

WETLAND DELINEATION

Approximately 29.4± Acres Located along Hollister Road
(James Clarkson Survey, Abstract 188)
Houston, Harris County, Texas 77040

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Established in 1993

Nationwide Environmental
Site Assessments

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WETLAND DELINEATION

1.0 Executive Summary

The subject property is approximately 29.4± acres located west of Hollister Road near the intersection of West Gulf Bank Road in Houston, Harris County, Texas 77040. Phase Engineering, Inc. prepared a Wetlands Determination report on July 6, 2016 using readily available maps and limited on-site observations. The findings of the determination report indicated that persistent ponding areas shown on aerial photographs and topographic maps satisfy the criteria to be jurisdictional wetlands based on location within the 100-year floodplain and proximity to Whiteoak Bayou. This follow-up delineation report includes additional investigation completed on October 5, 2016, to determine the existence and extent of the wetlands or other areas within the boundaries of the subject property subject to U.S. Army Corps of Engineers (ACOE) jurisdiction.

1.1 Delineation Summary

An extensive on-site assessment of the previously identified wetland areas were found to not satisfy the criteria to be a wetland pursuant to the ACOE 1987 Manual and the regional supplement with subsequent clarification memoranda. Observations in the two suspect wetland areas showed indications of ponding and hydrology needed to support a wetland, however the vegetation and soils did not meet the requirements for hydrophytic vegetation or hydric soils. Our assessment is deemed final and pursuant to confirmation by the ACOE. No permitting or additional evaluation appears to be warranted prior to site development activities.

The appropriate Corps of Engineers District Office has the final authority of determining whether an area is a jurisdictional wetland. Phase Engineering, Inc. is listed as a wetlands delineation service provider by the Galveston District of the ACOE, and Tracy Watson has completed an approved ACOE Wetlands Delineator Training Program.

1.2 Regulatory Summary

Pursuant to Section 404 of the Clean Water Act, the ACOE has jurisdiction over the placement of fill or dredged material in all jurisdictional waters of the United States. Jurisdictional areas include rivers, streams, tributary waterways, lakes, natural ponds and wetlands adjacent to these areas. A Section 404 permit must be obtained before placing any fill material within a jurisdictional area. Wetlands that lack a continuous surface connection through a relatively permanent tributary to traditionally navigable waters are considered isolated wetlands and are not regulated under the Clean Water Act.¹ A tributary must have continuous flow at least seasonally (typically at least three months) to be considered relatively permanent. Swales and erosional features are generally not considered to be tributaries or waters of the United States. Ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow are also generally not waters of the U.S. Wetlands adjacent to tributaries and ditches that do not have a relatively continuous flow will be regulated only if they have a significant nexus to traditionally navigable waters. A significant nexus determination will be based on hydrologic and ecological factors.

¹ June 29, 2015, USEPA and Department of the Army, Corps of Engineers, Clean Water Rule: Definition of "Waters of the United States" Federal Register Vol. 80, No. 124, Effective August 28, 2015

2.0 Introduction

2.1 Purpose

The purpose of this report is to complete a Wetland Delineation Survey of approximately 29.4± acres located west of Hollister Road near the intersection of West Gulf Bank Road in Houston, Harris County, Texas 77040. The delineation was conducted to determine if previously identified onsite wetland areas meet criteria associated with jurisdictional wetland features that would require additional permitting or mitigation.

2.2 Ecophysiology

The property occurs within the Western Gulf Coastal Plains Ecoregion which is distinguished by its relatively flat topography with mainly natural grassland vegetation except for the mostly forest or savanna-type vegetation more inland. The subject property is located within the Northern Humid Gulf Coastal Prairies sub-region of the Western Gulf Coastal Plains and within the Buffalo-San Jacinto Watershed (HUC 12040104). A Harris County Flood Control (HCFC) drainage canal (E124-00-00) is located along the western property boundary and is characterized as a permanent water body. The canal flows southward toward White Oak Bayou (designated as a navigable waterbody), which is approximately 1,000 feet to the south of the south subject property boundary.

Due to the low relief and clay subsoils, drainage within the Northern Humid Gulf Coastal Prairies subregion is generally poor and the soils remain wet for parts of the year. Vegetation species were historically tallgrass grasslands with a few clusters of oak trees. Dominant grassland species included Little bluestem (*Schizachyrium Scoparium*), yellow Indiangrass (*Sorghastrum nutans*), brownseed paspalum (*Paspalum plicatulum*), gulf muhly (*Muhlenbergia capillaris*), and switchgrass (*Panicum virgatum*). Large areas of the region have been invaded by the exotic Chinese tallow tree (*Triadica sebifera*) and Chinese privet (*Ligustrum sinense*). In the northern part of the region, in the transition to the South Central Plains Ecoregion, loblolly pine (*Pinus taeda*) is common. Almost all of the coastal prairies have been converted to cropland, rangeland, pasture, or urban land uses (Griffith et al. 2007).

2.3 Methods

Routine wetland delineations are conducted following the methods prescribed in the *Corps of Engineers Wetlands Delineation Manual* (1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coast Plain Region, Version 2.0*. Under the delineation procedures in the manual, an area must exhibit characteristic wetland hydrology, hydric soils, and hydrophytic vegetation to be considered a wetland. If field investigation determines that any of the three parameters are not satisfied, then the area usually does not qualify as wetland.

The field investigation was completed on October 5, 2015 by Tracy Watson of Phase Engineering, Inc. using the methods described below to generate the results reported in Section 3.0 of this report. During preparation of the field work, a 750-foot baseline was measured along the drainage ditch along the western boundary of the subject property and three transect lines were subsequently plotted utilizing ArcGIS software across the property in a west to east orientation. The field survey was roughly completed along these transect lines to identify transitions in plant communities. The spatial extent of features were collected during field investigation activities using a Trimble Geo-XH 6000 global positioning system (GPS) with sub-meter accuracy. Photographic evidence of all potential waters of the U.S. was recorded with a digital camera. Data at each wetland site was recorded on a ACOE Wetland Determination Data Form.

As part of a delineation report, the ACOE requires data forms and technical information to document evidence of the three parameters for any area determined to be wetland. Data forms completed for wetlands identified at the subject property are provided in Appendix II. Representative photographs of delineated wetlands are provided in Appendix III.

Hydrophytic Vegetation

Hydrophytic vegetation refers to a predominance of plants adapted to survive in soils that remain saturated or inundated for at least five percent of the growing season. Within a given assessment area, the positive identification of wetland and upland vegetation along with the corresponding ACOE-designated wetland indicator status for each identified species establishes the presence or absence of hydrophytic vegetation. Five designations are used to classify plants based on an individual species' proclivity to tolerate hydric conditions. Ranging from most to least hydric the plant species are categorized as the following:

- obligate (OBL)
- facultative wetland (FACW)
- facultative (FAC)
- facultative upland (FACU)
- upland (UPL)

Phase Engineering, Inc. examined relevant strata within each vegetative community to assess vegetation consistently as prescribed in the Regional Supplement. Each plant species identified was recorded by dominance and prevalence. A determination was documented if the surveyed area exhibited sufficient hydrophytic vegetation to satisfy the criteria for wetland status.

Hydric Soils

Hydric soils are defined as a soil formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (six inches for sands and ten inches for loams and clays). The *Regional Supplement* requires the use of the Natural Resources Conservation Service (NRCS) *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 7.0* (USDA 2010) to identify characteristic morphologies endemic to soils that have formed under conditions of prolonged saturation, flooding, or ponding. These indicators are often specific to individual Land Resource Regions (LRR) and Major Land Resource Areas (MLRA). As the property is located within LRR T (Atlantic and Gulf Coast Lowland Forest and Crop Region) and MLRA 150A (Gulf Coast Prairies), soils meeting the hydric criterion must match an indicator approved for use in this area. Phase Engineering, Inc. scientists completed a soil pit at each sample location to a depth of at least 16 inches below ground surface and identified soil characteristics such as color, texture, and other morphological features. The soil matrix and redoximorphic features color was recorded for each soil horizon by use of *Munsell Soil Color Charts*. The soil texture was determined by use of the "ribbon" test. A determination of hydric soils was documented on each data form based on the presence of a hydric soil indicator.

Hydrology

Wetland hydrology refers to the presence of water at or near the soil surface for a duration sufficient for the development of anaerobic conditions in the upper portion of the soil profile. An abundant supply of water is characteristic of all wetlands. The source of the water may be runoff from direct precipitation, headwater or backwater flooding, tidal influence, groundwater, or a combination of these sources. The frequency and duration is further influenced by topographic position, stratigraphy, and soil permeability. The 1987 *Manual and Regional Supplement* detail a variety of hydrology indicators which provide sufficient evidence to confirm the presence of wetland hydrology. The list of primary and secondary indicators includes: evidence of a high water table, iron deposits, water marks, saturation, hydrogen sulfide odor, surface soil cracks, crawfish burrows, and other related physical evidence. Observations of these indicators were recorded on the data forms (Appendix II).

The amount of rainfall in a given time period may significantly influence the presence of wetland hydrology, especially during times of drought or abnormally wet seasons. To best assess the normalcy of rainfall for the area, Phase Engineering, Inc. utilized the guidance described in the ACOE technical report *Assessing and Using Meteorological Data to Evaluate Wetland Hydrology* (Sprecher and Warne 2000). The *NRCS Engineering Field Handbook* method is utilized to assess rainfall considering the three month period prior to the month being evaluated and then comparing it to a baseline of normal rainfall occurrence provided by the NRCS Wetlands Evaluation Tables (WETS).

Evaluation in accordance with these methods results in a determination of a generic defined condition (drier than normal, normal, or wetter than normal).

3.0 Results

The property can be largely categorized into the following two major vegetative communities:

- Pine Forest
- Seasonally flooded deciduous forest.

The deciduous forested areas include two isolated areas that water generally ponds in the Spring. Although indications of flooding is apparent in the deciduous forested areas, the soils do not appear to be saturated for adequate periods that allow hydric soils to fully develop and hydrophytic vegetation to thrive.

A Wetland Delineation Map is included in Appendix I. Data forms were completed for each presumed wetland area. Copies of the data forms and photographs are located in the appendices.

3.1 Vegetation

Historical aerial photography was reviewed to aid in the overall understanding of vegetation distribution across the property over time. Imagery from 2015, 2010, 2006, 1996, 1989, 1978, 1969, 1953, and 1944 were available for review. The aerials show that the subject property has remained relatively undeveloped except for oil well production and unpaved roads in the earliest years. The on-site oil production appears to have ceased in the 1970s, however various paths traversing the property were present until the 1990s. A drainage channel was constructed along the western boundary in the 1970s and a residential subdivision was developed at the north and south adjoining properties. An unpaved easement was present in the 2010s along the center of the subject property that ultimately divided it into two separate parcels. Topographic maps reviewed from the 1940s to 2013 support the findings associated with the aerial photographs used for this evaluation.

The forested vegetation is consistent across the property and include young mixed hardwoods typical of the Pine-Hardwood Forest vegetation type as described by the TPWD documented in *Vegetation Types of Texas* (McMahan 1984). Common tree species include Loblolly Pine (*Pinus taeda*), Post Oak (*Quercus stellate*), American Beech (*Fagus grandifolia*), Eastern Red Cedar (*Juniperus virginiana*), and Yaupon holly (*Ilex vomitoria*). The understory is dominated by Trumpet Creeper (*Campsis radicans*), Japanese Honeysuckle (*Lonicera japonica*), Sawtooth Blackberry (*Rubus argutus*), and American beautyberry (*Callicarpa Americana*).

An exception to the typical vegetation described above are two isolated circular areas that lack of Loblolly Pine trees and ponded water is present in the spring as indicated on the aerial photographs. These areas are located on either side of the dividing easement and depicted on the NWI map as wetland areas. Dominate species include American Beech (*F. grandifolia*), Water Oak (*Quercus nigra*), White Ash (*Fraxinus Americana*), Yaupon (*I. vomitoria*), and Rattan (*Berchemia scandens*). Although a few hydrophytes are present in these areas, they do not pass the Rapid Test for Hydrophytic Vegetation, Dominance Test, or Prevalence Index. Thus, the requirements for hydrophytic vegetation is not present as required for a wetland.

3.2 Soils

The on-site soils present within the property are classified as Clodine fine sandy loam (Cd), 0 to 1 percent slopes, according to *the NRCS Soil Survey Geographic Database of Texas* (USDA 2011). This soil type does meet hydric soil criteria per the USDA / NRCS soil survey (2011). Although a hydric listing alone is often insufficient for determining if a given soil is in fact hydric, it does indicate that suitable properties or conditions exist to promote the formation of hydric soils. A discussion of the soil map unit mapped within the subject property boundaries soils and their estimated depth to the shallow water table is as follows:

- **Cd:** Clodine fine sandy loam, 0-1% occurs on flats on flat coastal plains deriving from loamy fluviomarine deposits of igneous, metamorphic and sedimentary rock. The soil is somewhat poorly drained with a moderate shrink-swell potential. A seasonal zone of water saturation is at 5 inches December-March. Clodine soils are a coarse-loamy, siliceous, superactive, hyperthermic typic epiaqualfs, a typical alfisol with a saturated moisture regime. (UCD 2004)

Two soil pits were excavated and examined to identify observable NRCS hydric soil indicators. The test pits were completed in the areas identified in aerial photography and on the NWI map as potential wetland areas. Soils observed in the soil pits were very dark gray sandy clay loam with a 1% depletion noted in the matrix. No redox features were observed. The soils did not exhibit any hydric soil indicators to a depth of 16 inches.

3.3 Hydrology

The following data sources were reviewed regarding the area hydrology:

- *USGS Topographic Map:* The subject property is relatively flat according to the Hedwig Village 7.5 USGS quadrangle map. The ground elevation is approximately 93 feet above mean sea level (MSL). The general area down-gradient is predominately to the southeast.
- *National Wetland Inventory Map (NWI):* One U.S. Fish and Wildlife Service (F&WS) National Wetland Inventory (NWI) map was available for review. The NWI map identified two wetland areas on the subject property. These areas are depicted as PFO1A (Palustrine – Forested – Broad-Leaved Deciduous - Temporarily Flooded).
- *FEMA FIRM Map:* The subject property is located entirely within Zone AE according to the FEMA Flood Insurance Rate Map, Map Number 48201C0445M dated June 9, 2014. Zone AE represents areas of within the 100-year flood plain where base flood elevations have been determined.
- *Aerial photography:* Historical aerial photography was reviewed to identify potential periods of inundation or saturation on the property over time. Two distinct circular areas of persistent ponding are visible on the property from the 1940s to the present. The most western ponded area was partially filled during development of an easement in 2010. The 2015 aerial photograph shows that these two areas are shown as a lighter color than the surrounding wooded vegetation which is indicative of saturation and dead trees.

Current rainfall data was obtained from the Houston/Galveston Weather Forecast Office's Houston Intercontinental Airport Station to determine the normality of rainfall at the time of the site assessment. The weather forecast data collection station is located approximately twelve (12) miles northeast of the subject property. Historical data was also obtained from the nearest NRCS WETS station located in Harris County, Texas and identified as Houston Intercont AP, TX960. The precipitation data is summarized in Table 2 and the current condition was determined by the prescribed NRCS method. Based on these calculations normal rainfall conditions were present at the time of the field assessment on October 5, 2016.

Table 2: Normal Rainfall

Prior Month	WETS Rainfall Percentile		Measured Rainfall	Condition Value ¹	Month Weight ²	Product Condition Value and Month Weight
	30th (inches)	70 th (inches)				
1 st – September	2.33	5.33	1.70	1	3	3
2 nd – August	2.11	4.67	10.41	3	2	6
3 rd – July	1.83	3.86	1.09	1	1	1
					Sum³	10 (Normal)

Notes

- 1 – Condition Value, 1 = dry, 2 = normal, 3 = wet
- 2 – Month Weight Value, highest value assigned to the most recent month
- 3 – Condition: Drier than normal (sum is 6-9), normal (sum is 10-14), wetter than normal (sum is 15-18)

Wetland hydrology was determined in the field by considering frequency and duration of inundation through visual observations of saturation, and the presence of other primary and secondary wetland hydrology indicators. Hydrology indicators found within the depressed wetland areas include sediment deposits (B2), water-stained leaves (B9), and saturation visible on aerial imagery (C9). Wetland communities observed during the delineation displayed at least one primary or two secondary indicators of wetland hydrology, as required by the 1987 Manual and Regional Supplement.

4.0 Conclusion

Phase Engineering, Inc. completed an extensive on-site assessment of the previously identified wetland areas that persistent ponding is visible in historical aerial photography and topographic maps. Observations in the two suspect wetland areas showed indications of ponding and hydrology necessary to support a wetland, however the vegetation and soils evaluated within these areas did not meet the requirements for hydrophytic vegetation or hydric soils. Phase Engineering, Inc. has the opinion that no wetland areas are located within the subject property boundaries pursuant to the U.S. Army Corps of Engineers' 1987 Manual and the regional supplement with subsequent clarification memoranda. The assessment is deemed final and pursuant to confirmation by the U.S. Army Corps of Engineers. No permitting or additional evaluation appears to be warranted prior to site development activities.

No Wetland

The appropriate Corps of Engineers District Office has the final authority of determining whether an area is a jurisdictional wetland. Phase Engineering, Inc. is listed as a wetlands delineation service provider by the Galveston District of the U.S. Corps of Engineers, and Tracy Watson has completed a U.S. Army Corps of Engineers Wetlands Delineator Training Program.