Handbook for the Corps Regulatory Program. USACE. Retrieved July 28, 2017 online at: [https://www.aswm.org/pdf\\_lib/site\\_protection\\_instrument\\_handbook\\_august\\_2016.pdf](https://www.aswm.org/pdf_lib/site_protection_instrument_handbook_august_2016.pdf)



## 5.0 Baseline Information

### 5.1 General Ecological Setting

The proposed PRM site is located in the United States (“U.S.”) Environmental Protection Agency (“EPA”) Level III Ecoregion Western Gulf Coastal Plains<sup>8</sup>, which occupies approximately 9.5 million acres along the coast of Texas. The Texas Parks and Wildlife (“TPWD”) identifies this region in Texas as the Gulf Prairies and Marshes. Coastal prairies are nearly level, slowly drained, less than 150 feet in elevation, and intersected by streams and rivers flowing into the Gulf of Mexico. The region includes barrier islands along the coast, salt grass marshes surrounding bays and estuaries, and remnant tallgrass prairies. Common plants include many species of *Carex spp.*, *Cyperus spp.*, *Eleocharis spp.*, *Juncus spp.*, *Scirpus spp.*, and *Spartina spp.* In areas of this region invaded by trees and brush, mesquite (*Prosopis spp.*), prickly pear (*Opuntia engelmannii*), oaks (*Quercus spp.*), and acacias (*Acacia spp.*) are commonly encountered<sup>9</sup>. Average rainfall varies from 30-50 inches per year and is fairly uniform in distribution throughout the year. The growing season is more than 300 days and soils are typically sands and sandy loams<sup>10</sup>.

It is estimated that as much as 99 percent of coastal prairies in Texas have been converted to agricultural land<sup>11,12</sup>. Although much of the native habitat of this area has been lost to agriculture and urbanization, the region still provides important habitat for migratory birds and other wildlife.

Figure 5 illustrates the United States Department of Agriculture (“USDA”) National Land Cover Dataset land use classifications of the proposed PRM site and surrounding areas. The majority of the proposed PRM site is identified as emergent herbaceous wetlands with patches of

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<sup>8</sup> U.S. EPA, 2013, Level III ecoregions of the continental United States: Corvallis, Oregon, U.S. EPA - National Health and Environmental Effects Research Laboratory, map scale 1:7,500,000, [http://www.epa.gov/wed/pages/ecoregions/level\\_iii\\_iv.htm](http://www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm).

<sup>9</sup> Native Prairies Association of Texas. 2012. Gulf Prairies and Marshes. Available online at [http://texasprairie.org/index.php/npat\\_prairies/region\\_info/gulf\\_prairies\\_and\\_marshes/](http://texasprairie.org/index.php/npat_prairies/region_info/gulf_prairies_and_marshes/). Accessed October 2016.

<sup>10</sup> TPWD. Texas Ecoregions. Available online at <https://tpwd.texas.gov/education/hunter-education/online-course/wildlife-conservation/texas-ecoregions>. Accessed October 2016.

<sup>11</sup> Gould, F.W. 1975. Texas Plants-A Checklist and Ecological Summary. Texas Agricultural Experiment Station, Publication 585.

<sup>12</sup> McMahan, C.A., R.G. Frye, and K.L. Brown. 1984. The Vegetation Types of Texas Including Cropland, an Illustrated Synopsis to Accompany the Map. Texas Park and Wildlife Department. Austin, Texas.

herbaceous upland and cultivated crops. The surrounding land is predominantly identified as emergent herbaceous wetlands, herbaceous upland, cultivated crops, and hay/pasture.

## 5.2 Site Specific Ecology

The habitat on the proposed 89.60-acre PRM site has been historically disturbed by agricultural activities, including livestock grazing. In a wetland delineation conducted in late May and early June of 2017, 48.84 acres of PEM wetlands and man-made drainage ditch 0.92 acres in size were identified onsite. The table below summarizes the aquatic features observed onsite. Refer to the wetland delineation report for a map depicting the aquatic resources. The wetland delineation report can be found in Attachment 3.

**Table 5-1 Summary of Aquatic Resources on Proposed PRM Site**

<b>Name</b>	<b>Aquatic Resource</b>	<b>Size (Acres)</b>
Wetland 1	PEM	19.71
Wetland 2	PEM	1.01
Wetland 3	PEM	9.00
Wetland 4	PEM	19.12
<b>PEM Subtotal</b>		<b>48.84</b>
Man-made Drainage Ditch	Ditch	0.92
<b>Ditch Total</b>		<b>0.92</b>
<b>Aquatic Resource Total</b>		<b>49.76</b>

The tables below summarize the dominant vegetation observed within the PEM wetlands and surrounding uplands.

**Table 5-2 Proposed PRM Site Dominant PEM Vegetation**

Strata	Species Name	Common Name	Indicator Status
Herbaceous	<i>Paspalum notatum</i>	Bahiagrass	FACU
Herbaceous	<i>Aristida purpurascens</i>	Arrowfeather Threawn	FACW
Herbaceous	<i>Paspalum floridanum</i>	Florida Beadgrass	FACW
Herbaceous	<i>Cyperus virens</i>	Green Flatsedge	FACW
Herbaceous	<i>Cyperus odoratus</i>	Fragrant Flatsedge	FACW
Herbaceous	<i>Rhynchospora colorata</i>	Starrush Whitetop	FACW
Herbaceous	<i>Eleocharis montevidensis</i>	Sand Spikerush	FACW
Herbaceous	<i>Persicaria pensylvanica</i>	Pennsylvania Smartweed	FACW
Herbaceous	<i>Rhynchospora caduca</i>	Anglestem Beaksedge	OBL
Herbaceous	<i>Schoenoplectus pungens</i>	Common Threesquare	OBL
Sapling/Shrub	<i>Triadica sebifera</i>	Chinese Tallow	FAC
Sapling/Shrub	<i>Sesbania punicea</i>	Rattlebox	FAC
Sapling/Shrub	<i>Iva frutescens</i>	Jesuit's Bark	FACW

**Table 5-3 Proposed PRM Site Dominant Upland Vegetation**

Strata	Species Name	Common Name	Indicator Status
Herbaceous	<i>Phyla nodiflora</i>	Frogfruit	FAC
Herbaceous	<i>Mimosa strigillosa</i>	Powderpuff	FAC
Herbaceous	<i>Muhlenbergia rigens</i>	Deergrass	FACU
Herbaceous	<i>Paspalum notatum</i>	Bahiagrass	FACU
Herbaceous	<i>Cynodon dactylon</i>	Bermudagrass	FACU
Herbaceous	<i>Schizachyrium scoparium</i>	Little Bluestem	FACU
Herbaceous	<i>Rhynchospora colorata</i>	Starrush Whitetop	FACW
Herbaceous	<i>Cyperus virens</i>	Green Flatsedge	FACW
Herbaceous	<i>Setaria leucopila</i>	Steambled Bristlegrass	UPL
Sapling/Shrub	<i>Triadica sebifera</i>	Chinese Tallow	FAC
Sapling/Shrub	<i>Ilex vomitoria</i>	Yaupon	FAC
Sapling/Shrub	<i>Sesbania drummondii</i>	Rattlebush	FACW
Sapling/Shrub	<i>Rosa bracteata</i>	Macartney Rose	UPL
Tree	<i>Triadica sebifera</i>	Chinese Tallow	FAC

### 5.2.1 Site Topography

According to a review of United States Geological Survey (“USGS”) topographic maps, the project site is flat and is situated 15 feet above sea level. Drainage flows gently to the southeast towards

West Galveston Bay. Refer to Attachment 2 Figure 3 for a topographic overview map of the project site. Attachment 2 Figure 6 depicts additional elevation data for the project site.

### **5.2.2 Site Hydrology**

The proposed mitigation site is located in the West Galveston Bay watershed (HUC8 12040204), which drains approximately 900 square miles of land. Based on site reconnaissance conducted during the wetland delineation of the proposed PRM site, observed hydrology within the on-site wetlands included surface water, a high water table, and soil saturation. On-site wetlands are subject to seasonal saturation and flooding for a duration that is suitable for the proliferation of these wetlands. Attachment 2 Figure 4 includes an illustration of National Wetland Inventory ("NWI") features located in and around the proposed PRM site. According to the Federal Emergency Management Agency ("FEMA"), the 100-year floodplain for West Galveston Bay extends approximately 1,200 feet into the proposed PRM site. Refer to Attachment 2 Figure 7 for an illustration of the location of the FEMA-designated 100-year flood zone.

### **5.2.3 Site Soils**

According to a review of the NRCS Web Soil Survey database, there are three (3) soil types on the proposed mitigation site. The table below summarizes these soil types.

**Table 5-4 NRCS Soils Data**

<b>Soil Unit</b>	<b>Soil Unit Name</b>	<b>Description</b>	<b>Hydric/ Non-hydric</b>
Ve	Verland silty clay loam	very deep, somewhat poorly drained, very slowly permeable, gray to light gray, silty clay loam or clay	Hydric
Md	Mocarey-Leton complex	very deep, moderately well drained, moderately slowly permeable, very dark gray to gray, loam	Hydric
Ls	Leton-Aris complex	very deep, poorly drained, very slowly permeable, gray to light gray, clay loam or loam	Hydric

All three (3) of the soil types identified by the NRCS are considered to be hydric soils. Of these soils, the Mocarey-Leton complex ("Md") unit comprises approximately 90 percent of the proposed PRM site. Based on site reconnaissance conducted during the wetland delineation of the proposed PRM site, soils exhibited characteristics similar to the Leton soil unit. According to the USDA Soil Survey of Galveston County, Texas<sup>13</sup>, the Leton soil unit occurs in landscapes with high water tables (0 to 1.5 feet deep). Site reconnaissance of the proposed PRM site revealed soil pits with water tables 8 inches to 14 inches from the surface. Pits that did not exhibit a high water table exhibited saturated soils. All hydric soils observed on site matched the Redox Dark Surface ("F6") and Depleted Matrix ("F3") hydric soil indicators. Due to the presence of a high water table onsite, the soils observed on the proposed PRM site would be ideal for restoring and sustaining wetland conditions and would help establish wetland habitat for a variety of mammals, birds, crustaceans, gastropods, and reptiles. A map depicting the soils data for the proposed PRM site can be found in Attachment 2 Figure 8.

<sup>13</sup> USDA. 1988. Soil Survey of Galveston County, Texas. Retrieved from the NRCS website: [https://www.nrcs.usda.gov/Internet/FSE\\_MANUSCRIPTS/texas/TX167/0/galveston.pdf](https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/texas/TX167/0/galveston.pdf)

### 5.3 Threatened and Endangered Species

Spirit biologists reviewed the TPWD Rare, Threatened, and Endangered Species of Texas by County database<sup>14</sup> and obtained an Information for Planning and Conservation (“iPAC”) report from the US Fish and Wildlife Service. Refer to Attachment 5 for a list of all the rare, threatened, and endangered species in Galveston County and Attachment 6 for a copy of the iPAC report. These data indicated that suitable habitat exists on-site for two (2) federally listed endangered species, two (2) state listed threatened species, and several species of greatest conservation need (“SGCN”) in Texas. The table below summarizes these species.

**Table 5-5 Summary of Listed Species with Compatible Habitat**

<b>Taxon</b>	<b>Species Name</b>	<b>Common Name</b>	<b>Federal</b>	<b>State</b>
Birds	<i>Grus americana</i>	Whooping Crane	LE	E
Birds	<i>Numenius borealis</i>	Eskimo Curlew	LE	E
Birds	<i>Plegadis chihi</i>	White-faced Ibis	NL	T
Birds	<i>Mycteria americana</i>	Wood Stork	NL	T
Amphibians	<i>Lithobates areolatus areolatus</i>	Southern Crawfish Frog	NL	SGCN
Birds	<i>Charadrius montanus</i>	Mountain Plover	NL	SGCN
Birds	<i>Anthus spragueii</i>	Sprague's Pipit	NL	SGCN
Mammals	<i>Spilogale putorius interrupta</i>	Plains spotted skunk	NL	SGCN
Plants	<i>Liatris bracteata</i>	Coastal gay-feather	NL	SGCN
Plants	<i>Rayjacksonia aurea</i>	Houston daisy	NL	SGCN
Plants	<i>Thurovia triflora</i>	Threeflower broomweed	NL	SGCN
Plants	<i>Bothriochloa exaristata</i>	Awnless bluestem	NL	SGCN

NL = Not Listed

LE = Listed Endangered

T = Threatened

E = Endangered

SGCN = Species of Greatest Conservation Need

In addition to the species listed above, 35 birds protected by the Migratory Bird Treaty Act (“MBTA”) have the potential to occur in the proposed PRM project site. The project presents an opportunity to provide refuge for federal and state listed terrestrial animal and plant life, especially migratory birds and waterfowl, in an area that has reduced habitat values due to livestock grazing.

<sup>14</sup> TPWD. Rare, Threatened, and Endangered Species of Texas by County. Retrieved June 30, 2017 online at: <http://tpwd.texas.gov/gis/rtest/>

By issuing a deed restriction on the 89.60-acre property and restoring 47.07 acres of herbaceous wetlands, the proposed mitigation work plan would positively benefit these species by increasing habitat availability and plant biodiversity.

## 5.4 Cultural Resources

A desktop review of the US Environmental Protection Agency's ("EPA") NEPAssist database<sup>15</sup> and the Texas Historic Sites atlas<sup>16</sup> indicated no known properties on the site that are listed on the National Register of Historic Places. Field reviews indicate no structures are present onsite. Additionally, the proposed work plan does not include any ground disturbing activities that would disturb any unknown cultural resources in the project area.

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<sup>15</sup> U.S. EPA. NEPAssist. Available online at: <https://nepassisttool.epa.gov/nepassist/nepamap.aspx>. Accessed June 28, 2017.

<sup>16</sup> Texas Historical Commission. Texas Historic Sites Atlas. Available online at: <https://atlas.thc.state.tx.us/Map>

## 6.0 Determination of Credits

This PRM Plan will mitigate for unavoidable impacts to aquatic resources by providing functions and services far superior to those provided by the impacted area. To ensure the function and value of impacted wetlands are adequately compensated for, the USACE Galveston District office currently utilizes four (4) interim hydrogeomorphic (“iHGM”) models for functional assessments of wetlands: forested riverine, herbaceous riverine, tidal fringe, and lacustrine. The impacts anticipated for the proposed project include both palustrine and estuarine wetland types.

### 6.1 Estuarine Wetlands

The tidal fringe iHGM was used to determine the ecological value of services lost for the 0.06 acres of Section 404 EEM wetland impacts and 0.45 acres of Section 10 EEM wetland impacts. The table below summarizes the amount of Functional Capacity Units (“FCU”) that are proposed to be removed from the ecosystem at the impact site as a result of implementation of the proposed project. Additional information regarding the tidal fringe iHGM results can be found in Attachment 7.

**Table 6-1 Summary of Tidal Fringe iHGM Results**

FCU Type	FCU Loss		
	Section 10 EEM WAA	Section 404 EEM WAA	Sum
Biota	0.39	0.04	0.43
Botanical	0.45	0.04	0.49
Physical	0.26	0.03	0.29
Chemical	0.45	0.05	0.50
<b>Total FCU Loss</b>	<b>1.55</b>	<b>0.17</b>	<b>1.71</b>

GCPMB is permitted to sell FCU's by the suite and to the nearest tenth of an FCU (i.e., four (4) FCUs in one suite). Additionally, because the impact site is located within the secondary service area of GCPMB, a 1.5 multiplier will be added. Therefore, the applicant will be required to purchase 0.5 FCU's each for biota, botanical, physical, and chemical FCU types to fully compensate for the proposed impacts. After assessing the 1.5 multiplier, the applicant will



purchase a total of 3.0 tidal fringe credits from GCPMB to compensate for the unavoidable loss of EEM wetlands.

## 6.2 Palustrine Wetlands

The PEM and PSS identified on the project site are extreme low-quality, man-made wetlands that have naturalized over time inside of the man-made wastewater treatment area that was created long before the passage of the Clean Water Act. There is currently no iHGM model provided by the USACE Galveston District to appropriately model the function and value of the 30.08 acres of PSS and 16.99 acres of PEM wetlands located within the proposed impact site. According to the USACE Galveston District office website, the herbaceous riverine iHGM model is *“limited to herbaceous wetlands that are located along floodplains and/or floodways located along a riverine system”* and also states that *“these wetlands share a surface hydrology connection with the waters of the riverine system for at least a portion of the season.”* Additionally, the tidal fringe iHGM is *“limited to the tidally influenced wetlands in the Galveston District”*.

The PEM and PSS wetlands on the impact site are not hydrologically connected to any tidal waters nor are they hydrologically connected to waters of a riverine system, as a result of the presence of the approximately 10-foot high levees that surround the historic wastewater treatment system. The historic wastewater treatment system was originally constructed in 1963. Due to the man-made nature of the wastewater treatment basins; berms, levees, and flow gates prevent any hydrological connection of the PEM and PSS wetlands with Galveston Bay. These wetlands are completely isolated from any hydrologic influence other than precipitation. Due to the low quality, man-made nature of the proposed PEM and PSS wetland impacts and the fact that there is no iHGM provided by the USACE Galveston District to appropriately represent the function and value of this wetland type, the client proposes to restore the proposed PSS and PEM wetland impacts at a 1:1 ratio through implementation of a PRM. The workplan for the proposed PRM to mitigate low-quality PEM/PSS impacts is detailed in subsequent sections.

## 7.0 Mitigation Work Plan

The applicant proposes to restore 47.07 acres of PEM wetlands on the 89.60-acre proposed PRM site. In addition to the restoration of the 47.07 acres of PEM restoration, 42.53 acres of uplands will be preserved. The preservation of upland habitats will benefit the overall mitigation plan by prohibiting future development and providing additional storm water filtration within the West Galveston Bay watershed.

Ecological site restoration will be accomplished through cessation of all agricultural practices (e.g. livestock grazing) on the proposed PRM site. The livestock would be removed from the site allowing the vegetation communities to return to natural conditions. Research has shown that livestock significantly modify many aspects of soil structure and function, including soil porosity, chemistry, microbiology, nutrient cycles, productivity, and erosion rates<sup>17</sup>. Many studies have shown that grazing increases soil compaction, erosion, and short-term nutrient availability and reduces long-term soil nutrient and organic matter levels. Removing livestock from the proposed mitigation site, would remove the source of soil disturbance and soil compaction, allowing for the restoration of a natural nutrient cycle. Although prairie ecosystems evolved under grazing disturbance regimes; permanent, non-migratory livestock have adverse impacts on plant structure and biodiversity<sup>18</sup>. According to the U.S. Fish & Wildlife Service (FWS), the physical structure of plant communities is often changed by grazing and selective grazing can reduce the competitive vigor of plants. Trampling can also injure plants and reduce their reproductive capacities. In addition to restoring the chemical and physical aspects of the wetlands on the proposed PRM site, removing the livestock would increase plant biodiversity. The applicant does not propose to complete any site preparation, dirt work, or planting as a part of this work plan. Due to an existing community of wetland plant species onsite (described in Section 5.2), the applicant proposes to achieve restoration of plant biodiversity through native recruitment. Refer to Attachment 2 Figure 9 for an illustration of the mitigation work plan.

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<sup>17</sup> CNPS. 1996. Impacts of Livestock Grazing on Soils and Recommendations for Management. Retrieved June 30, 2017 online at: <https://www.cnps.org/cnps/archive/letters/soils.pdf>

<sup>18</sup> USFWS. 2009. Ecological Forces of Grazing. Retrieved June 30, 2017 online at: <https://www.fws.gov/invasives/staffTrainingModule/methods/grazing/impacts.html>

## 8.0 Maintenance Plan

The applicant will be responsible for all maintenance and management activities. The applicant will consult a regional mitigation specialist and/or the USACE in the event adaptations or revisions to this PRM Plan are required. For the restoration of herbaceous wetlands, maintenance activities will be conducted annually for up to five (5) years.

Should it be determined that natural establishment of vegetative communities is unsuccessful in mitigation areas, site-replanting options will be evaluated. Invasive species identified in the Texas Invasives database<sup>19</sup> will be monitored and controlled during all phases of maintenance, and monitoring. Any Chinese Tallow trees found on the property will be sprayed with herbicide and/or mechanically cleared. The restored wetlands will be protected as needed by temporarily installed construction or wire fencing to prevent grazing of local fauna, if it is deemed necessary. No vehicular traffic will be allowed to transverse the restoration areas preventing soil compaction, plant mortality, and/or seed dispersal. Fencing will be installed around the perimeter to prohibit people and vehicles from entering the restored wetlands. The fencing type to be installed will be chosen so that it would also exclude domestic animals from entering the wetlands and disturbing vegetation and native wildlife. Installation of native vegetation by plantings and/or native seeding will occur if any significant event occurs that prevents coverage of vegetation from meeting the predetermined performance standards.

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<sup>19</sup> Texas A&M Agrilife Extension. Invasives Database. Available online at: [http://www.texasinvasives.org/invasives\\_database/](http://www.texasinvasives.org/invasives_database/). Accessed June 30, 2017.

## 9.0 Performance Standards

The proposed wetland restoration area will be considered successful if the following conditions are met:

- 90 percent areal coverage of native vegetation throughout the designated wetland restoration area
- Less than 5 percent relative cover of nuisance, invasive, noxious, and exotic species

If these requirements are not satisfied, adaptive management detailed in Section 12.0 will be required to achieve performance standards.

## 10.0 Monitoring Requirements

### 10.1 Monitoring Methods

Monitoring requirements for the compensatory mitigation area will adhere to the 2008 Final Compensatory Mitigation Rule and the USACE Regulatory Guidance Letter 08-03.

Monitoring will be conducted annually for up to five (5) years. Annual monitoring events past the five (5) year period will only be necessary if the mitigation site does not meet performance standards during that time. If additional monitoring is necessary, the mitigation area will be monitored for one (1) additional year to establish performance standards. This will be repeated on an annual basis until the wetland restoration area meets the required performance standards.

Performance standards of the compensatory mitigation area will be evaluated annually. The assessment of wetland vegetation establishment and invasive species control will be determined by a visual assessment of pre-established sample plots located in the restored wetlands. The location of each of these sample plots will be randomly determined, but will remain fixed for all subsequent monitoring events. This will allow for an accurate determination of the progress of the wetland as it matures, and will limit variation in assessment results due to site-specific differences.

### 10.2 Monitoring Reports

A mitigation monitoring report detailing the site conditions immediately after livestock removal will include a project description, project history, aerial photographs, and site photographs. The mitigation monitoring report will be submitted to the USACE within three (3) months after livestock removal and fencing is complete. Thereafter, the site will be monitored annually for up to five (5) years.

All subsequent annual monitoring reports will include descriptions of the entire proposed mitigation site. The annual monitoring reports will describe the results of the quantitative assessment of vegetative cover, provide photographic documentation of the mitigation site, discuss results in comparison to performance standards, and if needed, provide

recommendations for corrective actions that might be necessary to compensate for deficiencies. Annual monitoring reports will be submitted to the USACE by November 15<sup>th</sup> of each year.

### **10.3 Achievement of Performance standards**

Once the proposed mitigation sites have been determined to have met the minimum performance standards, the USACE will be notified in writing within 30 days of the last monitoring event that the mitigation plan has met minimum success. If the performance standards are not met, areas in need of rehabilitation will be improved via the methods outlined in Section 12.0 of this PRM Plan.

Should any condition be observed that is indicative of a problem at the proposed mitigation sites, the condition will be evaluated and a solution will be recommended in the annual monitoring reports. Solutions may include the installation of predator barriers, installation of additional vegetation, adjusting site elevations, or other solutions that are dependent on the site and situation. Should undesirable plant species threaten the proposed projects; these species will be removed manually or mechanically by industry-approved methods that will not harm wildlife or aquatic resources.

Should any corrective action be required during the monitoring and maintenance period, the applicant will implement the appropriate mitigation action in order to assure that project performance standards are achieved.

All monitoring reports will be submitted to:

United States Army Corps of Engineers  
Galveston District – Compliance Division  
2000 Fort Point Road  
Galveston, TX 77550

The applicant is the responsible party for conducting the monitoring. The applicant may choose to hire an environmental consultant to perform the monitoring, analyze the data collected, and prepare a monitoring report in accordance with this PRM Plan. The applicant is the responsible party for providing the monitoring reports to the USACE, at the address listed above, unless otherwise directed by the USACE.

## 11.0 Long Term Management Plan

After performance standards have been achieved and the mitigation areas have met all performance standards, long-term management is needed to ensure the sustainability of the resources. Oiltanking will be the responsible party for long-term management of the mitigation area and will provide the necessary funds for maintenance activities, such as controlling invasive species and providing security to the site. The Final Mitigation Monitoring Report for the proposed project will include a description of management needs and the funding mechanism that will be used to meet those needs. Additional details regarding the legal protection mechanisms that are proposed are located in Section 4.0 of this PRM Plan.

### 11.1 Force Majeure

Nothing herein shall be construed to authorize proceedings against the mitigation sponsor for any damages to the project site caused by acts of God such as earthquake, fire, flood, storm, war, civil disturbance, strike, or similar causes. In the event of a force majeure event, the mitigation sponsor will notify the USACE and work with the USACE to resolve the damages, if any, caused by the event. However, if the acts of God do not preclude the mitigation sponsor from resuming mitigation operations without unreasonable expense, then it shall not be relieved of its obligations under this document.

### 11.2 Water Rights

The mitigation activities associated with the restoration of functional wetlands will not require the use of public water or a Texas Commission on Environmental Quality ("TCEQ") Water Use Permit since the wetlands restored will not create a reservoir or off-channel reservoirs that artificially store, hold, retain, or divert water from state water sources (i.e., surface or subsurface). Furthermore, there will not be any construction features on the property that direct, divert, or cause the retention of flood waters (i.e. all berms, dikes, and ditches will be removed). Any water that may naturally flow onto or through the property will not be diverted or retained by any constructed surface features. As such, long-term hydrology maintenance will not depend on the utilization of water captured from irrigation wells or a Texas public water system; therefore, water rights will not be required.



## 11.3 Mineral Rights

Valuable mineral resources may exist under the land proposed for mitigation in this PRM Plan; however, the sponsor, Oiltanking, does not own any subsurface mineral rights for the property. Recognizing that surface landowners in the State of Texas cannot wholly control access to subsurface minerals, if a third party intends to explore for minerals within the proposed PRM project site, the third party will be requested to permit and compensate for any surface impacts to the PRM project and the relocation of the mitigation project under terms that will be outlined in the conservation easement.

## 11.4 Eminent Domain

In the event that all or part of this property is taken by exercise of the power of Eminent Domain or acquired by purchase in lieu of condemnation, whether by public, corporate, or other authority, so as to terminate the restrictive covenant in whole or in part, Oiltanking is entitled to the fair market value of the property to recover the full value of the interests taken in order to replace lost wetland mitigation credits with in-kind mitigation credits.

## 12.0 Adaptive Management Plan

Adaptive management is a strategy to address unforeseen changes in site conditions (e.g. drought, natural disasters) or other components of the compensatory mitigation project. If the compensatory mitigation project cannot be carried out in accordance with the approved PRM Plan, or if performance standards are not being met as anticipated, the permittee must notify the USACE with approval required for any significant modification of the PRM Plan. Performance standards may be revised in accordance with adaptive management to account for measures taken to address deficiencies in the mitigation project.

For the proposed mitigation areas, adaptive management may include the following measures:

- Plant additional wetland vegetation species in areas where new growth is inadequate
- Adjust site conditions to improve hydrologic conditions
- Improve or enhance erosion control measures
- Provide for additional access restrictions and revise monitoring schedule if human or domestic animal disturbance is impacting the site

The Final Mitigation Monitoring Report for the proposed project will include additional adaptive management details and guidelines for implementation.

Adaptive management is a key component of this PRM Plan that provides for ongoing evaluation and changes to the mitigation measures, as needed, to satisfy required compensation for impacts to waters of the US, including wetlands. The applicant will be responsible for implementing adaptive management to achieve mitigation success.

## 13.0 Financial Assurances

The overall success of compensatory mitigation, including creation, restoration, and enhancement of natural ecosystems is subject to many variables. Site-specific factors such as local droughts, catastrophic storm events, fires or floods, pest infestations, herbivory, disease, or illegal entrance by off-road vehicles may negatively affect a compensatory mitigation project before it has achieved the specified performance standards, and thus may require additional effort or remediation to ensure function success. The District Engineer determines if a project would require financial assurances on a case-by-case basis. Financial assurances may be necessary to ensure the initiation and successful completion of required compensatory mitigation, including but not limited to multiple-year plantings, invasive and/or nuisance species control, hydroperiod establishment, and any corrective actions following the initial mitigation work plan.

Should the District Engineer determine that financial assurances are required for this project, the permittee will create and implement a USACE-approved performance pond, letter of credit, escrow, or causality insurance for the period of restoration and monitoring activities. The amount of the financial assurances will be established based on the size and complexity of the proposed compensatory mitigation project, and monitoring of the compensatory mitigation site. The financial assurances will also include a reasonable amount to cover contingency costs to meet performance standards or other amounts determined to be appropriate to the level of the uncertainty for completion of a successful compensatory mitigation project.

## 14.0 References

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## 15.0 Attachments

1. Historic Aerial Photographs
2. Figures
3. Wetland Delineation Report
4. Draft Deed Restriction Language
5. Listed T&E Species - Galveston County
6. iPAC Report
7. Tidal Fringe iHGM Results

# Attachment 1 - Historic Aerial Photographs

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## ***Historical Aerial Photographs (Texas)***

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*Target Property:*

***Hitchcock PRM Site***

***Hitchcock, Galveston, Texas 77563***

*Prepared For:*

***Spirit Environmental-Houston***

***Order #: 89792***

***Job #: 194857***

***Project #: 17305.00F***

***Date: 6/30/2017***



## Target Property Summary

**Hitchcock PRM Site**

**Hitchcock, Galveston, Texas 77563**

USGS Quadrangle: **HITCHCOCK**

Target Property Geometry: **Area**

Target Property Longitude(s)/Latitude(s):

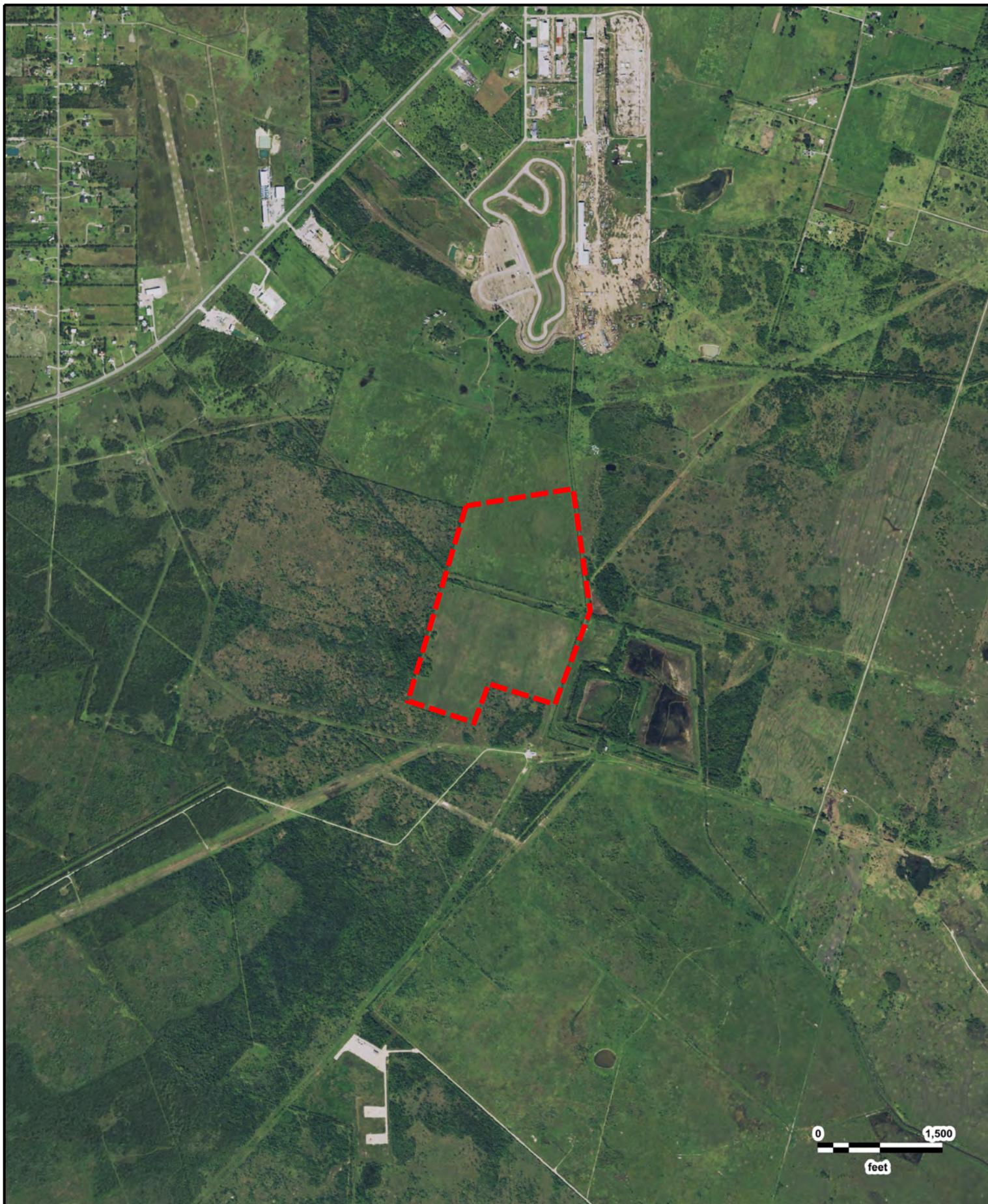
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(-95.047659874, 29.310725585), (-95.045170784, 29.310052000), (-95.043840408, 29.313120515),  
(-95.044484138, 29.317124413)**

## ***Aerial Research Summary***

<u>Date</u>	<u>Source</u>	<u>Scale</u>	<u>Frame</u>
2014	USDA	1" = 1500'	N/A
2004	USDA	1" = 1500'	N/A
1996	USGS	1" = 1500'	N/A
03/20/1990	TXDOT	1" = 1500'	218
10/08/1987	TXDOT	1" = 1500'	83
03/28/1978	TXDOT	1" = 1200'	125
05/10/1969	USGS	1" = 1500'	2-70
05/05/1958	ASCS	1" = 1500'	PI-1
04/26/1952	ASCS	1" = 700'	PI-3

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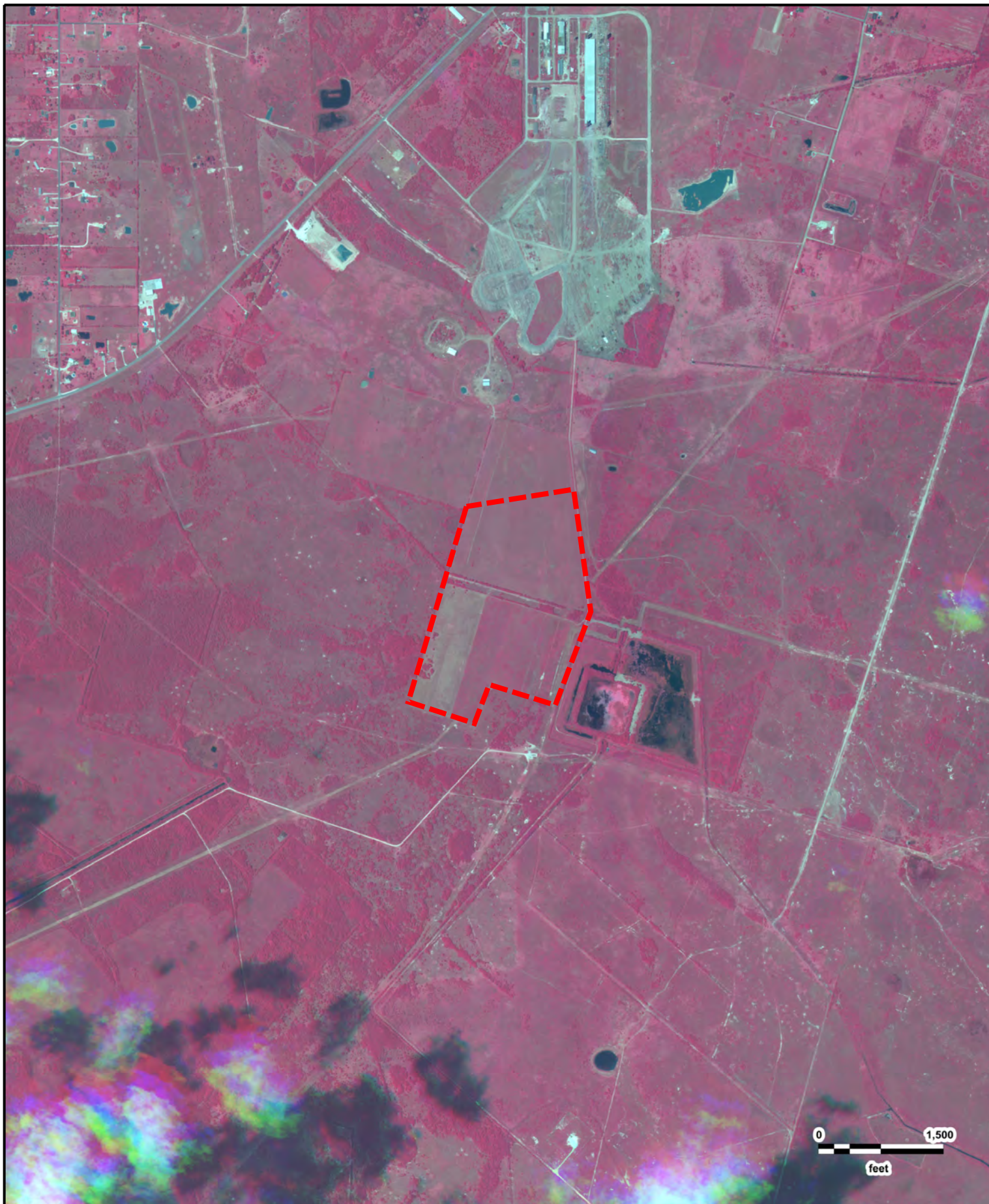




Hitchcock PRM Site  
USDA  
2014

GeoSearch

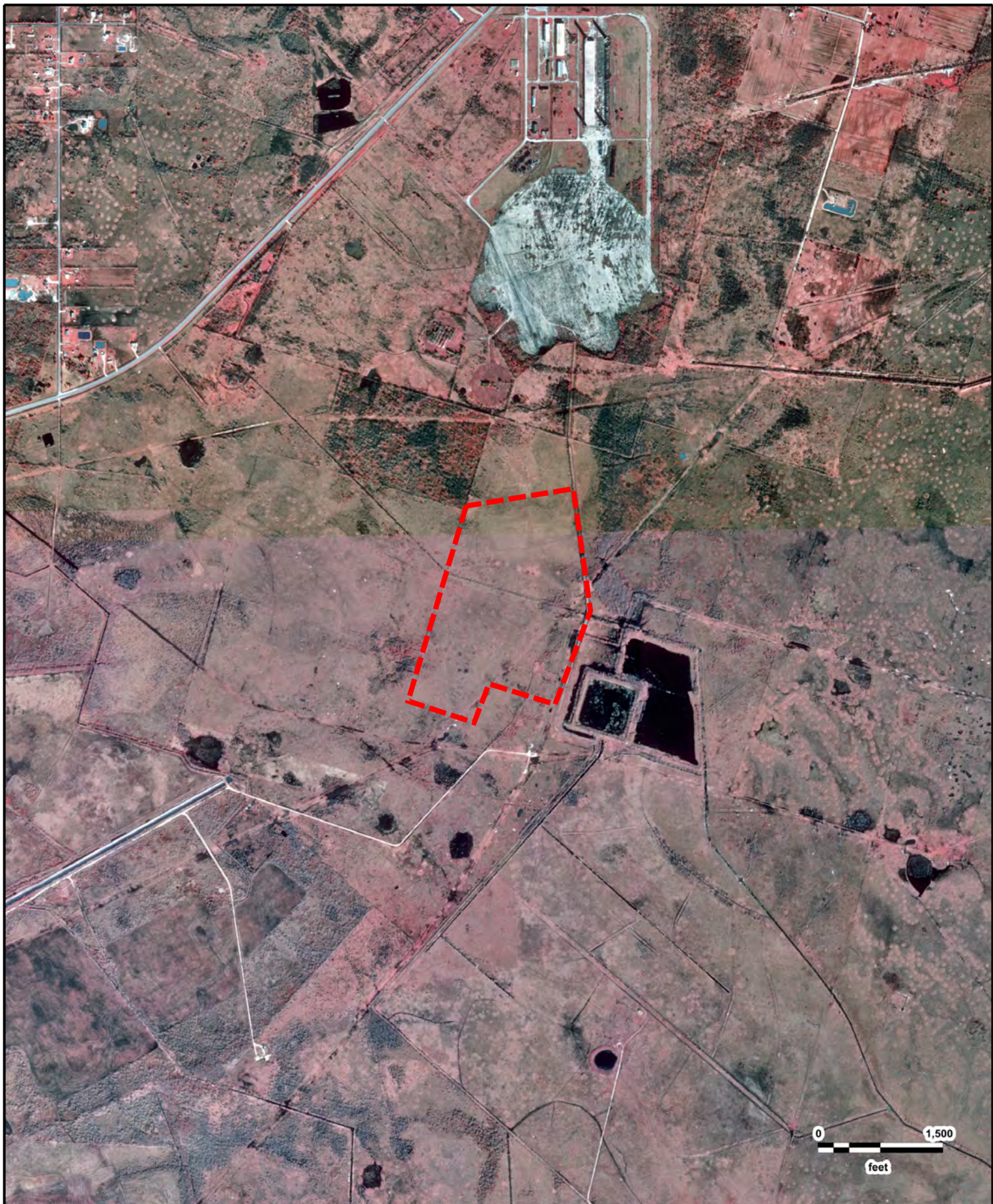




Hitchcock PRM Site  
USDA  
2004

GeoSearch





Hitchcock PRM Site  
USGS  
1996

GeoSearch

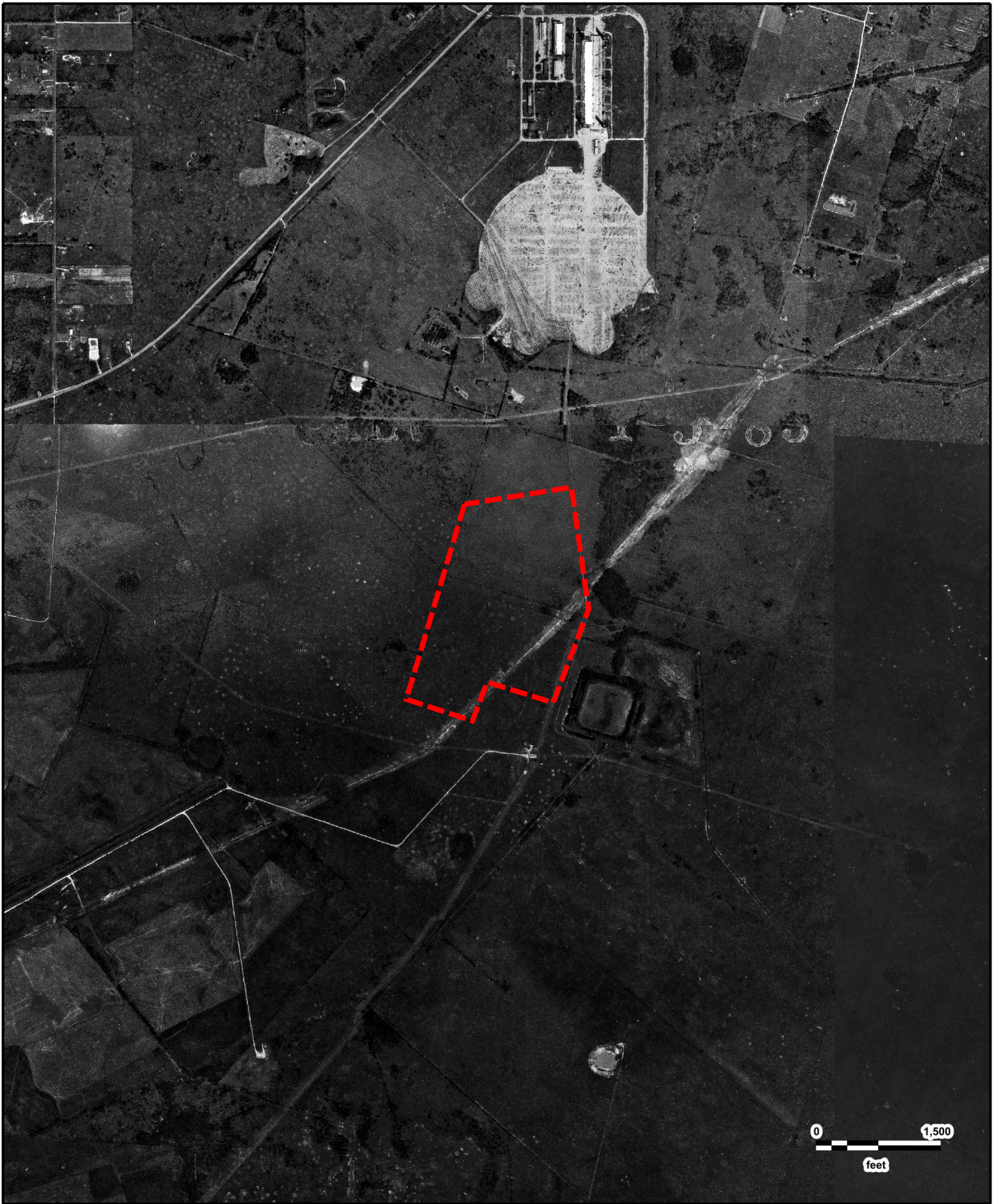




Hitchcock PRM Site  
TXDOT  
03/20/1990

GeoSearch





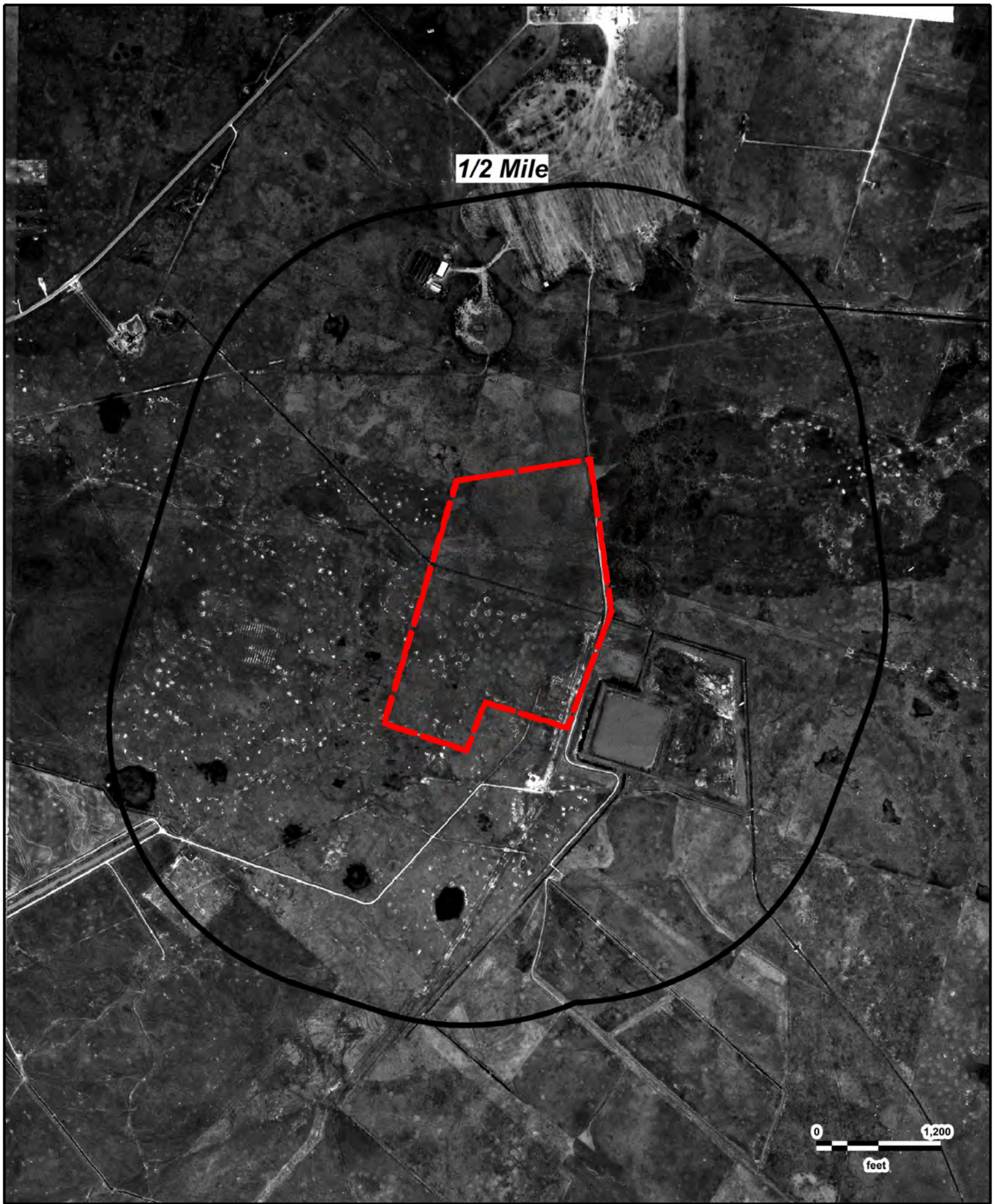
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feet



Hitchcock PRM Site  
TXDOT  
10/08/1987

GeoSearch





1/2 Mile

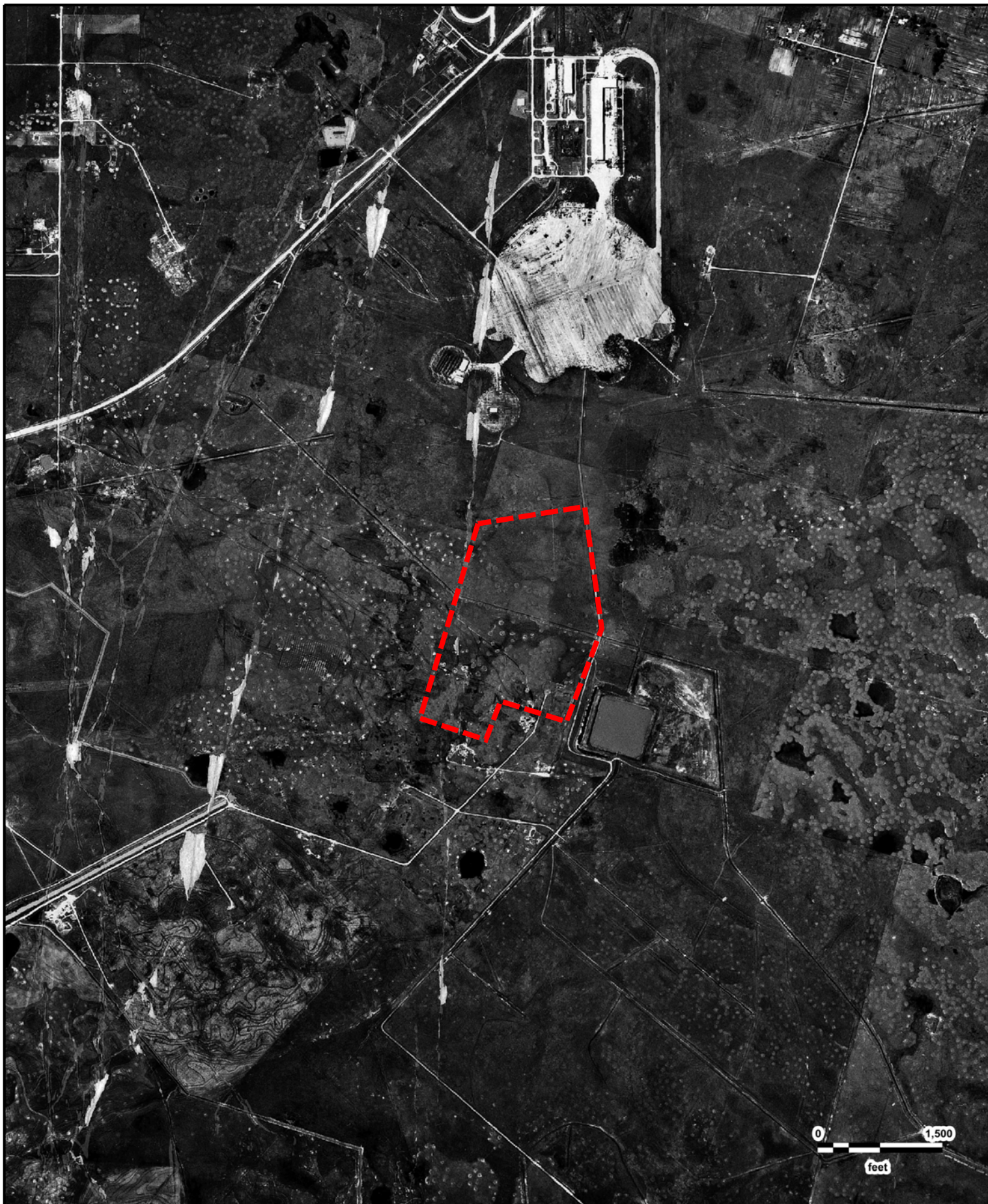
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feet



Hitchcock PRM Site  
TXDOT  
03/28/1978

GeoSearch

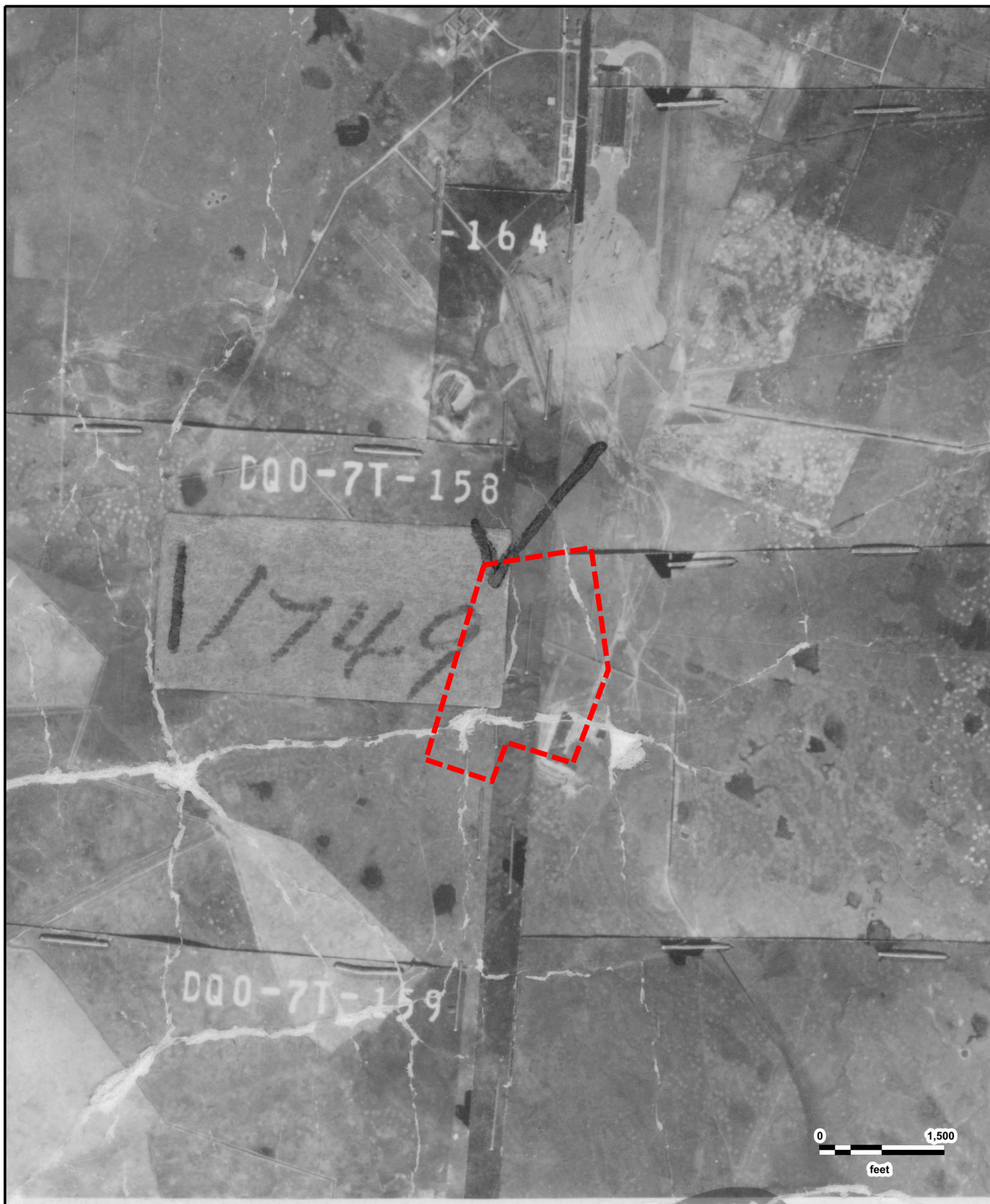




Hitchcock PRM Site  
USGS  
05/10/1969

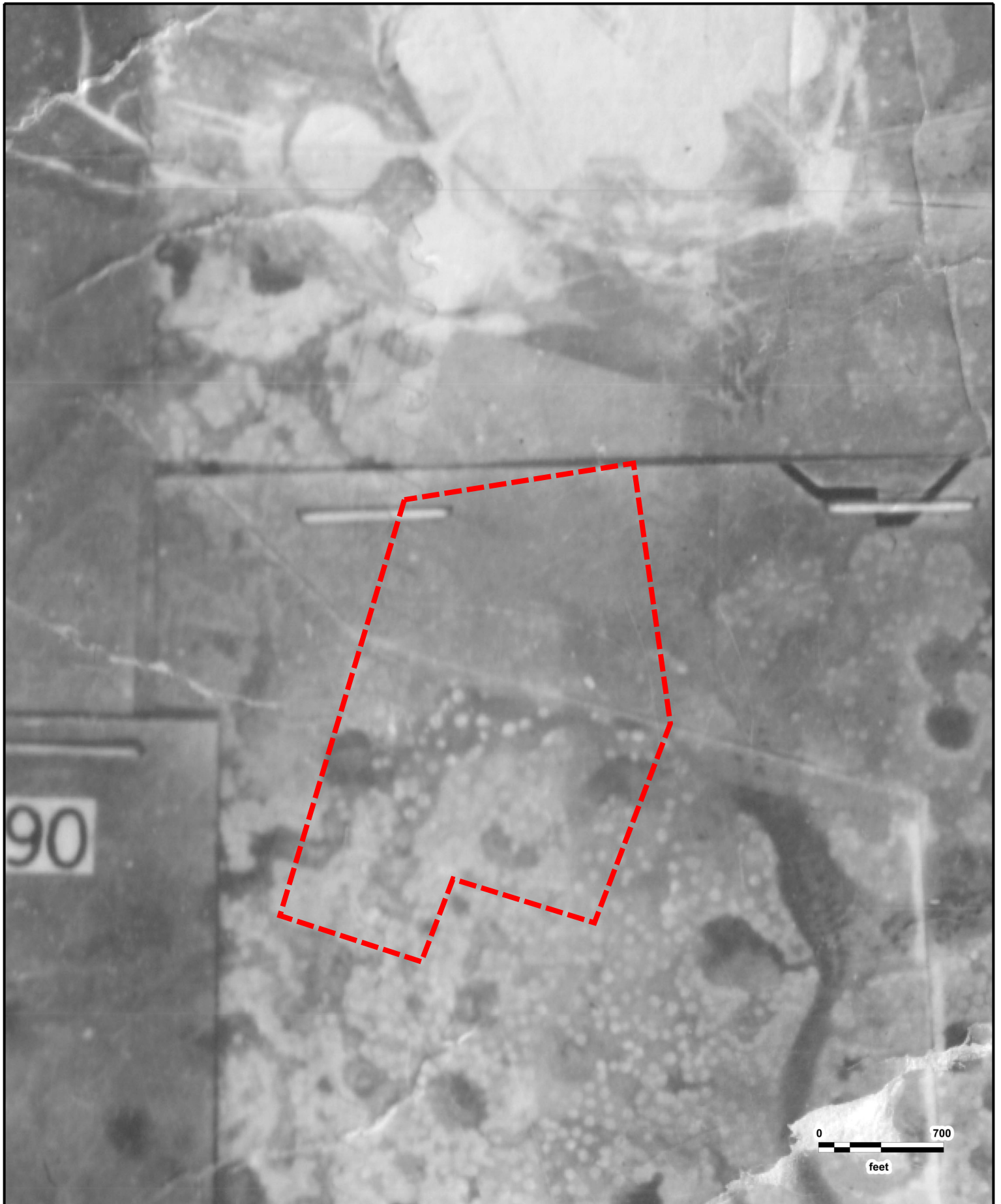
GeoSearch





Hitchcock PRM Site  
ASCS  
05/05/1958

GeoSearch



*Hitchcock PRM Site*  
**ASCS**  
**04/26/1952**

**GeoSearch**

## **Attachment 2 - Figures**

### **Figure 1 – Vicinity Map**

### **Figure 2 – Aerial Overview Map**

### **Figure 3 – Topographic Overview Map**

### **Figure 4 – NWI Features Map**

### **Figure 5 – Land Use Map**

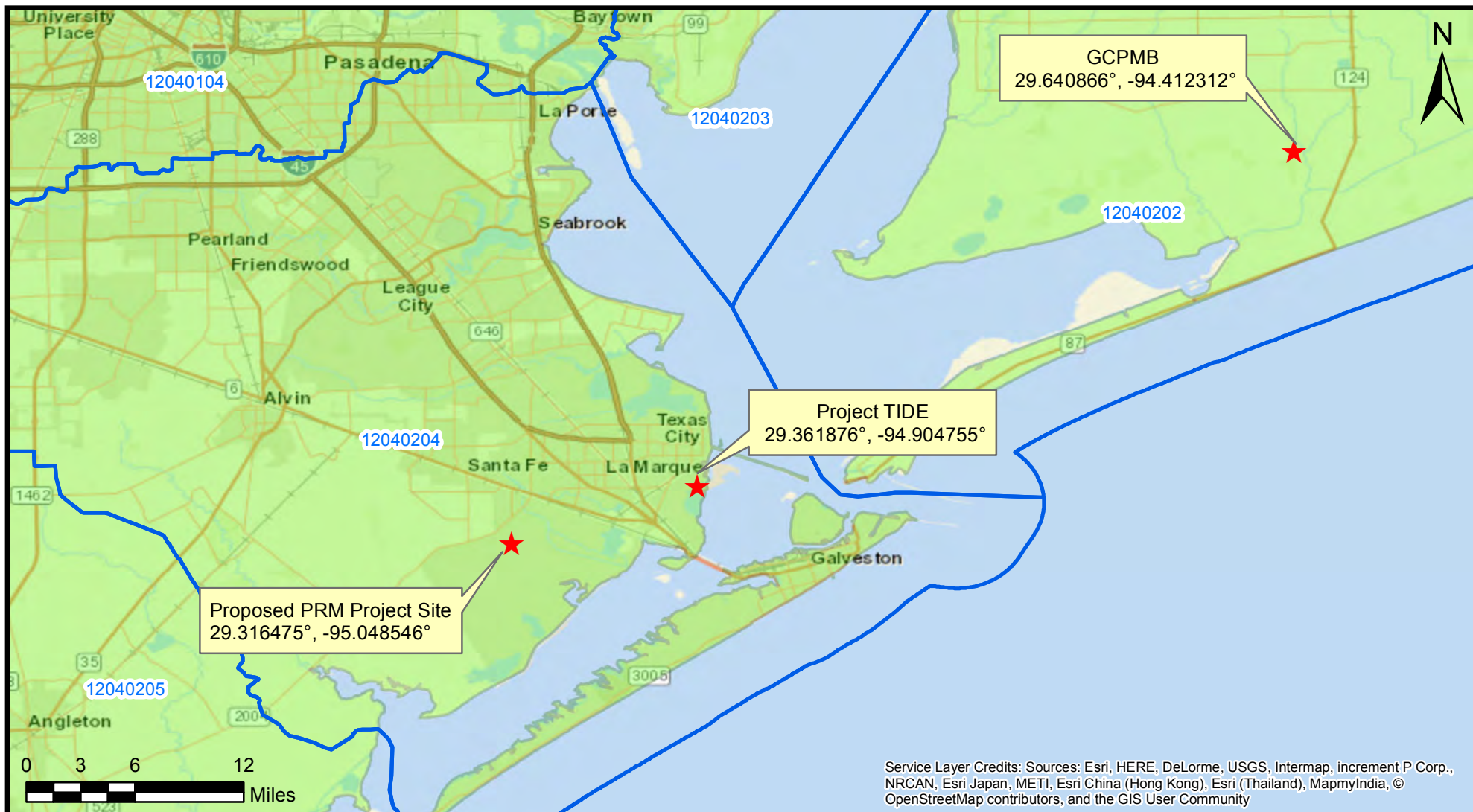
### **Figure 6 – Elevation Map**

### **Figure 7 – Flood Zone Map**

### **Figure 8 – NRCS Soils Map**

### **Figure 9 – Mitigation Plan**





Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

## Legend

- ★ Project Areas
- USGS 8-digit HUC
- Western Gulf Coastal Plain

**PRM PLAN  
PROJECT TIDE  
VICINITY MAP**  
**Oiltanking Texas Independent  
Deepwater Expansion, LLC  
GALVESTON COUNTY, TEXAS**



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 1

Date: 6/30/2017

Project No.: 17305.00F

Drawn By: EVDonato

Revision No.: 1

*Note: This is not a property  
boundary survey.*



**PRM PLAN  
PROJECT TIDE  
AERIAL OVERVIEW MAP**  
Oiltanking Texas Independent  
Deepwater Expansion, LLC  
GALVESTON COUNTY, TEXAS



20465 State Highway 249, Suite 300  
Houston, TX 77070

Drawing No.: 2

Date: 6/30/2017

Project No.: 17305.00F

Drawn By: EVDonato

Revision No.: 1

*Note: This is not a  
Property Boundary Survey*





Galveston County, TX

**PRM PLAN  
PROJECT TIDE TOPOGRAPHIC  
OVERVIEW MAP Oiltanking  
Texas Independent Deepwater  
Expansion, LLC GALVESTON  
COUNTY, TEXAS**



20465 State Highway 249, Suite 300  
Houston, TX 77070

Drawing No.: 3

Date: 6/30/2017

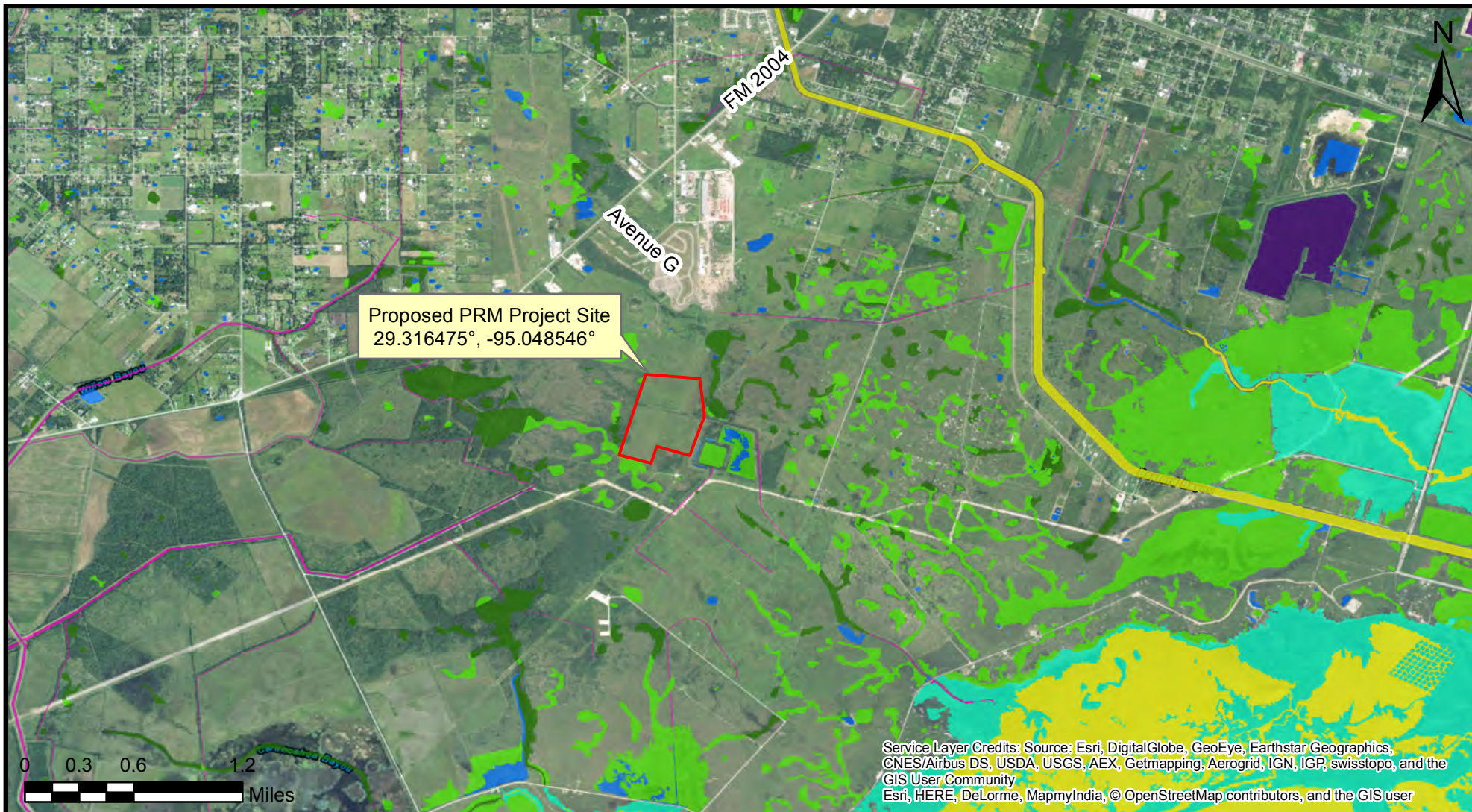
Project No.: 17305.00F

Drawn By: EVDonato

Revision No.: 1

*Note: This is not a  
Property Boundary Survey*





## Legend

- |   |  |
|---|--|
| <span style="border: 2px solid red; display: inline-block; width: 20px; height: 10px; vertical-align: middle;"></span> Proposed PRM Project Site          | <span style="display: inline-block; width: 20px; height: 10px; background-color: darkgreen; vertical-align: middle;"></span> Freshwater Forested/Shrub Wetland |
| <b>NWI Features</b>   | <span style="display: inline-block; width: 20px; height: 10px; background-color: blue; vertical-align: middle;"></span> Freshwater Pond                        |
| <span style="display: inline-block; width: 20px; height: 10px; background-color: yellow; vertical-align: middle;"></span> Estuarine and Marine Deepwater  | <span style="display: inline-block; width: 20px; height: 10px; background-color: purple; vertical-align: middle;"></span> Lake                                 |
| <span style="display: inline-block; width: 20px; height: 10px; background-color: cyan; vertical-align: middle;"></span> Estuarine and Marine Wetland      | <span style="display: inline-block; width: 20px; height: 10px; background-color: magenta; vertical-align: middle;"></span> Riverine                            |
| <span style="display: inline-block; width: 20px; height: 10px; background-color: lightgreen; vertical-align: middle;"></span> Freshwater Emergent Wetland |  |

**PRM PLAN  
PROJECT TIDE  
NWI FEATURES MAP Oiltanking  
Texas Independent Deepwater  
Expansion, LLC GALVESTON  
COUNTY, TEXAS**



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 4

Date: 8/3/2017

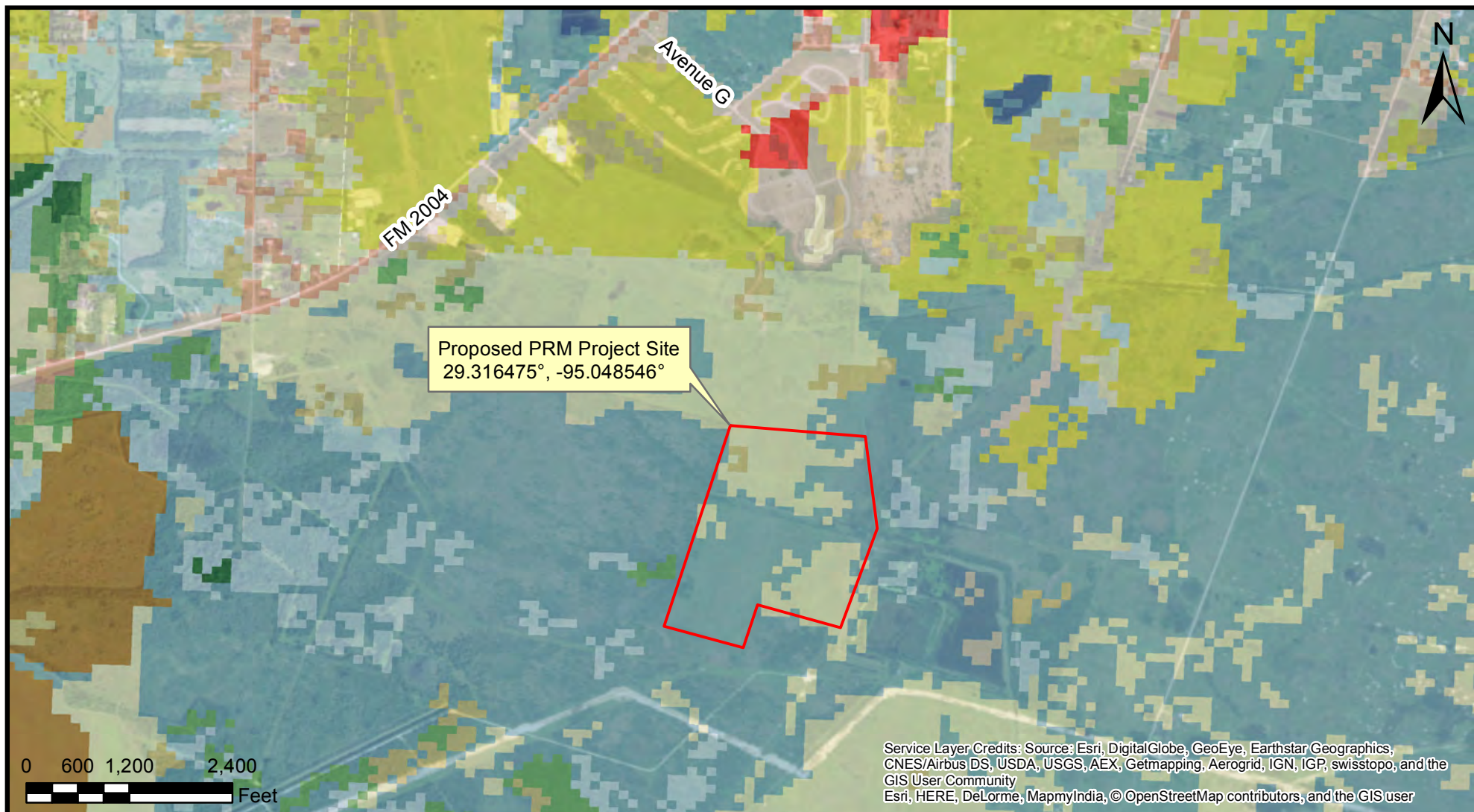
Project No.: 17305.00F

Drawn By: EVDonato

Revision No.: 1

*Note: This is not a property  
boundary survey.*





## Legend

<span style="border: 2px solid red; display: inline-block; width: 20px; height: 10px;"></span> Proposed PRM Project Site	<span style="display: inline-block; width: 20px; height: 10px; background-color: red;"></span> Developed, Medium Intensity	<span style="display: inline-block; width: 20px; height: 10px; background-color: #d2b48c;"></span> Shrub/Scrub
<b>Land Use</b>	<span style="display: inline-block; width: 20px; height: 10px; background-color: #c00000;"></span> Developed, High Intensity	<span style="display: inline-block; width: 20px; height: 10px; background-color: #f5f5dc;"></span> Herbaceous
<span style="display: inline-block; width: 20px; height: 10px; background-color: #808080;"></span> Unclassified	<span style="display: inline-block; width: 20px; height: 10px; background-color: #d3d3d3;"></span> Barren Land	<span style="display: inline-block; width: 20px; height: 10px; background-color: #fffacd;"></span> Hay/Pasture
<span style="display: inline-block; width: 20px; height: 10px; background-color: #add8e6;"></span> Open Water	<span style="display: inline-block; width: 20px; height: 10px; background-color: #90ee90;"></span> Deciduous Forest	<span style="display: inline-block; width: 20px; height: 10px; background-color: #d2b48c;"></span> Cultivated Crops
<span style="display: inline-block; width: 20px; height: 10px; background-color: #f5deb3;"></span> Developed, Open Space	<span style="display: inline-block; width: 20px; height: 10px; background-color: #2e8b57;"></span> Evergreen Forest	<span style="display: inline-block; width: 20px; height: 10px; background-color: #add8e6;"></span> Woody Wetlands
<span style="display: inline-block; width: 20px; height: 10px; background-color: #ffcc99;"></span> Developed, Low Intensity	<span style="display: inline-block; width: 20px; height: 10px; background-color: #b2df8a;"></span> Mixed Forest	<span style="display: inline-block; width: 20px; height: 10px; background-color: #add8e6;"></span> Emergent Herbaceous Wetlands

## PRM PLAN PROJECT TIDE LAND USE MAP Oiltanking Texas Independent Deepwater Expansion, LLC GALVESTON COUNTY, TEXAS



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 5

Date: 6/28/2017

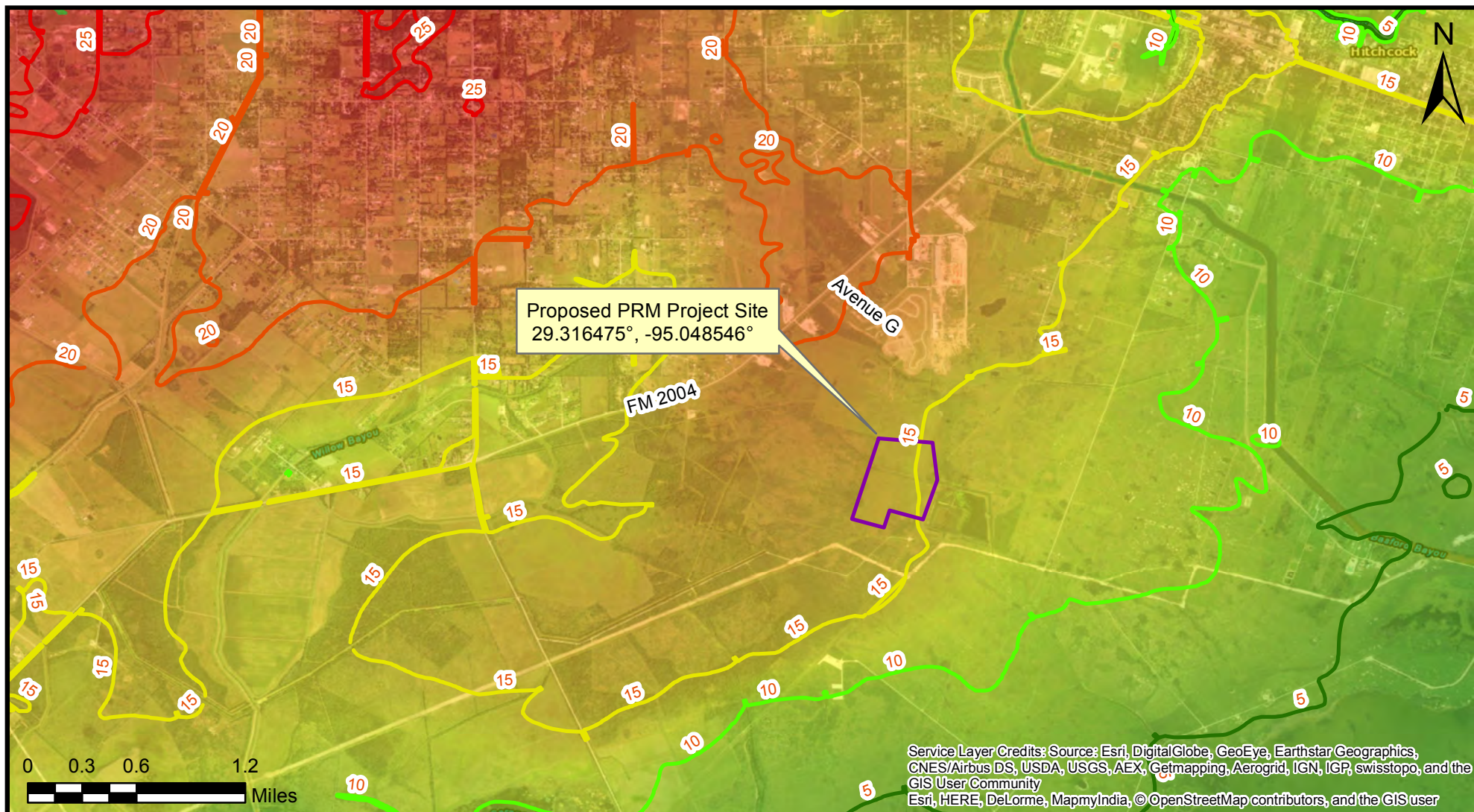
Project No.: 17305.00F

Drawn By: EVDonato

Revision No.: 1

*Note: This is not a property  
boundary survey.*





## Legend

Proposed PRM Project Site

## Elevation (feet)

- 25
- 20
- 15
- 10
- 5

**PRM PLAN  
PROJECT TIDE  
ELEVATION MAP  
Oiltanking Texas Independent  
Deepwater Expansion, LLC  
GALVESTON COUNTY, TEXAS**



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 6

Date: 7/12/2017

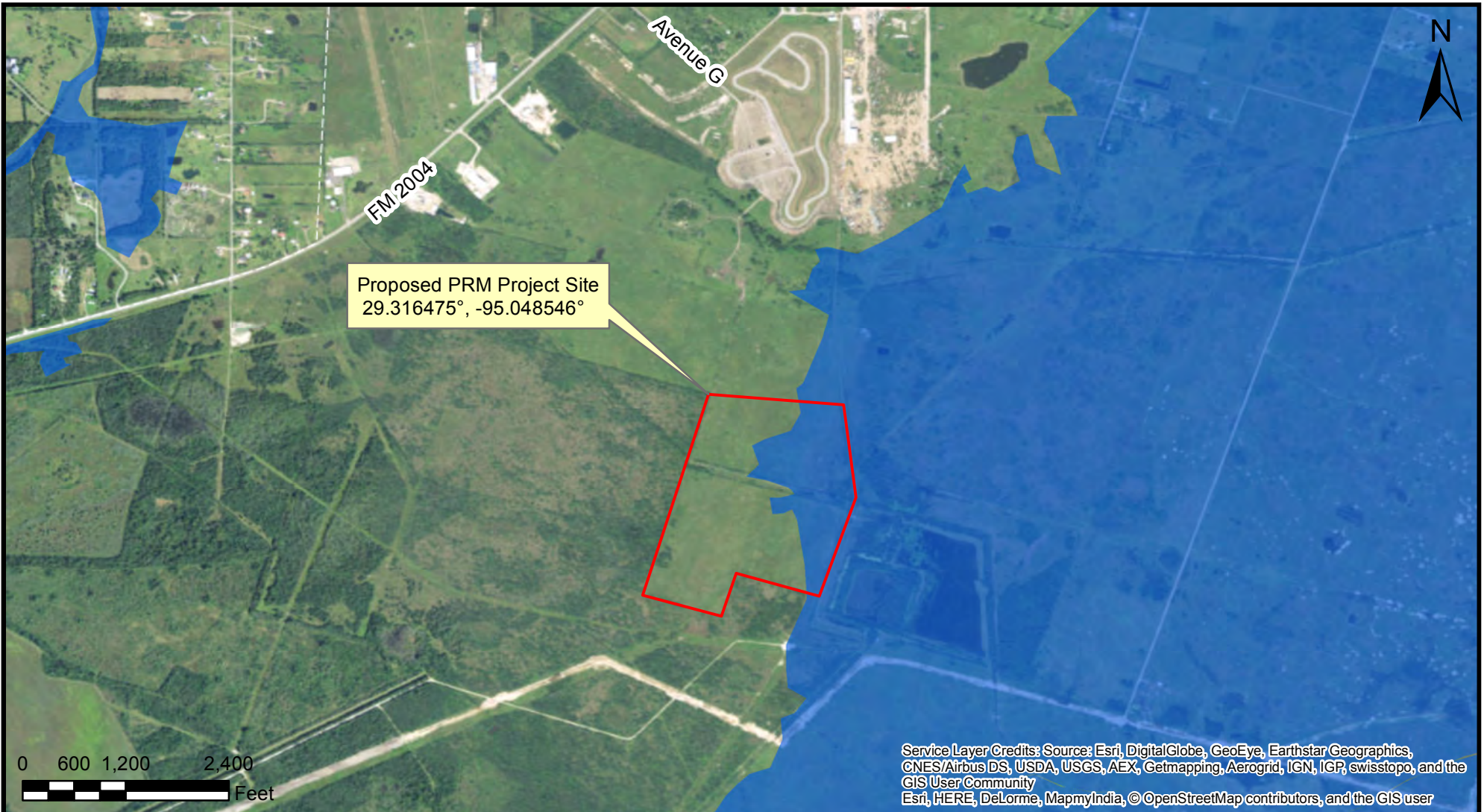
Project No.: 17305.00F

Drawn By: EVDDonato

Revision No.: 1

*Note: This is not a property  
boundary survey.*





## Legend

- Proposed PRM Project Site
- 100-year Floodplain

**PRM PLAN  
PROJECT TIDE  
FLOOD ZONES MAP**  
**Oil tanking Texas Independent  
Deepwater Expansion, LLC  
GALVESTON COUNTY, TEXAS**



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 7

Date: 6/28/2017

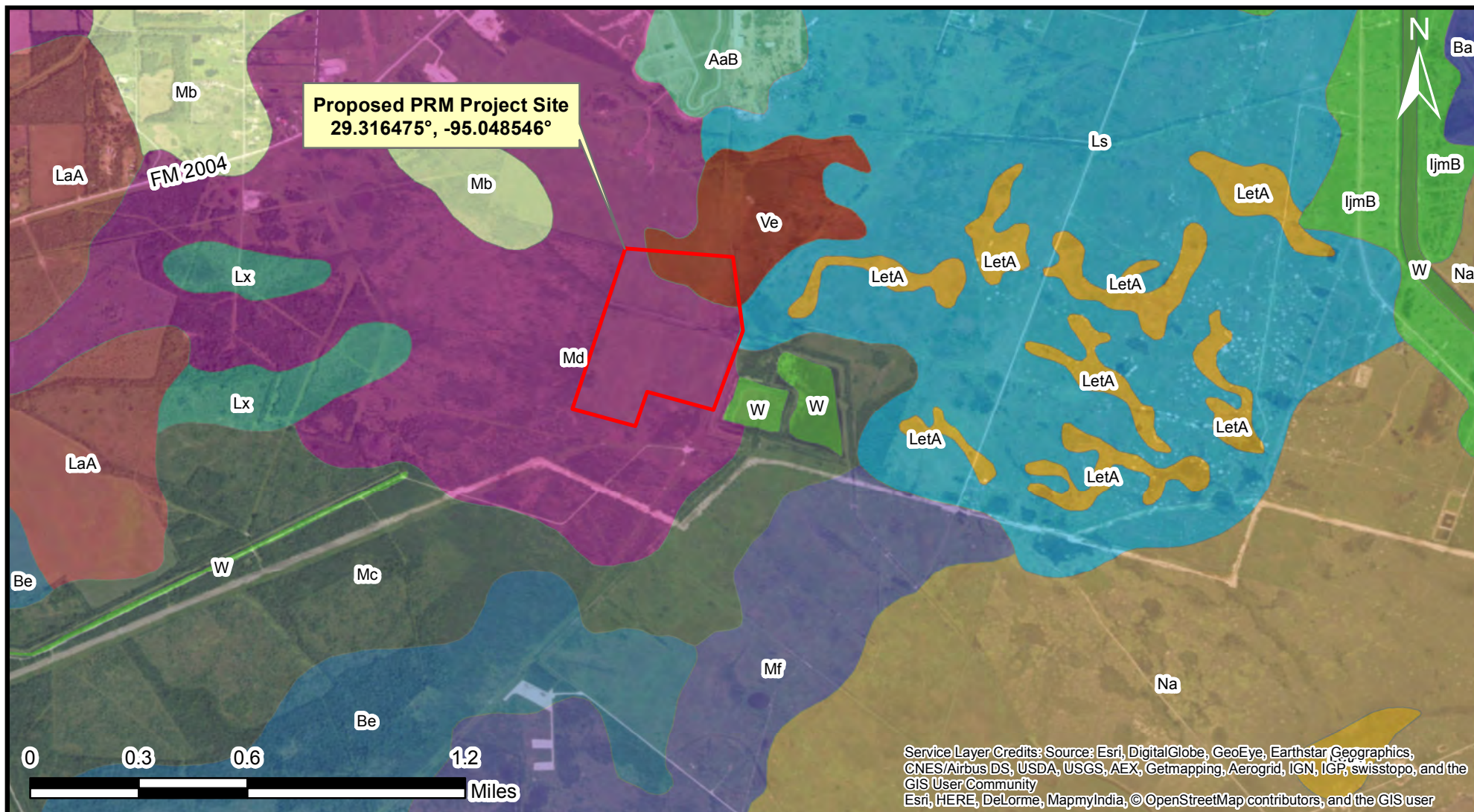
Project No.: 17305.00F

Drawn By: EVDonato

Revision No.: 1

*Note: This is not a property  
boundary survey.*





## Legend

Proposed PRM Project Site

### Soil Type

AaB-Arents clay

Ba

Be-Bernard clay loam

Bn

ljmB-ljam clay

LaA-Lake Charles clay

LetA - Leton loam

Ls - Leton-Aris complex

Lx-Leton-Lake Charles complex

Mb - Mocreay-Algoa complex

Mc - Mocreay-Cieno complex

Md - Mocreay-Leton complex

Mf-Morey-Leton complex

Na-Narta fine sandy loam

Ve - Verland silty clay loam

W - Water

**PRM PLAN**  
**PROJECT TIDE**  
**NRCS SOILS MAP**  
**Oiltanking Texas Independent**  
**Deepwater Expansion, LLC**  
**GALVESTON COUNTY, TEXAS**



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 8

Date: 8/3/2017

Project No.: 17305.00F

Drawn By: EVDonato

Revision No.: 1

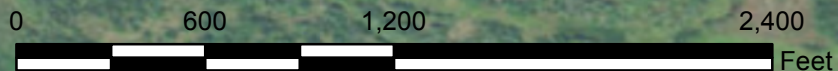
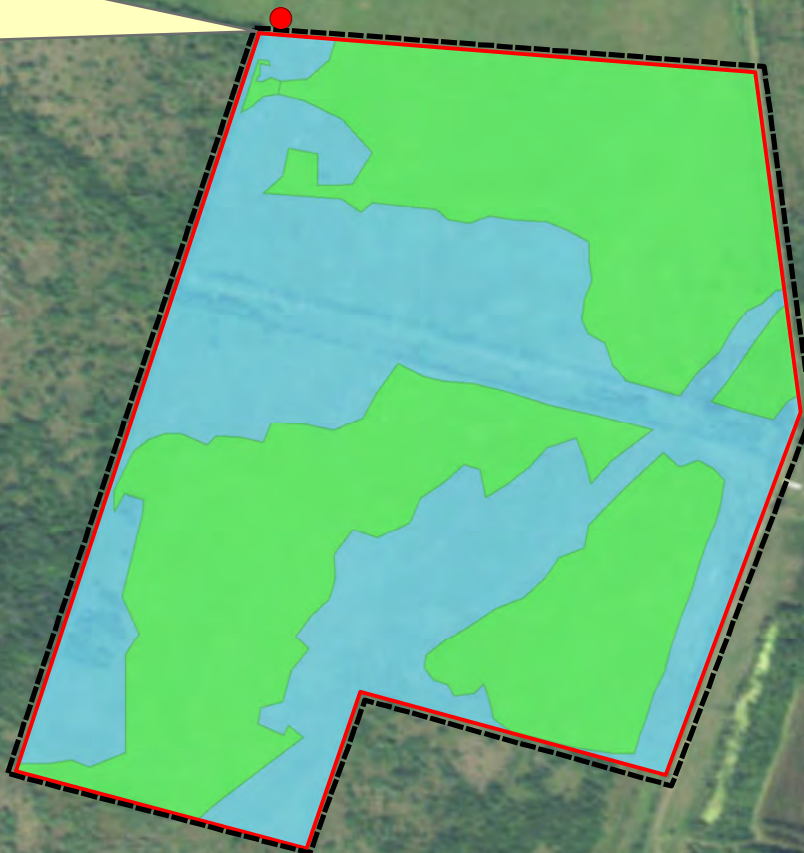
*Note: This is not a property boundary survey.*



Proposed PRM Project Site  
29.316475°, -95.048546°

Existing cattle grazing will be prohibited within the proposed PRM project site. Additionally no vehicles will be allowed onsite.

This property will be placed under a deed restriction.



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community  
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user

## Legend

- Proposed PRM Project Site (89.60 acres)
- Fencing
- Gated Entrance
- Proposed PEM Restoration (47.07 acres)
- Upland Preservation (42.53 acres)

**PRM PLAN  
PROJECT TIDE  
MITIGATION WORK PLAN  
Oiltanking Texas Independent  
Deepwater Expansion, LLC  
GALVESTON COUNTY, TEXAS**



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 9

Date: 8/9/2017

Project No.: 17305.00F

Drawn By: EVDonato

Revision No.: 1

*Note: This is not a property boundary survey.*

## **Attachment 3 - Wetland Delineation Report**



# Wetland Delineation Report

## Hitchcock PRM Site

Galveston County, Texas

August 1, 2017

### PREPARED FOR:

### **Oiltanking Texas Independent Deepwater Expansion, LLC**

15602 Jacintoport Blvd.

Channelview, TX 77530

SPIRIT PROJECT: 17305.00F

---

### FOR SPIRIT ENVIRONMENTAL:

A handwritten signature in black ink, appearing to read 'Jacqueline Prescott'.

Jacqueline Prescott

A handwritten signature in black ink, appearing to read 'Ryan Robol'.

Ryan Robol

OFFICE: 281-664-2490

FAX: 281-664-2491

20465 State Highway 249, Suite 300  
Houston, TX 77070

[spiritenv.com](http://spiritenv.com)

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# 1.0 Introduction

Spirit Environmental, LLC (“Spirit”) was subcontracted by Oiltanking Texas Independent Deepwater Expansion, LLC (“Oiltanking”) to conduct a wetland and waterbody delineation for a project area totaling approximately 89.6 acres of land in Galveston County, Texas. This report describes the methodology and results of the delineation, which was conducted in late May and early June of 2017.

The delineation was performed to evaluate the presence of jurisdictional wetlands and waterbodies and to identify their boundaries within the site. If it is determined that jurisdictional resources will be impacted, this report will also support applications for regulatory permits that may be required from the United States Army Corps of Engineers (“USACE”) for the proposed construction activities.

As required under Section 404 of the Clean Water Act (“CWA”), wetlands were delineated using the routine method described in the USACE 1987 Wetlands Delineation Manual (“1987 Manual”) and the USACE 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0) (“2010 Regional Supplement”). Wetland types and boundaries were determined through initial map review, followed by fieldwork involving the examination of three (3) parameters: vegetation, soils, and hydrology. Delineation criteria and indicators for each of these parameters are outlined in the 1987 Manual and the 2010 Regional Supplement. The 2010 Regional Supplement presents wetland indicators, delineation guidance, and other information that is specific to the Atlantic and Gulf Coastal Plain Region. Wetlands and waterbodies were classified according to the Cowardin Classification System used for the United States Fish and Wildlife Service’s (“USFWS”) National Wetlands Inventory (“NWI”).

This document contains four (4) attachments. Attachment 1 contains maps of the project area; Attachment 2 contains the Wetland Determination Data Forms, which document the three (3) criteria for jurisdictional wetlands; Attachment 3 contains site photographs taken during the site visit; and Attachment 4 contains the Global Positioning System (“GPS”) Data Attribute Table.

## 2.0 Project Overview

The project site consists of approximately 89.6 acres of undeveloped agricultural land in Hitchcock, Galveston County, Texas. The project site is south of the intersection of Farm to Market Road (“FM”) 2004 and Avenue G near the Blimp Base Storage facility. The Subject Site is surrounded by agricultural land, scattered dwellings and agricultural buildings. The wetland delineation was conducted in late May and early June of 2017. Figure 1 provides a vicinity map that depicts the location of the project site. Figure 2 is an aerial overview map of the project site and Figure 3 is a 7.5-minute series United States Geological Survey (“USGS”) topographic map.

### 3.0 Site Description

The proposed project area is located within the Outer Coastal Plain Land Resource Region (“LRR T”) of the Atlantic and Gulf Coastal Plain and is more specifically located in Major Land Resource Area (“MLRA”) 150A (Gulf Coast Prairies). The Natural Regions of Texas map published by the Texas Parks and Wildlife Department refers to this region in Texas as the Gulf Coast Prairies & Marshes. This area is characterized by nearly level, slowly drained plains surrounded by coast, salt grass marshes, bays, and estuaries and is transected by rivers flowing to the Gulf of Mexico. The area was originally natural grass prairie with hardwood trees along rivers and streams. Where herbaceous vegetation is dominant, Little Bluestem (*Schizachrium scoparium*), Indiangrass (*Sorghastrum nutans*), Switchgrass (*Panicum virgatum*), and Big Bluestem (*Schizachrium scoparium*) are commonly encountered. Where trees are encountered, live oaks (*Quercus spp.*) are typically seen. Average rainfall ranges from 45 to 63 inches per year and is fairly uniformly distributed with typically high humidity and temperatures. The soils are generally well drained, very deep, and have a loamy or clayey surface layer.

Currently the proposed project area, which was evaluated as part of this study, consists of undeveloped land dominated by herbaceous vegetation.

## **4.0 Methods**

### **4.1 Map and Database Review**

The following information sources were consulted prior to and during the field delineation to assist in the identification of potential wetlands and waterbodies within the Subject Site.

#### **4.1.1 USGS Topo Maps**

USGS topographic maps illustrate elevation contours, drainage patterns, and hydrography. Spirit staff reviewed the Hitchcock, Texas USGS Quad map to determine the likelihood of the Subject Site containing jurisdictional waterbodies.

#### **4.1.2 USFWS NWI Data**

Spirit staff reviewed NWI data as a resource to determine the likelihood of wetland features in the Subject Site.

#### **4.1.3 NRCS Soil Survey Data**

The United States Department of Agriculture (“USDA”) Natural Resources Conservation Service (“NRCS”) maintains an online Web Soil Survey database. The data provided in the Web Soil Survey provides a standard basis for the soil textures and types one can expect at a delineation area. Spirit staff obtained reports for the NRCS-mapped soil types at the site to determine the likelihood of the soils in the Subject Site exhibiting hydric characteristics. NRCS-mapped soil types are assigned a hydric indicator status of “hydric” or “non-hydric” by the National Technical Committee for Hydric Soils.

#### **4.1.4 Aerial Photography**

Aerial photography, both current and historic, provides insight to the state and function of land. Signs of inundation and vegetative signatures on aerial images indicate whether land might be functioning as a wetland. Spirit staff reviewed historic and current aerial photography available on Google Earth, prior to and during the field delineation, in order to further understand the nature of the Subject Site.

#### **4.1.5 FEMA FIRM**

#### **4.1.6 The Federal Emergency Management Agency (“FEMA”) maintains flood insurance rate maps (“FIRM”). The FIRM of the project area was reviewed to determine if the 100-year floodplain is present. The USACE utilizes the 100-year floodplain to assist in determining jurisdiction of aquatic features. Climatological Observations**

The National Oceanic & Atmospheric Administration (“NOAA”) maintains records of climate data collected from regional stations. Spirit obtained climate data from the closest NOAA station to the Subject Site, which was the Bayou Vista 0.2 SE, TX US GHCND Station US1TXGV0006. This station is approximately 6.59 miles east of the project site.

### **4.2 Wetland Delineation**

Wetlands in the Subject Site were delineated based on the 1987 Manual and the 2010 Regional Supplement and the three (3) parameters – hydrophytic vegetation, hydric soils, and hydrological characteristics – at selected data points within a study area. Data points are located to ascertain upland/wetland boundaries and to record significant spatial changes in wetland plant communities. All three (3) indicator parameters must be met in order for the area to be classified as a wetland. Spirit staff collected geospatial data by utilizing a Trimble GeoXT 2005 Series GPS device with sub-meter accuracy.

Activities in waters of the United States, including wetlands, are regulated by the USACE under Section 10 of the Rivers and Harbors Act (“RHA”) and Section 404 of the CWA. Section 10 of the RHA applies to all navigable waters of the United States, and those waters that are subject to the ebb and flow of tides, including any wetlands located below the Mean High Water (“MHW”) line of tidal waters. Section 404 of the CWA applies to all waters, including wetlands, that have a significant nexus to a Traditional Navigable Water (“TNW”).

#### **4.2.1 Hydrology**

Wetland hydrology is characterized when, under normal circumstances, the surface is either inundated or the upper horizon(s) of the soil are saturated at a sufficient frequency and duration



to create anaerobic conditions. Seasonal and long-term rainfall patterns, local geology and topography, soil type, local water table conditions, and drainage are factors that control hydrology.

Wetland hydrology indicators include: surface water, high water tables, saturation, water marks, sediment deposits, drift deposits, surface soil cracks, inundation visible on aerial imagery, water-stained leaves, salt crusts, biotic crusts, aquatic invertebrates, hydrogen sulfide odor, oxidized rhizospheres along living roots, the presence of iron reduction in tilled soils, thin muck surfaces, drainage patterns, crayfish burrows, and shallow aquitards.

During the field survey, these indicators were used to determine if a plot area contained wetland hydrology.

#### 4.2.2 Vegetation

In accordance with the procedure set forth in the 1987 Manual and the 2010 Regional Supplement, the hydrophytic status of vegetation communities was determined by identifying dominant species and, if necessary, calculating a "Prevalence Index."

Individual plant species were checked against the 2016 National Wetland Plant List ("NWPL") and their regional wetland indicator status determined. Species are classified as:

- Obligate Wetland ("OBL") if they almost always occur in wetlands (>99 percent of the time),
- Facultative Wetland ("FACW") if they usually occur in wetlands (67-99 percent of the time),
- Facultative ("FAC") if they are equally likely to occur in wetlands or non-wetlands (34-66 percent of the time),
- Facultative Upland ("FACU") if they usually occur in non-wetlands (67-99 percent of the time), and
- Obligate Upland ("UPL") if they almost always occur in non-wetlands (>99 percent of the time). A no indicator ("NI") status is recorded for those species for which insufficient information is available to determine an indicator status.

Hydrophytic (wetland) vegetation is considered prevalent where more than 50 percent of the dominant species in a plant community have an indicator status of OBL, FACW, or FAC.

However, in cases where the vegetation community does not meet this hydrophytic threshold but indicators of hydric soils and wetlands hydrology are present, the prevalence index can be applied. Calculation of this index is based on consideration of both dominant and non-dominant plants in the vegetation community, whereby each indicator status category is given a numeric code and weighted by absolute percent cover. The prevalence index ranges from 1 to 5 and an index of 3.0 or less signifies that hydrophytic vegetation is present. In the current delineation, and as shown on the wetland determination data sheets in Attachment 8, a prevalence index was calculated for each sampling station's vegetation community.

### **4.2.3 Soils**

Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper horizons. The anaerobic conditions created by repeated or prolonged saturation or flooding results in permanent changes in soil color and chemistry. These changes in soil color are used to differentiate hydric from non-hydric soils.

At each data point, in areas where the absence of inundation or heavy saturation allowed, a pit was excavated to a depth of at least 16 inches to reveal soil profiles and to determine whether positive indicators of hydric soils were present. Hydric soil indicators relate to color, structure, organic content, and the presence of reducing conditions. Color characteristics (Hue, Value, and Chroma) were recorded using Munsell® Charts.

## **4.3 Waterbody Survey**

With respect to any linear waterbodies located within the site, the width, depth, and flow classification (perennial, intermittent, or ephemeral) were collected at each observed waterbody.

## 5.0 Results

### 5.1 Map and Database Review

#### 5.1.1 USGS Topo Maps

A review of the USGS Hitchcock, Texas USGS Quad map attached in Figure 3 showed the site as flat with a gentle slope to the east. The elevation at the project site varies from 10 feet to 16 feet above sea level. A pipeline runs east to west just south of the boundary.

#### 5.1.2 USFWS NWI Data

A review of available NWI data showed that no mapped NWI features were located within the project area. Both freshwater emergent and freshwater forested/shrub mapped wetlands surround the site in all directions. See Figure 4 for an illustration of NWI features surrounding the project site.

#### 5.1.3 NRCS Soil Survey Data

According to the Web Soil Survey database, three (3) mapped soil units, described below, are represented onsite. Refer to Figure 5 for an illustration of the mapped soil units.

**Table 5-1 NRCS Soils Data**

Soil Unit	Soil Unit Name	Description	Hydric/ Non-hydric
Ve	Verland silty clay loam	Very deep, somewhat poorly drained, very slowly permeable, gray to light gray, silty clay loam or clay	Hydric
Md	Mocarey-Leton complex	Very deep, moderately well drained, moderately slowly permeable, very dark gray to gray, loam	Hydric
Ls	Leton-Arts complex	Very deep, poorly drained, very slowly permeable, gray to light gray, clay loam or loam	Hydric

#### **5.1.4 Aerial Photography**

Based upon a review of the earliest available aerial photograph available from Google Earth, 1969, the Subject Site appears to consist of coastal wetland prairie. Signatures of prairie potholes and inundation are evident in the 1969 image. Remnants of these prairie potholes can still be seen onsite in the most recent aerial imagery, 2015. Across all images, aerial signatures indicative of saturated soils are apparent throughout the site. A pipeline running northeast to southwest is apparent in the 1987 aerial image. Recent pipeline construction was observed on the project site at this location during the site visit where vegetation and soils had been disturbed. Agricultural activities become apparent in the 1990 aerial and remain similar to the activities seen during the site visit.

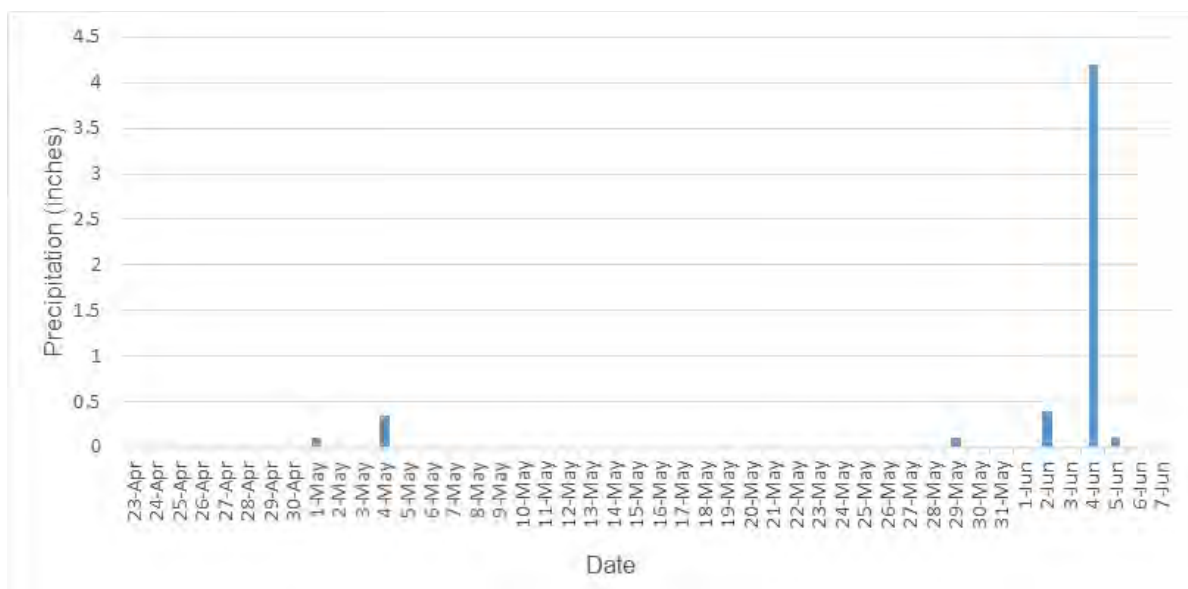
#### **5.1.5 FEMA FIRM**

A review of the available FEMA FIRMs indicated that the 100-year floodplain extends along the eastern portion of the project area. Figure 6 illustrates the location of the 100-year floodplain in the project area.

#### **5.1.6 Climatological Observations**

A review of climatological data provided by NOAA obtained the following results for the Subject Site at the Bayou Vista 0.2 SE, TX US GHCND Station US1TXGV0006. The results, although not site-specific, represent rainfall trends for the region surrounding the site.

**Chart 5-1 Rainfall Trends for Bayou Vista, Galveston County, Texas**



These data show that there were six (6) precipitation events that totaled 5.24 inches of rain in the month prior to the last day of the site visit. A heavy rain event occurred on June 4, 2017 totaling 4.19 inches of rain.

## 5.2 Wetland Delineation

Spirit staff conducted a wetland and waterbody field survey on the project site with two (2) crew members. Field conditions varied between cloudy with light rain to sunny without rain. Approximately 48.84 acres of palustrine emergent (“PEM”) wetlands were observed within the project site. Refer to Table 5-3 below for details on each wetland feature delineated. Figure 7 illustrates the locations of the data points taken onsite and the wetland polygons delineated during the site visit.

**Table 5-2 Wetland Attributes**

Wetland	Type	Latitude	Longitude	Size (Acres)
Wetland 1	PEM	29.315152°	-95.046053°	19.71
Wetland 2	PEM	29.313326°	-95.044136°	1.01
Wetland 3	PEM	29.311514°	-95.045505°	9.00
Wetland 4	PEM	29.312273°	-95.048741°	19.12
<b>Total</b>				<b>48.84</b>

## 5.2.1 Hydrology

Wetland hydrological indicators noted in the field included surface water, high water table, saturation, oxidized rhizospheres along living roots, hydrogen sulfide odor, and crawfish burrows. Nine (9) data points exhibited hydrology and were determined to be wetlands (“DP-1”, “DP-2”, “DP-5”, “DP-6”, “DP-10”, “DP-11”, “DP-13”, “DP-14”, and “DP-16”). Data points “DP-9” and “DP-12” exhibited secondary hydrological indicators; however, were not determined to be wetlands. Data points “DP-3”, “DP-4”, “DP-7”, “DP-8”, “DP-15”, and “DP-17” did not exhibit hydrological indicators and therefore were determined to be uplands.

## 5.2.2 Vegetation

Representative dominant taxa observed onsite are described in the tables below. Indicator status for each species was obtained from the 2016 NWPL.

**Table 5-3 Upland Dominant Plant Species**

Strata	Species Name	Common Name	Indicator Status
Herbaceous	<i>Phyla nodiflora</i>	Frogfruit	FAC
Herbaceous	<i>Mimosa strigillosa</i>	Powderpuff	FAC
Herbaceous	<i>Muhlenbergia rigens</i>	Deergrass	FACU
Herbaceous	<i>Paspalum notatum</i>	Bahiagrass	FACU
Herbaceous	<i>Cynodon dactylon</i>	Bermudagrass	FACU
Herbaceous	<i>Schizachyrium scoparium</i>	Little Bluestem	FACU
Herbaceous	<i>Rhynchospora colorata</i>	Starrush Whitetop	FACW
Herbaceous	<i>Aristida purpurascens</i>	Arrowfeather Threeawn	FACW
Herbaceous	<i>Cyperus virens</i>	Green Flatsedge	FACW
Herbaceous	<i>Setaria leucopila</i>	Steambed Bristlegrass	UPL
Sapling/Shrub	<i>Triadica sebifera</i>	Chinese Tallow	FAC
Sapling/Shrub	<i>Ilex vomitoria</i>	Yaupon	FAC
Sapling/Shrub	<i>Rubus arvensis</i>	Field Blackberry	FAC
Sapling/Shrub	<i>Sesbania drummondii</i>	Rattlebush	FACW
Sapling/Shrub	<i>Rosa bracteata</i>	Macartney Rose	UPL
Tree	<i>Triadica sebifera</i>	Chinese Tallow	FAC

**Table 5-4 Wetland Dominant Plant Species**

Strata	Species Name	Common Name	Indicator Status
Herbaceous	<i>Paspalum notatum</i>	Bahiagrass	FACU
Herbaceous	<i>Aristida purpurascens</i>	Arrowfeather Threawn	FACW
Herbaceous	<i>Paspalum floridanum</i>	Florida Beadgrass	FACW
Herbaceous	<i>Cyperus virens</i>	Green Flatsedge	FACW
Herbaceous	<i>Cyperus odoratus</i>	Fragrant Flatsedge	FACW
Herbaceous	<i>Rhynchospora colorata</i>	Starrush Whitetop	FACW
Herbaceous	<i>Eleocharis montevidensis</i>	Sand Spikerush	FACW
Herbaceous	<i>Persicaria pensylvanica</i>	Pennsylvania Smartweed	FACW
Herbaceous	<i>Rhynchospora caduca</i>	Anglestem Beaksedge	OBL
Herbaceous	<i>Schoenoplectus pungens</i>	Common Threesquare	OBL
Sapling/Shrub	<i>Triadica sebifera</i>	Chinese Tallow	FAC
Sapling/Shrub	<i>Sesbania punicea</i>	Rattlebox	FAC
Sapling/Shrub	<i>Iva frutescens</i>	Jesuit's Bark	FACW

### 5.2.3 Soils

Subsurface soil profiles were obtained at each sample point throughout the site. Generally, the soil consisted of dark gray to black clay loam soils. Wetland soils observed exhibited 10YR 3/1, 3/2 or 4/1 matrices with redoximorphic features and were determined to meet the *Redox Dark Surface (F6)* or *Depleted Matrix (F3)* hydric soil indicators. *Hydrogen Sulfide (A4)* was encountered at “DP-5” and “DP-6.” Upland soils exhibited 10YR 2/1, 3/1, or 3/2 matrices without redoximorphic features.

## 5.3 Waterbody Survey

One (1) waterbody totaling 0.92 acres was observed transecting the project site from west to east. The man-made drainage ditch flowed through a culvert on the western property boundary. The table below displays the characteristics of the man-made drainage ditch delineated onsite.

**Table 5-5 Waterbody Characteristics**

<b>Waterbody ID</b>	<b>Waterbody Type</b>	<b>Average Width (feet)</b>	<b>Length (linear feet)</b>	<b>Size (acres)</b>
Water	Man-made Drainage Ditch	20	1,730	0.92



## 6.0 Conclusion

Spirit conducted a wetland and waterbody delineation associated with the site of a proposed Permittee Responsible Mitigation (“PRM”) site located on approximately 89.6 acres of land in Hitchcock, Galveston County, Texas. Field efforts were performed in late May and early June of 2017. This delineation was conducted following the USACE 1987 Manual and the 2010 Regional Supplement. Aquatic resources observed within the project area are detailed in Table 6-1.

**Table 6-1 Aquatic Features**

<b>Resource Type</b>	<b>Size (Acres)</b>
PEM Wetlands	48.84
Man-made Ditch	0.92
Uplands	39.84
<b>Total</b>	<b>89.60</b>

According to the FEMA FIRM map, the eastern portion of the site is inside of the 100-year floodplain of West Galveston Bay. The 100-year floodplain extends approximately 1,200 feet inside of the project site. There are four (4) PEM wetland polygons within the project site that total 48.84 acres. It is Spirit’s professional opinion that the USACE will likely invoke jurisdiction on all wetlands located on the property due to their significant nexus to a Traditional Navigable Water (“TNW”).

One (1) waterbody totaling 0.92 acres was observed transecting the project site from west to east. This man-made drainage ditch flowed through a culvert on the western property boundary. It does not appear that this ditch was excavated from a natural tributary; therefore, it is Spirit’s professional opinion this feature would not be considered a water of the U.S. according to USACE definitions.

Spirit’s professional opinions offered in this report are based on best professional judgement; however, it should be noted that only the USACE may make a final determination of the location of wetland and waterbody boundaries and their jurisdiction. To obtain an official wetland determination from the USACE, this report should be submitted to the Galveston District Office of the USACE.

## 7.0 References

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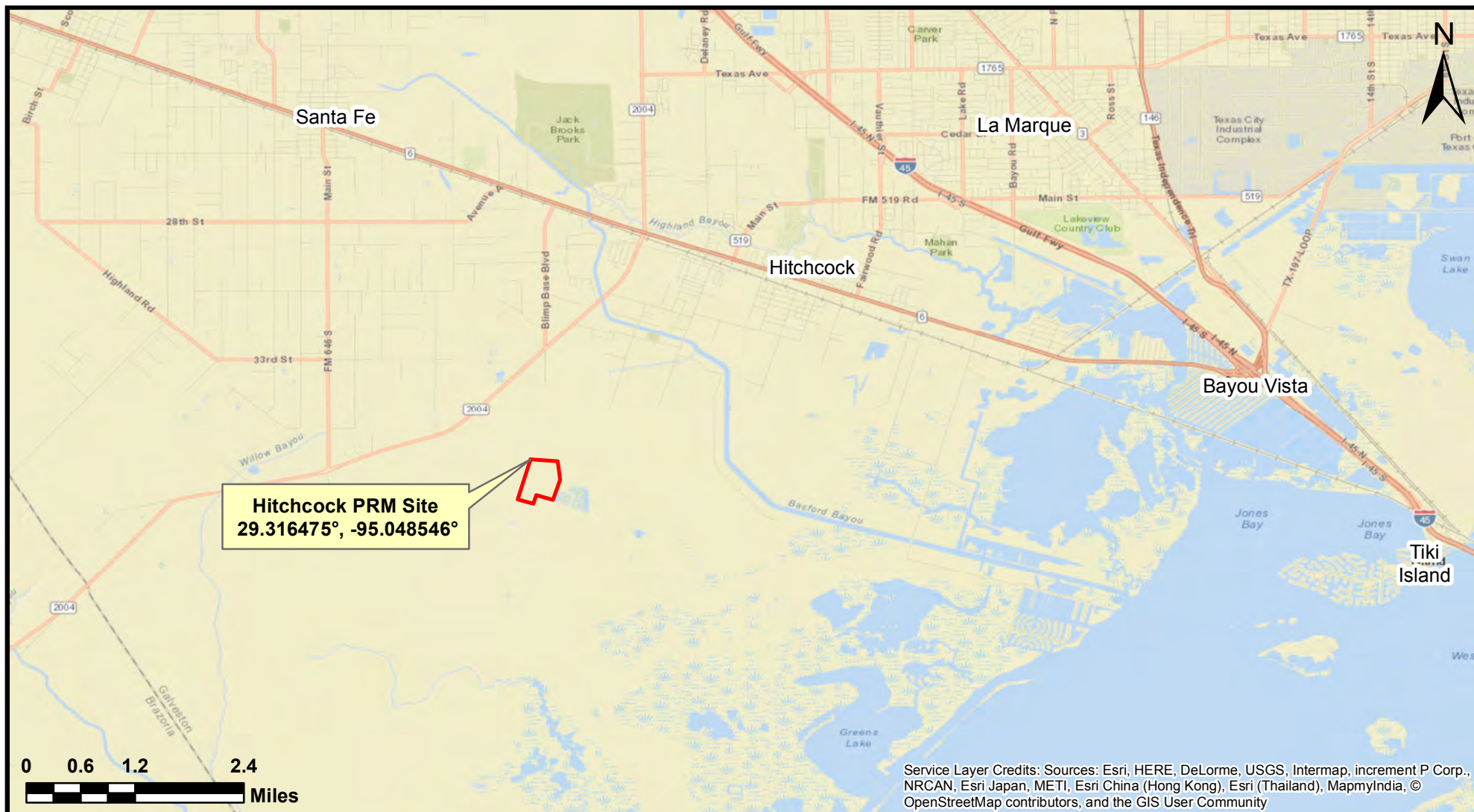
U.S. Army Corps of Engineers (USACE). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0), ed. J.S. Wakely, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-10-20. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

## 8.0 Attachments

1. Figures
2. Wetland Determination Data Forms
3. Site Visit Photographs
4. GPS Attribute Data

# Attachment 1

## Figures



Galveston County, TX

**PROJECT TIDE**  
**HITCHCOCK PRM SITE**  
**VICINITY MAP**  
**Oil tanking Texas Independent**  
**Deepwater Expansion, LLC**  
**GALVESTON COUNTY, TEXAS**



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 1  
Date: 8/1/2017  
Project No.: 17305.00F  
Drawn By: JPrescott  
Revision No.: 1  
*Note: This is not a property boundary survey.*

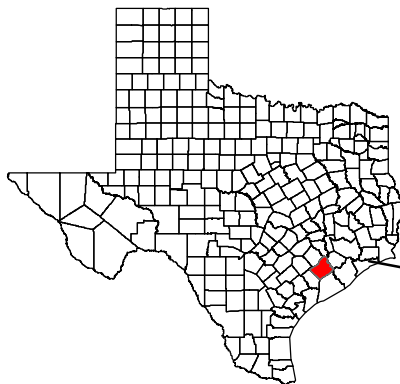


Hitchcock PRM Site  
29.316475°, -95.048546°



0 300 600 1,200  
Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community  
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user



Galveston County, TX

**PROJECT TIDE  
HITCHCOCK PRM SITE  
AERIAL MAP  
Oiltanking Texas Independent  
Deepwater Expansion, LLC  
GALVESTON COUNTY, TEXAS**



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 2

Date: 8/1/2017

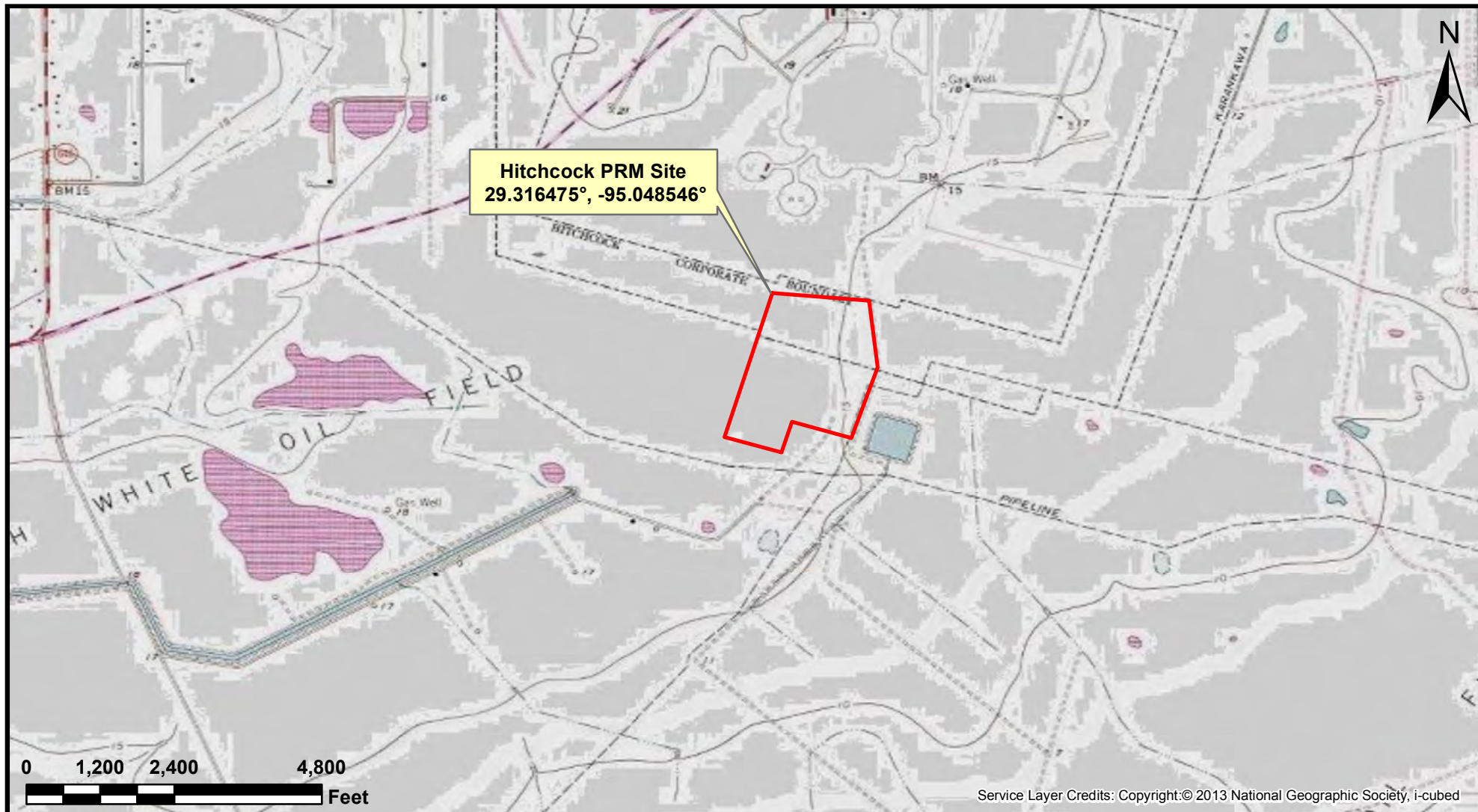
Project No.: 17305.00F

Drawn By: JPrescott

Revision No.: 1

*Note: This is not a property  
boundary survey.*





Galveston County, TX

**PROJECT TIDE  
HITCHCOCK PRM SITE  
TOPOGRAPHIC MAP  
Oiltanking  
GALVESTON COUNTY, TEXAS**



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 3

Date: 8/1/2017

Project No.: 17305.00F

Drawn By: JPrescott

Revision No.: 1

*Note: This is not a property  
boundary survey.*





## Legend

Proposed PRM Project Site

### NWI Features

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

**PROJECT TIDE  
HITCHCOCK PRM SITE  
NWI FEATURES MAP  
OILTANKING  
GALVESTON COUNTY, TEXAS**



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 4

Date: 8/1/2017

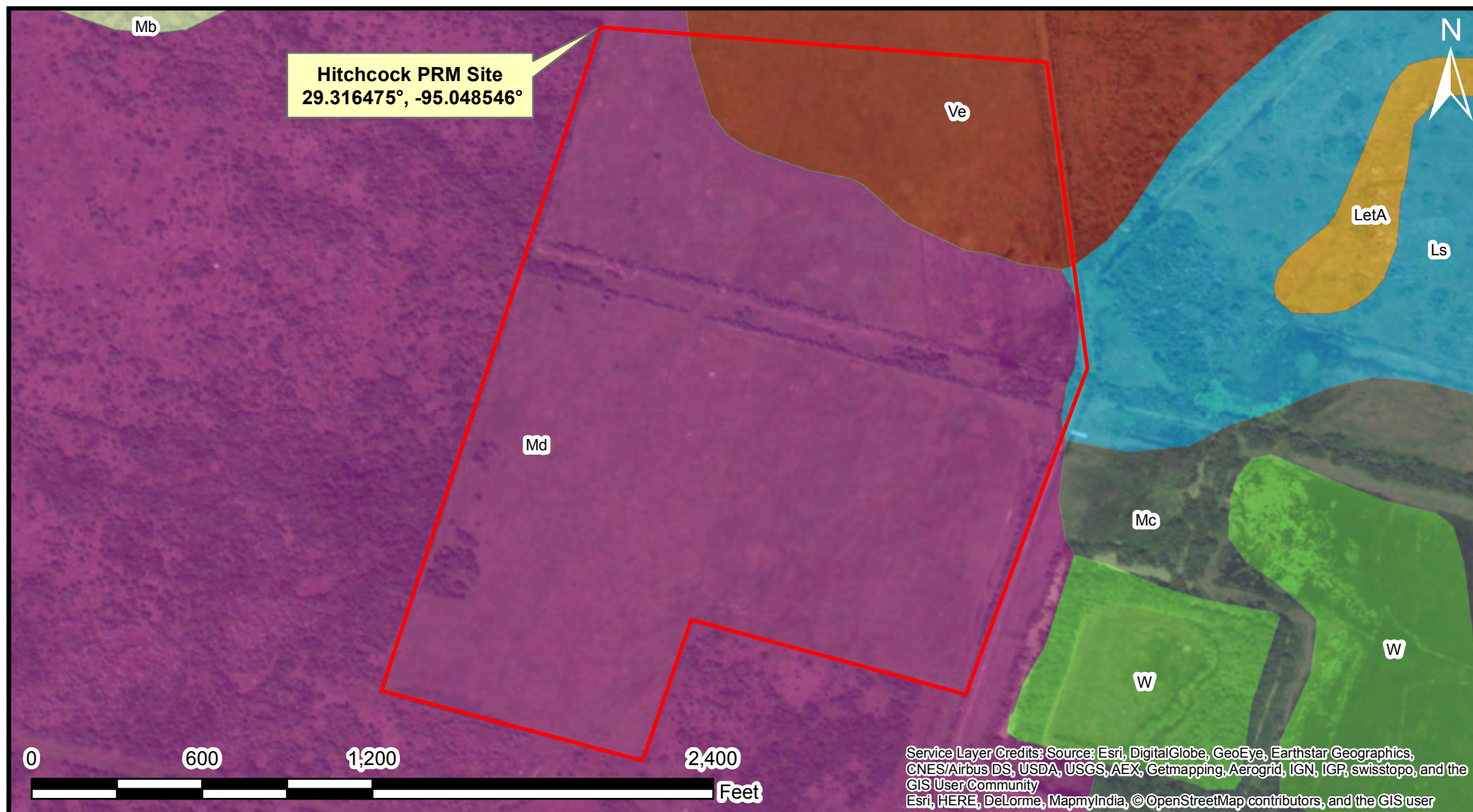
Project No.: 17305.00F

Drawn By: JPrescott

Revision No.: 1

*Note: This is not a property boundary survey.*





## Legend

Proposed PRM Project Site

### Soil Type

LetA - Leton loam  
 Ls - Leton-Aris complex  
 Mb - Mocarey-Algoa complex

Mc - Mocarey-Cieno complex  
 Md - Mocarey-Leton complex  
 Ve - Verland silty clay loam  
 W - Water

**PROJECT TIDE**  
**HITCHCOCK PRM SITE NRCS**  
**SOILS MAP**  
**OILTANKING**  
**GALVESTON COUNTY, TEXAS**



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 5

Date: 8/1/2017

Project No.: 17305.00F

Drawn By: JPrescott

Revision No.: 1

*Note: This is not a property boundary survey.*





## Legend

- Proposed PRM Project Site
- 100-year Floodplain

## PROJECT TIDE HITCHCOCK PRM SITE FLOOD ZONE MAP OILTANKING GALVESTON COUNTY, TEXAS



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 6

Date: 8/1/2017

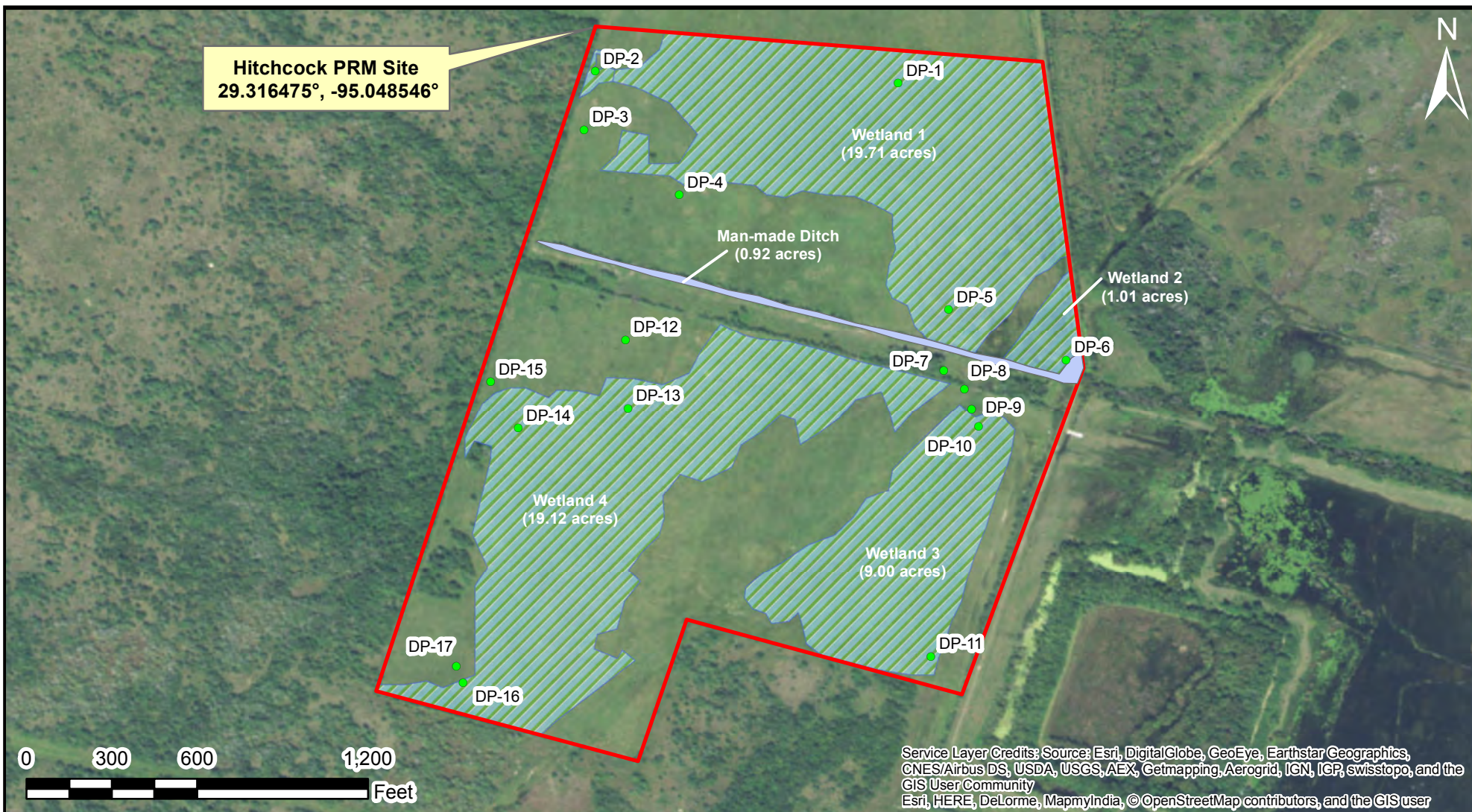
Project No.: 17305.00F

Drawn By: JPrescott

Revision No.: 1

*Note: This is not a property boundary survey.*





## Legend

- Project Site (89.60 acres)
- Data Points
- PEM Wetlands (48.84 acres)
- Man-made Ditch (0.92 acres)

## PROJECT TIDE HITCHCOCK PRM SITE AQUATIC FEATURES MAP OILTANKING GALVESTON COUNTY, TEXAS



20465 State Highway 249, Suite 300  
Houston, TX 77070

Figure No.: 7

Date: 8/1/2017

Project No.: 17305.00F

Drawn By: JPrescott

Revision No.: 1

*Note: This is not a property boundary survey.*

# Attachment 2

## Wetland Determination Data Forms

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-1  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):**  **Local relief (concave, convex, none):**  **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.315926° **Long.:** -95.045691° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): <u>0.5</u> Water Table Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): <u>14</u> Saturation Present? (includes capillary fringe) Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): <u>1</u>	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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

Sampling Point: **DP-1**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	<b>= Total Cover</b>	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	<b>= Total Cover</b>	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	<b>= Total Cover</b>	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1. <i>Paspalum floridanum</i>		60	<input checked="" type="checkbox"/> 54.5%	FACW
2. <i>Paspalum notatum</i>		2	<input type="checkbox"/> 1.8%	FACU
3. <i>Rhynchospora corniculata</i>		10	<input type="checkbox"/> 9.1%	OBL
4. <i>Setaria parviflora</i>		10	<input type="checkbox"/> 9.1%	FACW
5. <i>Mimosa strigillosa</i>		8	<input type="checkbox"/> 7.3%	FAC
6. <i>Phyla nodiflora</i>		20	<input type="checkbox"/> 18.2%	FAC
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>55</u> 20% of Total Cover: <u>22</u>		110	<b>= Total Cover</b>	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	<b>= Total Cover</b>	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 110 Multiply by: 2

OBL species 10 x 1 = 10

FACW species 70 x 2 = 140

FAC species 28 x 3 = 84

FACU species 2 x 4 = 8

UPL species 0 x 5 = 0

Column Total s: 110 (A) 242 (B)

Prevalence Index = B/A = 2.200

**Hydrophytic Vegetation Indicators:**

☒ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-1

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

[illegible]

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

---

**Hydric Soil Indicators:**

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol (A1)                         | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)  |
| <input type="checkbox"/> Histic Epipedon (A2)                  | <input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)        |
| <input type="checkbox"/> Black Histic (A3)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)            |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                 | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                    |
| <input type="checkbox"/> Stratified Layers (A5)                | <input checked="" type="checkbox"/> Depleted Matrix (F3)             |
| <input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)     | <input type="checkbox"/> Redox Dark Surface (F6)                     |
| <input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U) | <input type="checkbox"/> Depleted Dark Surface (F7)                  |
| <input type="checkbox"/> Muck Presence (A8) (LRR U)            | <input type="checkbox"/> Redox Depressions (F8)                      |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)             | <input type="checkbox"/> Marl (F10) (LRR U)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)     | <input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)            |
| <input type="checkbox"/> Thick Dark Surface (A12)              | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)   |
| <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A) | <input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)          |
| <input type="checkbox"/> Sandy Muck Mineral (S1) (LRR O, S)    | <input type="checkbox"/> Delta Ochric (F17) (MLRA 151)               |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)              | <input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)      |
| <input type="checkbox"/> Sandy Redox (S5)                      | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A) |
| <input type="checkbox"/> Stripped Matrix (S6)                  | <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 1  |
| <input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)    |  |

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches):

Hydric Soil Present? Yes ☒ No ☐

Remarks:



# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-2  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.316042° **Long.:** -95.048610° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): <u>6</u>	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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

Sampling Point: **DP-2**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1. <i>Cyperus virens</i>		65	<input checked="" type="checkbox"/> 53.3%	FACW
2. <i>Persicaria pensylvanica</i>		20	<input type="checkbox"/> 16.4%	FACW
3. <i>Eleocharis montevidensis</i>		20	<input type="checkbox"/> 16.4%	FACW
4. <i>Lolium perenne</i>		10	<input type="checkbox"/> 8.2%	FACU
5. <i>Iva frutescens</i>		7	<input type="checkbox"/> 5.7%	FACW
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 61      20% of Total Cover: 24.4		122	= Total Cover	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 0 Multiply by: 1

OBL species 0 x 1 = 0

FACW species 112 x 2 = 224

FAC species 0 x 3 = 0

FACU species 10 x 4 = 40

UPL species 0 x 5 = 0

Column Total s: 122 (A) 264 (B)

Prevalence Index = B/A = 2.164

**Hydrophytic Vegetation Indicators:**

☒ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-2

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

[illegible]

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

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**Hydric Soil Indicators:**

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol (A1)                         | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)  |
| <input type="checkbox"/> Histic Epipedon (A2)                  | <input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)        |
| <input type="checkbox"/> Black Histic (A3)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)            |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                 | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                    |
| <input type="checkbox"/> Stratified Layers (A5)                | <input checked="" type="checkbox"/> Depleted Matrix (F3)             |
| <input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)     | <input type="checkbox"/> Redox Dark Surface (F6)                     |
| <input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U) | <input type="checkbox"/> Depleted Dark Surface (F7)                  |
| <input type="checkbox"/> Muck Presence (A8) (LRR U)            | <input type="checkbox"/> Redox Depressions (F8)                      |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)             | <input type="checkbox"/> Marl (F10) (LRR U)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)     | <input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)            |
| <input type="checkbox"/> Thick Dark Surface (A12)              | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)   |
| <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A) | <input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)          |
| <input type="checkbox"/> Sandy Muck Mineral (S1) (LRR O, S)    | <input type="checkbox"/> Delta Ochric (F17) (MLRA 151)               |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)              | <input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)      |
| <input type="checkbox"/> Sandy Redox (S5)                      | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A) |
| <input type="checkbox"/> Stripped Matrix (S6)                  | <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 1  |
| <input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)    |  |

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type:

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☒ No ☐

Remarks:

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-3  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.315477° **Long.:** -95.048718° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		



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

					Sampling Point: <b>DP-3</b>
<b>Tree Stratum</b> (Plot size: _____ )		<b>Absolute % Cover</b>	<b>Dominant Species? Rel.Strat. Cover</b>	<b>Indicator Status</b>	<b>Dominance Test worksheet:</b> Number of Dominant Species That are OBL, FACW, or FAC: <u>1</u> (A)  Total Number of Dominant Species Across All Strata: <u>5</u> (B)  Percent of dominant Species That Are OBL, FACW, or FAC: <u>20.0%</u> (A/B)  <b>Prevalence Index worksheet:</b> <div style="display: flex; justify-content: space-between;"> <span>Total % Cover of:</span> <span>Multiply by:</span> </div> <div style="display: flex; justify-content: space-between;"> <div> <b>OBL spec</b> es <u>0</u>  <b>FACW spec</b> es <u>7</u>  <b>FAC spec</b> es <u>20</u>  <b>FACU spec</b> es <u>70</u>  <b>UPL spec</b> es <u>37</u>  <b>Column Total s:</b> <u>134</u> (A)                         </div> <div> <b>x 1 =</b> <u>0</u>  <b>x 2 =</b> <u>14</u>  <b>x 3 =</b> <u>60</u>  <b>x 4 =</b> <u>280</u>  <b>x 5 =</b> <u>185</u>  <b>(B)</b> <u>539</u> </div> </div> Prevalence Index = B/A = <u>4.022</u>  <b>Hydrophytic Vegetation Indicators:</b> <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is > 50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.  <b>Definition of Vegetation Strata:</b> Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).  Sapling - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.  Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.  Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.  Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.  Woody vine - All woody vines, regardless of height.
1. _____	0	<input type="checkbox"/> 0.0%			
2. _____	0	<input type="checkbox"/> 0.0%			
3. _____	0	<input type="checkbox"/> 0.0%			
4. _____	0	<input type="checkbox"/> 0.0%			
5. _____	0	<input type="checkbox"/> 0.0%			
6. _____	0	<input type="checkbox"/> 0.0%			
7. _____	0	<input type="checkbox"/> 0.0%			
8. _____	0	<input type="checkbox"/> 0.0%			
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover		
<b>Sapling or Sapling/Shrub Stratum</b> (Plot size: _____ )					
1. _____	0	<input type="checkbox"/> 0.0%			
2. _____	0	<input type="checkbox"/> 0.0%			
3. _____	0	<input type="checkbox"/> 0.0%			
4. _____	0	<input type="checkbox"/> 0.0%			
5. _____	0	<input type="checkbox"/> 0.0%			
6. _____	0	<input type="checkbox"/> 0.0%			
7. _____	0	<input type="checkbox"/> 0.0%			
8. _____	0	<input type="checkbox"/> 0.0%			
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover		
<b>Shrub Stratum</b> (Plot size: _____ )					
1. <u>Triadica sebifera</u>	3	<input checked="" type="checkbox"/> 37.5%	FAC		
2. <u>Rosa bracteata</u>	5	<input checked="" type="checkbox"/> 62.5%	UPL		
3. _____	0	<input type="checkbox"/> 0.0%			
4. _____	0	<input type="checkbox"/> 0.0%			
5. _____	0	<input type="checkbox"/> 0.0%			
6. _____	0	<input type="checkbox"/> 0.0%			
50% of Total Cover: <u>4</u> 20% of Total Cover: <u>1.6</u>		8	= Total Cover		
<b>Herb Stratum</b> (Plot size: _____ )					
1. <u>Setaria leucopilla</u>	20	<input checked="" type="checkbox"/> 15.9%	UPL		
2. <u>Cynodon dactylon</u>	10	<input type="checkbox"/> 7.9%	FACU		
3. <u>Phyla nodiflora</u>	10	<input type="checkbox"/> 7.9%	FAC		
4. <u>Heterotheca canescens</u>	7	<input type="checkbox"/> 5.6%	UPL		
5. <u>Ambrosia psilostachya</u>	7	<input type="checkbox"/> 5.6%	FAC		
6. <u>Centella erecta</u>	7	<input type="checkbox"/> 5.6%	FACW		
7. <u>Muhlenbergia rigens</u>	40	<input checked="" type="checkbox"/> 31.7%	FACU		
8. <u>Paspalum notatum</u>	20	<input checked="" type="checkbox"/> 15.9%	FACU		
9. <u>Astragalus lindheimeri</u>	5	<input type="checkbox"/> 4.0%	UPL		
10. _____	0	<input type="checkbox"/> 0.0%			
11. _____	0	<input type="checkbox"/> 0.0%			
12. _____	0	<input type="checkbox"/> 0.0%			
50% of Total Cover: <u>63</u> 20% of Total Cover: <u>25.2</u>		126	= Total Cover		
<b>Woody Vine Stratum</b> (Plot size: _____ )					
1. _____	0	<input type="checkbox"/> 0.0%			
2. _____	0	<input type="checkbox"/> 0.0%			
3. _____	0	<input type="checkbox"/> 0.0%			
4. _____	0	<input type="checkbox"/> 0.0%			
5. _____	0	<input type="checkbox"/> 0.0%			
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover		

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-3

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

[illegible]

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

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**Hydric Soil Indicators:**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Muck Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ No ☒

Remarks:

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-4  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.314851° **Long.:** -95.047800° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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

**Dominant Species?**

**Sampling Point: DP-4**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	<b>= Total Cover</b>	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	<b>= Total Cover</b>	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Rel.Strat. Cover	Indicator Status
1.	Triadica sebifera	5	<input checked="" type="checkbox"/> 50.0%	FAC
2.	Rosa bracteata	5	<input checked="" type="checkbox"/> 50.0%	UPL
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 5      20% of Total Cover: 2		10	<b>= Total Cover</b>	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Rel.Strat. Cover	Indicator Status
1.	Centella erecta	10	<input type="checkbox"/> 7.5%	FACW
2.	Muhlenbergia rigens	55	<input checked="" type="checkbox"/> 41.0%	FACU
3.	Paspalum notatum	40	<input checked="" type="checkbox"/> 29.9%	FACU
4.	Rhynchospora caduca	15	<input type="checkbox"/> 11.2%	OBL
5.	Phyla nodiflora	7	<input type="checkbox"/> 5.2%	FAC
6.	Oenothera speciosa	7	<input type="checkbox"/> 5.2%	UPL
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 67      20% of Total Cover: 26.8		134	<b>= Total Cover</b>	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	<b>= Total Cover</b>	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 15      Multiply by: 1

OBL spec ies 15 x 1 = 15

FACW spec ies 10 x 2 = 20

FAC spec ies 12 x 3 = 36

FACU spec ies 95 x 4 = 380

UPL spec ies 12 x 5 = 60

Column Total s: 144 (A)      511 (B)

Prevalence Index = B/A = 3.549

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☐ 2 - Dominance Test is > 50%

☐ 3 - Prevalence Index is ≤3.0 <sup>1</sup>

☐ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?**      Yes ☐      No ☒

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.



## SOIL

Sampling Point: DP-4

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

[illegible]

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

---

**Hydric Soil Indicators:**

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol (A1)                         | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)  |
| <input type="checkbox"/> Histic Epipedon (A2)                  | <input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)        |
| <input type="checkbox"/> Black Histic (A3)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)            |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                 | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                    |
| <input type="checkbox"/> Stratified Layers (A5)                | <input type="checkbox"/> Depleted Matrix (F3)                        |
| <input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)     | <input checked="" type="checkbox"/> Redox Dark Surface (F6)          |
| <input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U) | <input type="checkbox"/> Depleted Dark Surface (F7)                  |
| <input type="checkbox"/> Muck Presence (A8) (LRR U)            | <input type="checkbox"/> Redox Depressions (F8)                      |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)             | <input type="checkbox"/> Marl (F10) (LRR U)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)     | <input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)            |
| <input type="checkbox"/> Thick Dark Surface (A12)              | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)   |
| <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A) | <input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)          |
| <input type="checkbox"/> Sandy Muck Mineral (S1) (LRR O, S)    | <input type="checkbox"/> Delta Ochric (F17) (MLRA 151)               |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)              | <input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)      |
| <input type="checkbox"/> Sandy Redox (S5)                      | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A) |
| <input type="checkbox"/> Stripped Matrix (S6)                  | <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 1  |
| <input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)    |  |

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: \_\_\_\_\_

Depth (inches):

Hydric Soil Present? Yes ☒ No ☐

Remarks:

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-5  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.313741° **Long.:** -95.045202° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): <u>2</u> Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): <u>0</u>	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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

**Dominant Species?**

**Sampling Point: DP-5**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	<b>= Total Cover</b>	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	<b>= Total Cover</b>	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	Triadica sebifera	5	<input checked="" type="checkbox"/> 100.0%	FAC
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 2.5      20% of Total Cover: 1		5	<b>= Total Cover</b>	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	Persicaria hydropiper	10	<input type="checkbox"/> 9.1%	OBL
2.	Rhynchospora colorata	15	<input type="checkbox"/> 13.6%	FACW
3.	Rhynchospora corniculata	20	<input checked="" type="checkbox"/> 18.2%	OBL
4.	Juncus validus	10	<input type="checkbox"/> 9.1%	FACW
5.	Iva annua	5	<input type="checkbox"/> 4.5%	FAC
6.	Eleocharis montevidensis	20	<input checked="" type="checkbox"/> 18.2%	FACW
7.	Cyperus virens	20	<input checked="" type="checkbox"/> 18.2%	FACW
8.	Cyperus odoratus	10	<input type="checkbox"/> 9.1%	FACW
9.			<input type="checkbox"/> 0.0%	
10.			<input type="checkbox"/> 0.0%	
11.			<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 55      20% of Total Cover: 22		110	<b>= Total Cover</b>	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	<b>= Total Cover</b>	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 115 Multiply by: 5

OBL species 30 x 1 = 30

FACW species 75 x 2 = 150

FAC species 10 x 3 = 30

FACU species 0 x 4 = 0

UPL species 0 x 5 = 0

Column Total s: 115 (A) 210 (B)

Prevalence Index = B/A = 1.826

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-5

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

[illegible]

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

### Hydric Soil Indicators:

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol (A1)                         | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)  |
| <input type="checkbox"/> Histic Epipedon (A2)                  | <input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)        |
| <input type="checkbox"/> Black Histic (A3)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)            |
| <input checked="" type="checkbox"/> Hydrogen Sulfide (A4)      | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                    |
| <input type="checkbox"/> Stratified Layers (A5)                | <input checked="" type="checkbox"/> Depleted Matrix (F3)             |
| <input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)     | <input type="checkbox"/> Redox Dark Surface (F6)                     |
| <input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U) | <input type="checkbox"/> Depleted Dark Surface (F7)                  |
| <input type="checkbox"/> Muck Presence (A8) (LRR U)            | <input type="checkbox"/> Redox Depressions (F8)                      |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)             | <input type="checkbox"/> Marl (F10) (LRR U)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)     | <input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)            |
| <input type="checkbox"/> Thick Dark Surface (A12)              | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)   |
| <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A) | <input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)          |
| <input type="checkbox"/> Sandy Muck Mineral (S1) (LRR O, S)    | <input type="checkbox"/> Delta Ochric (F17) (MLRA 151)               |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)              | <input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)      |
| <input type="checkbox"/> Sandy Redox (S5)                      | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A) |
| <input type="checkbox"/> Stripped Matrix (S6)                  | <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 1  |
| <input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)    |  |

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☒ No ☐

Remarks:



# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-6  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.313261° **Long.:** -95.044071° **Datum:** WGS84  
**Soil Map Unit Name:** Ls - Leton-Aris complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): <u>2</u> Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): <u>0</u>	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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

Tree Stratum (Plot size: _____ )					Dominant Species?	Sampling Point: <b>DP-6</b>
	Absolute % Cover	Rel.Strat. Cover	Indicator Status			
1. _____	0	<input type="checkbox"/> 0.0%				
2. _____	0	<input type="checkbox"/> 0.0%				
3. _____	0	<input type="checkbox"/> 0.0%				
4. _____	0	<input type="checkbox"/> 0.0%				
5. _____	0	<input type="checkbox"/> 0.0%				
6. _____	0	<input type="checkbox"/> 0.0%				
7. _____	0	<input type="checkbox"/> 0.0%				
8. _____	0	<input type="checkbox"/> 0.0%				
50% of Total Cover: <u>0</u>	20% of Total Cover: <u>0</u>	0	<b>= Total Cover</b>			
Sapling or Sapling/Shrub Stratum (Plot size: _____ )						
1. _____	0	<input type="checkbox"/> 0.0%				
2. _____	0	<input type="checkbox"/> 0.0%				
3. _____	0	<input type="checkbox"/> 0.0%				
4. _____	0	<input type="checkbox"/> 0.0%				
5. _____	0	<input type="checkbox"/> 0.0%				
6. _____	0	<input type="checkbox"/> 0.0%				
7. _____	0	<input type="checkbox"/> 0.0%				
8. _____	0	<input type="checkbox"/> 0.0%				
50% of Total Cover: <u>0</u>	20% of Total Cover: <u>0</u>	0	<b>= Total Cover</b>			
Shrub Stratum (Plot size: _____ )						
1. <i>Iva frutescens</i>	5	<input checked="" type="checkbox"/> 50.0%	FACW			
2. <i>Triadica sebifera</i>	5	<input checked="" type="checkbox"/> 50.0%	FAC			
3. _____	0	<input type="checkbox"/> 0.0%				
4. _____	0	<input type="checkbox"/> 0.0%				
5. _____	0	<input type="checkbox"/> 0.0%				
6. _____	0	<input type="checkbox"/> 0.0%				
50% of Total Cover: <u>5</u>	20% of Total Cover: <u>2</u>	10	<b>= Total Cover</b>			
Herb Stratum (Plot size: _____ )						
1. <i>Persicaria pensylvanica</i>	30	<input checked="" type="checkbox"/> 24.0%	FACW			
2. <i>Persicaria virginiana</i>	10	<input type="checkbox"/> 8.0%	FAC			
3. <i>Rhynchospora colorata</i>	15	<input type="checkbox"/> 12.0%	FACW			
4. <i>Rhynchospora caduca</i>	20	<input checked="" type="checkbox"/> 16.0%	OBL			
5. <i>Schoenoplectus pungens</i>	10	<input type="checkbox"/> 8.0%	OBL			
6. <i>Juncus dudleyi</i>	15	<input type="checkbox"/> 12.0%	FACW			
7. <i>Panicum repens</i>	5	<input type="checkbox"/> 4.0%	FACW			
8. <i>Eleocharis quadrangulata</i>	20	<input checked="" type="checkbox"/> 16.0%	OBL			
9. _____	0	<input type="checkbox"/> 0.0%				
10. _____	0	<input type="checkbox"/> 0.0%				
11. _____	0	<input type="checkbox"/> 0.0%				
12. _____	0	<input type="checkbox"/> 0.0%				
50% of Total Cover: <u>62.5</u>	20% of Total Cover: <u>25</u>	125	<b>= Total Cover</b>			
Woody Vine Stratum (Plot size: _____ )						
1. _____	0	<input type="checkbox"/> 0.0%				
2. _____	0	<input type="checkbox"/> 0.0%				
3. _____	0	<input type="checkbox"/> 0.0%				
4. _____	0	<input type="checkbox"/> 0.0%				
5. _____	0	<input type="checkbox"/> 0.0%				
50% of Total Cover: <u>0</u>	20% of Total Cover: <u>0</u>	0	<b>= Total Cover</b>			

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 5 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of:	Multiply by:
OBL species <u>50</u>	x 1 = <u>50</u>
FACW species <u>70</u>	x 2 = <u>140</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Total s: <u>135</u> (A)	<u>235</u> (B)
Prevalence Index = B/A = <u>1.741</u>	

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-6

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

[illegible]

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

### Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☒ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Muck Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☒ No ☐

Remarks:

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-7  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.313160° **Long.:** -95.045248° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		



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

**Dominant Species?**

**Sampling Point:** DP-7

Tree Stratum (Plot size: _____ )	Absolute % Cover	Indicator Status
1. <u>Triadica sebifera</u>	15	<input checked="" type="checkbox"/> 100.0% FAC
2. _____	0	<input type="checkbox"/> 0.0%
3. _____	0	<input type="checkbox"/> 0.0%
4. _____	0	<input type="checkbox"/> 0.0%
5. _____	0	<input type="checkbox"/> 0.0%
6. _____	0	<input type="checkbox"/> 0.0%
7. _____	0	<input type="checkbox"/> 0.0%
8. _____	0	<input type="checkbox"/> 0.0%
50% of Total Cover: <u>7.5</u> 20% of Total Cover: <u>3</u> 15 = <b>Total Cover</b>		
Sapling or Sapling/Shrub Stratum (Plot size: _____ )	Absolute % Cover	Indicator Status
1. <u>Triadica sebifera</u>	25	<input checked="" type="checkbox"/> 62.5% FAC
2. <u>Ilex vomitoria</u>	15	<input checked="" type="checkbox"/> 37.5% FAC
3. _____	0	<input type="checkbox"/> 0.0%
4. _____	0	<input type="checkbox"/> 0.0%
5. _____	0	<input type="checkbox"/> 0.0%
6. _____	0	<input type="checkbox"/> 0.0%
7. _____	0	<input type="checkbox"/> 0.0%
8. _____	0	<input type="checkbox"/> 0.0%
50% of Total Cover: <u>20</u> 20% of Total Cover: <u>8</u> 40 = <b>Total Cover</b>		
Shrub Stratum (Plot size: _____ )	Absolute % Cover	Indicator Status
1. <u>Iva frutescens</u>	15	<input checked="" type="checkbox"/> 42.9% FACW
2. <u>Rubus arvensis</u>	10	<input checked="" type="checkbox"/> 28.6% FAC
3. <u>Rosa bracteata</u>	10	<input checked="" type="checkbox"/> 28.6% UPL
4. _____	0	<input type="checkbox"/> 0.0%
5. _____	0	<input type="checkbox"/> 0.0%
6. _____	0	<input type="checkbox"/> 0.0%
50% of Total Cover: <u>17.5</u> 20% of Total Cover: <u>7</u> 35 = <b>Total Cover</b>		
Herb Stratum (Plot size: _____ )	Absolute % Cover	Indicator Status
1. <u>Ambrosia psilostachya</u>	7	<input type="checkbox"/> 10.4% FAC
2. <u>Centella erecta</u>	5	<input type="checkbox"/> 7.5% FACW
3. <u>Cynodon dactylon</u>	30	<input checked="" type="checkbox"/> 44.8% FACU
4. <u>Paspalum notatum</u>	25	<input checked="" type="checkbox"/> 37.3% FACU
5. _____	0	<input type="checkbox"/> 0.0%
6. _____	0	<input type="checkbox"/> 0.0%
7. _____	0	<input type="checkbox"/> 0.0%
8. _____	0	<input type="checkbox"/> 0.0%
9. _____	0	<input type="checkbox"/> 0.0%
10. _____	0	<input type="checkbox"/> 0.0%
11. _____	0	<input type="checkbox"/> 0.0%
12. _____	0	<input type="checkbox"/> 0.0%
50% of Total Cover: <u>33.5</u> 20% of Total Cover: <u>13.4</u> 67 = <b>Total Cover</b>		
Woody Vine Stratum (Plot size: _____ )	Absolute % Cover	Indicator Status
1. <u>Smlax bona-nox</u>	5	<input checked="" type="checkbox"/> 100.0% FAC
2. _____	0	<input type="checkbox"/> 0.0%
3. _____	0	<input type="checkbox"/> 0.0%
4. _____	0	<input type="checkbox"/> 0.0%
5. _____	0	<input type="checkbox"/> 0.0%
50% of Total Cover: <u>2.5</u> 20% of Total Cover: <u>1</u> 5 = <b>Total Cover</b>		

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 0 Multiply by: 1 = 0

OBL spec ies 0 x 1 = 0

FACW spec ies 20 x 2 = 40

FAC spec ies 77 x 3 = 231

FACU spec ies 55 x 4 = 220

UPL spec ies 10 x 5 = 50

Col umn Total s: 162 (A) 541 (B)

Prevalence Index = B/A = 3.340

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☐ 3 - Prevalence Index is  $\leq 3.0$ <sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-7

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

[illegible]

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

**Hydric Soil Indicators:**

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol (A1)                         | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)  |
| <input type="checkbox"/> Histic Epipedon (A2)                  | <input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)        |
| <input type="checkbox"/> Black Histic (A3)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)            |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                 | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                    |
| <input type="checkbox"/> Stratified Layers (A5)                | <input type="checkbox"/> Depleted Matrix (F3)                        |
| <input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)     | <input type="checkbox"/> Redox Dark Surface (F6)                     |
| <input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U) | <input type="checkbox"/> Depleted Dark Surface (F7)                  |
| <input type="checkbox"/> Muck Presence (A8) (LRR U)            | <input type="checkbox"/> Redox Depressions (F8)                      |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)             | <input type="checkbox"/> Marl (F10) (LRR U)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)     | <input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)            |
| <input type="checkbox"/> Thick Dark Surface (A12)              | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)   |
| <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A) | <input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)          |
| <input type="checkbox"/> Sandy Muck Mineral (S1) (LRR O, S)    | <input type="checkbox"/> Delta Ochric (F17) (MLRA 151)               |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)              | <input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)      |
| <input type="checkbox"/> Sandy Redox (S5)                      | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A) |
| <input type="checkbox"/> Stripped Matrix (S6)                  | <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 1  |
| <input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)    |  |

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☐ No ☒

Remarks:

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-8  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.312972° **Long.:** -95.045049° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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

Sampling Point: **DP-8**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	<u>Sesbania drummondii</u>	20	<input checked="" type="checkbox"/> 100.0%	FACW
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>10</u> 20% of Total Cover: <u>4</u>		20	= Total Cover	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	<u>Phyla nodiflora</u>	35	<input checked="" type="checkbox"/> 28.7%	FAC
2.	<u>Rhynchospora colorata</u>	45	<input checked="" type="checkbox"/> 36.9%	FACW
3.	<u>Centella erecta</u>	15	<input type="checkbox"/> 12.3%	FACW
4.	<u>Paspalum notatum</u>	10	<input type="checkbox"/> 8.2%	FACU
5.	<u>Cyperus virens</u>	10	<input type="checkbox"/> 8.2%	FACW
6.	<u>Mimosa strigillosa</u>	7	<input type="checkbox"/> 5.7%	FAC
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>61</u> 20% of Total Cover: <u>24.4</u>		122	= Total Cover	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 0    Multiply by: 1

OBL spec ies 0 x 1 = 0

FACW spec ies 90 x 2 = 180

FAC spec ies 42 x 3 = 126

FACU spec ies 10 x 4 = 40

UPL spec ies 0 x 5 = 0

Col umn Total s: 142 (A)    346 (B)

Prevalence Index = B/A = 2.437

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?**    Yes ☒    No ☐

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-8

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

[illegible]

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

**Hydric Soil Indicators:**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Muck Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☐ No ☒

Remarks:



# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-9  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.312781° **Long.:** -95.044981° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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

Sampling Point: **DP-9**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	<b>= Total Cover</b>	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	<u>Triadica sebifera</u>	10	<input checked="" type="checkbox"/> 100.0%	FAC
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>5</u> 20% of Total Cover: <u>2</u>		10	<b>= Total Cover</b>	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	<b>= Total Cover</b>	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	<u>Phyla nodiflora</u>	30	<input checked="" type="checkbox"/> 37.5%	FAC
2.	<u>Cyperus virens</u>	20	<input checked="" type="checkbox"/> 25.0%	FACW
3.	<u>Schoenoplectus pungens</u>	5	<input type="checkbox"/> 6.3%	OBL
4.	<u>Juncus valldus</u>	5	<input type="checkbox"/> 6.3%	FACW
5.	<u>Mimosa strigillosa</u>	20	<input checked="" type="checkbox"/> 25.0%	FAC
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>40</u> 20% of Total Cover: <u>16</u>		80	<b>= Total Cover</b>	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	<b>= Total Cover</b>	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 5    Multiply by: 1

OBL spec ies 5 x 1 = 5

FACW spec ies 25 x 2 = 50

FAC spec ies 60 x 3 = 180

FACU spec ies 0 x 4 = 0

UPL spec ies 0 x 5 = 0

Col umn Total s: 90 (A)    235 (B)

Prevalence Index = B/A = 2.611

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?**    Yes ☒    No ☐

Remarks: (If observed, list morphological adaptations below).  
Vegetation was sparse due to pipeline construction through this area.

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-9

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

[illegible]

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

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**Hydric Soil Indicators:**

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol (A1)                         | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)  |
| <input type="checkbox"/> Histic Epipedon (A2)                  | <input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)        |
| <input type="checkbox"/> Black Histic (A3)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)            |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                 | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                    |
| <input type="checkbox"/> Stratified Layers (A5)                | <input type="checkbox"/> Depleted Matrix (F3)                        |
| <input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)     | <input type="checkbox"/> Redox Dark Surface (F6)                     |
| <input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U) | <input type="checkbox"/> Depleted Dark Surface (F7)                  |
| <input type="checkbox"/> Muck Presence (A8) (LRR U)            | <input type="checkbox"/> Redox Depressions (F8)                      |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)             | <input type="checkbox"/> Marl (F10) (LRR U)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)     | <input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)            |
| <input type="checkbox"/> Thick Dark Surface (A12)              | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)   |
| <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A) | <input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)          |
| <input type="checkbox"/> Sandy Muck Mineral (S1) (LRR O, S)    | <input type="checkbox"/> Delta Ochric (F17) (MLRA 151)               |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)              | <input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)      |
| <input type="checkbox"/> Sandy Redox (S5)                      | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A) |
| <input type="checkbox"/> Stripped Matrix (S6)                  | <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 1  |
| <input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)    |  |

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: \_\_\_\_\_

Depth (inches):

Hydric Soil Present? Yes ☐ No ☒

Remarks:

Disturbed soils due to pipeline construction through this area.

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-10  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.312618° **Long.:** -95.044911° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): <u>6</u>	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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

Tree Stratum (Plot size: _____ )				Dominant Species?	Indicator Status	Sampling Point: <b>DP-10</b>	
	Absolute % Cover	Rel.Strat. Cover				Dominance Test worksheet:	
1. _____	0	<input type="checkbox"/> 0.0%				Number of Dominant Species That are OBL, FACW, or FAC: <u>3</u> (A)	
2. _____	0	<input type="checkbox"/> 0.0%				Total Number of Dominant Species Across All Strata: <u>3</u> (B)	
3. _____	0	<input type="checkbox"/> 0.0%				Percent of dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)	
4. _____	0	<input type="checkbox"/> 0.0%				<b>Prevalence Index worksheet:</b> <div style="display: flex; justify-content: space-between;"> <span>Total % Cover of:</span> <span>Multiply by:</span> </div> <div style="display: flex; justify-content: space-between;"> <div> <b>OBL spec</b> es <u>85</u>  <b>FACW spec</b> es <u>52</u>  <b>FAC spec</b> es <u>20</u>  <b>FACU spec</b> es <u>0</u>  <b>UPL spec</b> es <u>0</u>  <b>Column Total s:</b> <u>157</u> (A)                         </div> <div> <b>x 1 =</b> <u>85</u>  <b>x 2 =</b> <u>104</u>  <b>x 3 =</b> <u>60</u>  <b>x 4 =</b> <u>0</u>  <b>x 5 =</b> <u>0</u>  <b>(B)</b> <u>249</u> </div> </div> <div style="text-align: center; margin-top: 5px;">                     Prevalence Index = B/A = <u>1.586</u> </div>	
5. _____	0	<input type="checkbox"/> 0.0%					
6. _____	0	<input type="checkbox"/> 0.0%					
7. _____	0	<input type="checkbox"/> 0.0%					
8. _____	0	<input type="checkbox"/> 0.0%					
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u> 0 = <b>Total Cover</b>							
Sapling or Sapling/Shrub Stratum (Plot size: _____ )						<b>Hydrophytic Vegetation Indicators:</b> <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is > 50% <input checked="" type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
1. <u>Triadica sebifera</u>	20	<input checked="" type="checkbox"/> 100.0%	FAC				
2. _____	0	<input type="checkbox"/> 0.0%					
3. _____	0	<input type="checkbox"/> 0.0%					
4. _____	0	<input type="checkbox"/> 0.0%					
5. _____	0	<input type="checkbox"/> 0.0%				<b>Definition of Vegetation Strata:</b> Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).  Sapling - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.  Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.  Shrub - Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.  Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.  Woody vine - All woody vines, regardless of height.	
6. _____	0	<input type="checkbox"/> 0.0%					
7. _____	0	<input type="checkbox"/> 0.0%					
8. _____	0	<input type="checkbox"/> 0.0%					
50% of Total Cover: <u>10</u> 20% of Total Cover: <u>4</u> 20 = <b>Total Cover</b>							
Shrub Stratum (Plot size: _____ )						<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
1. _____	0	<input type="checkbox"/> 0.0%					
2. _____	0	<input type="checkbox"/> 0.0%					
3. _____	0	<input type="checkbox"/> 0.0%					
4. _____	0	<input type="checkbox"/> 0.0%					
5. _____	0	<input type="checkbox"/> 0.0%				Remarks: (If observed, list morphological adaptations below).   	
6. _____	0	<input type="checkbox"/> 0.0%					
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u> 0 = <b>Total Cover</b>							
Herb Stratum (Plot size: _____ )							
1. <u>Rhynchospora colorata</u>	45	<input checked="" type="checkbox"/> 32.8%	FACW				
2. <u>Hydrocotyle verticillata</u>	15	<input type="checkbox"/> 10.9%	OBL				
3. <u>Schoenoplectus pungens</u>	35	<input checked="" type="checkbox"/> 25.5%	OBL				
4. <u>Eleocharis quadrangulata</u>	25	<input type="checkbox"/> 18.2%	OBL				
5. <u>Aristida purpurascens</u>	7	<input type="checkbox"/> 5.1%	FACW				
6. <u>Alternanthera philoxeroides</u>	10	<input type="checkbox"/> 7.3%	OBL				
7. _____	0	<input type="checkbox"/> 0.0%					
8. _____	0	<input type="checkbox"/> 0.0%					
9. _____	0	<input type="checkbox"/> 0.0%					
10. _____	0	<input type="checkbox"/> 0.0%					
11. _____	0	<input type="checkbox"/> 0.0%					
12. _____	0	<input type="checkbox"/> 0.0%					
50% of Total Cover: <u>68.5</u> 20% of Total Cover: <u>27.4</u> 137 = <b>Total Cover</b>							
Woody Vine Stratum (Plot size: _____ )							
1. _____	0	<input type="checkbox"/> 0.0%					
2. _____	0	<input type="checkbox"/> 0.0%					
3. _____	0	<input type="checkbox"/> 0.0%					
4. _____	0	<input type="checkbox"/> 0.0%					
5. _____	0	<input type="checkbox"/> 0.0%					
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u> 0 = <b>Total Cover</b>							

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.



## SOIL

Sampling Point: DP-10

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

[illegible]

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

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**Hydric Soil Indicators:**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Muck Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches):

Hydric Soil Present? Yes ☒ No ☐

Remarks:

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-11  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.310394° **Long.:** -95.045374° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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

Sampling Point: **DP-11**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	<b>= Total Cover</b>	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	<u>Triadica sebifera</u>	10	<input checked="" type="checkbox"/> 100.0%	FAC
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>5</u> 20% of Total Cover: <u>2</u>		10	<b>= Total Cover</b>	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	<b>= Total Cover</b>	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	<u>Cyperus virens</u>	60	<input checked="" type="checkbox"/> 37.5%	FACW
2.	<u>Setaria parviflora</u>	20	<input type="checkbox"/> 12.5%	FACW
3.	<u>Phyla nodiflora</u>	15	<input type="checkbox"/> 9.4%	FAC
4.	<u>Aristida purpurascens</u>	10	<input type="checkbox"/> 6.3%	FACW
5.	<u>Rhynchospora caduca</u>	30	<input checked="" type="checkbox"/> 18.8%	OBL
6.	<u>Rhynchospora colorata</u>	25	<input type="checkbox"/> 15.6%	FACW
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>80</u> 20% of Total Cover: <u>32</u>		160	<b>= Total Cover</b>	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	<b>= Total Cover</b>	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 30    Multiply by: 1

OBL spec ies 30 x 1 = 30

FACW spec ies 115 x 2 = 230

FAC spec ies 25 x 3 = 75

FACU spec ies 0 x 4 = 0

UPL spec ies 0 x 5 = 0

Col umn Total s: 170 (A)    335 (B)

Prevalence Index = B/A = 1.971

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?**    Yes ☒    No ☐

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-11

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

[illegible]

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

### Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Muck Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☒ No ☐

Remarks:

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-12  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.313451° **Long.:** -95.048317° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		



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

Sampling Point: **DP-12**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1. <i>Phyla nodiflora</i>		20	<input type="checkbox"/> 15.0%	FAC
2. <i>Aristida purpurascens</i>		70	<input checked="" type="checkbox"/> 52.6%	FACW
3. <i>Ambrosia psilostachya</i>		5	<input type="checkbox"/> 3.8%	FAC
4. <i>Rhynchospora colorata</i>		10	<input type="checkbox"/> 7.5%	FACW
5. <i>Setaria parviflora</i>		15	<input type="checkbox"/> 11.3%	FACW
6. <i>Schizachyrium scoparium</i>		3	<input type="checkbox"/> 2.3%	FACU
7. <i>Paspalum notatum</i>		10	<input type="checkbox"/> 7.5%	FACU
8.		0	<input type="checkbox"/> 0.0%	
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 66.5      20% of Total Cover: 26.6		133	= Total Cover	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 0 Multiply by: 1

OBL spec ies 0 x 1 = 0

FACW spec ies 95 x 2 = 190

FAC spec ies 25 x 3 = 75

FACU spec ies 13 x 4 = 52

UPL spec ies 0 x 5 = 0

Col umn Total s: 133 (A) 317 (B)

Prevalence Index = B/A = 2.383

**Hydrophytic Vegetation Indicators:**

☒ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-12

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

[illegible]

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

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**Hydric Soil Indicators:**

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol (A1)                         | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)  |
| <input type="checkbox"/> Histic Epipedon (A2)                  | <input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)        |
| <input type="checkbox"/> Black Histic (A3)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)            |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                 | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                    |
| <input type="checkbox"/> Stratified Layers (A5)                | <input type="checkbox"/> Depleted Matrix (F3)                        |
| <input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)     | <input type="checkbox"/> Redox Dark Surface (F6)                     |
| <input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U) | <input type="checkbox"/> Depleted Dark Surface (F7)                  |
| <input type="checkbox"/> Muck Presence (A8) (LRR U)            | <input type="checkbox"/> Redox Depressions (F8)                      |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)             | <input type="checkbox"/> Marl (F10) (LRR U)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)     | <input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)            |
| <input type="checkbox"/> Thick Dark Surface (A12)              | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)   |
| <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A) | <input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)          |
| <input type="checkbox"/> Sandy Muck Mineral (S1) (LRR O, S)    | <input type="checkbox"/> Delta Ochric (F17) (MLRA 151)               |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)              | <input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)      |
| <input type="checkbox"/> Sandy Redox (S5)                      | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A) |
| <input type="checkbox"/> Stripped Matrix (S6)                  | <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 1  |
| <input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)    |  |

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches):

Hydric Soil Present? Yes ☐ No ☒

Remarks:

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-13  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.312792° **Long.:** -95.048293° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): <u>8</u> Saturation Present? (includes capillary fringe) Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): <u>0</u>	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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

Sampling Point: **DP-13**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1. <i>Phyla nodiflora</i>		7	<input type="checkbox"/> 5.4%	FAC
2. <i>Cyperus virens</i>		5	<input type="checkbox"/> 3.9%	FACW
3. <i>Rhynchospora colorata</i>		10	<input type="checkbox"/> 7.8%	FACW
4. <i>Rhynchospora caduca</i>		10	<input type="checkbox"/> 7.8%	OBL
5. <i>Eleocharis montevidensis</i>		15	<input checked="" type="checkbox"/> 11.6%	FACW
6. <i>Eleocharis montana</i>		5	<input type="checkbox"/> 3.9%	OBL
7. <i>Paspalum floridanum</i>		30	<input checked="" type="checkbox"/> 23.3%	FACW
8. <i>Paspalum notatum</i>		15	<input checked="" type="checkbox"/> 11.6%	FACU
9. <i>Aristida purpurascens</i>		15	<input checked="" type="checkbox"/> 11.6%	FACW
10. <i>Centella erecta</i>		10	<input type="checkbox"/> 7.8%	FACW
11. <i>Diodia virginiana</i>		7	<input type="checkbox"/> 5.4%	FACW
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 64.5      20% of Total Cover: 25.8		129	= Total Cover	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 129 Multiply by: 5

OBL species 15 x 1 = 15

FACW species 92 x 2 = 184

FAC species 7 x 3 = 21

FACU species 15 x 4 = 60

UPL species 0 x 5 = 0

Column Total s: 129 (A) 280 (B)

Prevalence Index = B/A = 2.171

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-13

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

[illegible]

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

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**Hydric Soil Indicators:**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Muck Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches):

Hydric Soil Present? Yes ☒ No ☐

Remarks:



# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-14  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.312601° **Long.:** -95.049353° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): <u>12</u>	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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

Sampling Point: **DP-14**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	<b>= Total Cover</b>	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	<b>= Total Cover</b>	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	Rosa bracteata	10	<input checked="" type="checkbox"/> 66.7%	UPL
2.	Sesbania punicea	5	<input checked="" type="checkbox"/> 33.3%	FAC
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 7.5      20% of Total Cover: 3		15	<b>= Total Cover</b>	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	Rhynchospora caduca	60	<input checked="" type="checkbox"/> 40.0%	OBL
2.	Hydrocotyle verticillata	15	<input type="checkbox"/> 10.0%	OBL
3.	Cyperus virens	15	<input type="checkbox"/> 10.0%	FACW
4.	Phyla nodiflora	20	<input type="checkbox"/> 13.3%	FAC
5.	Aristida purpurascens	25	<input checked="" type="checkbox"/> 16.7%	FACW
6.	Carex texensis	5	<input type="checkbox"/> 3.3%	UPL
7.	Cynodon dactylon	10	<input type="checkbox"/> 6.7%	FACU
8.		0	<input type="checkbox"/> 0.0%	
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 75      20% of Total Cover: 30		150	<b>= Total Cover</b>	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	<b>= Total Cover</b>	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 75 Multiply by: 1

OBL species 75 x 1 = 75

FACW species 40 x 2 = 80

FAC species 25 x 3 = 75

FACU species 10 x 4 = 40

UPL species 15 x 5 = 75

Column Total s: 165 (A) 345 (B)

Prevalence Index = B/A = 2.091

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-14

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

[illegible]

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

**Hydric Soil Indicators:**

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol (A1)                         | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)  |
| <input type="checkbox"/> Histic Epipedon (A2)                  | <input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)        |
| <input type="checkbox"/> Black Histic (A3)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)            |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                 | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                    |
| <input type="checkbox"/> Stratified Layers (A5)                | <input checked="" type="checkbox"/> Depleted Matrix (F3)             |
| <input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)     | <input checked="" type="checkbox"/> Redox Dark Surface (F6)          |
| <input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U) | <input type="checkbox"/> Depleted Dark Surface (F7)                  |
| <input type="checkbox"/> Muck Presence (A8) (LRR U)            | <input type="checkbox"/> Redox Depressions (F8)                      |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)             | <input type="checkbox"/> Marl (F10) (LRR U)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)     | <input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)            |
| <input type="checkbox"/> Thick Dark Surface (A12)              | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)   |
| <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A) | <input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)          |
| <input type="checkbox"/> Sandy Muck Mineral (S1) (LRR O, S)    | <input type="checkbox"/> Delta Ochric (F17) (MLRA 151)               |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)              | <input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)      |
| <input type="checkbox"/> Sandy Redox (S5)                      | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A) |
| <input type="checkbox"/> Stripped Matrix (S6)                  | <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 1  |
| <input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)    |  |

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes ☒ No ☐

Remarks:

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-15  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.313046° **Long.:** -95.049618° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

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

Sampling Point: **DP-15**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1. <i>Phyla nodiflora</i>		20	<input checked="" type="checkbox"/> 20.6%	FAC
2. <i>Mimosa strigillosa</i>		5	<input type="checkbox"/> 5.2%	FAC
3. <i>Setaria leucopila</i>		20	<input checked="" type="checkbox"/> 20.6%	UPL
4. <i>Rhynchospora colorata</i>		10	<input type="checkbox"/> 10.3%	FACW
5. <i>Heterotheca canescens</i>		10	<input type="checkbox"/> 10.3%	UPL
6. <i>Plantago lanceolata</i>		7	<input type="checkbox"/> 7.2%	FACU
7. <i>Muhlenbergia rigens</i>		20	<input checked="" type="checkbox"/> 20.6%	FACU
8. <i>Oenothera speciosa</i>		5	<input type="checkbox"/> 5.2%	UPL
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>48.5</u> 20% of Total Cover: <u>19.4</u>		97	= Total Cover	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: <u>0</u> 20% of Total Cover: <u>0</u>		0	= Total Cover	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 97 Multiply by: 3.897

OBL species 0 x 1 = 0

FACW species 10 x 2 = 20

FAC species 25 x 3 = 75

FACU species 27 x 4 = 108

UPL species 35 x 5 = 175

Column Total s: 97 (A) 378 (B)

Prevalence Index = B/A = 3.897

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☐ 2 - Dominance Test is > 50%

☐ 3 - Prevalence Index is  $\leq 3.0$ <sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☐ No ☒

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.



## SOIL

Sampling Point: DP-15

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

[illegible]

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

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**Hydric Soil Indicators:**

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol (A1)                         | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR S, T, U)  |
| <input type="checkbox"/> Histic Epipedon (A2)                  | <input type="checkbox"/> Thin Dark Surface (S9) (LRR S, T, U)        |
| <input type="checkbox"/> Black Histic (A3)                     | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR O)            |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                 | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                    |
| <input type="checkbox"/> Stratified Layers (A5)                | <input type="checkbox"/> Depleted Matrix (F3)                        |
| <input type="checkbox"/> Organic Bodies (A6) (LRR P, T, U)     | <input checked="" type="checkbox"/> Redox Dark Surface (F6)          |
| <input type="checkbox"/> 5 cm Mucky Mineral (A7) (LRR P, T, U) | <input type="checkbox"/> Depleted Dark Surface (F7)                  |
| <input type="checkbox"/> Muck Presence (A8) (LRR U)            | <input type="checkbox"/> Redox Depressions (F8)                      |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR P, T)             | <input type="checkbox"/> Marl (F10) (LRR U)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)     | <input type="checkbox"/> Depleted Ochric (F11) (MLRA 151)            |
| <input type="checkbox"/> Thick Dark Surface (A12)              | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR O, P, T)   |
| <input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 150A) | <input type="checkbox"/> Umbric Surface (F13) (LRR P, T, U)          |
| <input type="checkbox"/> Sandy Muck Mineral (S1) (LRR O, S)    | <input type="checkbox"/> Delta Ochric (F17) (MLRA 151)               |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)              | <input type="checkbox"/> Reduced Vertic (F18) (MLRA 150A, 150B)      |
| <input type="checkbox"/> Sandy Redox (S5)                      | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149A) |
| <input type="checkbox"/> Stripped Matrix (S6)                  | <input type="checkbox"/> Anomalous Bright Loamy Soils (F20) (MLRA 1  |
| <input type="checkbox"/> Dark Surface (S7) (LRR P, S, T, U)    |  |

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches):

Hydric Soil Present? Yes ☒ No ☐

Remarks:

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-16  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.310147° **Long.:** -95.049887° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:   Remarks:		

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

Sampling Point: **DP-16**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.	Rhynchospora colorata	20	<input type="checkbox"/> 15.2%	FACW
2.	Eleocharis montevidensis	15	<input type="checkbox"/> 11.4%	FACW
3.	Rhynchospora caduca	25	<input checked="" type="checkbox"/> 18.9%	OBL
4.	Aristida purpurascens	30	<input checked="" type="checkbox"/> 22.7%	FACW
5.	Cyperus virens	30	<input checked="" type="checkbox"/> 22.7%	FACW
6.	Sophora tomentosa	5	<input type="checkbox"/> 3.8%	FAC
7.	Hydrocotyle verticillata	7	<input type="checkbox"/> 5.3%	OBL
8.		0	<input type="checkbox"/> 0.0%	
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 66      20% of Total Cover: 26.4		132	= Total Cover	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	

**Dominance Test worksheet:**

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 132 Multiply by: 5

OBL species 32 x 1 = 32

FACW species 95 x 2 = 190

FAC species 5 x 3 = 15

FACU species 0 x 4 = 0

UPL species 0 x 5 = 0

Column Total s: 132 (A) 237 (B)

Prevalence Index = B/A = 1.795

**Hydrophytic Vegetation Indicators:**

☒ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤3.0<sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: DP-16

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

[illegible]

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

### Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Muck Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches):

Hydric Soil Present? Yes ☒ No ☐

Remarks:

# WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

**Project/Site:** Project TIDE PRM Site **City/County:** Hitchcock / Galveston **Sampling Date:** 30-May-17  
**Applicant/Owner:** Oiltanking North America **State:** TX **Sampling Point:** DP-17  
**Investigator(s):** J.Prescott **Section, Township, Range:** S T R  
**Landform (hillslope, terrace, etc.):** Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °  
**Subregion (LRR or MLRA):** LRR T / MLRA 150A **Lat.:** 29.310303° **Long.:** -95.049951° **Datum:** WGS84  
**Soil Map Unit Name:** Md - Mocreay-Leton complex **NWI classification:** None

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes ☒ No ☐ (If no, explain in Remarks.)  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ☒ No ☐  
**Are Vegetation** ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	<b>Is the Sampled Area</b> <b>within a Wetland?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
Remarks:	

## HYDROLOGY

<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators (minimum of one required; check all that apply)</b> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)		<b>Secondary Indicators (minimum of 2 required)</b> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		



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

Sampling Point: **DP-17**

Tree Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Sapling or Sapling/Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
7.		0	<input type="checkbox"/> 0.0%	
8.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Shrub Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
6.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	
Herb Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1. <i>Aristida purpurascens</i>		20	<input type="checkbox"/> 14.6%	FACW
2. <i>Croton capitatus</i>		7	<input type="checkbox"/> 5.1%	UPL
3. <i>Phyla nodiflora</i>		5	<input type="checkbox"/> 3.6%	FAC
4. <i>Plantago lanceolata</i>		15	<input type="checkbox"/> 10.9%	FACU
5. <i>Cyperus virens</i>		20	<input type="checkbox"/> 14.6%	FACW
6. <i>Schizachyrium scoparium</i>		30	<input checked="" type="checkbox"/> 21.9%	FACU
7. <i>Cynodon dactylon</i>		40	<input checked="" type="checkbox"/> 29.2%	FACU
8.		0	<input type="checkbox"/> 0.0%	
9.		0	<input type="checkbox"/> 0.0%	
10.		0	<input type="checkbox"/> 0.0%	
11.		0	<input type="checkbox"/> 0.0%	
12.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 68.5      20% of Total Cover: 27.4		137	= Total Cover	
Woody Vine Stratum	(Plot size: _____ )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
1.		0	<input type="checkbox"/> 0.0%	
2.		0	<input type="checkbox"/> 0.0%	
3.		0	<input type="checkbox"/> 0.0%	
4.		0	<input type="checkbox"/> 0.0%	
5.		0	<input type="checkbox"/> 0.0%	
50% of Total Cover: 0      20% of Total Cover: 0		0	= Total Cover	

**Dominance Test worksheet:**

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

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

Percent of dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

**Prevalence Index worksheet:**

Total % Cover of: 0 Multiply by: 1

OBL spec ies 0 x 1 = 0

FACW spec ies 40 x 2 = 80

FAC spec ies 5 x 3 = 15

FACU spec ies 85 x 4 = 340

UPL spec ies 7 x 5 = 35

Col umn Total s: 137 (A) 470 (B)

Prevalence Index = B/A = 3.431

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☐ 2 - Dominance Test is > 50%

☐ 3 - Prevalence Index is  $\leq 3.0$ <sup>1</sup>

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definition of Vegetation Strata:**

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

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

Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1m) tall.

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

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

Woody vine - All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes ☐ No ☒

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

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## SOIL

Sampling Point: **DP-17**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-16	10YR	3/2	100				Clay Loam	

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

## Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Organic Bodies (A6) (LRR P, T, U)
- ☐ 5 cm Mucky Mineral (A7) (LRR P, T, U)
- ☐ Muck Presence (A8) (LRR U)
- ☐ 1 cm Muck (A9) (LRR P, T)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Coast Prairie Redox (A16) (MLRA 150A)
- ☐ Sandy Muck Mineral (S1) (LRR O, S)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR P, S, T, U)

- ☐ Polyvalue Below Surface (S8) (LRR S, T, U)
- ☐ Thin Dark Surface (S9) (LRR S, T, U)
- ☐ Loamy Mucky Mineral (F1) (LRR O)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (LRR U)
- ☐ Depleted Ochric (F11) (MLRA 151)
- ☐ Iron-Manganese Masses (F12) (LRR O, P, T)
- ☐ Umbric Surface (F13) (LRR P, T, U)
- ☐ Delta Ochric (F17) (MLRA 151)
- ☐ Reduced Vertic (F18) (MLRA 150A, 150B)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149A)
- ☐ Anomalous Bright Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

## Restrictive Layer (if observed):

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present?    Yes ☐    No ☒

Remarks:

# **Attachment 3**

## **Site Visit Photographs**

Photograph 1 – Typical wetland soils at DP-1



Photograph 2 – Typical vegetation at DP-1 in Wetland 1, facing northwest





Photograph 3 – View of Wetland 1, facing northeast



Photograph 4 – High water table and saturation at DP-1





Photograph 5 – Secondary hydrological indicator – crawfish burrows seen throughout site



Photograph 6 – Typical upland soils at DP-8





Photograph 7 – Typical upland vegetation at DP-8, facing west



Photograph 8 – Culvert at western edge of man-made drainage ditch





Photograph 9 – View of man-made drainage ditch, facing east



Photograph 10 – View of Wetland 2, facing east





Photograph 11 – View of Wetland 3, facing west



Photograph 12 – View of surface water in Wetland 4, facing west at southern border



Photograph 13 – View of Wetland 4, facing west





# **Attachment 4**

## **GPS Attribute Data**

Unique Number	Unique Name	Date Recorded	Receiver Type	Latitude	Longitude	Number of Satellites	PDOP	Standard Deviation	Correction Status
728	z2	5/30/2017	Geo 7X (Centimeter)	29.31413494	-95.04423374	≥ 4	≤ 6	0.323392	Postprocessed Code
729	z3	5/30/2017	Geo 7X (Centimeter)	29.31406558	-95.04436742	≥ 4	≤ 6	0.227048	Postprocessed Carrier Float
730	z4	5/30/2017	Geo 7X (Centimeter)	29.3138983	-95.04449364	≥ 4	≤ 6	0.267267	Postprocessed Carrier Float
731	z5	5/30/2017	Geo 7X (Centimeter)	29.31371017	-95.04459936	≥ 4	≤ 6	0.072765	Postprocessed Carrier Float
732	z6	5/30/2017	Geo 7X (Centimeter)	29.31351346	-95.04480748	≥ 4	≤ 6	0.082852	Postprocessed Carrier Float
733	z7	5/30/2017	Geo 7X (Centimeter)	29.31332373	-95.044951	≥ 4	≤ 6	0.504855	Postprocessed Carrier Float
734	z8	5/30/2017	Geo 7X (Centimeter)	29.31346599	-95.04541958	≥ 4	≤ 6	0.325687	Postprocessed Carrier Float
735	z9	5/30/2017	Geo 7X (Centimeter)	29.31358446	-95.04553144	≥ 4	≤ 6	0.110512	Postprocessed Carrier Float
736	z10	5/30/2017	Geo 7X (Centimeter)	29.31378498	-95.04560072	≥ 4	≤ 6	0.057248	Postprocessed Carrier Float
737	z10-2	5/30/2017	Geo 7X (Centimeter)	29.31378496	-95.04560085	≥ 4	≤ 6	0.032762	Postprocessed Carrier Float
738	z11	5/30/2017	Geo 7X (Centimeter)	29.31385903	-95.04574591	≥ 4	≤ 6	0.094499	Postprocessed Carrier Float
739	z12	5/30/2017	Geo 7X (Centimeter)	29.31398143	-95.04580589	≥ 4	≤ 6	0.462893	Postprocessed Carrier Float
740	z13	5/30/2017	Geo 7X (Centimeter)	29.31416411	-95.04577824	≥ 4	≤ 6	0.151398	Postprocessed Carrier Float
741	z14	5/30/2017	Geo 7X (Centimeter)	29.31432628	-95.04571232	≥ 4	≤ 6	0.094081	Postprocessed Code
742	z15	5/30/2017	Geo 7X (Centimeter)	29.31447759	-95.0457392	≥ 4	≤ 6	0.231419	Postprocessed Carrier Float
743	z16	5/30/2017	Geo 7X (Centimeter)	29.31466006	-95.04574425	≥ 4	≤ 6	0.073872	Postprocessed Carrier Float
744	z17	5/30/2017	Geo 7X (Centimeter)	29.31476499	-95.04593913	≥ 4	≤ 6	0.253338	Postprocessed Carrier Float
745	z18	5/30/2017	Geo 7X (Centimeter)	29.31483237	-95.04610567	≥ 4	≤ 6	0.150869	Postprocessed Code
746	z19	5/30/2017	Geo 7X (Centimeter)	29.31485271	-95.0463894	≥ 4	≤ 6	0.139311	Postprocessed Carrier Float
747	z20	5/30/2017	Geo 7X (Centimeter)	29.31488548	-95.04660941	≥ 4	≤ 6	0.102257	Postprocessed Code
748	z20-2	5/30/2017	Geo 7X (Centimeter)	29.31488643	-95.04660933	≥ 4	≤ 6	0.151613	Postprocessed Carrier Float
749	z21	5/30/2017	Geo 7X (Centimeter)	29.31482428	-95.04677831	≥ 4	≤ 6	0.113667	Postprocessed Carrier Float
750	z22	5/30/2017	Geo 7X (Centimeter)	29.3148526	-95.04695888	≥ 4	≤ 6	0.364958	Postprocessed Code
751	z23	5/30/2017	Geo 7X (Centimeter)	29.31493718	-95.04706682	≥ 4	≤ 6	0.048313	Postprocessed Carrier Float
847	DP-50	5/30/2017	Geo 7X (Centimeter)	29.31485082	-95.04780026	≥ 4	≤ 6	0.399668	Postprocessed Code
848	xx1	5/30/2017	Geo 7X (Centimeter)	29.31440058	-95.04918191	≥ 4	≤ 6	0.465813	Postprocessed Carrier Float
849	xx2	5/30/2017	Geo 7X (Centimeter)	29.31432267	-95.04899878	≥ 4	≤ 6	0.677522	Postprocessed Carrier Float
850	xx3	5/30/2017	Geo 7X (Centimeter)	29.31424777	-95.04873735	≥ 4	≤ 6	0.301227	Postprocessed Carrier Float
851	xx4	5/30/2017	Geo 7X (Centimeter)	29.31417282	-95.04841774	≥ 4	≤ 6	0.218738	Postprocessed Code
852	xx5	5/30/2017	Geo 7X (Centimeter)	29.3140649	-95.0480572	≥ 4	≤ 6	0.381585	Postprocessed Code
853	xx6	5/30/2017	Geo 7X (Centimeter)	29.31399584	-95.04778473	≥ 4	≤ 6	0.117549	Postprocessed Code
854	xx7	5/30/2017	Geo 7X (Centimeter)	29.31393006	-95.04751963	≥ 4	≤ 6	0.220951	Postprocessed Code
855	xx8	5/30/2017	Geo 7X (Centimeter)	29.31384777	-95.04722519	≥ 4	≤ 6	0.739326	Postprocessed Code
856	xx9	5/30/2017	Geo 7X (Centimeter)	29.31373115	-95.0467586	≥ 4	≤ 6	0	Postprocessed Code
857	xx10	5/30/2017	Geo 7X (Centimeter)	29.31364813	-95.04641689	≥ 4	≤ 6	0.105137	Postprocessed Code
858	xx10-2	5/30/2017	Geo 7X (Centimeter)	29.31364917	-95.04641723	≥ 4	≤ 6	0.219454	Postprocessed Carrier Float
859	xx11	5/30/2017	Geo 7X (Centimeter)	29.31356398	-95.04604032	≥ 4	≤ 6	0.4639	Postprocessed Code
860	xx12	5/30/2017	Geo 7X (Centimeter)	29.31346212	-95.04570931	≥ 4	≤ 6	0.146853	Postprocessed Code
861	xx13	5/30/2017	Geo 7X (Centimeter)	29.31341137	-95.04550067	≥ 4	≤ 6	0.115897	Postprocessed Carrier Float
862	xx14	5/30/2017	Geo 7X (Centimeter)	29.31334967	-95.04525956	≥ 4	≤ 6	0.200632	Postprocessed Code
863	xx15	5/30/2017	Geo 7X (Centimeter)	29.31327729	-95.04498655	≥ 4	≤ 6	0.144475	Postprocessed Carrier Float
864	xx16	5/30/2017	Geo 7X (Centimeter)	29.3131986	-95.04471988	≥ 4	≤ 6	0.193973	Postprocessed Carrier Float
865	xx17	5/30/2017	Geo 7X (Centimeter)	29.3131679	-95.04456998	≥ 4	≤ 6	0.047828	Postprocessed Carrier Float
866	xx18	5/30/2017	Geo 7X (Centimeter)	29.31312615	-95.04441175	≥ 4	≤ 6	0.420906	Postprocessed Code
867	xx19	5/30/2017	Geo 7X (Centimeter)	29.31308202	-95.04424604	≥ 4	≤ 6	0.269275	Postprocessed Carrier Float
868	xx20	5/30/2017	Geo 7X (Centimeter)	29.3130329	-95.04409457	≥ 4	≤ 6	0.149841	Postprocessed Carrier Float



Unique Number	Unique Name	Date Recorded	Receiver Type	Latitude	Longitude	Number of Satellites	PDOP	Standard Deviation	Correction Status
682	DP-40	5/30/2017	Geo 7X (Centimeter)	29.31604159	-95.04860998	≥ 4	≤ 6	0.166586	Postprocessed Code
683	w1	5/30/2017	Geo 7X (Centimeter)	29.31624928	-95.04861246	≥ 4	≤ 6	0.100972	Postprocessed Carrier Float
684	w2	5/30/2017	Geo 7X (Centimeter)	29.31623456	-95.04852256	≥ 4	≤ 6	0.247298	Postprocessed Carrier Float
685	w3	5/30/2017	Geo 7X (Centimeter)	29.31619145	-95.04850943	≥ 4	≤ 6	0.102679	Postprocessed Carrier Float
686	w4	5/30/2017	Geo 7X (Centimeter)	29.31621237	-95.04859774	≥ 4	≤ 6	0.087591	Postprocessed Carrier Float
687	w5	5/30/2017	Geo 7X (Centimeter)	29.31611657	-95.04859825	≥ 4	≤ 6	0.028397	Postprocessed Carrier Float
688	w6	5/30/2017	Geo 7X (Centimeter)	29.31606523	-95.04863274	≥ 4	≤ 6	0.260807	Postprocessed Carrier Float
689	w7	5/30/2017	Geo 7X (Centimeter)	29.31605306	-95.04858289	≥ 4	≤ 6	0.056603	Postprocessed Carrier Float
690	w8	5/30/2017	Geo 7X (Centimeter)	29.31609178	-95.0485024	≥ 4	≤ 6	0.031082	Postprocessed Carrier Float
691	w9	5/30/2017	Geo 7X (Centimeter)	29.31605607	-95.04841986	≥ 4	≤ 6	0.114077	Postprocessed Code
692	w10	5/30/2017	Geo 7X (Centimeter)	29.31594668	-95.0484418	≥ 4	≤ 6	0.169508	Postprocessed Carrier Float
693	w10-2	5/30/2017	Geo 7X (Centimeter)	29.3159464	-95.0484412	≥ 4	≤ 6	0.159264	Postprocessed Carrier Float
694	w11	5/30/2017	Geo 7X (Centimeter)	29.31592651	-95.04857606	≥ 4	≤ 6	0.472377	Postprocessed Code
695	w12	5/30/2017	Geo 7X (Centimeter)	29.31583817	-95.04866073	≥ 4	≤ 6	0.280865	Postprocessed Code
696	w13	5/30/2017	Geo 7X (Centimeter)	29.31578314	-95.04876528	≥ 4	≤ 6	0.086233	Postprocessed Code
697	DP-41	5/30/2017	Geo 7X (Centimeter)	29.31547721	-95.04871836	≥ 4	≤ 6	0.093277	Postprocessed Carrier Float
698	x1	5/30/2017	Geo 7X (Centimeter)	29.31440799	-95.04915285	≥ 4	≤ 6	0.268652	Postprocessed Carrier Float
699	x2	5/30/2017	Geo 7X (Centimeter)	29.31436786	-95.04891804	≥ 4	≤ 6	0.456602	Postprocessed Carrier Float
700	x3	5/30/2017	Geo 7X (Centimeter)	29.31428634	-95.04866507	≥ 4	≤ 6	0.163474	Postprocessed Carrier Float
701	x4	5/30/2017	Geo 7X (Centimeter)	29.31420612	-95.04838666	≥ 4	≤ 6	0.370976	Postprocessed Code
702	x6	5/30/2017	Geo 7X (Centimeter)	29.31413272	-95.04808514	≥ 4	≤ 6	0.206674	Postprocessed Carrier Float
703	x7	5/30/2017	Geo 7X (Centimeter)	29.31407216	-95.04779478	≥ 4	≤ 6	0.350894	Postprocessed Code
704	x8	5/30/2017	Geo 7X (Centimeter)	29.31400035	-95.04755271	≥ 4	≤ 6	0.100002	Postprocessed Code
705	x9	5/30/2017	Geo 7X (Centimeter)	29.3139302	-95.04732427	≥ 4	≤ 6	0.110599	Postprocessed Code
706	x10	5/30/2017	Geo 7X (Centimeter)	29.31387462	-95.04703371	≥ 4	≤ 6	0.177429	Postprocessed Code
707	x10-2	5/30/2017	Geo 7X (Centimeter)	29.31387484	-95.04703351	≥ 4	≤ 6	0.352063	Postprocessed Carrier Float
708	x11	5/30/2017	Geo 7X (Centimeter)	29.31378557	-95.04675351	≥ 4	≤ 6	0.467957	Postprocessed Code
709	x12	5/30/2017	Geo 7X (Centimeter)	29.31371715	-95.04646163	≥ 4	≤ 6	0.434862	Postprocessed Code
710	x13	5/30/2017	Geo 7X (Centimeter)	29.31361474	-95.04609805	≥ 4	≤ 6	0.054049	Postprocessed Carrier Float
711	x14	5/30/2017	Geo 7X (Centimeter)	29.3135371	-95.04573853	≥ 4	≤ 6	0.134684	Postprocessed Carrier Float
712	x15	5/30/2017	Geo 7X (Centimeter)	29.3134613	-95.04543061	≥ 4	≤ 6	0.139886	Postprocessed Carrier Float
713	x16	5/30/2017	Geo 7X (Centimeter)	29.31338945	-95.04517173	≥ 4	≤ 6	1.603429	Postprocessed Code
714	x17	5/30/2017	Geo 7X (Centimeter)	29.31332421	-95.04496071	≥ 4	≤ 6	0.450284	Postprocessed Carrier Float
715	x18	5/30/2017	Geo 7X (Centimeter)	29.31326151	-95.04465222	≥ 4	≤ 6	0.132963	Postprocessed Carrier Float
716	x19	5/30/2017	Geo 7X (Centimeter)	29.31319159	-95.04441675	≥ 4	≤ 6	0.58725	Postprocessed Code
717	x20	5/30/2017	Geo 7X (Centimeter)	29.31311937	-95.04413964	≥ 4	≤ 6	0.089559	Postprocessed Carrier Float
718	x20-2	5/30/2017	Geo 7X (Centimeter)	29.31311952	-95.04413798	≥ 4	≤ 6	0.210315	Postprocessed Carrier Float
719	x21	5/30/2017	Geo 7X (Centimeter)	29.3132752	-95.04401846	≥ 4	≤ 6	0.84969	Postprocessed Code
720	DP-42	5/30/2017	Geo 7X (Centimeter)	29.31326066	-95.04407099	≥ 4	≤ 6	0.077691	Postprocessed Carrier Float
721	y1	5/30/2017	Geo 7X (Centimeter)	29.31326981	-95.04466631	≥ 4	≤ 6	0.6064	Postprocessed Code
722	y2	5/30/2017	Geo 7X (Centimeter)	29.31342461	-95.04455505	≥ 4	≤ 6	0.401494	Postprocessed Code
723	y3	5/30/2017	Geo 7X (Centimeter)	29.31359022	-95.04443751	≥ 4	≤ 6	0.292094	Postprocessed Code
724	y4	5/30/2017	Geo 7X (Centimeter)	29.31379437	-95.04429973	≥ 4	≤ 6	0.101068	Postprocessed Code
725	y5	5/30/2017	Geo 7X (Centimeter)	29.31391729	-95.04420586	≥ 4	≤ 6	0.458405	Postprocessed Code
726	y6	5/30/2017	Geo 7X (Centimeter)	29.31406589	-95.04409942	≥ 4	≤ 6	0.34446	Postprocessed Code
727	z1	5/30/2017	Geo 7X (Centimeter)	29.31423795	-95.04412391	≥ 4	≤ 6	0.49437	Postprocessed Code



Unique Number	Unique Name	Date Recorded	Receiver Type	Latitude	Longitude	Number of Satellites	PDOP	Standard Deviation	Correction Status
869	xx20-2	5/30/2017	Geo 7X (Centimeter)	29.31303399	-95.0440955	≥ 4	≤ 6	0.082977	Postprocessed Code
870	DP-51	5/30/2017	Geo 7X (Centimeter)	29.31295711	-95.04423504	≥ 4	≤ 6	0.170408	Postprocessed Code
871	ad1	5/30/2017	Geo 7X (Centimeter)	29.31302517	-95.04409607	≥ 4	≤ 6	0.160392	Postprocessed Carrier Float
872	ad2	5/30/2017	Geo 7X (Centimeter)	29.31280757	-95.04420301	≥ 4	≤ 6	0.250325	Postprocessed Carrier Float
873	ad3	5/30/2017	Geo 7X (Centimeter)	29.31263298	-95.04419228	≥ 4	≤ 6	0.153101	Postprocessed Carrier Float
874	ad4	5/30/2017	Geo 7X (Centimeter)	29.3128022	-95.04439477	≥ 4	≤ 6	0.157534	Postprocessed Carrier Float
875	ad5	5/30/2017	Geo 7X (Centimeter)	29.31283839	-95.04449243	≥ 4	≤ 6	0.150951	Postprocessed Carrier Float
876	ad6	5/30/2017	Geo 7X (Centimeter)	29.31287455	-95.04460809	≥ 4	≤ 6	0	Postprocessed Code
877	ad7	5/30/2017	Geo 7X (Centimeter)	29.31297226	-95.04492367	≥ 4	≤ 6	0.139347	Postprocessed Carrier Float
878	ad8	5/30/2017	Geo 7X (Centimeter)	29.31308392	-95.04482701	≥ 4	≤ 6	0.10662	Postprocessed Carrier Float
879	DP-52	5/30/2017	Geo 7X (Centimeter)	29.31315986	-95.0452475	≥ 4	≤ 6	0.030665	Postprocessed Carrier Float
880	DP-53	5/30/2017	Geo 7X (Centimeter)	29.31278135	-95.04498063	≥ 4	≤ 6	0.350027	Postprocessed Carrier Float
881	DP-54	5/30/2017	Geo 7X (Centimeter)	29.31261801	-95.04491128	≥ 4	≤ 6	0.041989	Postprocessed Carrier Float
882	ae1	5/30/2017	Geo 7X (Centimeter)	29.31270129	-95.0449524	≥ 4	≤ 6	0.213305	Postprocessed Carrier Float
883	ae2	5/30/2017	Geo 7X (Centimeter)	29.31275795	-95.04478996	≥ 4	≤ 6	0.195665	Postprocessed Code
884	ae3	5/30/2017	Geo 7X (Centimeter)	29.31269462	-95.04466409	≥ 4	≤ 6	0.221183	Postprocessed Code
885	ae4	5/30/2017	Geo 7X (Centimeter)	29.31258353	-95.04456414	≥ 4	≤ 6	0.055712	Postprocessed Carrier Float
886	ae5	5/30/2017	Geo 7X (Centimeter)	29.31235723	-95.04459904	≥ 4	≤ 6	0.21361	Postprocessed Carrier Float
887	ae6	5/30/2017	Geo 7X (Centimeter)	29.31221309	-95.04464537	≥ 4	≤ 6	0.314312	Postprocessed Code
888	ae7	5/30/2017	Geo 7X (Centimeter)	29.31202215	-95.04472397	≥ 4	≤ 6	0.144507	Postprocessed Carrier Float
889	ae8	5/30/2017	Geo 7X (Centimeter)	29.31180515	-95.04479497	≥ 4	≤ 6	0.080042	Postprocessed Code
890	ae9	5/30/2017	Geo 7X (Centimeter)	29.31164933	-95.04484048	≥ 4	≤ 6	0.383676	Postprocessed Code
891	ae10	5/30/2017	Geo 7X (Centimeter)	29.31135774	-95.0449549	≥ 4	≤ 6	0.213671	Postprocessed Carrier Float
892	ae10-2	5/30/2017	Geo 7X (Centimeter)	29.31135733	-95.04495501	≥ 4	≤ 6	0.096056	Postprocessed Carrier Float
893	ae11	5/30/2017	Geo 7X (Centimeter)	29.31111105	-95.04503332	≥ 4	≤ 6	0.129759	Postprocessed Code
894	ae12	5/30/2017	Geo 7X (Centimeter)	29.3109287	-95.04508023	≥ 4	≤ 6	0.161963	Postprocessed Code
895	ae13	5/30/2017	Geo 7X (Centimeter)	29.31072161	-95.04518203	≥ 4	≤ 6	0.120209	Postprocessed Carrier Float
896	ae14	5/30/2017	Geo 7X (Centimeter)	29.31051351	-95.04524467	≥ 4	≤ 6	0.203634	Postprocessed Carrier Float
897	ae15	5/30/2017	Geo 7X (Centimeter)	29.31038231	-95.0452988	≥ 4	≤ 6	0.332301	Postprocessed Carrier Float
898	DP-55	5/30/2017	Geo 7X (Centimeter)	29.31039361	-95.04537355	≥ 4	≤ 6	0.06304	Postprocessed Carrier Float
899	ae16	5/30/2017	Geo 7X (Centimeter)	29.3102134	-95.04534499	≥ 4	≤ 6	0.197032	Postprocessed Carrier Float
900	ae17	5/30/2017	Geo 7X (Centimeter)	29.31021395	-95.04554658	≥ 4	≤ 6	0.156227	Postprocessed Carrier Float
901	ae18	5/30/2017	Geo 7X (Centimeter)	29.3102661	-95.04587149	≥ 4	≤ 6	0.10649	Postprocessed Carrier Float
902	ae19	5/30/2017	Geo 7X (Centimeter)	29.31033979	-95.04616106	≥ 4	≤ 6	0.144407	Postprocessed Carrier Float
903	ae20	5/30/2017	Geo 7X (Centimeter)	29.31040239	-95.04641783	≥ 4	≤ 6	0.158195	Postprocessed Carrier Float
904	ae20-2	5/30/2017	Geo 7X (Centimeter)	29.31040212	-95.04641691	≥ 4	≤ 6	0.098484	Postprocessed Carrier Float
905	ae21	5/30/2017	Geo 7X (Centimeter)	29.31051862	-95.04657224	≥ 4	≤ 6	0.178683	Postprocessed Carrier Float
906	ae22	5/30/2017	Geo 7X (Centimeter)	29.31066575	-95.04660505	≥ 4	≤ 6	0.372902	Postprocessed Carrier Float
907	ae23	5/30/2017	Geo 7X (Centimeter)	29.3108169	-95.04665279	≥ 4	≤ 6	0.124037	Postprocessed Carrier Float
908	ae24	5/30/2017	Geo 7X (Centimeter)	29.31073185	-95.04673891	≥ 4	≤ 6	0.212969	Postprocessed Carrier Float
909	ae25	5/30/2017	Geo 7X (Centimeter)	29.31071134	-95.04690936	≥ 4	≤ 6	0.091765	Postprocessed Carrier Float
910	ae26	5/30/2017	Geo 7X (Centimeter)	29.31080866	-95.04696678	≥ 4	≤ 6	0.814824	Postprocessed Carrier Float
911	ae27	5/30/2017	Geo 7X (Centimeter)	29.31085175	-95.04709395	≥ 4	≤ 6	0.298717	Postprocessed Carrier Float
912	ae28	5/30/2017	Geo 7X (Centimeter)	29.31095684	-95.04717116	≥ 4	≤ 6	0.216511	Postprocessed Carrier Float
913	ae29	5/30/2017	Geo 7X (Centimeter)	29.31105998	-95.04715703	≥ 4	≤ 6	0.189897	Postprocessed Carrier Float
914	ae30	5/30/2017	Geo 7X (Centimeter)	29.31119721	-95.04699	≥ 4	≤ 6	0.167934	Postprocessed Carrier Float



Unique Number	Unique Name	Date Recorded	Receiver Type	Latitude	Longitude	Number of Satellites	PDOP	Standard Deviation	Correction Status
915	ae30-2	5/30/2017	Geo 7X (Centimeter)	29.31119869	-95.04698924	≥ 4	≤ 6	0.117552	Postprocessed Carrier Float
916	ae31	5/30/2017	Geo 7X (Centimeter)	29.31130695	-95.04679949	≥ 4	≤ 6	0.114369	Postprocessed Carrier Float
917	ae32	5/30/2017	Geo 7X (Centimeter)	29.31147325	-95.04655049	≥ 4	≤ 6	0.725413	Postprocessed Carrier Float
918	ae33	5/30/2017	Geo 7X (Centimeter)	29.31156578	-95.04630347	≥ 4	≤ 6	0.057228	Postprocessed Code
919	ae34	5/30/2017	Geo 7X (Centimeter)	29.31174008	-95.04612039	≥ 4	≤ 6	0.273017	Postprocessed Code
920	ae35	5/30/2017	Geo 7X (Centimeter)	29.31191581	-95.04599716	≥ 4	≤ 6	0.034427	Postprocessed Carrier Float
921	ae16	5/30/2017	Geo 7X (Centimeter)	29.31199641	-95.0457834	≥ 4	≤ 6	0.195967	Postprocessed Carrier Float
922	ae37	5/30/2017	Geo 7X (Centimeter)	29.3122039	-95.04574108	≥ 4	≤ 6	0.319085	Postprocessed Carrier Float
923	ae38	5/30/2017	Geo 7X (Centimeter)	29.31236704	-95.04558275	≥ 4	≤ 6	0.170003	Postprocessed Code
924	ae39	5/30/2017	Geo 7X (Centimeter)	29.31249591	-95.04545225	≥ 4	≤ 6	0.149203	Postprocessed Carrier Float
925	ae40	5/30/2017	Geo 7X (Centimeter)	29.31265866	-95.04527816	≥ 4	≤ 6	0.107084	Postprocessed Carrier Float
926	ae40-2	5/30/2017	Geo 7X (Centimeter)	29.31265877	-95.04527765	≥ 4	≤ 6	0.025588	Postprocessed Carrier Float
927	ae41	5/30/2017	Geo 7X (Centimeter)	29.31282509	-95.04509827	≥ 4	≤ 6	0.104045	Postprocessed Carrier Float
928	DP-56	5/30/2017	Geo 7X (Centimeter)	29.31293111	-95.04546069	≥ 4	≤ 6	0.06068	Postprocessed Carrier Float
929	DP-57	5/30/2017	Geo 7X (Centimeter)	29.31274322	-95.04766781	≥ 4	≤ 6	0.240948	Postprocessed Carrier Float
930	af1	5/30/2017	Geo 7X (Centimeter)	29.31259864	-95.04903728	≥ 4	≤ 6	0.211199	Postprocessed Carrier Float
931	af2	5/30/2017	Geo 7X (Centimeter)	29.31265085	-95.04916626	≥ 4	≤ 6	0.063789	Postprocessed Carrier Float
932	af3	5/30/2017	Geo 7X (Centimeter)	29.31283204	-95.04920111	≥ 4	≤ 6	0.11419	Postprocessed Code
933	af4	5/30/2017	Geo 7X (Centimeter)	29.31299114	-95.04929041	≥ 4	≤ 6	0.10612	Postprocessed Carrier Float
934	af5	5/30/2017	Geo 7X (Centimeter)	29.31298735	-95.04943807	≥ 4	≤ 6	0.076398	Postprocessed Code
935	af6	5/30/2017	Geo 7X (Centimeter)	29.31293944	-95.04957126	≥ 4	≤ 6	0.11873	Postprocessed Carrier Float
936	af7	5/30/2017	Geo 7X (Centimeter)	29.31283498	-95.04969663	≥ 4	≤ 6	0.223783	Postprocessed Code
937	af8	5/30/2017	Geo 7X (Centimeter)	29.3127249	-95.04975469	≥ 4	≤ 6	0.208892	Postprocessed Carrier Float
938	af9	5/30/2017	Geo 7X (Centimeter)	29.31250814	-95.0498643	≥ 4	≤ 6	0.44006	Postprocessed Code
939	af10	5/30/2017	Geo 7X (Centimeter)	29.31231735	-95.04986265	≥ 4	≤ 6	0.151363	Postprocessed Carrier Float
940	af10-2	5/30/2017	Geo 7X (Centimeter)	29.31231718	-95.04986272	≥ 4	≤ 6	0.063942	Postprocessed Carrier Float
941	af11	5/30/2017	Geo 7X (Centimeter)	29.31247472	-95.04977355	≥ 4	≤ 6	0.033177	Postprocessed Carrier Float
942	af12	5/30/2017	Geo 7X (Centimeter)	29.31242012	-95.04960831	≥ 4	≤ 6	0.038262	Postprocessed Carrier Float
943	af13	5/30/2017	Geo 7X (Centimeter)	29.3122992	-95.04962124	≥ 4	≤ 6	0.093121	Postprocessed Code
944	af14	5/30/2017	Geo 7X (Centimeter)	29.31227467	-95.04951884	≥ 4	≤ 6	0.084929	Postprocessed Carrier Float
945	af15	5/30/2017	Geo 7X (Centimeter)	29.31239198	-95.04935609	≥ 4	≤ 6	0.118948	Postprocessed Carrier Float
946	af16	5/30/2017	Geo 7X (Centimeter)	29.3124738	-95.04919917	≥ 4	≤ 6	0.170197	Postprocessed Carrier Float
947	DP-59	5/30/2017	Geo 7X (Centimeter)	29.31014663	-95.04988743	≥ 4	≤ 6	0.091759	Postprocessed Carrier Float
948	DP-60	5/30/2017	Geo 7X (Centimeter)	29.3103035	-95.04995086	≥ 4	≤ 6	0.078532	Postprocessed Carrier Float
949	ag1	5/30/2017	Geo 7X (Centimeter)	29.31012451	-95.05066971	≥ 4	≤ 6	0.062696	Postprocessed Code
950	ag2	5/30/2017	Geo 7X (Centimeter)	29.31012101	-95.05045661	≥ 4	≤ 6	0.059915	Postprocessed Code
951	ag3	5/30/2017	Geo 7X (Centimeter)	29.31015774	-95.05023688	≥ 4	≤ 6	0.131639	Postprocessed Carrier Float
952	ag4	5/30/2017	Geo 7X (Centimeter)	29.31009241	-95.05007895	≥ 4	≤ 6	0.120549	Postprocessed Code
953	ag5	5/30/2017	Geo 7X (Centimeter)	29.31016004	-95.0499185	≥ 4	≤ 6	0.080866	Postprocessed Carrier Float
954	ag6	5/30/2017	Geo 7X (Centimeter)	29.31022044	-95.04976685	≥ 4	≤ 6	0.0191	Postprocessed Carrier Float
955	ag7	5/30/2017	Geo 7X (Centimeter)	29.31010788	-95.04970474	≥ 4	≤ 6	0.041313	Postprocessed Carrier Float
956	ag8	5/30/2017	Geo 7X (Centimeter)	29.31000184	-95.04967284	≥ 4	≤ 6	0.070311	Postprocessed Carrier Float
957	ag9	5/30/2017	Geo 7X (Centimeter)	29.30989923	-95.04956121	≥ 4	≤ 6	0.134088	Postprocessed Carrier Float
958	ag10	5/30/2017	Geo 7X (Centimeter)	29.30984545	-95.04942318	≥ 4	≤ 6	0.087631	Postprocessed Carrier Float
959	ag10-2	5/30/2017	Geo 7X (Centimeter)	29.30984632	-95.04942336	≥ 4	≤ 6	0.082802	Postprocessed Carrier Float
960	ag11	5/30/2017	Geo 7X (Centimeter)	29.30980508	-95.04927321	≥ 4	≤ 6	0.088907	Postprocessed Carrier Float





Unique Number	Unique Name	Date Recorded	Receiver Type	Latitude	Longitude	Number of Satellites	PDOP	Standard Deviation	Correction Status
961	ag12	5/30/2017	Geo 7X (Centimeter)	29.30983531	-95.049071	≥ 4	≤ 6	0.087043	Postprocessed Carrier Float
962	ag13	5/30/2017	Geo 7X (Centimeter)	29.3097707	-95.04899067	≥ 4	≤ 6	0.093962	Postprocessed Carrier Float
963	ag14	5/30/2017	Geo 7X (Centimeter)	29.30961816	-95.04917835	≥ 4	≤ 6	0.332083	Postprocessed Carrier Float
13	ba12	6/5/2017	Geo 7X (Centimeter)	29.31608144	-95.04818218	≥ 4	≤ 6	0.066184	Postprocessed Code
14	ba13	6/5/2017	Geo 7X (Centimeter)	29.31624776	-95.04799321	≥ 4	≤ 6	0.028888	Postprocessed Code
15	ba14	6/5/2017	Geo 7X (Centimeter)	29.31655363	-95.04789713	≥ 4	≤ 6	0.01666	Postprocessed Carrier Float
16	ba15	6/5/2017	Geo 7X (Centimeter)	29.31589248	-95.04822239	≥ 4	≤ 6	0.062063	Postprocessed Carrier Fixed
17	ba16	6/5/2017	Geo 7X (Centimeter)	29.31573211	-95.0478918	≥ 4	≤ 6	0.029006	Postprocessed Carrier Float
18	ba17	6/5/2017	Geo 7X (Centimeter)	29.31543308	-95.04762082	≥ 4	≤ 6	0.029529	Postprocessed Carrier Float
19	ba18	6/5/2017	Geo 7X (Centimeter)	29.31499791	-95.04762364	≥ 4	≤ 6	0.008479	Postprocessed Code
20	ba19	6/5/2017	Geo 7X (Centimeter)	29.31491763	-95.04772149	≥ 4	≤ 6	0.010719	Postprocessed Code
21	ba20	6/5/2017	Geo 7X (Centimeter)	29.3151546	-95.047801	≥ 4	≤ 6	0.012234	Postprocessed Code
22	ba20-	6/5/2017	Geo 7X (Centimeter)	29.31515472	-95.04780092	≥ 4	≤ 6	0.013562	Postprocessed Carrier Fixed
23	ba21	6/5/2017	Geo 7X (Centimeter)	29.31515378	-95.04787332	≥ 4	≤ 6	0.153763	Postprocessed Code
24	ba22	6/5/2017	Geo 7X (Centimeter)	29.31503153	-95.04789017	≥ 4	≤ 6	0.023226	Postprocessed Carrier Fixed
25	ba23	6/5/2017	Geo 7X (Centimeter)	29.31514925	-95.04809446	≥ 4	≤ 6	0.031654	Postprocessed Code
26	ba24	6/5/2017	Geo 7X (Centimeter)	29.31542403	-95.04809408	≥ 4	≤ 6	0.017613	Postprocessed Carrier Float
27	ba25	6/5/2017	Geo 7X (Centimeter)	29.31547113	-95.04834935	≥ 4	≤ 6	0.023573	Postprocessed Carrier Float
28	ba26	6/5/2017	Geo 7X (Centimeter)	29.31523544	-95.04839973	≥ 4	≤ 6	0.043564	Postprocessed Code
29	ba27	6/5/2017	Geo 7X (Centimeter)	29.31508493	-95.04856684	≥ 4	≤ 6	0.019959	Postprocessed Code
0	dp-70	6/7/2017	Geo 7X (Centimeter)	29.31345089	-95.04831737	≥ 4	≤ 6	0.039624	Postprocessed Carrier Fixed
1	dp-71	6/7/2017	Geo 7X (Centimeter)	29.31279187	-95.04829349	≥ 4	≤ 6	0.181504	Postprocessed Carrier Fixed
2	ca1	6/7/2017	Geo 7X (Centimeter)	29.31289461	-95.04905881	≥ 4	≤ 6	0.020487	Postprocessed Carrier Fixed
3	ca2	6/7/2017	Geo 7X (Centimeter)	29.31296805	-95.04897805	≥ 4	≤ 6	0.119641	Postprocessed Carrier Fixed
4	ca3	6/7/2017	Geo 7X (Centimeter)	29.31295806	-95.04877024	≥ 4	≤ 6	0.012269	Postprocessed Carrier Fixed
5	ca4	6/7/2017	Geo 7X (Centimeter)	29.3129121	-95.04856927	≥ 4	≤ 6	0.032513	Postprocessed Carrier Fixed
6	ca5	6/7/2017	Geo 7X (Centimeter)	29.31308784	-95.0485033	≥ 4	≤ 6	0.038672	Postprocessed Carrier Fixed
7	ca6	6/7/2017	Geo 7X (Centimeter)	29.31307646	-95.04822025	≥ 4	≤ 6	0.008889	Postprocessed Carrier Fixed
8	ca7	6/7/2017	Geo 7X (Centimeter)	29.31301857	-95.04795692	≥ 4	≤ 6	0.024415	Postprocessed Carrier Fixed
9	ca8	6/7/2017	Geo 7X (Centimeter)	29.31312907	-95.04770621	≥ 4	≤ 6	0.132512	Postprocessed Carrier Fixed
10	ca9	6/7/2017	Geo 7X (Centimeter)	29.31334117	-95.0475899	≥ 4	≤ 6	0.058986	Postprocessed Carrier Fixed
11	ca10	6/7/2017	Geo 7X (Centimeter)	29.31360462	-95.04740043	≥ 4	≤ 6	0.022237	Postprocessed Carrier Fixed
12	ca10*	6/7/2017	Geo 7X (Centimeter)	29.31360457	-95.04740078	≥ 4	≤ 6	0.009922	Postprocessed Carrier Fixed
13	ca11	6/7/2017	Geo 7X (Centimeter)	29.31349238	-95.04717806	≥ 4	≤ 6	0.074054	Postprocessed Carrier Fixed
14	ca12	6/7/2017	Geo 7X (Centimeter)	29.31345508	-95.04702285	≥ 4	≤ 6	0.053663	Postprocessed Code
15	ca13	6/7/2017	Geo 7X (Centimeter)	29.31343275	-95.04674121	≥ 4	≤ 6	0	Postprocessed Carrier Float
16	ca14	6/7/2017	Geo 7X (Centimeter)	29.31336014	-95.04644773	≥ 4	≤ 6	0.010844	Postprocessed Code
17	ca15	6/7/2017	Geo 7X (Centimeter)	29.31324491	-95.04607638	≥ 4	≤ 6	0	Postprocessed Carrier Float
18	ca16	6/7/2017	Geo 7X (Centimeter)	29.31315498	-95.04568135	≥ 4	≤ 6	0	Postprocessed Code
19	ca17	6/7/2017	Geo 7X (Centimeter)	29.31302711	-95.04518601	≥ 4	≤ 6	0.505146	Postprocessed Code
20	ca18	6/7/2017	Geo 7X (Centimeter)	29.31276029	-95.0455406	≥ 4	≤ 6	0.016932	Postprocessed Carrier Float
21	ca19	6/7/2017	Geo 7X (Centimeter)	29.31255869	-95.0457227	≥ 4	≤ 6	0.017506	Postprocessed Carrier Fixed
22	ca20	6/7/2017	Geo 7X (Centimeter)	29.31274497	-95.04576921	≥ 4	≤ 6	0.01841	Postprocessed Carrier Fixed
23	ca20*	6/7/2017	Geo 7X (Centimeter)	29.31274493	-95.04576913	≥ 4	≤ 6	0.007692	Postprocessed Carrier Fixed
24	ca21	6/7/2017	Geo 7X (Centimeter)	29.31295199	-95.04585269	≥ 4	≤ 6	0.022433	Postprocessed Carrier Fixed
25	ca23	6/7/2017	Geo 7X (Centimeter)	29.31287261	-95.0461019	≥ 4	≤ 6	0.028784	Postprocessed Carrier Fixed



Unique Number	Unique Name	Date Recorded	Receiver Type	Latitude	Longitude	Number of Satellites	PDOP	Standard Deviation	Correction Status
26	ca24	6/7/2017	Geo 7X (Centimeter)	29.31269477	-95.04626264	≥ 4	≤ 6	0.034118	Postprocessed Carrier Fixed
27	ca25	6/7/2017	Geo 7X (Centimeter)	29.31255041	-95.0464536	≥ 4	≤ 6	0.031613	Postprocessed Code
28	ca26	6/7/2017	Geo 7X (Centimeter)	29.31244081	-95.046635	≥ 4	≤ 6	0.04316	Postprocessed Carrier Fixed
29	ca27	6/7/2017	Geo 7X (Centimeter)	29.31267876	-95.0466865	≥ 4	≤ 6	0.032786	Postprocessed Carrier Fixed
30	ca28	6/7/2017	Geo 7X (Centimeter)	29.31272631	-95.04682459	≥ 4	≤ 6	0.04351	Postprocessed Carrier Fixed
31	ca29	6/7/2017	Geo 7X (Centimeter)	29.31257367	-95.04699386	≥ 4	≤ 6	0.011773	Postprocessed Carrier Fixed
32	ca30	6/7/2017	Geo 7X (Centimeter)	29.31243484	-95.04720483	≥ 4	≤ 6	0.009068	Postprocessed Carrier Fixed
33	ca30*	6/7/2017	Geo 7X (Centimeter)	29.31243483	-95.04720474	≥ 4	≤ 6	0.003485	Postprocessed Carrier Fixed
34	ca31	6/7/2017	Geo 7X (Centimeter)	29.31222286	-95.04729362	≥ 4	≤ 6	0.008246	Postprocessed Carrier Fixed
35	ca32	6/7/2017	Geo 7X (Centimeter)	29.31208463	-95.04757664	≥ 4	≤ 6	0.065566	Postprocessed Carrier Fixed
36	ca33	6/7/2017	Geo 7X (Centimeter)	29.31215662	-95.0477912	≥ 4	≤ 6	0.010759	Postprocessed Carrier Fixed
37	ca34	6/7/2017	Geo 7X (Centimeter)	29.3119433	-95.04795856	≥ 4	≤ 6	0.022587	Postprocessed Carrier Fixed
38	ca35	6/7/2017	Geo 7X (Centimeter)	29.31173147	-95.04794623	≥ 4	≤ 6	0.257826	Postprocessed Carrier Fixed
39	ca36	6/7/2017	Geo 7X (Centimeter)	29.31155785	-95.04799378	≥ 4	≤ 6	0.007111	Postprocessed Carrier Float
40	ca37	6/7/2017	Geo 7X (Centimeter)	29.31140529	-95.04815455	≥ 4	≤ 6	0.011299	Postprocessed Code
41	ca38	6/7/2017	Geo 7X (Centimeter)	29.31122636	-95.04828954	≥ 4	≤ 6	0.063365	Postprocessed Carrier Fixed
42	ca39	6/7/2017	Geo 7X (Centimeter)	29.31111617	-95.04817303	≥ 4	≤ 6	0.082351	Postprocessed Carrier Fixed
43	ca40	6/7/2017	Geo 7X (Centimeter)	29.31092594	-95.04832798	≥ 4	≤ 6	0.019588	Postprocessed Code
44	ca40*	6/7/2017	Geo 7X (Centimeter)	29.31092609	-95.04832795	≥ 4	≤ 6	0.006904	Postprocessed Carrier Fixed
45	ca41	6/7/2017	Geo 7X (Centimeter)	29.31065865	-95.04840087	≥ 4	≤ 6	0.063108	Postprocessed Code
46	ca42	6/7/2017	Geo 7X (Centimeter)	29.31054422	-95.04842857	≥ 4	≤ 6	0.029764	Postprocessed Carrier Fixed
47	ca43	6/7/2017	Geo 7X (Centimeter)	29.31061059	-95.04858791	≥ 4	≤ 6	0.039469	Postprocessed Carrier Fixed
48	ca44	6/7/2017	Geo 7X (Centimeter)	29.31047167	-95.04861945	≥ 4	≤ 6	0.122735	Postprocessed Carrier Fixed
49	ca45	6/7/2017	Geo 7X (Centimeter)	29.31037341	-95.04839635	≥ 4	≤ 6	0.062008	Postprocessed Carrier Fixed
50	ca46	6/7/2017	Geo 7X (Centimeter)	29.31045804	-95.04834937	≥ 4	≤ 6	0.021214	Postprocessed Code
51	ca47	6/7/2017	Geo 7X (Centimeter)	29.31035703	-95.04822389	≥ 4	≤ 6	0.042449	Postprocessed Carrier Float

This data was collected by Spirit Environmental, LLC and processed by Jacqueline Prescott on 6/7/2017.

Signature:  Date: 6/30/2017

## **Attachment 4 - Draft Deed Restriction Language**

## **DEED RESTRICTION**

\_\_\_\_\_ is the owner of the real property more particularly described and shown in Exhibit “A” (hereinafter the “Property”) attached hereto and made a part hereof. The approximately \_\_\_\_-acre Property is also referenced in “The Mitigation Plan for \_\_\_\_\_”. The Property is subject to the conditions of Department of the Army Section 404/Section 10 Permit Number \_\_\_\_\_, dated \_\_\_\_\_, or a revision thereof. One of the conditions of the referenced permit requires restrictions be placed on the deed for the Property for the purpose of providing compensation for adverse impacts to waters of the United States”. The intent of this document is to assure that the Property will be retained and maintained forever predominantly in the natural vegetative and hydrologic condition described in success criteria of the “The Mitigation Plan for \_\_\_\_\_”. Activities, which may, in the future, be conducted within the Property that will affect the vegetative and or hydrologic conditions outlined in the success criteria of the Mitigation Plan, must be coordinated with and approved by the United States Army Corps of Engineers (USACE), Galveston District, Regulatory Branch, prior to initiation.

The parties to this agreement include the Property owner(s) who by their signature accept the third-party rights of enforcement herein and agree that the deed restrictions will be subject to the following conditions:

### **1) Property Description**

(Applicant) will provide as Attachment A-1:

- a) On-site photographs taken at appropriate locations on the Protected Property including all major natural features; and
- b) A copy of the deed with an accurate legal description or a current survey certified by a Texas Registered Professional Land Surveyor (RPLS) of the Protected Property.
- c) A copy of a verified wetland survey map, which delineates all waters of the United States, including wetlands within the Property.

### **2) Term**

These restrictions shall run with the land in perpetuity and be binding on all future owners, heirs, successors, administrators, assigns, lessees, or other occupiers and users. The owner must file this Deed Restriction of record with the County Clerk of \_\_\_\_\_ County, Texas within 10 days of the date this document is signed and provide a copy of the recorded Deed Restriction to the USACE, Galveston District within 30 days of filing.

### **3) General**

Except for such specific activities as authorized pursuant to DA Permit Number \_\_\_\_\_, the following activities are prohibited on the Property subject to this Deed Restriction:

- (a) There shall be no filling, excavation, mining or alteration of the Property that will affect the success criteria outlined in the Mitigation Plan unless approved in writing in advance by the USACE, Galveston District.

**4) Rights of Access and Entry**

The USACE shall have the right to enter and go upon the Property for purposes of inspection, and to take actions including but not limited to scientific or educational observations and studies, and collection of samples.

**5) Enforcement**

In the event of a breach of the restrictions by the Owner, or a third party working with the permission of or under the direction of the Owner, the USACE must be notified immediately. If the USACE becomes aware of a breach of this Agreement, the USACE will notify the Owner of the breach. The Owner shall have thirty (30) days after receipt of such notice to undertake actions that are reasonably calculated to swiftly correct the conditions constituting the breach. If the Owner corrects the conditions constituting the breach in a timely and reasonable manner, no further action is warranted or authorized. If the Owner fails to initiate such corrective action within thirty (30) days or fails to complete the necessary corrective action, the USACE may undertake such actions, including legal proceedings, as are necessary to effect such corrective action. Any forbearance on the part of the USACE to exercise its rights in the event of a breach of the restrictions shall not be deemed or construed to be a waiver of their rights hereunder in the event of any subsequent failure of the Property owner to comply.

Approved by Property Owner

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Title

Approved by Applicant

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Title



## **Attachment 5 - Listed T&E Species - Galveston County**

Taxon	Species Name	Common Name	Federal	State	Description	Habitat Present?
Birds	<i>Grus americana</i>	Whooping Crane	LE	E	Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.	Yes
Birds	<i>Pelecanus occidentalis</i>	Brown Pelican	DL	SGCN	Largely coastal and near shore areas, where it roosts and nests on islands and spoil banks.	No
Birds	<i>Egretta rufescens</i>	Reddish Egret	NL	T	Resident of the Texas Gulf Coast; brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear.	No
Birds	<i>Numenius borealis</i>	Eskimo Curlew	LE	E	Historic; nonbreeding: grasslands, pastures, plowed fields, and less frequently, marshes and mudflats.	Yes
Amphibians	<i>Lithobates areolatus areolatus</i>	Southern Crawfish Frog	NL	SGCN	The Southern Crawfish Frog can be found in abandoned crawfish holes and small mammal burrows. This species inhabits moist meadows, pasturelands, pine scrub, and river flood plains. This species spends nearly all of its time in burrows and only leaves the burrow area to breed. Although this species can be difficult to detect due to its reclusive nature, the call of breeding males can be heard over great distances. Eggs are laid and larvae develop in temporary water such as flooded fields, ditches, farm ponds and small lakes. Habitat: Shallow water, Herbaceous Wetland, Riparian, Temporary Pool, Cropland/hedgerow, Grassland/herbaceous, Suburban/orchard, Woodland Conifer.	Yes
Birds	<i>Haliaeetus leucocephalus</i>	Bald Eagle	DL	T	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds.	No
Birds	<i>Buteo albicaudatus</i>	White-tailed Hawk	NL	T	Near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May.	No

Taxon	Species Name	Common Name	Federal	State	Description	Habitat Present?
Birds	Falco peregrinus	Peregrine Falcon	DL	T	Both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	No
Birds	Falco peregrinus anatum	American Peregrine Falcon	DL	T	Year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	No
Birds	Falco peregrinus tundrius	Arctic Peregrine Falcon	DL	SGCN	Migrant throughout state from subspecies far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	No
Birds	Tympanuchus cupido attwateri	Attwater's Greater Prairie-Chicken	LE	E	This county within historic range; endemic; open prairies of mostly thick grass one to three feet tall; from near sea level to 200 feet along coastal plain on upper two-thirds of Texas coast; males form communal display flocks during late winter-early spring; booming grounds important; breeding February-July.	No
Birds	Laterallus jamaicensis	Black Rail	NL	SGCN	Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually	No

Taxon	Species Name	Common Name	Federal	State	Description	Habitat Present?
					on mat of previous year's dead grasses; nest usually hidden in marsh grass or at base of Salicornia.	
Birds	Charadrius montanus	Mountain Plover	NL	SGCN	Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous.	Yes
Birds	Charadrius alexandrinus	Snowy Plover	NL	SGCN	Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast.	No
Birds	Charadrius melodus	Piping Plover	LT	T	Wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats.	No
Birds	Anthus spragueii	Sprague's Pipit	NL	SGCN	Only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.	Yes
Mammals	Spilogale putorius interrupta	Plains spotted skunk	NL	SGCN	Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie.	Yes
Birds	Calidris canutus rufa	Red Knot	T	SGCN	Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.	No



Taxon	Species Name	Common Name	Federal	State	Description	Habitat Present?
Plants	<i>Liatris bracteata</i>	Coastal gay-feather	NL	SGCN	Texas endemic; coastal prairie grasslands of various types, from salty prairie on low-lying somewhat saline clay loams to upland prairie on nonsaline clayey to sandy loams; flowering in fall.	Yes
Birds	<i>Ammodramus henslowii</i>	Henslow's Sparrow	NL	SGCN	Wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking.	No
Fishes	<i>Anguilla rostrata</i>	American eel	NL	SGCN	Coastal waterways below reservoirs to gulf; spawns January to February in ocean, larva move to coastal waters, metamorphose, then females move into freshwater; most aquatic habitats with access to ocean, muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries; diet varies widely, geographically, and seasonally.	No
Fishes	<i>Pristis pectinata</i>	Smalltooth sawfish	LE	E	Different life history stages have different patterns of habitat use; young found very close to shore in muddy and sandy bottoms, seldom descending to depths greater than 32 ft (10 m); in sheltered bays, on shallow banks, and in estuaries or river mouths; adult sawfish are encountered in various habitat types (mangrove, reef, seagrass, and coral), in varying salinity regimes and temperatures, and at various water depths, feed on a variety of fish species and crustaceans.	No
Mammals	<i>Canis rufus</i>	Red wolf	LE	E	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies.	No
Mammals	<i>Ursus americanus luteolus</i>	Louisiana black bear	DL	T	Possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas.	No

Taxon	Species Name	Common Name	Federal	State	Description	Habitat Present?
Plants	Rayjacksonia aurea	Houston daisy	NL	SGCN	Texas endemic; on and around naturally barren or sparsely vegetated saline slick spots or pimple mounds on coastal prairies, usually on sandy to sandy loam soils, occasionally in pastures and on roadsides in similar soil types where mowing may mimic natural prairie disturbance regimes; flowering late September-November (-December).	Yes
Mammals	Trichechus manatus	West Indian manatee	LE	E	Gulf and bay system; opportunistic, aquatic herbivore.	No
Reptiles	Caretta caretta	Loggerhead sea turtle	LT	T	Gulf and bay system primarily for juveniles, adults are most pelagic of the sea turtles; omnivorous, shows a preference for mollusks, crustaceans, and coral; nests from April through November.	No
Reptiles	Chelonia mydas	Green sea turtle	LT	T	Gulf and bay system; shallow water seagrass beds, open water between feeding and nesting areas, barrier island beaches; adults are herbivorous feeding on sea grass and seaweed; juveniles are omnivorous feeding initially on marine invertebrates, then increasingly on sea grasses and seaweeds; nesting behavior extends from March to October, with peak activity in May and June.	No
Reptiles	Eretmochelys imbricata	Atlantic hawksbill sea turtle	LE	E	Gulf and bay system, warm shallow waters especially in rocky marine environments, such as coral reefs and jetties, juveniles found in floating mats of sea plants; feed on sponges, jellyfish, sea urchins, molluscs, and crustaceans, nests April through November.	No
Reptiles	Lepidochelys kempii	Kemp's Ridley sea turtle	LE	E	Gulf and bay system, adults stay within the shallow waters of the Gulf of Mexico; feed primarily on crabs, but also snails, clams, other crustaceans and plants, juveniles feed on sargassum and its associated fauna; nests April through August.	No

Taxon	Species Name	Common Name	Federal	State	Description	Habitat Present?
Reptiles	<i>Macrochelys temminckii</i>	Alligator snapping turtle	NL	T	Perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October.	No
Reptiles	<i>Dermochelys coriacea</i>	Leatherback sea turtle	LE	E	Gulf and bay systems, and widest ranging open water reptile; omnivorous, shows a preference for jellyfish; in the US portion of their western Atlantic nesting territories, nesting season ranges from March to August.	No
Reptiles	<i>Malaclemys terrapin littoralis</i>	Texas diamondback terrapin	NL	SGCN	Coastal marshes, tidal flats, coves, estuaries, and lagoons behind barrier beaches; brackish and salt water; burrows into mud when inactive; may venture into lowlands at high tide.	No
Reptiles	<i>Phrynosoma cornutum</i>	Texas horned lizard	NL	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September.	No
Reptiles	<i>Crotalus horridus</i>	Timber rattlesnake	NL	T	Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto.	No
Plants	<i>Echinacea atrorubens</i>	Topeka purple-coneflower	NL	SGCN	Occurring mostly in tallgrass prairie of the southern Great Plains, in blackland prairies but also in a variety of other sites like limestone hillsides; Perennial; Flowering Jan-June; Fruiting Jan-May.	No
Plants	<i>Helianthus praecox</i> ssp. <i>praecox</i>	Texas sunflower	NL	SGCN	Sandy open areas along the upper Texas coast; Annual; Flowering April-Sept.	No

Taxon	Species Name	Common Name	Federal	State	Description	Habitat Present?
Plants	Thurovia triflora	Threeflower broomweed	NL	SGCN	Texas endemic; near coast in sparse, low vegetation on a veneer of light colored silt or fine sand over saline clay along drier upper margins of ecotone between between salty prairies and tidal flats; further inland associated with vegetated slick spots on prairie mima mounds; flowering September-November.	Yes
Plants	Bothriochloa exaristata	Awnless bluestem	NL	SGCN	Coastal prairies on black clay; Perennial; Flowering April-Dec; Fruiting April- Dec.	Yes
Birds	Plegadis chihi	White-faced Ibis	NL	T	Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.	Yes
Plants	Physostegia correllii	Correll's false dragon-head	NL	SGCN	Wet, silty clay loams on streamsides, in creek beds, irrigation channels and roadside drainage ditches; or seepy, mucky, sometimes gravelly soils along riverbanks or small islands in the Rio Grande; or underlain by Austin Chalk limestone along gently flowing spring-fed creek in central Texas; flowering May-September.	No
Plants	Oenothera pilosella ssp sessilis	Grand Prairie evening primrose	NL	SGCN	Known in Texas from a single historic collection from Galveston Island; elsewhere known from remnant moist to dry tallgrass prairies on sandy or silty Alfisols over claypan on ancient river terraces of the Mississippi Alluvial Plain, and fragipan flatwoods; flowering May-June.	No
Plants	Spiranthes brevilabris var. brevilabris	Texas ladies'-tresses	NL	SGCN	Sandy soils in moist prairies, incl. blackland/Fleming prairies, calcareous prairie pockets surrounded by pines, pine-hardwood forest, open pinelands, wetland pine savannahs/flatwoods, and dry to moist fields, meadows, and roadsides. Delicate, nearly ephemeral orchid, producing winter rosettes, flowers Feb-Apr. Historically endemic to SE coastal plain.	No

Taxon	Species Name	Common Name	Federal	State	Description	Habitat Present?
Birds	<i>Mycteria americana</i>	Wood Stork	NL	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.	Yes
Plants	<i>Chloris texensis</i>	Texas windmill-grass	NL	SGCN	Texas endemic; sandy to sandy loam soils in relatively bare areas in coastal prairie grassland remnants, often on roadsides where regular mowing may mimic natural prairie fire regimes; flowering in fall.	No

NL = Not Listed

DL = Delisted

LE = Listed Endangered

LT = Listed Threatened

C = Candidate for Listing

T = Threatened

E = Endangered

SGCN = Species of Greatest Conservation Need



## Attachment 6 - iPAC Report

# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

## Project information

### NAME

Proposed PRM Project Site

### LOCATION

Galveston County, Texas



### DESCRIPTION

proposed wetland mitigation site to restore approximately 50 acres of herbaceous wetlands.

## Local office

Texas Coastal Ecological Services Field Office

☎ (281) 286-8282

📠 (281) 488-5882

17629 El Camino Real #211

Houston, TX 77058

<http://www.fws.gov/southwest/es/TexasCoastal/>

[http://www.fws.gov/southwest/es/ES\\_Lists\\_Main2.html](http://www.fws.gov/southwest/es/ES_Lists_Main2.html)

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species<sup>1</sup> are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service.

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.

The following species are potentially affected by activities in this location:

## Mammals

NAME	STATUS
<b>West Indian Manatee</b> <i>Trichechus manatus</i> There is a <b>final critical habitat</b> designated for this species. Your location is outside the designated critical habitat. <a href="https://ecos.fws.gov/ecp/species/4469">https://ecos.fws.gov/ecp/species/4469</a>	Threatened

## Birds

NAME	STATUS
<b>Attwater's Greater Prairie-chicken</b> <i>Tympanuchus cupido attwateri</i> No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/7259">https://ecos.fws.gov/ecp/species/7259</a>	Endangered
<b>Piping Plover</b> <i>Charadrius melodus</i> There is a <b>final critical habitat</b> designated for this species. Your location is outside the designated critical habitat. <a href="https://ecos.fws.gov/ecp/species/6039">https://ecos.fws.gov/ecp/species/6039</a>	Threatened
<b>Red Knot</b> <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/1864">https://ecos.fws.gov/ecp/species/1864</a>	Threatened

## Reptiles

NAME	STATUS
<b>Green Sea Turtle</b> <i>Chelonia mydas</i> No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/6199">https://ecos.fws.gov/ecp/species/6199</a>	Threatened

<b>Hawksbill Sea Turtle</b> <i>Eretmochelys imbricata</i> There is a <b>final critical habitat</b> designated for this species. Your location is outside the designated critical habitat. <a href="https://ecos.fws.gov/ecp/species/3656">https://ecos.fws.gov/ecp/species/3656</a>	Endangered
<b>Kemp's Ridley Sea Turtle</b> <i>Lepidochelys kempii</i> No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/5523">https://ecos.fws.gov/ecp/species/5523</a>	Endangered
<b>Leatherback Sea Turtle</b> <i>Dermochelys coriacea</i> There is a <b>final critical habitat</b> designated for this species. Your location is outside the designated critical habitat. <a href="https://ecos.fws.gov/ecp/species/1493">https://ecos.fws.gov/ecp/species/1493</a>	Endangered
<b>Loggerhead Sea Turtle</b> <i>Caretta caretta</i> There is a <b>final critical habitat</b> designated for this species. Your location is outside the designated critical habitat. <a href="https://ecos.fws.gov/ecp/species/1110">https://ecos.fws.gov/ecp/species/1110</a>	Threatened

## Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

## Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service<sup>3</sup>. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data <http://www.birdscanada.org/birdmon/default/datasummaries.jsp>

The migratory birds species listed below are species of particular conservation concern (e.g. [Birds of Conservation Concern](#)) that may be potentially affected by activities in this location. It is not a list of every bird species you may find in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To view available data on other bird species that may occur in your project area, please visit the [AKN Histogram Tools](#) and [Other Bird Data Resources](#). To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

NAME	SEASON(S)
<b>American Oystercatcher</b> <i>Haematopus palliatus</i> <a href="https://ecos.fws.gov/ecp/species/8935">https://ecos.fws.gov/ecp/species/8935</a>	Year-round
<b>Bald Eagle</b> <i>Haliaeetus leucocephalus</i> <a href="https://ecos.fws.gov/ecp/species/1626">https://ecos.fws.gov/ecp/species/1626</a>	Year-round
<b>Black Rail</b> <i>Laterallus jamaicensis</i> <a href="https://ecos.fws.gov/ecp/species/7717">https://ecos.fws.gov/ecp/species/7717</a>	Year-round

Black Skimmer <i>Rynchops niger</i> <a href="https://ecos.fws.gov/ecp/species/5234">https://ecos.fws.gov/ecp/species/5234</a>	Year-round
Buff-bellied Hummingbird <i>Amazilia yucatanensis</i>	Year-round
Burrowing Owl <i>Athene cunicularia</i> <a href="https://ecos.fws.gov/ecp/species/9737">https://ecos.fws.gov/ecp/species/9737</a>	Wintering
Dickcissel <i>Spiza americana</i>	Breeding
Fox Sparrow <i>Passerella iliaca</i>	Wintering
Gull-billed Tern <i>Gelochelidon nilotica</i> <a href="https://ecos.fws.gov/ecp/species/9501">https://ecos.fws.gov/ecp/species/9501</a>	Year-round
Henslow's Sparrow <i>Ammodramus henslowii</i> <a href="https://ecos.fws.gov/ecp/species/3941">https://ecos.fws.gov/ecp/species/3941</a>	Wintering
Hudsonian Godwit <i>Limosa haemastica</i>	Migrating
Le Conte's Sparrow <i>Ammodramus leconteii</i>	Wintering
Least Tern <i>Sterna antillarum</i>	Breeding
Lesser Yellowlegs <i>Tringa flavipes</i> <a href="https://ecos.fws.gov/ecp/species/9679">https://ecos.fws.gov/ecp/species/9679</a>	Wintering
Loggerhead Shrike <i>Lanius ludovicianus</i> <a href="https://ecos.fws.gov/ecp/species/8833">https://ecos.fws.gov/ecp/species/8833</a>	Year-round
Long-billed Curlew <i>Numenius americanus</i> <a href="https://ecos.fws.gov/ecp/species/5511">https://ecos.fws.gov/ecp/species/5511</a>	Wintering
Marbled Godwit <i>Limosa fedoa</i> <a href="https://ecos.fws.gov/ecp/species/9481">https://ecos.fws.gov/ecp/species/9481</a>	Wintering
Mississippi Kite <i>Ictinia mississippiensis</i>	Breeding
Nelson's Sparrow <i>Ammodramus nelsoni</i>	Wintering
Painted Bunting <i>Passerina ciris</i>	Breeding
Peregrine Falcon <i>Falco peregrinus</i> <a href="https://ecos.fws.gov/ecp/species/8831">https://ecos.fws.gov/ecp/species/8831</a>	Wintering
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i>	Wintering
Reddish Egret <i>Egretta rufescens</i> <a href="https://ecos.fws.gov/ecp/species/7617">https://ecos.fws.gov/ecp/species/7617</a>	Year-round
Rusty Blackbird <i>Euphagus carolinus</i>	Wintering
Sandwich Tern <i>Thalasseus sandvicensis</i>	Year-round
Seaside Sparrow <i>Ammodramus maritimus</i>	Year-round
Sedge Wren <i>Cistothorus platensis</i>	Wintering



Short-billed Dowitcher <i>Limnodromus griseus</i> <a href="https://ecos.fws.gov/ecp/species/9480">https://ecos.fws.gov/ecp/species/9480</a>	Wintering
Short-eared Owl <i>Asio flammeus</i> <a href="https://ecos.fws.gov/ecp/species/9295">https://ecos.fws.gov/ecp/species/9295</a>	Wintering
Snowy Plover <i>Charadrius alexandrinus</i>	Breeding
Swainson's Warbler <i>Limnithlypis swainsonii</i>	Breeding
Whimbrel <i>Numenius phaeopus</i> <a href="https://ecos.fws.gov/ecp/species/9483">https://ecos.fws.gov/ecp/species/9483</a>	Wintering
Wilson's Plover <i>Charadrius wilsonia</i>	Breeding
Worm Eating Warbler <i>Helmitheros vermivorum</i>	Migrating
Yellow Rail <i>Coturnicops noveboracensis</i> <a href="https://ecos.fws.gov/ecp/species/9476">https://ecos.fws.gov/ecp/species/9476</a>	Wintering

#### What does IPaC use to generate the list of migratory bird species potentially occurring in my specified location?

##### Landbirds:

Migratory birds that are displayed on the IPaC species list are based on ranges in the latest edition of the National Geographic Guide, Birds of North America (6th Edition, 2011 by Jon L. Dunn, and Jonathan Alderfer). Although these ranges are coarse in nature, a number of U.S. Fish and Wildlife Service migratory bird biologists agree that these maps are some of the best range maps to date. These ranges were clipped to a specific Bird Conservation Region (BCR) or USFWS Region/Regions, if it was indicated in the 2008 list of Birds of Conservation Concern (BCC) that a species was a BCC species only in a particular Region/Regions. Additional modifications have been made to some ranges based on more local or refined range information and/or information provided by U.S. Fish and Wildlife Service biologists with species expertise. All migratory birds that show in areas on land in IPaC are those that appear in the 2008 Birds of Conservation Concern report.

##### Atlantic Seabirds:

Ranges in IPaC for birds off the Atlantic coast are derived from species distribution models developed by the National Oceanic and Atmospheric Association (NOAA) National Centers for Coastal Ocean Science (NCCOS) using the best available seabird survey data for the offshore Atlantic Coastal region to date. NOAA/NCCOS assisted USFWS in developing seasonal species ranges from their models for specific use in IPaC. Some of these birds are not BCC species but were of interest for inclusion because they may occur in high abundance off the coast at different times throughout the year, which potentially makes them more susceptible to certain types of development and activities taking place in that area. For more refined details about the abundance and richness of bird species within your project area off the Atlantic Coast, see the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other types of taxa that may be helpful in your project review.

About the NOAA/NCCOS models: the models were developed as part of the NOAA/NCCOS project: [Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#). The models resulting from this project are being used in a number of decision-support/mapping products in order to help guide decision-making on activities off the Atlantic Coast with the goal of reducing impacts to migratory birds. One such product is the [Northeast Ocean Data Portal](#), which can be used to explore details about the relative occurrence and abundance of bird species in a particular area off the Atlantic Coast.

All migratory bird range maps within IPaC are continuously being updated as new and better information becomes available.

#### Can I get additional information about the levels of occurrence in my project area of specific birds or groups of birds listed in IPaC?

##### Landbirds:

The [Avian Knowledge Network \(AKN\)](#) provides a tool currently called the "Histogram Tool", which draws from the data within the AKN (latest survey, point count, citizen science datasets) to create a view of relative abundance of species within a particular location over the course of the year. The results of the tool depict the frequency of detection of a species in survey events, averaged between multiple datasets within AKN in a particular week of the year. You may access the histogram tools through the [Migratory Bird Programs AKN Histogram Tools](#) webpage.

The tool is currently available for 4 regions (California, Northeast U.S., Southeast U.S. and Midwest), which encompasses the following 32 states: Alabama, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin.

In the near future, there are plans to expand this tool nationwide within the AKN, and allow the graphs produced to appear with the list of trust resources generated by IPaC, providing you with an additional level of detail about the level of occurrence of the species of particular concern potentially occurring in your project area throughout the course of the year.

##### Atlantic Seabirds:

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA/NCCOS [Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project](#) webpage.

## Facilities

### Wildlife refuges

Any activity proposed on [National Wildlife Refuge](#) lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

### Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

## Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

[PEM1/SS1A](#)

A full description for each wetland code can be found at the National Wetlands Inventory website: <https://ecos.fws.gov/ipac/wetlands/decoder>

#### Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

#### Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

#### Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

## **Attachment 7 - Tidal Fringe iHGM Results**

**1 Vedge: The amount of marsh-water meters/hectare**

Site Description	Qualitative	Quantitative	Sub index	
Marsh shows deterioration due to subsidence large amounts of open water	Very High	Greater than 800 m/ha	0.8	
Well developed tidal drainage network present OR Simple tidal network with isolated ponds & depression in the marsh interior OR Large amount of shallow shoreline in relations to the entire area	High	350 - 800 m/ha	1.0	
Simple tidal drainage network...isolated ponds and depressions are few & lacking	Moderate	200-350 m/ha	0.7	
Marsh lack both tidal creeks & isolated ponds & depressions, shoreline is linear or smooth ...Marsh area is large relative to shoreline length. OR the WAA is a depression that us not affected by the daily tide (l.e. high marsh)	Low	Less than 200 m/ha	0.4	x

**2 Vhydro: Site hydroperiod or degree of hydrological modifications**

Site Description	Sub index	
Site is open, no hydrologic restrictions	1.0	x
Moderate hydrologic restriction (i.e. low level berms overtopped frequently by waves, or has multi-breeches or large numerous culverts)	0.6	
Severe hydrologic restriction (high elevation berm with infrequent over-top, small culverts, single opening or breach)	0.3	
Site receives water only during extreme storm events	0.1	
Site is cut off from tidal exchange	0.0	

**3 Vnhc: Number of nekton habitat types present**

Habitattypes within 150 ft of the edge of the WAA

Low Marsh	High Marsh	Subtidal creeks	Intertidal creeks
ponds or depressions	SAVs	Oyster Reef	Unvegetative flats
Algal flats	Mangroves	Coarse woody debris	

Number of habitat types	Variable Subindex	
1	0.2	x
2	0.3	
3	0.5	
4	0.7	
5	0.8	
6	1.0	

**4 Vtypical: Proportion of the site that is covered by vegetation typical of the regional subclsss**

Invasive species: tallow, alligator weeds, spiny aster, common reed, rattlebox, cattail, flat sedge

(Sapium sabiferum, Alternathera philoxeroides, Aster spinosus, Phragmites drummondii, Sesbania drumondii, Typha sp, Cyperus entranianus )

Total % Cover by typical species	Variable Sub index	
10%	0.1	
20%	0.1	
30%	0.2	
40%	0.4	
50%	0.5	
60%	0.6	
70%	0.7	
80%	0.9	
90%	1.0	
100%	1.0	x

Variable	Subindex
V <sub>edge</sub>	0.40
V <sub>hydro</sub>	1.00
V <sub>nhc</sub>	0.20
V <sub>typical</sub>	1.00
V <sub>slope</sub>	0.10
V <sub>width</sub>	0.10
V <sub>rough</sub>	0.90
V <sub>soil</sub>	0.80

WAA Size (Acres)	WAA Name
0.48	Section 10 WAA

Biota:
$FCL = [(V_{edge} + 2 V_{hydro} + 0.5 V_{nhc/3.3}) + V_{typical}] / 2$
<b>FCI = 0.86</b>
<b>FCU = 0.41</b>

0.39

Botanical
$FCI = V_{typical}$
<b>FCI = 1.00</b>
<b>FCU = 0.48</b>

0.45

Physical
$FCL = [(V_{slope} + V_{width} + V_{rough} + V_{soil} + V_{hydro}) / 5]$
<b>FCI = 0.58</b>
<b>FCU = 0.28</b>

0.26

Chemical
$FCL = [V_{typical} \times V_{hydro}]^{1/2}$
<b>FCI = 1.00</b>
<b>FCU = 0.48</b>

0.45

**5 Slope: Distance to water greater than or equal to 6 feet deep**

Distance to Navigation Channel or water greater than or equal to 6 ft deep	Variable Sub index	
Less than 150 ft	0.10	x
151-450 ft	0.50	
Greater than 450 ft	1.00	

**6 Vwidth: Average marsh width**

Mean Width WAA Distance (ft)	Variable Sub index	
0 - 30 ft	0.1	x
31 - 75 ft	0.25	
76 - 150 ft	0.5	
151 - 225 ft	0.6	
226 - 300 ft	0.8	
301 - 375 ft	0.85	
376 - 450 ft	0.9	
451 - 525 ft	0.95	
526 - 600 ft	1.0	
Greater than 600 ft	1.0	

**7 Vrough: Manning's roughness coefficient**

$n_{base} + n_{topo} + n_{veg} = \text{manning's end}$

**(nbase) = 0.025**

Sediment surface	0.025	Base value for bare marsh soil	x
	0.030	More than 25% of the sediment surface covered with gravel or broken shell	

**(ntopo) = 0.001**

Topographic relief	0.001	WAA is flat no microtopographic or macrotopographic relief	x
	0.005	WAA has 5-25% topographic relief	
	0.010	WAA has 26-50% topographic relief	
	0.20	WAA has greater than 50% topographic relief	

**(nveg) = 0.070**

Vegetation	Less 50% cover	50-75%	76-100%	Description of Conditions	
	0.025	0.030	0.035	Predominantly short flexible stem grass (i.e. <i>Spartina alterniflora</i> , <i>S. patens</i> , <i>Distichlis spicata</i> )	
	0.035	0.040	0.05	Predominantly short stiff trailing stems (i.e. <i>Batis</i> & <i>Salicornia</i> )	
	0.050	0.060	0.07	Predominantly tall flexible grass (i.e. tall <i>Spartina alterniflora</i> , <i>S. cynosuroides</i> , <i>Scirpus</i> sp.)	x
	0.070	0.100	0.161	Predominantly tall with stiff leaves or mixed with woody shrubs (i.e. <i>Juncus roemerianus</i> , Mangroves, etc.)	
			x		

**Roughness (rounded down) = 0.09**

**FCI variable sub index =**

Roughness	Variable Sub Index	"X" Automatically picked
0.04	0.1	
0.05	0.2	
0.06	0.4	
0.07	0.6	
0.08	0.8	
0.09	0.9	x
0.10	1.0	

Lookup
6
0.9

**8 Vsoil**

Soil Texture	Variable Sub index	
Sandy	0.2	
Sandy loam	0.40	
Loam	0.6	
Clay loam	0.8	x
Clay	1.0	



1 Vedge: The amount of marsh-water meters/hectare				
Site Description	Qualitative	Quantitative	Sub index	
Marsh shows deterioration due to subsidence large amounts of open water	Very High	Greater than 800 m/ha	0.8	
Well developed tidal drainage network present OR Simple tidal network with isolated ponds & depression in the marsh interior OR Large amount of shallow shoreline in relations to the entire area	High	350 - 800 m/ha	1.0	
Simple tidal drainage network...isolated ponds and depressions are few & lacking	Moderate	200-350 m/ha	0.7	
Marsh lack both tidal creeks & isolated ponds & depressions, shoreline is linear or smooth ...Marsh area is large relative to shoreline length. OR the WAA is a depression that us not affected by the daily tide (l.e. high marsh)	Low	Less than 200 m/ha	0.4	x

2 Vhydro: Site hydroperiod or degree of hydrological modifications		
Site Description	Sub index	
Site is open, no hydrologic restrictions	1.0	x
Moderate hydrologic restriction (i.e. low level berms overtopped frequently by waves, or has multi-breeches or large numerous culverts)	0.6	
Severe hydrologic restriction (high elevation berm with infrequent over-top, small culverts, single opening or breech)	0.3	
Site receives water only during extreme storm events	0.1	
Site is cut off from tidal exchange	0.0	

3 Vnhc: Number of nekton habitat types present			
Habitattypes within 150 ft of the edge of the WAA			
Low Marsh	High Marsh	Subtidal creeks	Intertidal creeks
ponds or depressions	SAVs	Oyster Reef	Unvegetative flats
Algal flats	Mangroves	Coarse woody debris	

Number of habitat types	Variable Subindex	
1	0.2	
2	0.3	x
3	0.5	
4	0.7	
5	0.8	
6	1.0	

4 Vtypical: Proportion of the site that is covered by vegetation typical of the regional subclsss	
Invasive species: tallow, alligator weeds, spiny aster, common reed, rattlebox, cattail, flat sedge ( <i>Sapium sabiferum</i> , <i>Alternathera philoxeroides</i> , <i>Aster spinosus</i> , <i>Phragmites drummondii</i> , <i>Sesbania drumondii</i> , <i>Typha sp</i> , <i>Cyperus entranianus</i> )	

Total % Cover by typical species	Variable Sub index	
10%	0.1	
20%	0.1	
30%	0.2	
40%	0.4	
50%	0.5	
60%	0.6	
70%	0.7	x
80%	0.9	
90%	1.0	
100%	1.0	

Variable	Subindex
V <sub>edge</sub>	0.40
V <sub>hydro</sub>	1.00
V <sub>nhc</sub>	0.30
V <sub>typical</sub>	0.70
V <sub>slope</sub>	0.10
V <sub>width</sub>	0.25
V <sub>rough</sub>	0.80
V <sub>soil</sub>	0.60

WAA Size (Acres)	WAA Name
0.02	Section 404 WAA

Biota:	
$FCL = \{[V_{edge} + 2 V_{hydro} + 0.5V_{nhc/3.3} + V_{typical}]/2$ $FCI = 0.71$ $FCU = 0.01$	
0.04	
Botanical	
$FCI = V_{typical}$ $FCI = 0.70$ $FCU = 0.01$	
0.04	
Physical	
$FCL = \{[V_{slope} + V_{width} + V_{rough} + V_{soil} + V_{hydro}]/5$ $FCI = 0.55$ $FCU = 0.01$	
0.03	
Chemical	
$FCL = [V_{typical} \times V_{hydro}]^{1/2}$ $FCI = 0.84$ $FCU = 0.02$	
0.05	

**5 Slope: Distance to water greater than or equal to 6 feet deep**

Distance to Navigation Channel or water greater than or equal to 6 ft deep	Variable Sub index	
Less than 150 ft	0.10	x
151-450 ft	0.50	
Greater than 450 ft	1.00	

**6 Vwidth: Average marsh width**

Mean Width WAA Distance (ft)	Variable Sub index	
0 - 30 ft	0.1	
31 - 75 ft	0.25	x
76 - 150 ft	0.5	
151 - 225 ft	0.6	
226 - 300 ft	0.8	
301 - 375 ft	0.85	
376 - 450 ft	0.9	
451 - 525 ft	0.95	
526 - 600 ft	1.0	
Greater than 600 ft	1.0	

**7 Vrough: Manning's roughness coefficient**

$n_{base} + n_{topo} + n_{veg} = \text{manning's end}$

**(nbase) = 0.025**

Sediment surface	0.025	Base value for bare marsh soil	x
	0.030	More than 25% of the sediment surface covered with gravel or broken shell	

**(ntopo) = 0.005**

Topographic relief	0.001	WAA is flat no microtopographic or macrotopographic relief	
	0.005	WAA has 5-25% topographic relief	x
	0.010	WAA has 26-50% topographic relief	
	0.20	WAA has greater than 50% topographic relief	

**(nveg) = 0.050**

Vegetation	Less 50% cover	50-75%	76-100%	Description of Conditions	
	0.025	0.030	0.035	Predominantly short flexible stem grass (i.e. <i>Spartina alterniflora</i> , <i>S. patens</i> , <i>Distichlis spicata</i> )	
	0.035	0.040	0.05	Predominantly short stiff trailing stems (i.e. <i>Batis</i> & <i>Salicornia</i> )	x
	0.050	0.060	0.07	Predominantly tall flexible grass (i.e. tall <i>Spartina alterniflora</i> , <i>S. cynosuroides</i> , <i>Scirpus</i> sp.)	
	0.070	0.100	0.161	Predominantly tall with stiff leaves or mixed with woody shrubs (i.e. <i>Juncus roemerianus</i> , Mangroves, etc.)	
			x		

**Roughness (rounded down) = 0.08**

**FCI variable sub index =**

Roughness	Variable Sub Index	"X" Automatically picked
0.04	0.1	
0.05	0.2	
0.06	0.4	
0.07	0.6	
0.08	0.8	x
0.09	0.9	
0.10	1.0	

Lookup
5
0.8

**8 Vsoil**

Soil Texture	Variable Sub index	
Sandy	0.2	
Sandy loam	0.40	
Loam	0.6	x
Clay loam	0.8	
Clay	1.0	