

**WETLAND ASSESSMENT
JURISDICTIONAL WATERS
OF THE UNITED STATES**

**1,713± ACRES
EAST OF PAUL CAMPBELL ROAD AND FM 1010
LIBERTY COUNTY, TEXAS**



**PREPARED FOR:
Colony Ridge Land, LLC**

**BERG & OLIVER ASSOCIATES, INC.
ENVIRONMENTAL SCIENCE AND LAND USE CONSULTANTS
HOUSTON, TEXAS
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EXHIBIT

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SUMMARY

A Wetland Assessment and Delineation was performed for Colony Ridge Land, LLC on a 1,713± acre tract of land, located east of Paul Campbell Road and FM 1010 in Liberty County, Texas.

The subject property was evaluated for its content of jurisdictional wetlands, based on criteria set forth in the 2011 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (v.2.0). Using interpretation of historical aerial photography, topographic maps, hydrology indicators, and field evaluation of hydric soils, hydrology, and hydrophytic vegetation, wetlands were identified and delineated as accurately as possible.

Topographical information published by the United States Geological Survey (USGS) indicates that the terrain is relatively flat. The Federal Emergency Management Agency (FEMA) floodplain maps published in 2009 indicates that a small portion of the subject property (at the western edge) lies within the 100-year flood zone.

The United States Department of Agriculture (USDA) Web Soil Survey of Liberty County, Texas, was, for the most part, reasonably accurate in identifying the basic soil types on the property as Sorter-Tarkington complex (USDA Classification - SosA), Splendor fine sandy loam (SplB), Waller-Tarkington complex (WatA), Westcott very fine sandy loam (WesA), and Westcott-Plumgrove complex (WetA).

Vegetation communities were evaluated and documented to delineate wetland and upland boundaries. The subject property was dominated by dewberry (*Rubus trivialis*), Chinese tallow (*Triadica sebifera*), loblolly pine (*Pinus taeda*), sweetgum (*Liquidambar styraciflua*), yaupon (*Ilex vomitoria*), and American beautyberry (*Callicarpa americana*).

Based on the wetland delineation presented in this report and the data collected using a Global Positioning System (GPS) satellite equipment, it is our conclusion that 25.88(±) acres of the subject property would be classified as wetlands. Of those, it is the professional opinion of Berg♦Oliver Associates that 3.47(±) acres would be classified as jurisdictional waters of the U.S. (adjacent wetlands). 22.41(±) acres of the wetland areas identified would likely be considered isolated, and thus, non-jurisdictional for the following reasons: 1) there is no unbroken surface or shallow sub-surface connection to jurisdictional waters; 2) the wetlands' proximity to a jurisdictional water is not reasonably close, supporting the science-based inference that the wetlands do not have an ecological connection with jurisdictional waters; and 3) the wetlands are located outside any mapped 100-year floodplain. Additionally, 1,986(±) linear feet of jurisdictional waters of the U.S. were identified based on the presence of a defined bed and bank and ordinary high water mark, as well as an apparently direct connection to downstream relatively permanent waters.

The USACE and the EPA are the final authority over the jurisdictional status of both wetlands and waters of the U.S. per Section 404 of the Clean Water Act. The findings discussed in this report are solely the opinion of BOA and have not been verified by the aforementioned regulatory government agencies.



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JURISDICTIONAL WATERS OF THE UNITED STATES WETLAND ASSESSMENT DETERMINATION AND DELINEATION

**1,713± ACRES
LIBERTY COUNTY, TEXAS**

INTRODUCTION

The study reported herein is a Wetland Determination and Delineation Study for Colony Ridge Land, LLC on a 1,713± acre tract of land, located east of Paul Campbell Road and FM 1010 in Liberty County, Texas.

AUTHORIZATION

This study was performed as authorized by Colony Ridge Land, LLC.

SITE LOCATION

The subject property is located east of Paul Campbell Road and FM 1010, in Liberty County, Texas. The subject property is depicted more specifically in the site maps located in the appendices of this report.

SCOPE OF WORK

The objective of this Wetland Determination and Delineation Study was to evaluate the subject properties for jurisdictional wetlands in accordance with Section 404 of the Clean Water Act and current regulations and policies of the U. S. Army Corps of Engineers (USACE). The following evaluations were performed for this project:

1. Vegetation Indicators: Evaluation for the presence or absence of hydrophytic vegetation (waterplants) that is typically adapted to wetlands and determine the vegetative patterns that are prevalent within the site, or specific areas within the site.
2. Soil Indicators: Determination for the presence or absence of soils that would be classified as hydric.
3. Hydrology Indicators: Evaluation of the hydrological features of the site with respect to water accumulation and wetland development.
4. Historical Characteristics: Evaluation of historical information to determine the existence and development of wetland features over extended periods of time.

METHODOLOGY/INVESTIGATIVE WORK

Wetland Analysis and Delineation work consisted of reviews of published historical information, as well as detailed site reconnaissance, to evaluate the subject properties for the presence or absence of jurisdictional wetlands according to criteria set forth in the 2011 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (v.2). The following activities were undertaken to perform the wetland delineation: 1) review county soil maps; 2) review Federal Emergency Management Agency (FEMA) floodplain maps; 3) review United States Geological Survey (USGS) topographic maps; 4) interpret current and historical aerial photography; and 5) perform site reconnaissance to evaluate and document soil, hydrology, and vegetation indicators.

1. Soil Survey Evaluation:

Prior to site reconnaissance activities, the USDA Web Soil Survey of Liberty County, Texas was reviewed to determine the types of soils that would most likely be present on the subject property. Specifically, the dominant soils were Sorter-Tarkington complex (USDA Classification - SosA), Splendor fine sandy loam (SplB), Waller-Tarkington complex (WatA), Westcott very fine sandy loam (WesA), and Westcott-Plumgrove complex (WetA).

These soils are typically a dark grayish-brown fine sandy loam about four inches thick underlain with a grayish-brown fine sandy loam to about 10 inches deep. Underlying layers are mottled to heavily mottled yellowish-brown and light brownish-gray loam and red, yellowish-red, and brown sandy clay loam to approximately ninety-five inches deep. They tend to be somewhat poorly drained, and the available water capacity is moderate. It has a fine sandy loam surface layer over moderately slowly permeable lower layers. Although primarily used for pine timber, these soils have been cleared for small crop and forage production. These soils are considered hydric soils and can be associated with a "wetland".

Given the criteria and techniques employed by the Natural Resources Conservation Service (NRCS), formerly known as the Soil Conservation Service, for the survey process, it was considered probable that the boundaries depicted on the survey could contain certain inaccuracies. The minimum mapping area for any given soil in the NRCS survey is ten (10) acres, with the probability of imprecise boundary delineation being relatively high. Therefore, as part of site reconnaissance activities, on-site soil evaluations were performed to describe, classify, and document the hydric, or non-hydric, characteristics of the primary soils on the subject property.

2. Floodplain Evaluation:

To assess the hydrological characteristics of the site, current published FEMA maps were evaluated to determine if the property lies within, or adjacent to, the 100 and/or 500-year floodplain. Due to the low topographic grades found on the Gulf Coast, periodic floods are common along rivers, creeks and bayous. These floods, along with rainfall and subsurface flow, are the primary sources of hydrology for wetlands located inland of immediate coastal areas. In addition to FEMA maps, probable flow patterns and evidence of inundation and/or periods of saturation in potential wetland areas were evaluated on-site.

3. Topography Evaluation:

Investigative activities also included observations of the property's general topography and the location of landscape features such as depressions, ridges, and levees. These features could determine wetland patterns and their associated hydrological functions. Topography was evaluated by reviewing: 1) topographical information published by the USGS; 2) aerial photography; and 3) on-site observations.

4. Aerial Photography:

Wetlands generally occur as historical features on the landscape and usually maintain their basic configurations and appearances over a long period of time. However, vegetation communities naturally progress through several stages of succession as wetlands age and mature. Additionally, topographical and hydrological characteristics may be changed by natural processes or by man-induced alterations in or near wetland areas. While field verification remains essential to wetland identification and delineation, historical aerial photography can play a vital role in the evaluation of wetland features and the variations, which may occur over extended periods of time. Aerial photography was used extensively in the evaluations made on the subject properties. A variety

of sources were used to provide photographic coverage of the area, including large-scale infrared photographs, color photographs, and black and white photographs.

1. Infrared Photography: High-altitude infrared photographs provide views of the subject properties as a complete unit where areas and systems of high water content become more easily defined. Such areas are slightly cooler than the surrounding areas and will appear on the false color imagery as variations in shading.
2. Color Photography: Color photographs provide contrasts in shading from lower altitudes that can assist in the identification of vegetation patterns and development that should be verified in the field.
3. Methodology of Interpretation: A color photograph from 2010 was analyzed for vegetation patterns that might distinguish wetland areas. This photograph was compared with infrared photography from 1995 and 2010. Areas which consistently appeared as possible wetlands were marked for field confirmation. The same process also identified areas that appeared as marginal or upland. From these photographic interpretations, a preliminary "rough" delineation pattern was established and incorporated into planned field reconnaissance.

5. Site Reconnaissance:

The primary method of wetland identification and delineation was site reconnaissance activity that would identify and document the conditions that existed on the subject properties as related to jurisdictional wetlands. The site visits were performed to target the following specific areas: 1) soil surveys and geology; 2) topography and hydrology; and 3) vegetation.

The site was visited in October 2014 by Shanon Mathis and Jeff Dunn from Berg♦Oliver Associates, Inc. Using the diagnostic criteria set forth in the 2011 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (v.2) for sampling hydrology, soils and vegetation, the sites were evaluated for the presence of wetlands that would be classified as Jurisdictional Waters of the United States. As part of a comprehensive assessment of the property, upland (non-wetland) areas were identified and sampled according to the 2011 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (v.2) as well.

Soil samples were documented and fully described according to NRCS staff (1991) criteria and were classified as either hydric or non-hydric. Numerous additional undocumented observations were made to define and establish trends or to verify aerial photo interpretation and/or NRCS mappings.

During site survey activities for soil identification, dominant plant life and vegetation communities were sampled, identified and documented for correlation with soil and hydrology data. As each soil description was made, dominant vegetation was recorded for the respective area. Representative samples were collected as necessary for specific sites and were identified. Attempts were made to comprehensively observe and document plant communities and species for all areas of the property, with special focus on those plants that would be considered associated with wetlands.

Site reconnaissance activities also included observations of the general topography of the properties and the landscape positions of depressions, ridges, levees, and other features that could determine wetland patterns and their associated hydrological features. A total of ninety-seven (97) samples were documented and fully described according to the 2011 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (v.2).

FINDINGS

1. Geology and Soils:

Geologically, the subject property is underlain by the Lissie Formation. Formed during the Pleistocene era, this formation crops out extensively throughout Liberty County. The Lissie Formation is characterized by a gently sloping relief and punctuated by shallow, undrained depressions of varying sizes. Hydric soils on the Lissie Formation are generally confined to these depressions and other large, less frequently occurring depressional flats.

Soil on the site matched the descriptions given in the USDA Web Soil Survey of Liberty County, Texas as a Gessner fine sandy loam (USDA Classification - Ge). The survey was reasonably accurate in identifying the basic type of soil found on the property and depicting significant areas of hydric soils.

Documentation of soil descriptions and classifications from each of the sample areas are presented in the Data Forms contained in Appendix E of this report.

2. Topography and Hydrology:

USGS maps indicate a relatively flat topography. FEMA maps display the documented flood zones of various water bodies. FEMA information published in 2009 indicates that a small portion of the subject property (at the western edge) lies within the 100-year flood zone. Copies of these maps are included in Appendix C.

3. Vegetation:

Vegetation communities were evaluated and documented to delineate wetland and upland boundaries. The following species were observed in significant numbers on the subject property: dewberry (*Rubus trivialis*), Japanese climbing fern (*Lygodium japonicum*), Chinese tallow (*Triadica sebifera*), loblolly pine (*Pinus taeda*), sweetgum (*Liquidambar styraciflua*), yaupon (*Ilex vomitoria*), water oak (*Quercus nigra*), bearded beggarticks (*Bidens aristosa*), and American beautyberry (*Callicarpa americana*).

As with the methods employed during soil survey activities, specific documentation was made in order to identify representative vegetation patterns within certain areas. Records of plant descriptions and classifications from each of the sample areas are presented in the Data Forms contained in Appendix E of this report.

4. GPS Data:

Over two-hundred (200) GPS positions were collected to generate the information and features found on the wetland delineation map. Cumulative Frequency Distribution comparing RTCM data with post processed data (DGPS) indicates that 95% of all positions are accurate to less than 1.0 meter (sub-meter accuracy).

CONCLUSIONS

Based on the wetland delineation presented in this report and the data collected using a Global Positioning System (GPS) satellite equipment, it is our conclusion that 25.88(±) acres of the subject property would be classified as wetlands. Of those, it is the professional opinion of Berg•Oliver Associates that 3.47(±) acres would be classified as jurisdictional waters of the U.S. (adjacent wetlands). 22.41(±) acres of the wetland areas identified would likely be considered isolated, and thus, non-jurisdictional for the following reasons: 1) there is no unbroken surface or shallow sub-surface connection to jurisdictional waters; 2) the wetlands' proximity to a jurisdictional water is not reasonably close, supporting the science-based inference that the wetlands do not have an ecological connection with jurisdictional waters; and 3) the wetlands are located outside any mapped 100-year floodplain. Additionally, 1,986(±) linear feet of jurisdictional waters of the U.S. were identified based on the presence of a defined bed and bank and ordinary high water mark, as well as an apparently direct connection to downstream relatively permanent waters.

Respectfully,



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