

**WETLAND DELINEATION REPORT
TREASURE OAKS, LP
GALVESTON, GALVESTON COUNTY, TEXAS**

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Acronyms and Abbreviations

CFR	Code of Federal Regulations
CWA	Clean Water Act
dFIRM	digital flood insurance rate maps
DGPS	differentially corrected global positioning system
E2EM	Estuarine Intertidal Emergent Wetlands
E2US	Estuarine Intertidal Unconsolidated Shore Open Water
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GNSS	global navigation satellite system
LRR	Land Resource Region
MLRA	Major Land Resource Area
NRCCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
NWPL	National Wetland Plant List
OHWM	ordinary high-water mark
PEM	Palustrine Emergent Wetlands
PUB	Palustrine Unconsolidated Bottom Open Water
Regional Supplement	Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)
RHA	Rivers and Harbors Act
TNW	traditional navigable water
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WOUS	Water(s) of the United States

1.0 Introduction

Atkins performed an environmental investigation on September 20, 2017, for the Treasure Oaks, LP property (Project), to identify potential environmental constraints (i.e., potentially jurisdictional wetlands and waterbodies) for an approximate 16.53-acre tract. The Project is located south of FM 3005 from the highway to the north toe of the dune roughly between 7 ½ Mile Road and 8 Mile Road in Galveston, Galveston County, Texas. Refer to the vicinity map provided as Appendix 1-1 for a depiction of the site location.

SITE INFORMATION

The purpose of the investigation was to determine the location and extent of any wetlands and/or waterbodies within the site. As part of this investigation, determinations were made as to those features being considered potential waters of the United States (WOUS), as defined by Section 404 of the Clean Water Act (CWA) and/or Section 10 of the Rivers and Harbors Act (RHA), which may be subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE) Galveston District and U.S. Environmental Protection Agency (EPA). This information was obtained through both desktop analysis and field investigations.

Prior to the fieldwork being conducted, Atkins reviewed publicly available data including U.S. Geological Survey (USGS) topographic maps (Appendix 1-2), Natural Resource Conservation Service (NRCS) soil survey data (Appendix 1-3), U.S. Fish and Wildlife Service's (USFWS) National Wetland Inventory (NWI) maps (Appendix 1-4), Federal Emergency Management Administration (FEMA) floodplain maps (Appendix 1-5), and aerial photography (Appendix 1-6) to identify potential wetlands and/or waterbodies within the Project's vicinity.

As determined from the aerial photography (Appendix 1-6) and the field investigation conducted on September 20, 2017, the approximate 16.53-acre Project site is located south of FM 3005 from the highway to the north toe of the dune roughly between 7 ½ Mile Road and 8 Mile Road and is adjacent to a residential development to the west and commercial land to the east. A detailed description of the vegetation identified throughout the Project site can be found in section 4.3 of this report.

The following discussion describes the regulatory framework, methods, and results of the investigation conducted for the site.

2.0 Regulatory Framework

A wetland delineation was completed on September 20, 2017 within the Project area following the methods described in the *Wetlands Delineation Manual* (USACE, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0) (Regional Supplement)* (USACE, 2010), where appropriate. These methods for delineating wetlands require that, under normal circumstances, an area meet three criteria to be designated as a wetland. The criteria are: (1) the prevalence of hydrophytic vegetation, (2) the presence of hydric soils, and (3) the presence of wetland hydrology.

The wetland delineation consisted of the following:

- Using the methods described in the *Wetlands Delineation Manual* (USACE, 1987), data points were used to determine wetland or non-wetland (upland) status. Visual observations were used to identify vegetation, soil, and hydrological characteristics within the vicinity of the data points. Completed wetland determination data forms are provided in Appendix 2.
- Plant community types in proximity to potential wetland boundaries were identified. All dominant plant species were identified within the visually perceived wetland boundary or until the nearest significant vegetative community change. The ecologists selected a representative observation point for each plant community, visually determined the dominant species from each stratum of the community, and recorded the wetland indicator status of the dominant species. A determination was then made as to whether the vegetation was hydrophytic.
- Hydrophytic vegetation is typically present where the frequency and duration of inundation or soil saturation exert a controlling influence on the plant species present. Plant species are assigned wetland indicator status according to the probability of species occurring in wetlands. Hydrophytic vegetation was determined present when greater than 50 percent of the dominant species were listed as Facultative (FAC), Facultative Wet (FACW), or Obligate (OBL). Plant species were compared to the 2016 National Wetland Plant List (NWPL) website, Version 3.2 (Lichvar, et al., 2016) to determine the indicator status of the plant species. Taxonomy of plant species follows Lichvar, et al. (2016) and the NRCS PLANTS Database (U.S. Department of Agriculture [USDA] NRCS, 2017). At those sites where the vegetation, soil, and hydrology criteria were met, the site was identified as a wetland and categorized following suggestions of Cowardin et al. (1979). Hydrophytic plant indicator status designations conform to the following:
 - Obligate (OBL) – Plants that occur almost always (estimated probability >99 percent) in wetlands under natural conditions, but may also occur rarely (estimated probability <1 percent) in non-wetlands.
 - Facultative Wet (FACW) – Plants that occur usually (estimated probability >67 percent to 99 percent) in wetlands under natural conditions, but also occur (estimated probability 1 to 33 percent) in non-wetlands.

- Facultative (FAC) – Plants with a similar likelihood (estimated probability 33 to 67 percent) of occurring in both wetlands and non-wetlands.
- Facultative Upland (FACU) – Plants that occur sometimes (estimated probability 1 to <33 percent) in wetlands, but occur more often (estimated probability >67 to 99 percent) in non-wetlands.
- Upland (UPL) - Plants that occur rarely (estimated probability <1 percent) in wetlands, but almost always occur (estimated probability >99 percent) in non-wetlands under natural conditions.
- A total of 18 soil pits were dug as data points for the Project area being investigated. The soil samples are identified on the wetland data forms, located in Appendix 2. Munsell Soil Color Charts were used to evaluate the hue, value, and chroma of representative soils and associated soil mottles. When appropriate, soil mottles were also characterized by their size, distinction, and frequency of occurrence. Soil indicators were then recorded and determined if the soils were hydric. The soil pits were left open for at least 10 minutes to allow free water in the soil to stabilize before recording the depth to free water in the pits and the depth to saturated soil.

The field investigation was conducted to determine the primary biological and hydrological characteristics of the proposed Project area, and to identify appropriate areas to establish wetland data points. Where applicable, appropriate jurisdictional wetland boundaries were derived from wetland data point analysis and subsequently recorded using a differentially corrected Trimble global positioning system (DGPS) receiver. For areas between sample points, the wetland/upland boundary if present was determined by interpolation of the position of vegetation and hydrologic indicators. This information was then projected onto a representative aerial photograph to display the cumulative, on-site features. All potentially jurisdictional features delineated during the field investigation are provided in Appendix 1-6.

3.0 Methods

Impact assessments to potential jurisdictional areas (including wetlands), as defined by 33 CFR 328, were conducted within all portions of the site. Recent and historical aerial photography, USFWS NWI data, NRCS soil survey data, and FEMA National Flood Hazard Layer data were reviewed prior to field investigations. The entire site is located within Major Land Resource Area (MLRA) 150B-Gulf Coast Saline Prairies, which is within Land Resource Region (LRR) T-Atlantic and Gulf Coast Lowland Forest and Crop Region. Therefore, all data was collected per the *Regional Supplement* (USACE, 2010) and recorded on Atlantic and Gulf Coastal Plain Region wetland determination data forms. As required by existing regulations or regional general permits, potential wetlands, as defined by the *Wetlands Delineation Manual* (USACE, 1987) and *Regional Supplement*, were evaluated based on the presence of hydrophytic vegetation, wetland hydrology, and hydric soils. This evaluation included assessments of ephemeral, intermittent, and perennial streams; navigable and non-navigable waterways; wetlands; and other special aquatic sites (i.e., sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle and pool complexes [USACE, 1987]).

Vegetation, hydrology, and soils were evaluated and recorded in the field at each data point (Plot). Plant species were recorded at each Plot by visually estimating the percent areal cover of each species, using nested sampling Plots by strata, in accordance with the Regional Supplement. The 2016 National Wetland Plant List (NWPL) website, Version 3.3 (Lichvar et al., 2016), was used to determine the indicator status of plant species. Taxonomy of plant species follows Lichvar, et al. (2016) and the NRCS PLANTS Database (U.S. Department of Agriculture [USDA] NRCS, 2017). Field indicators of hydrology and hydric soils were evaluated and recorded at each Plot. A shallow soil pit was dug at each Plot to document soil characteristics and to examine subsurface hydrology. The soil pit was left open for at least 10 minutes, to allow any free water in the soil to stabilize, before recording the depth to free water in the pit and the depth to saturated soil. Meanwhile, soil characteristics were recorded and included, but were not limited to, soil color(s), texture, structure, and presence of redoximorphic features, nodules, or concretions, and hydric soil indicators. The moist matrix color, and when present, moist mottle color of soils, were determined by soil horizon/strata utilizing the Munsell Soil Color Charts (Kollmorgen Instruments Corporation, 2000). At Plot locations where the wetland vegetation, soil, and hydrology criteria were met, the site was identified as a wetland and categorized following the classification system of Cowardin et al. (1979). At the time of the assessment, the Plot locations, wetland boundaries, and ordinary high water mark (OHWM) limits of WOUS within the overall site were delineated according to field data and digitally georeferenced/mapped using a Trimble Geo 7X global navigation satellite system (GNSS) with sub-meter accuracy.

4.0 Results

The field investigation was conducted on September 20, 2017, to identify WOUS, including wetlands, potentially subject to USACE jurisdiction under Section 404 of the CWA and Section 10 of the RHA. The vegetation, hydrology, and soil characteristics at each plot was recorded on wetland determination data forms provided in Appendix 2.

4.1 Topographic Data

The Project area is located on the *Lake Como, Texas* USGS 7.5-minute topographic map (USGS, 1994) and exhibits elevations ranging from 0-10 feet above mean sea level; with the surrounding topography consisting primarily of flat coastal plains (Appendix 1-2).

4.2 Soils

Based on the mapped soil data for Galveston County, Texas (USDA NRCS, 2017), four mapped soil units are present within the boundaries of the Project site. Descriptions of the mapped soil types are provided in Table 4-1. The abbreviations listed in the Soil Symbol column of the table corresponds with the soil unit abbreviations provided on the soil map in Appendix 1-3.

Table 4-1
Characteristics of the Soil Mapping Units within the Project Area

Soil Name ¹	Soil Symbol	Soil Characteristics				
		Percent Slopes	Drainage Class	Permeability	Hydric Soil Rating	Surface Runoff
Beaches, very frequently flooded, Tidal	BBBx	0 to 1	Very poorly drained	Very low	Not hydric	Negligible
Mustang fine sand, frequently flooded, frequently ponded	Mn	0 to 1	Poorly drained	Low	Hydric	Negligible
Galveston-Nass complex	Gc	0 to 4	Very poorly drained	Low	Hydric	Negligible
Mustang-Nass complex	Mt	0 to 3	Poorly drained	Very low	Hydric	Negligible
Water	W	0	N/A	N/A	N/A	N/A

1: Soil Survey Geographic (SSURGO) Database (NRCS, 2017)

Soils observed during field investigations at the site consisted of sand, organic matter, and trace amounts of clay textures. Soil colors observed throughout the Project area were varied and ranged from Brown (2.5Y 4/1) to dark brown (10YR 3/1) as determined using Munsell Soil Color Charts (Kollmorgen Instruments Corporation, 2000). Three out of the four soil classifications present on the property are classified as hydric, based on criteria defined in NRCS (2010) and as outlined in the *Wetlands Delineation Manual* (USACE, 1987) and the *Regional Supplement* (USACE, 2010). Refer to the wetland determination data forms provided in Appendix 2 for detailed descriptions of observed soils for individual data point locations within the Project area.

4.3 Vegetation

During the field investigations, three vegetative communities (estuarine intertidal emergent wetlands, palustrine emergent wetlands, and uplands) were identified within the Project area (Appendix 1-6). Refer to Appendix 3 for representative photographs of the vegetation communities observed within the Project area.

The wetland indicator status for each plant species identified within the Project area is provided in Table 4-2. Indicator statuses were determined using Lichvar et al. (2016). Each indicator status reflects a plant species' fidelity and preference for wetlands or uplands based upon its frequency and abundance in wetlands versus uplands and the availability of wetland habitat across the local to regional landscape (Lichvar and Minkin, 2008). The resulting indicator status categories are used in determining dominance of hydrophytic versus non-hydrophytic vegetation at each Plot.

Table 4-2
Plant Species Wetland Indicator Status Categories

Code	Category	Definition
OBL	Obligate Wetland	Hydrophyte - Almost always occurs in wetlands
FACW	Facultative Wetland	Hydrophyte - Usually occurs in wetlands, but may occur in non-wetlands
FAC	Facultative	Hydrophyte - Occurs in wetlands and non-wetlands
FACU	Facultative Upland	Non-hydrophyte - Usually occurs in non-wetlands, but may occur in wetlands
UPL	Obligate Upland	Non-hydrophyte - Almost never occurs in wetlands

Source: Lichvar et al., 2016. *The National Wetland Plant List*: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X. Website Version 3.3 available at http://rsgisias.crel.usace.army.mil/nwpl_static/mapper/mapper.html.

4.3.1 Estuarine Intertidal Emergent Wetlands (E2EM)

The Project area is comprised of 0.72 acre of estuarine intertidal emergent wetlands (E2EM). These E2EM wetlands consist of intertidal habitats located adjacent to and influenced by periodic tidal activity from the open water pond that is located in the center of the property. During the field investigation, the following plant species were identified within the E2EM community: salt-meadow cordgrass (*Spartina patens* – FACW), bushy seaside-tansy (*Borrichia frutescens* – OBL), three-square (*Schoenoplectus pungens* – OBL), coastal salt grass (*Distichlis spicata* – OBL), jesuit's-bark (*Iva frutescens* – FACW), turtleweed (*Batis maritima* – OBL), and rushes (*Juncus* sp. – OBL). Based on the technical criteria outlined in the *Wetland Delineation Manual* (USACE, 1987) and the *Regional Supplement* (USACE, 2010), the vegetation observed within the E2EM areas of the Project area is representative of a hydrophytic plant community.

4.3.2 Palustrine Emergent Wetlands (PEM)

A palustrine emergent wetland (PEM) comprises 1.53 acres of the Project area. PEM wetlands are freshwater wetlands dominated by herbaceous, perennial vegetation. During the field investigation, the following plant species were identified within the PEM community: salt-meadow cordgrass (FACW), bushy seaside-tansy (OBL), three-square (OBL), spike rush (*Eleocharis* sp. – OBL), jesuit's-bark (FACW), black

needle rush (*Juncus roemerianus* – OBL), turtleweed (OBL), and glade morning glory (*Ipomoea sagittata* – FACW). Based on the technical criteria outlined in the *Wetland Delineation Manual* (USACE, 1987) and the *Regional Supplement* (USACE, 2010), the vegetation observed within the PEM areas of the Project area is representative of a hydrophytic plant community.

4.3.3 Uplands

During the field investigation, approximately 9.71 acres of uplands were identified within the Project area (Appendix 1-6). The following plant species were identified within the upland area: salt-meadow cordgrass (FACW), bushy seaside-tansy (OBL), three square (OBL), salt cedar (*Tamarix gallica* – FACW), firewheel (*Gaillardia pulchella* – UPL), ragweed (*Ambrosia psilostachya* – FAC), jesuit's-bark (FACW), tapered rosette grass (*Dicanthelium acuminatum* – FAC), bitter panic grass (*Panicum amarum* – FAC), seaside goldenrod (*Solidago sempervirens* – FACW), and southern dewberry (*Rubus trivialis* – FACU). Based on the technical criteria outlined in the *Wetland Delineation Manual* (USACE, 1987) and the *Regional Supplement* (USACE, 2010), the vegetation observed within the upland areas of the Project area is representative of a hydrophytic plant community.

4.4 Hydrology

Indicators of wetland hydrology were observed at Plots 1, 3, 5, 7, 9, 11, 15, 16, and 17 but were not identified at Plots 2, 4, 6, 8, 10, 12, 13, 14 or 18. Refer to the wetland determination data forms provided in Appendix 2 for site-specific observations of hydrology at each plot. Additionally, two other water features encompassing approximately 4.57-acres were identified within the Project area. Based on field observations and Cowardin classification system, these features are classified as an approximate 0.27-acre, Palustrine Unconsolidated Bottom (PUB) and an approximate 4.30-acre, Estuarine Intertidal Unconsolidated Shore (E2US).

Additionally, USFWS NWI data (Appendix 1-4), indicates three mapped features on the tract including one wetland area designated as a PEM1A, and two open water areas designated as a E2USM and a E2USN, respectively. Based on field observations and NWI data, all WOUS identified on the tract are subject to Section 404 of the CWA and/or subject to Section 10 of the RHA.

4.5 Floodplain

Galveston County is a participant in the National Flood Insurance Program (NFIP) as administered by FEMA and has the authority to issue floodplain development permits for county development activities. As such, Atkins reviewed digital Flood Insurance Rate Maps (dFIRM) published by FEMA to determine if the Project occurs within a 1% annual chance floodplain boundary (FEMA, 2017). Based on the 2017 dFIRM data, the Project area is located within a designated 1% annual chance floodplain boundary (Appendix 1-5). As a result, the proposed Project would require a floodplain development permit prior to performing construction activities.

4.6 Wetlands and Other Waters of the U.S.

Several potentially jurisdictional wetlands and two potentially jurisdictional open waterbodies were identified within the Project area during the field investigation (Appendix 1-6). The potentially jurisdictional wetlands

encompassed a total area of approximately 2.25-acres and are comprised of approximately 1.53-acres of PEM habitat and approximately 0.72-acre of E2EM habitat (Appendix 1-6) within the Project area. Additionally, two potentially jurisdictional open waterbodies encompassing approximately 4.57-acres were also identified and comprise approximately 4.30-acres of E2US waters and 0.27-acre of PUB waters (Appendix 1-6) within the Project area. Appendices 2 and 3 contain the wetland determination data forms and associated representative site photographs, respectively.

Based on the on-site investigation, the E2US within the Project area is likely a jurisdictional waterbody, because it is located within an area of tidal influence, exhibited an OHWM, and has a significant nexus to a traditional navigable water (TNW), the Gulf of Mexico. In addition, the PUB also exhibited an OHWM and has a direct connection to the E2US waters. Since both waters identified within the Project area exhibit a significant nexus to a TNW, they would be classified as a WOUS (USACE, 2007). All wetlands observed within the Project area are potentially jurisdictional wetlands, as defined by the *Wetlands Delineation Manual* (USACE, 1987).

All the potentially jurisdictional features identified within the Project area have a significant nexus to adjacent wetlands and/or other waters which serve either as a drainage for surrounding neighborhoods or provide water conveyance from areas adjacent to the Project area. All features have a significant nexus to the Gulf of Mexico and are located within the 100-year floodplain. The open water areas are vegetated on all sides and surrounded by either the E2EM or PEM wetland areas. Both waters identified within the Project area exhibited a true OHWM and physical hydrologic factors suggestive of significant volumes and durations were identified. As such, both features exhibit a significant nexus to a TNW. Therefore, it is likely that these features are considered WOUS and subject to USACE jurisdiction under Section 10 of the RHA and Section 404 of the CWA.

5.0 Conclusions

The Project area includes approximately 16.53 acres of undeveloped land and open water. During the field investigation, approximately 6.82-acres of WOUS were identified: PEM wetlands (1.53-acres), E2EM wetlands (0.72-acre), a E2US open waterbody (4.30-acres), and a PUB open waterbody (0.27-acre). All features exhibited a surface connection and a significant nexus to the Gulf of Mexico and have a substantial effect on the chemical, physical, and/or biological integrity of a TNW, and therefore would likely be subject to USACE jurisdiction under Section 10 of the RHA and Section 404 of the CWA. Therefore, the discharge of dredge or fill material into these features would be regulated under Section 10 of the RHA and Section 404 of the CWA; however, it is important to note that final jurisdictional authority resides with the USACE.

Additionally, the remaining approximate 9.71-acres of the Project area are comprised of uplands. No potentially jurisdictional wetlands, as defined by the *Wetland Delineation Manual* (USACE, 1987) or the *Regional Supplement* (USACE, 2010) were observed within the upland area. Therefore, the discharge of dredged or fill material into this feature would not be regulated under Section 404 of the CWA; however, it is important to note that final jurisdictional authority resides with the USACE.

6.0 References

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