# APPENDIX D
# WETLAND DELINEATION

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

February 19, 2019

SUBJECT: Acknowledgement of Request

ROGER S. WILLIS
ECS SOUTHWEST, LLP
3033 KELLWAY DRIVE, SUITE 110
CARROLLTON, TEXAS 75006

This is to acknowledge receipt of your February 8, 2019 request for an Approved Jurisdictional Determination/Delineation Verification located Harris County, Texas.

We will use the information provided combined with other site-specific data/information to determine the presence and/or absence of aquatic resources on the site and their jurisdictional status as it pertains to Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. For ease and future reference please note the following information has been assigned to this request:

| | |
|---|---|
| **File Number:** | **SWG-2009-01020** |
| **Compliance Regulator** | **Ms. KARA VICK** |
| **Telephone number** | **409-766-6354** |
| **e-mail** | **kara.d.vick@usace.army.mil** |

By submitting this written request you are indicating that you have the authority, or are acting as the duly authorized agent of a person or entity with such authority, to and do hereby grant Corps personnel right of entry to legally access the site if needed to perform the jurisdictional determination. If you do not have this authorization you need to immediately notify the compliance regulator above.

This information may be shared with the Department of Justice and other federal , state and local governmental agencies, and the public and may be made available as part of a public notice as required by federal law. Your name and property location(s) where federal jurisdiction is to be determined will be included. Note that with approved jurisdiction determinations (AJD) this information will be made available to the public on the District's website and on the Headquarters USACE website. Submission of the requested information is voluntary; however if the information is not provided the request for an AJD cannot be evaluated nor can and AJD be issued.

It should be noted that at the present time our response time to finalize determinations often exceed 120 days. Please contact the Compliance regulator working on this request for any concerns and/or questions that you may have pertaining to this action.

# ECS Southwest, LLP

Wetland Delineation

Houston National Cemetery Expansion
10410 Veterans Memorial Drive
Houston, Texas 77038

For: Gordon
148 South Queen Street
Suite 201
Martinsburg, West Virginia 25401

ECS Project No. 51:1465

February 5, 2019

February 5, 2019

Mr. Mark A. Dyck
Gordon
148 South Queen Street
Suite 201
Martinsburg, West Virginia 25401

ECS Project No. 51:1465

Reference: Wetland Delineation – Houston National Cemetery Expansion – 10410 Veterans Memorial Drive, Houston, Harris County, Texas 77038

Dear Mr. Dyck:

ECS Southwest, LLP (ECS) is pleased to submit this Wetland Delineation report for the above-referenced site. ECS' services were provided in general accordance with ECS Proposal No. 51:726 authorized on October 5, 2018 and generally meet the requirements of the 1987 U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual, the Regional Supplement to the USACE Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region, Version 2.0 dated November 2010, and the SWG-Standard Operating Procedures; Recording and Submitting Jurisdictional Determinations Using GPS and GIS Tools and Technologies dated April 2016. ***Based on our wetland delineation, potentially jurisdictional Waters of the U.S. (WOUS) are not present on the Project site***.

Upon your request, we will contact the USACE to schedule a field meeting to conduct a jurisdictional determination. This process takes anywhere from a few weeks to six (6) months, depending on the availability of USACE personnel. After the boundaries of the waters of the U.S. have been confirmed by the USACE, we suggest that the areas be surveyed for future planning purposes and be submitted to the USACE as a final record. If any potential impacts are proposed, we can assist you with permitting options and support to complete the process.

ECS would like to thank Gordon for the opportunity to provide you with this Wetland Delineation. We look forward to assisting you further with this project and other environmental concerns you may have. If you have any questions, please feel free to contact us at any time at 512-837-8005.

Sincerely,

**ECS SOUTHWEST, LLP**

Roger S. Willis II, M.S.
Environmental Project Manager

Craig W. Hiatt, M.S.
Director of Environmental Services

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## Tables



## Appendices

February 5, 2019

U.S. Army Corps of Engineers
Regulatory Division
(CESWF-DE-R)
Galveston District
P.O. Box 1229
Galveston, TX 77553-1229

ECS Project No. 51:1465

Reference: Wetland Delineation – Houston National Cemetery Expansion – 10410 Veterans Memorial Drive, Houston, Harris County, Texas 77038

## 1.0 INTRODUCTION

The purpose of this assessment is to review a proposed expansion of the Houston National Cemetery in Houston, Harris County, Texas, hereafter referred to as the Project, for jurisdictional Waters of the U.S (WOUS) within the Project study area.

Wetlands are defined by the United States Army Corps of Engineers (USACE) and the United States Environmental Protection Agency (EPA) as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions." In order for an area to be classified as wetland, hydrophytic vegetation, hydric soils, and wetland hydrology indicators must be present.

## 2.0 PROPERTY DESCRIPTION

The Client is proposing to expand the Houston National Cemetery, located at 10410 Veterns Memorial Drive in Houston, Texas. The Project consists of approximately 229 acres of undeveloped land and pasture.

A map of the Project is included as Appendix I, Figure 1.

## 3.0 METHODOLOGY

This Wetland Delineation is based on ECS' professional judgment and application of the technical criteria presented in the 1987 USACE Wetlands Delineation Manual, the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region Version 2.0 dated November 2010, and the SWG-Standard Operating Procedures; Recording and Submitting Jurisdictional Determinations Using GPS and GIS Tools and Technologies dated April 2016.

ECS completed the following tasks to identify and delineate potentially jurisdictional WOUS boundaries onsite:

### 3.1 Literature Review

ECS wetland scientists reviewed the U.S. Geological Survey (USGS) Topographic Map, U.S. Department of Agriculture Natural Resource Conservation Service (USDA-NRCS) Soil Survey of Harris County, the USDA NRCS 2015 National Hydric Soils List for Harris County, the Federal Emergency Management Agency (FEMA) Floodplain Mapping, U.S. Fish & Wildlife Service (USFWS) National Wetlands Inventory (NWI) Wetlands Mapper, available aerial photographs to identify potentially jurisdictional Waters of the U.S. (i.e., streams, wetlands, natural ponds, lakes), and available watershed information.

Additionally, ECS reviewed a wetland delineation report dated July 2009 and conducted by Corrigan Consulting, Inc as well as prior approved jurisdictional determination SWG-2009-01020. The prior wetland delineation and jurisdictional determination concluded that Waters of the United States were not present on the Project.

### 3.2 Methodology for Field Investigation

Wetland boundaries were delineated using the routine onsite determination method described in the USACE Manual and Regional Supplement, in conjunction with the Atlantic and Gulf Coastal Plain 2016 Regional Wetland Plant List and the USDA Soil Survey.

ECS performed onsite wetland delineations as described above. First, site hydrology was observed and the plant community within the data plot was characterized. The dominant plant species within each community were then identified, and it was determined whether or not hydrophytic (wetland) plants dominated the plant community. The USFWS has defined five (5) wetland plant indicator categories including:

Obligate wetland (OBL) – has >99% probability of occurring in wetlands
Facultative wetland (FACW) – has 66% to 99% chance of occurring in wetlands
Facultative (FAC) – has 33% to 66% chance of occurring in wetlands
Facultative upland (FACU) – has 1 to 33% chance of occurring in wetlands
Upland (UPL) – has <1% chance of occurring in wetlands
No Indicator (NI) – no wetland indicator for the specified species, considered UPL
Plants identified as OBL, FACW, or FAC are considered wetland plants (or hydrophytes) by USACE.

In areas determined to have hydrophytic vegetation and potential wetland hydrology, an approximately 16-24 inch hand auger soil boring or shovel test pit was completed to determine if hydric soils were present. The soil boring was also inspected to determine if indicators of wetland hydrology (inundation, soil saturation, etc.) were present.

Once an area is determined to be a potential wetland, further testing was performed to locate the wetland/upland (non-wetland) boundary. A second soil data point was completed in the upland area to document non-wetland conditions.

Data forms specified in the Regional Supplement were completed for each potential wetland and non-wetland soil data point location. The data forms recorded the vegetation, soils, and hydrology observations used in making the potential wetland determinations.

Pedestrian field reconnaissance was performed by ECS scientists on October 18, 2018. Field investigations compared the reviewed background data to existing conditions and

determined the current extent of potential Waters of the U.S. on the Project. A Trimble Geo 7X was utilized to record all field data. The Trimble Geo 7X is a handheld Global Navigation Satellite System (GNSS) capable of sub-meter accuracy data collection. Waypoints were taken of all data points. Wetland and stream field notes were recorded on the appropriate regional supplement wetland data sheets. Following the field investigation, the GNSS data was imported into Google Earth Pro. The collected waypoint data was used to interpret and develop polygon boundaries for all stream and wetland features.

### 3.3 Methodology for Delineating Streams

During the field investigation for potential wetlands, ECS identified streams onsite that would be considered jurisdictional by state and federal regulatory agencies. ECS used field indicators such as flow, substrate composition, presence/absence of defined bed and banks, origin of hydrologic source, presence/absence of vegetation in the stream channel, and composition and relative abundance of resident benthic macroinvertebrates to classify onsite streams into three stream types: ephemeral, intermittent, and perennial. No streams were identified on the Project.

## 4.0 PROJECT SUMMARY AND SETTING

Hydrology, topography, vegetation, and soils within the Project boundaries are detailed below.

### 4.1 Topography

Elevation of the Project ranges from approximately 97 feet above mean sea level (msl) at the northwest corner of the Project, sloping to approximately 88 feet above msl at the eastern boundary of the Project. A topographic map of the Project is included as Appendix I, Figure 2.

### 4.2 Hydrology

Five (5) ponds and three (3) wetlands are depicted on the Aldine, TX USGS topographic map. One (1) pond is located on the southwestern corner of the Project, one (1) is located on the western, isolated area of the Project, and three (3) are located along eastern boundary of the Project. One (1) wetland is located on the western, isolated portion of the Project, one (1) is located on the central portion of the Project, and one (1) located on the southeastern portion of the Project.

Three (3) ponds and seven (7) wetlands are mapped on the Project according to the NWI Wetlands Mapper. One (1) pond is located on the southeastern corner of the western, isolated area of the Project, one (1) pond is located on the southwestern corner of the Project, and one (1) pond is located on the eastern boundary of the Project. Four (4) wetlands are located on the southeastern portion of the Project, one (1) wetland is located on the central portion of the Project, one (1) wetland is located on the northwestern portion of the Project, and one (1) wetland is located on the western, isolated area of the Project.

The proposed Project is located within the Halls Bayou watershed, identified as Hydrologic Unit Code (HUC) 120401040604 (EPA 2018). The Project is located outside of the FEMA 100-year floodplain (Zone X) (Appendix II, Attachment 3).

It appears that the wetlands identified originate from overland sheet flow from the northwest, flowing across the Project area to the southeast. During periods of high

precipitation, the ponds and wetlands may overtop and flow southeast towards a stream east of the Project or a flood control channel south of the Project.

### 4.3 Vegetation

Vegetation observed during field reconnaissance included Chinese tallow (*Triadica sebifera*), longleaf pine (*Pinus palustris*), common hackberry (*Celtis occidentalis*), curly dock (*Rumex crispus*), western ragweed (*Ambrosia psilostachya*), bermudagrass (*Cynodon dactylon*), little hogweed (*Portulaca oleracea*), annual marsh elder (*Iva annua*), yellow foxtail (*setaria pumila*), yellow nutsedge (*Cyperus esculentus*), seep muhly (*Muhlenbergia reverchonii*), rough cocklebur (*Xanthium strumarium*), common crabgrass (*Digitaria sanguinalis*), floating primrose-willow (*Ludwigia peploides*), Virginia buttonweed (*Diodia virginiana*), variable flatsedge (*Cyperus difformis*), Japanese knotweed (*Polygonum cuspidatum*), big bluestem (*Andropogon gerardii*), bushy bluestem (*Andropogon glomeratus*), littleleaf sensitive-briar (*Mimosa microphylla*), southern crabgrass (*Digitaria ciliaris*), marsh seedbox (*Ludwigia palustris*), obovate beakgrain (*Diarrhena obovata*), purpletop tridens (*Tridens flavus*), pickerelweed (*Pontederia cordata*), poverty rush (*Juncus tenuis*), southern dewberry (*Rubus trivialis*), poison ivy (*Toxicodendron radicans*), bagpod (*Sesbania vasicaria*), and camphorweed (*Heterotheca subaxillaris*).

### 4.4 Soils

Two (2) soil units (Table 1) are located within the Project boundaries (NRCS 2018). Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Both of the soil units found on the Project are listed as hydric in Harris County (NRCS 2018) (Appendix II, Attachment 1).

**Table 1: Soil Units within the Project Boundaries**

| Map Unit Symbol | Map Unit Name | Hydric Status | Data Points |
|---|---|---|---|
| Ad | Addicks loam | Yes | T2DP-2<br>T2DP-3<br>UDP-1<br>WDP-1a<br>WDP-1b |
| Cd | Clodine fine sandy loam, 0 to 1 percent slopes | Yes | T1DP-1<br>T1DP-2<br>T2DP-1<br>T3DP-1<br>WDP-2<br>WDP-3<br>WDP-4<br>WDP-5<br>WDP-6<br>WDP-7<br>WDP-8 |

## 5.0 RESULTS

Based on our field investigation, four maintained ponds, two stock ponds, and four isolated wetlands are located on the Project. Three of the wetlands are delineated as Palustrine Emergent Persistent Seasonally Flooded (PEM1C) and Palustrine Forested Persistent Temporarily Flooded (PFO1A) on the NWI Wetland Mapper, and are generally visible as more vegetated areas on aerial photographs. Two of the ponds are identified as Palustrine Unconsolidated Bottom Permanently Flooded Excavated (PUBHx) and Palustrine Unconsolidated Bottom Semipermanently Flooded Excavated (PUBFx) on the NWI Wetland Mapper with four ponds being unmapped. Land use and development changes appear to have created different wetland regimes from those identified on the NWI Wetland Mapper on the southeastern, central, and northwestern portions of the Project.

During periods of high precipitation, the ponds and wetlands may overtop and flow southeast towards a stream east of the Project or a flood control channel south of the Project. In the event that substantial flow occurs, the ponds and wetlands on the Project may have surface connection to the off-site waterways. While the waterways are not listed by the USACE Galveston District as a waterway that is subject to Section 10 of the Rivers and Harbors Act, it may be considered navigable-in-fact. Final authority in determining jurisdiction of a water feature, including significant nexus decisions, rests with USACE.

Wetland 1a was identified on the isolated western portion of the Project. The wetland was characterized by surface water, aquatic fauna, inundation visible on aerial imagery, and geomorphic position. Vegetation at WDP-1a included *Pinus palustris, Cynodon dactylon*, and *Ludwigia palustris*. Soils were considered problematic due to their shallow depth before a clay and gravel liner at a depth of 4 inches. The soils are considered hydric due to the presence of 20% redox concentrations as well as wetland hydrology and a hydrophytic plant community. Wetland 1a appears to be a Palustrine Unconsolidated Bottom Permanently Flooded Excavated (PUBHx) wetland.

Wetland 1b was identified on the isolated western portion of the Project. The wetland was characterized by surface water and geomorphic position. Vegetation at WDP-1b included *Cynodon dactylon* and *Diarrhena obovata*. The soils are considered hydric due to the presence of 10% redox concentrations indicating a redox dark surface (Indicator F6). Wetland 1b appears to be a Palustrine Emergent Persistent Temporarily Flooded (PEM1A) wetland.

Wetland 2 was identified on the northeastern portion of the Project. The wetland was characterized by surface water, inundation visible on aerial imagery, and geomorphic position. Vegetation at WDP-2 included *Triadica sebifera, Setaria pumila*, *Cynodon dactylon*, *Cyperus esculentus*, and *Tridens flavus*. The soils are considered hydric due to a value/chroma of 6/2 indicating a depleted matrix (Indicator F3). Wetland 2 appears to be a Palustrine Unconsolidated Bottom Semipermanently Flooded Excavated (PUBFx) wetland.

Wetland 3 was identified on the southeastern portion of the Project. The wetland was characterized by surface water, crayfish burrows, and geomorphic position. Vegetation at WDP-3 included *Pontedaria cordata* and *Juncus tenuis*. The soils are considered hydric due to a value/chroma of 4/2 with 30% redox concentrations in the upper 12” of soil indicating a depleted matrix (Indicator F3). Wetland 3 appears to be a Palustrine Emergent Persistent Temporarily Flooded (PEM1A) wetland.

Wetland 5 was identified on the southeastern portion of the Project. The wetland was characterized by saturation, water marks, and geomorphic position. Vegetation at WDP-5 included *Triadica sebifera, Celtis occidentalis*, *Iva annua*, *Cynodon dactylon*, *Cyperus esculentus*, and *Ambrosia psilostachya*. The soils are considered hydric due to a value/chroma of 4/2 with 20% redox concentrations in the upper 16" of soil indicating a depleted matrix and redox dark surface (Indicators F3 and F6). Wetland 3 appears to be a Palustrine Forested Persistent Temporarily Flooded (PFO1A) wetland.

Wetland 6 was identified on the southeastern portion of the Project. The wetland was characterized by surface water, algal mat, inundation visible on aerial imagery, and geomorphic position. Vegetation at WDP-6 included *Triadica sebifera, Iva annua*, *Cynodon dactylon*, *Cyperus esculentus*, *Rubus trivialis*, *Toxicodendron radicans*, and *Ambrosia psilostachya*. The soils are considered hydric due to a value/chroma of 5/3 with 10% redox concentrations in the upper 8" of soil indicating a coast prairie redox (Indicators A16). Wetland 6 appears to be a Palustrine Unconsolidated Bottom Semipermanently Flooded Excavated (PUBFx) wetland.

Wetland T2DP3 was identified on the northern portion of the Project. The wetland was characterized by surface water, oxidized rhizopsheres along living roots, crayfish burrows, and geomorphic position. Vegetation at WDP-T2DP3 was dominated by *Diodia virginiana* and *Cyperus difformis*. The soils are considered hydric due to a value/chroma of 4/2 indicating a depleted matrix (Indicator F3). Wetland T2DP3 appears to be a Palustrine Emergent Persistent Temporarily Flooded (PEM1A) wetland.

Wetlands 9, 10, and 11 are excavated, maintained ponds located on the western portion of the Project. The ponds consisted features manmade liners, creating restrictive barriers near the surface of submerged soils and are maintained via pumping year-round. Wetlands 9, 10, and 11 appear to be Palustrine Unconsolidated Bottom Permanently Flooded Excavated (PUBHx) wetlands.

Table 2 summarizes the on-site features. Table 3 summarizes the wetland data points. A map of the results of the investigation is included in Appendix I, Figure 3.

Please note the final authority in determining jurisdiction of a water feature, including significant nexus decisions, rests with USACE.

**Table 2: Onsite Features**

| Feature | Classification | Width at Ordinary High Water Mark | Depth at Ordinary High Water Mark | Length | Surface Area |
|---|---|---|---|---|---|
| Wetland 1a | PUBHx | N/A | N/A | N/A | 0.65 acres |
| Wetland 1b | PEM1A | N/A | N/A | N/A | 1,907 sq ft |
| Wetland 2 | PUBFx | N/A | N/A | N/A | 0.51 acres |
| Wetland 3 | PEM1A | N/A | N/A | N/A | 1,349 sq ft |
| Wetland 5 | PFO1A | N/A | N/A | N/A | 1.72 acres |
| Wetland 6 | PUBFx | N/A | N/A | N/A | 0.34 acres |
| Wetland 7 | Non-Wetland | N/A | N/A | N/A | N/A |
| Wetland T2DP3 | PEM1A | N/A | N/A | N/A | 0.17 acres |
| Wetland 9 | PUBHx | N/A | N/A | N/A | 7.0 acres |
| Wetland 10 | PUBHx | N/A | N/A | N/A | 2.98 acres |
| Wetland 11 | PUBHx | N/A | N/A | N/A | 4.1 acres |

**Table 3: Data Points Summary**

| Data Point | Lat/Long | Hydrology | Hydrophytic Vegetation | Hydric Soils | Classification |
|---|---|---|---|---|---|
| T1DP1 | 29.933625, -95.437255 | No | Yes | No | Non-Wetland |
| T1DP2 | 29.932103, -95.436457 | No | Yes | No | Non-Wetland |
| T2DP1 | 29.927800, -95.437858 | No | Yes | No | Non-Wetland |
| T2DP2 | 29.932652, -95.440704 | No | Yes | No | Non-Wetland |
| T2DP3 | 29.934109, -95.441570 | Yes | Yes | Yes | PEM1A |
| T3DP1 | 29.927927, -95.442622 | No | Yes | No | Non-Wetland |
| UDP-1 | 29.932455, -95.446437 | No | No | No | Non-Wetland |
| WDP-1a | 29.932274, -95.446519 | Yes | Yes | Yes | PUBHx |
| WDP-1b | 29.932356, -95.446250 | Yes | Yes | Yes | PEM1A |
| WDP-2 | 29.933060, -95.434460 | Yes | Yes | Yes | PUBFx |
| WDP-3 | 29.929034, -95.435540 | Yes | Yes | Yes | PEM1A |
| WDP-4 | 29.926325, -95.435021 | No | Yes | Yes | Non-Wetland |
| WDP-5 | 29.926384, -95.435825 | Yes | Yes | Yes | PFO1A |
| WDP-6 | 29.927648, -95.437039 | Yes | Yes | Yes | PUBFx |
| WDP-7 | 29.927301, -95.437186 | Yes | Yes | No | Non-Wetland |
| WDP-8 | 29.931630, -95.439266 | Yes | Yes | No | Non-Wetland |

## 6.0 SUMMARY

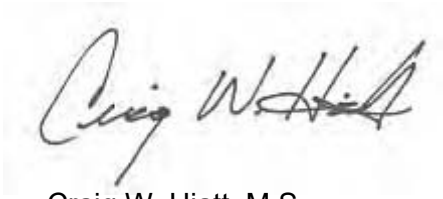
Based on our wetland delineation, potentially jurisdictional Waters of the U.S. (WOUS) are not present on the Project site. Upon your request, we will contact the USACE to schedule a field meeting to conduct a jurisdictional determination.

The WOUS boundaries are subject to change during the jurisdictional determination meeting with the USACE. ECS cannot guarantee that field conditions and/or WOUS boundaries will not change over time.

Sincerely,

**ECS SOUTHWEST, LLP**

Roger S. Willis II, M.S.
Environmental Project Manager



Craig W. Hiatt, M.S.
Director of Environmental Services

## 7.0 REFERENCES

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Federal Emergency Management Agency (FEMA) [Map]. (2007). Flood Insurance Rate Map (No. 48201C0470L).

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# Appendix I: Figures

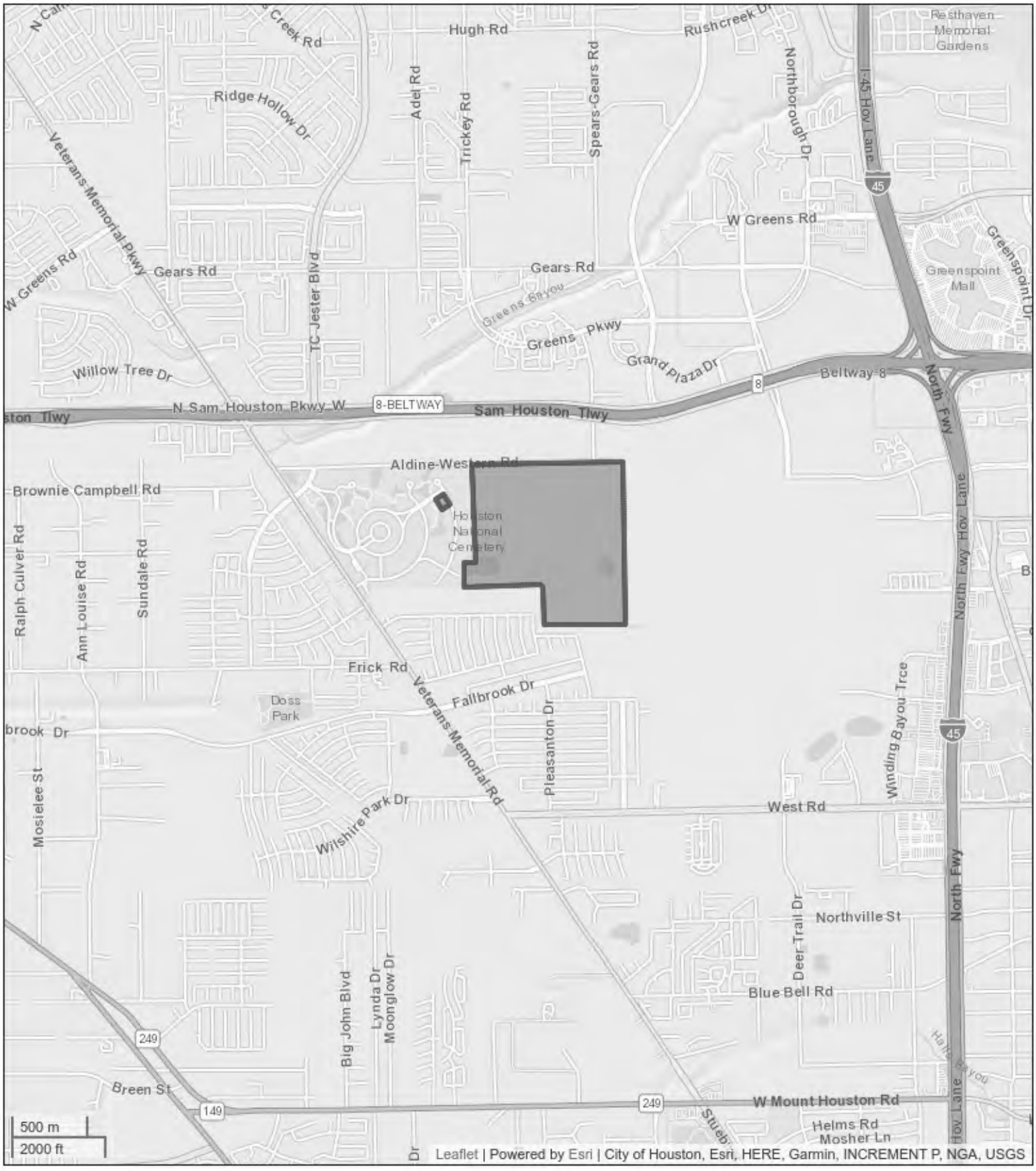


**Figure 1 - Project Location**

Houston National Cemetery
10410 Veterans Memorial Drive
Houston, Texas 77038
ECS Project 51-1465

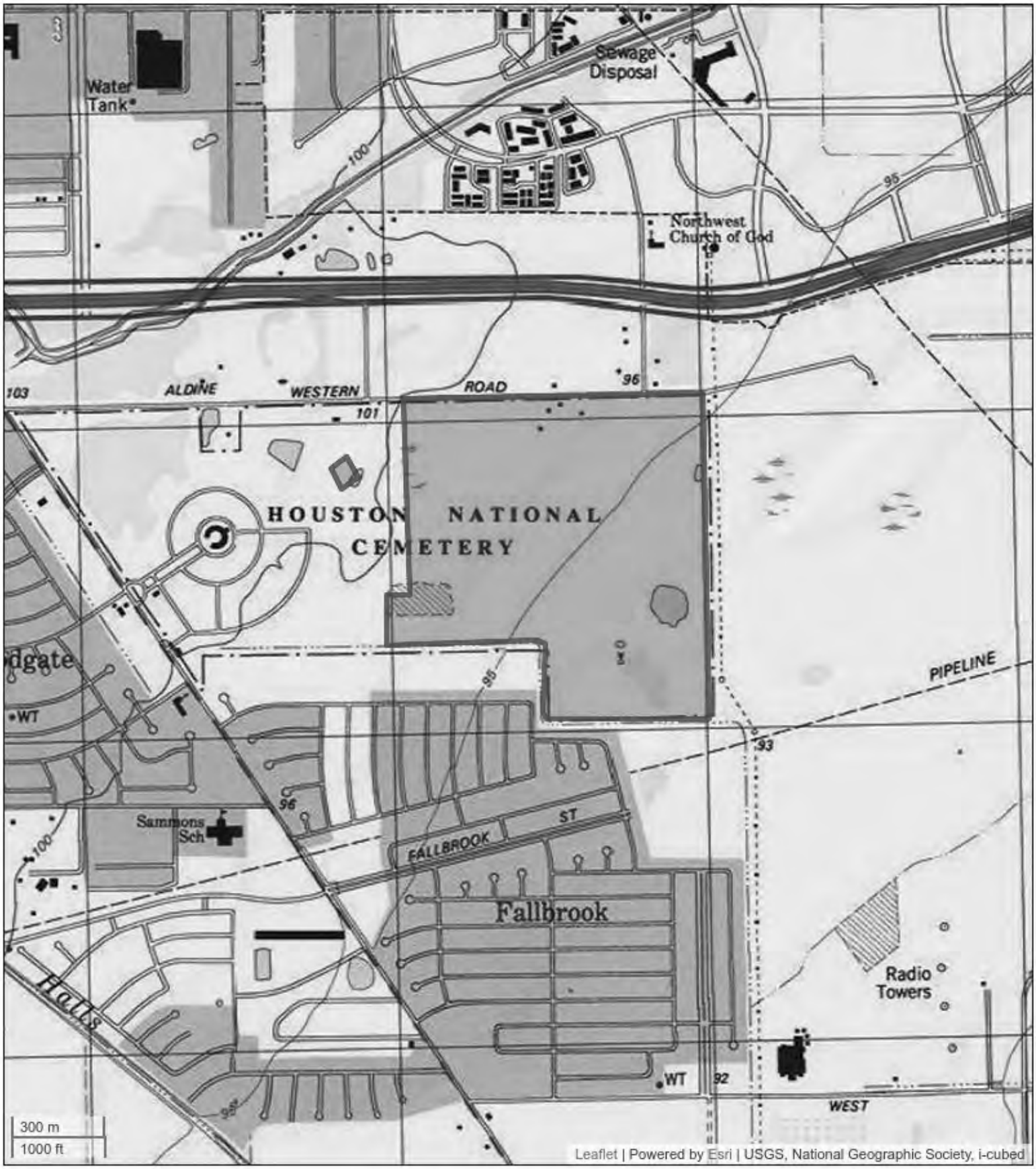


**Figure 2 - USGS Topographic Map**

Aldine, TX Quadrangle
Houston National Cemetery
10410 Veterans Memorial Drive
Houston, Texas 77038
ECS Project 51-1465


**Figure 3 - Summary Results**

Houston National Cemetery
10410 Veterans Memorial Drive
Houston, Texas 77038
ECS Project 51-1465


**Figure 4 - Wetland 1a and 1b**

Houston National Cemetery
10410 Veterans Memorial Drive
Houston, Texas 77038
ECS Project 51-1465


**Figure 5 - Wetland 2**

Houston National Cemetery
10410 Veterans Memorial Drive
Houston, Texas 77038
ECS Project 51-1465


**Figure 6 - Wetlands 3, 5, and 6**

Houston National Cemetery
10410 Veterans Memorial Drive
Houston, Texas 77038
ECS Project 51-1465

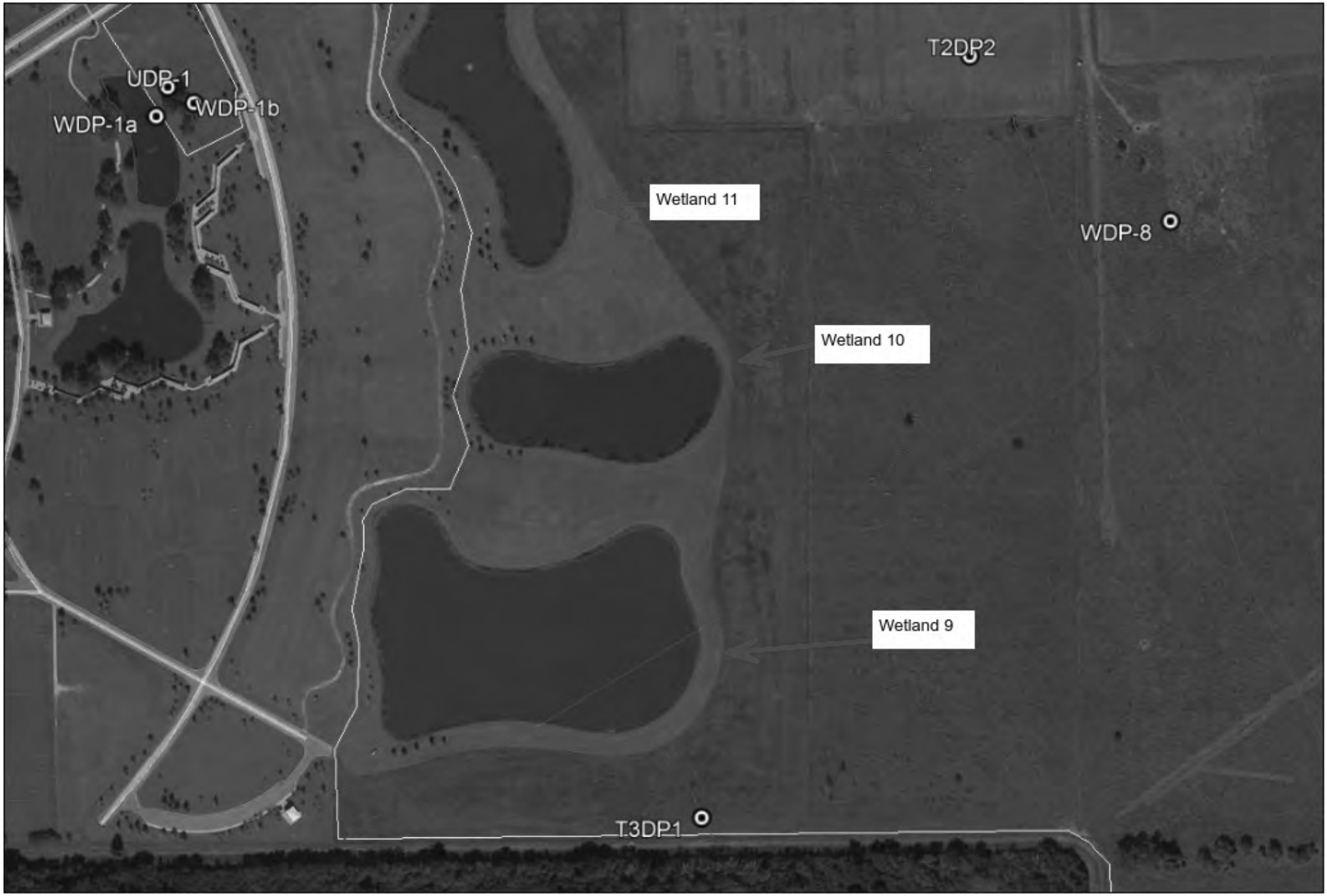


**Figure 7 - Wetlands 9, 10, and 11**

Houston National Cemetery
10410 Veterans Memorial Drive
Houston, Texas 77038
ECS Project 51-1465


**Figure 8 - Wetland T2DP3**

Houston National Cemetery
10410 Veterans Memorial Drive
Houston, Texas 77038
ECS Project 51-1465

# Appendix II: Attachments

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Harris County, Texas

## Houston National Cemetery


October 31, 2018

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# Contents

# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map


Map Scale: 1:9,260 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 100 200 400 600

Feet
0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Harris County, Texas
Survey Area Data: Version 19, Sep 14, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 26, 2017—Nov 10, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| Ad | Addicks loam | 91.0 | 29.5% |
| Cd | Clodine fine sandy loam, 0 to 1 percent slopes | 209.7 | 68.0% |
| CyuA | Cyfair-Urban land complex, 0 to 1 percent slopes | 7.5 | 2.4% |
| **Totals for Area of Interest** | | **308.2** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# Harris County, Texas

## Ad—Addicks loam

### Map Unit Setting

*National map unit symbol:* db8f
*Elevation:* 50 to 300 feet
*Mean annual precipitation:* 40 to 52 inches
*Mean annual air temperature:* 68 to 70 degrees F
*Frost-free period:* 295 to 305 days
*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Addicks and similar soils:* 90 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Addicks

#### Setting

*Landform:* Flats
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Loamy fluviomarine deposits of early pleistocene age

#### Typical profile

*H1 - 0 to 11 inches:* loam
*H2 - 11 to 49 inches:* loam
*H3 - 49 to 78 inches:* loam

#### Properties and qualities

*Slope:* 0 to 1 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Poorly drained
*Runoff class:* Negligible
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* About 12 to 21 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 35 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Sodium adsorption ratio, maximum in profile:* 4.0
*Available water storage in profile:* High (about 12.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3w
*Hydrologic Soil Group:* B/D
*Ecological site:* Loamy Prairie 44-56" PZ (R150AY741TX)
*Hydric soil rating:* Yes

**Minor Components**

**Unnamed**

*Percent of map unit:* 10 percent
*Hydric soil rating:* No

## Cd—Clodine fine sandy loam, 0 to 1 percent slopes

**Map Unit Setting**

*National map unit symbol:* nrwb
*Elevation:* 100 to 230 feet
*Mean annual precipitation:* 43 to 49 inches
*Mean annual air temperature:* 68 to 70 degrees F
*Frost-free period:* 270 to 300 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Clodine and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Clodine**

**Setting**

*Landform:* Flats
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Concave
*Parent material:* Loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

**Typical profile**

*A - 0 to 9 inches:* fine sandy loam
*Bt1 - 9 to 23 inches:* loam
*Bt2 - 23 to 57 inches:* loam
*Bt3 - 57 to 80 inches:* loam

**Properties and qualities**

*Slope:* 0 to 1 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Somewhat poorly drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.14 to 1.42 in/hr)
*Depth to water table:* About 0 to 30 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 1 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)

*Sodium adsorption ratio, maximum in profile:* 12.0
*Available water storage in profile:* High (about 10.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 5w
*Land capability classification (nonirrigated):* 5w
*Hydrologic Soil Group:* C/D
*Ecological site:* Lowland 35-56" PZ (R150AY537TX)
*Hydric soil rating:* Yes

**Minor Components**

**Katy**

*Percent of map unit:* 10 percent
*Landform:* Flats
*Landform position (three-dimensional):* Rise
*Down-slope shape:* Linear
*Across-slope shape:* Convex
*Ecological site:* Loamy Prairie 44-56" PZ (R150AY741TX)
*Hydric soil rating:* No

**Gessner**

*Percent of map unit:* 5 percent
*Landform:* Depressions
*Landform position (three-dimensional):* Dip
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Ecological site:* Lowland 35-56" PZ (R150AY537TX)
*Hydric soil rating:* Yes

## CyuA—Cyfair-Urban land complex, 0 to 1 percent slopes

**Map Unit Setting**

*National map unit symbol:* 2x3yx
*Elevation:* 140 to 250 feet
*Mean annual precipitation:* 43 to 48 inches
*Mean annual air temperature:* 67 to 69 degrees F
*Frost-free period:* 271 to 300 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Cyfair and similar soils:* 55 percent
*Urban land:* 30 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Cyfair**

**Setting**

*Landform:* Flats
*Landform position (three-dimensional):* Talf

*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Loamy fluviomarine deposits derived from igneous, metamorphic and sedimentary rock

**Typical profile**

*A - 0 to 9 inches:* fine sandy loam
*Ab - 9 to 34 inches:* fine sandy loam
*Btg1 - 34 to 53 inches:* sandy clay loam
*Btg2 - 53 to 80 inches:* clay

**Properties and qualities**

*Slope:* 0 to 1 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Somewhat poorly drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* About 12 to 24 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Salinity, maximum in profile:* Nonsaline (0.1 to 1.0 mmhos/cm)
*Sodium adsorption ratio, maximum in profile:* 6.0
*Available water storage in profile:* Very high (about 12.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 3s
*Land capability classification (nonirrigated):* 3s
*Hydrologic Soil Group:* C/D
*Ecological site:* Loamy Prairie 44-56" PZ (R150AY741TX)
*Hydric soil rating:* No

## Description of Urban Land

**Typical profile**

*M - 0 to 40 inches:* variable

## Minor Components

### Katy

*Percent of map unit:* 10 percent
*Landform:* Flats
*Landform position (three-dimensional):* Rise
*Down-slope shape:* Linear
*Across-slope shape:* Convex
*Ecological site:* Loamy Prairie 44-56" PZ (R150AY741TX)
*Hydric soil rating:* No

### Garwood

*Percent of map unit:* 2 percent
*Landform:* Flats
*Landform position (three-dimensional):* Rise
*Down-slope shape:* Linear
*Across-slope shape:* Convex
*Ecological site:* Loamy Prairie 28-44 PZ (R150AY535TX)
*Hydric soil rating:* No

**Clodine**

*Percent of map unit:* 2 percent
*Landform:* Flats
*Landform position (three-dimensional):* Rise
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Ecological site:* Lowland 35-56" PZ (R150AY537TX)
*Hydric soil rating:* Yes

**Gessner**

*Percent of map unit:* 1 percent
*Landform:* Depressions
*Landform position (three-dimensional):* Dip
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Ecological site:* Lowland 35-56" PZ (R150AY537TX)
*Hydric soil rating:* Yes

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# National Wetlands Inventory Maps

U.S. Fish and Wildlife Service
National Wetlands Inventory

# Houston National Cemetery


October 31, 2018

**Wetlands**

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

# FEMA Flood Insurance Rate Maps

# National Flood Hazard Layer FIRMette

FEMA


0 250 500 1,000 1,500 2,000 Feet

1:6,000

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 — Cross Sections with 1% Annual Chance
- 17.5 — Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/31/2018 at 2:21:49 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# National Flood Hazard Layer FIRMette

FEMA


## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- **SPECIAL FLOOD HAZARD AREAS**
  - Without Base Flood Elevation (BFE) *Zone A, V, A99*
  - With BFE or Depth *Zone AE, AO, AH, VE, AR*
  - Regulatory Floodway
- **OTHER AREAS OF FLOOD HAZARD**
  - 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
  - Future Conditions 1% Annual Chance Flood Hazard *Zone X*
  - Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
  - Area with Flood Risk due to Levee *Zone D*
- **OTHER AREAS**
  - NO SCREEN Area of Minimal Flood Hazard *Zone X*
  - Effective LOMRs
  - Area of Undetermined Flood Hazard *Zone D*
- **GENERAL STRUCTURES**
  - Channel, Culvert, or Storm Sewer
  - Levee, Dike, or Floodwall
- **OTHER FEATURES**
  - 20.2 Cross Sections with 1% Annual Chance
  - 17.5 Water Surface Elevation
  - Coastal Transect
  - Base Flood Elevation Line (BFE)
  - Limit of Study
  - Jurisdiction Boundary
  - Coastal Transect Baseline
  - Profile Baseline
  - Hydrographic Feature
- **MAP PANELS**
  - Digital Data Available
  - No Digital Data Available
  - Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/31/2018 at 2:22:46 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# National Flood Hazard Layer FIRMette

FEMA


## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/31/2018 at 2:25:35 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# National Flood Hazard Layer FIRMette

FEMA


## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/31/2018 at 2:26:15 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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# Appendix III: Photographic Log

1 - Vegetation at WDP-3

2 - Wetland 3

3 - Vegetation at WDP-4

4 - Wetland 5

5 - Wetland 5

6 - Soils at WDP-6

7 - Vegetation at T2DP1

8 - Soils at T2DP1

9 - Wetland 9

# Appendix IV: USACE Wetland Data Forms

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: T1DP-1

Investigator(s): Roger Willis Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Pasture Local relief (concave, convex, none): None Slope (%): _____

Subregion (LRR or MLRA): MLRA 150A Lat: 29.933625 Long: -95.437255 Datum: WGS 1984

Soil Map Unit Name: Clodine fine sandy loam, 0 to 1 percent slopes NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X | No _____ | **Is the Sampled Area within a Wetland?** **Yes** _____ **No** X |
| Hydric Soil Present? | Yes _____ | No X | |
| Wetland Hydrology Present? | Yes _____ | No X | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes _____ | No X | Depth (inches): _____ |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes _____ | No X | Depth (inches): _____ |

**Wetland Hydrology Present?** **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants.

Sampling Point: T1DP-1

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

| Sapling/Shrub Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

| Herb Stratum (Plot size: 1 sq. meter ) | | | |
|---|---|---|---|
| 1. Rumex crispus | 5 | N | FAC |
| 2. Ambrosia psilostachya | 15 | N | FAC |
| 3. Cynodon dactylon | 65 | Y | FACU |
| 4. Portulaca oleracea | 10 | N | FACU |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 95 = Total Cover | | |
| 50% of total cover: 47.5 | 20% of total cover: 19 | | |

| Woody Vine Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of 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: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 20 | x 3 = | 60 |
| FACU species | 75 | x 4 = | 300 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 95 (A) | | 435 (B) |

Prevalence Index = B/A = 3.78

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

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

**SOIL**

Sampling Point: T1DP-1

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Redox Features Type[1] | Redox Features Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-24" | 5 YR 3/1 | 100 | | | | | Sandy Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: T1DP-2

Investigator(s): Roger Willis Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Pasture Local relief (concave, convex, none): None Slope (%): _____

Subregion (LRR or MLRA): MLRA 150A Lat: 29.932103 Long: -95.436457 Datum: WGS 1984

Soil Map Unit Name: Clodine fine sandy loam, 0 to 1 percent slopes NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X | No _____ | **Is the Sampled Area within a Wetland?** **Yes** _____ **No** X |
| Hydric Soil Present? | Yes _____ | No X | |
| Wetland Hydrology Present? | Yes _____ | No X | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes _____ | No X | Depth (inches): _____ |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes _____ | No X | Depth (inches): _____ |

**Wetland Hydrology Present?** **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants. Sampling Point: T1DP-2

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |

50% of total cover: _____ 20% of total cover: _____

| Sapling/Shrub Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |

50% of total cover: _____ 20% of total cover: _____

| Herb Stratum (Plot size: 1 sq. meter ) | | | |
|---|---|---|---|
| 1. Iva annua | 15 | N | FAC |
| 2. Setaria pumila | 5 | N | FAC |
| 3. Cynodon dactylon | 45 | Y | FACU |
| 4. Portulaca oleracea | 10 | N | FACU |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 95 = Total Cover | | |

50% of total cover: 47.5 20% of total cover: 19

| Woody Vine Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |

50% of total cover: _____ 20% of 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: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 20 | x 3 = | 60 |
| FACU species | 75 | x 4 = | 300 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 95 (A) | | 435 (B) |

Prevalence Index = B/A = 3.78

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** _____

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

**SOIL**

Sampling Point: T1DP-2

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Redox Features Type[1] | Redox Features Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-24" | 5 YR 3/1 | 100 | | | | | Sandy Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: T2DP-1

Investigator(s): Roger Willis Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Pasture Local relief (concave, convex, none): None Slope (%): _____

Subregion (LRR or MLRA): MLRA 150A Lat: 29.927800 Long: -95.437858 Datum: WGS 1984

Soil Map Unit Name: Clodine fine sandy loam, 0 to 1 percent slopes NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X | No _____ | **Is the Sampled Area within a Wetland?** **Yes** _____ **No** X |
| Hydric Soil Present? | Yes _____ | No X | |
| Wetland Hydrology Present? | Yes _____ | No X | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes _____ | No X | Depth (inches): _____ |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes _____ | No X | Depth (inches): _____ |

**Wetland Hydrology Present?** **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants.

Sampling Point: T2DP-1

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Sapling/Shrub Stratum** (Plot size: r=20' ) | | | |
| 1. Triadica sebifera | 15 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 15 = Total Cover | | |
| 50% of total cover: 7.5 | 20% of total cover: 3 | | |
| **Herb Stratum** (Plot size: 1 sq. meter ) | | | |
| 1. Cyperus esculentus | 15 | N | FAC |
| 2. Ambrosia psilostachya | 15 | N | FAC |
| 3. Cynodon dactylon | 55 | Y | FACU |
| 4. Muhlenbergia reverchonii | 60 | Y | FAC |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 145 = Total Cover | | |
| 50% of total cover: 72.5 | 20% of total cover: 29 | | |
| **Woody Vine Stratum** (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 105 | x 3 = | 315 |
| FACU species | 55 | x 4 = | 220 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 160 (A) | | 535 (B) |

Prevalence Index = B/A = 3.34

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

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

**SOIL**

Sampling Point: T2DP-1

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Redox Features Type[1] | Redox Features Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-24" | 7.5 YR 3/2 | 100 | | | | | Sandy Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: T2DP-2

Investigator(s): Roger Willis Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Pasture Local relief (concave, convex, none): None Slope (%): _____

Subregion (LRR or MLRA): MLRA 150A Lat: 29.932652 Long: -95.440704 Datum: WGS 1984

Soil Map Unit Name: Addicks loam NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X | No _____ | **Is the Sampled Area within a Wetland?** Yes _____ No X |
| Hydric Soil Present? | Yes _____ | No X | |
| Wetland Hydrology Present? | Yes _____ | No X | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes _____ | No X | Depth (inches): _____ |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes _____ | No X | Depth (inches): _____ |

**Wetland Hydrology Present?** Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants.

Sampling Point: T2DP-2

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

| Sapling/Shrub Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

| Herb Stratum (Plot size: 1 sq. meter ) | | | |
|---|---|---|---|
| 1. Xanthium strumarium | 30 | N | FAC |
| 2. Digitaria sanguinalis | 15 | N | FACU |
| 3. Cynodon dactylon | 55 | Y | FACU |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 100 = Total Cover | | |
| 50% of total cover: 50 | 20% of total cover: 20 | | |

| Woody Vine Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of 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: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 30 | x 3 = | 90 |
| FACU species | 70 | x 4 = | 280 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 100 (A) | | 370 (B) |

Prevalence Index = B/A = 3.7

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

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

**SOIL**

Sampling Point: T2DP-2

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Redox Features Type[1] | Redox Features Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-24" | 7.5 YR 3/2 | 100 | | | | | Sandy Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: T2DP-3

Investigator(s): Roger Willis Section, Township, Range:

Landform (hillslope, terrace, etc.): Pasture Local relief (concave, convex, none): None Slope (%):

Subregion (LRR or MLRA): MLRA 150A Lat: 29.934109 Long: -95.441570 Datum: WGS 1984

Soil Map Unit Name: Addicks loam NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No _____ | **Is the Sampled Area within a Wetland?** Yes X No _____ |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☑ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes X | No _____ | Depth (inches): 1" |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes X | No _____ | Depth (inches): 1" |

**Wetland Hydrology Present?** Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants.

Sampling Point: T2DP-3

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Sapling/Shrub Stratum** (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Herb Stratum** (Plot size: 1 sq. meter ) | | | |
| 1. Ludwigia peploides | 15 | N | OBL |
| 2. Digitaria sanguinalis | 10 | N | FACU |
| 3. Cynodon dactylon | 10 | N | FACU |
| 4. Diodia virginiana | 45 | Y | FACW |
| 5. Cyperus difformis | 25 | Y | OBL |
| 6. Polygonum cuspidatum | 10 | N | UPL |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 115 = Total Cover | | |
| 50% of total cover: 57.5 | 20% of total cover: 23 | | |
| **Woody Vine Stratum** (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 40 | x 1 = | 40 |
| FACW species | 45 | x 2 = | 90 |
| FAC species | 0 | x 3 = | 0 |
| FACU species | 20 | x 4 = | 80 |
| UPL species | 10 | x 5 = | 50 |
| Column Totals: | 115 (A) | | 260 (B) |

Prevalence Index = B/A = 2.26

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

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

**SOIL**

Sampling Point: T2DP-3

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-5" | 7.5 YR 3/2 | 100 | | | | | Sandy Clay | |
| 5-9" | 7.5 YR 4/2 | 85 | 10 YR 6/6 | 15 | C | M | Sandy Clay | |
| 9-24" | 7.5 YR 4/2 | 100 | | | | | Sandy Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X **No** _____

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: T3DP-1

Investigator(s): Roger Willis Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Pasture Local relief (concave, convex, none): None Slope (%): _____

Subregion (LRR or MLRA): MLRA 150A Lat: 29.927927 Long: -95.442622 Datum: WGS 1984

Soil Map Unit Name: Clodine fine sandy loam, 0 to 1 percent slopes NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X | No _____ | **Is the Sampled Area within a Wetland?** Yes _____ No X |
| Hydric Soil Present? | Yes _____ | No X | |
| Wetland Hydrology Present? | Yes _____ | No X | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes _____ | No X | Depth (inches): _____ |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes _____ | No X | Depth (inches): _____ |

**Wetland Hydrology Present?** Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants.

Sampling Point: T3DP-1

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |

50% of total cover: _____ 20% of total cover: _____

| Sapling/Shrub Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |

50% of total cover: _____ 20% of total cover: _____

| Herb Stratum (Plot size: 1 sq. meter ) | | | |
|---|---|---|---|
| 1. Setaria pumila | 35 | N | FAC |
| 2. Andropogon gerardii | 20 | N | FAC |
| 3. Cynodon dactylon | 55 | Y | FACU |
| 4. Andropogon glomeratus | 20 | N | FACW |
| 5. Ambrosia psilostachya | 35 | N | FAC |
| 6. Mimosa microphylla | 15 | N | FACU |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 180 = Total Cover | | |

50% of total cover: 90 20% of total cover: 36

| Woody Vine Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |

50% of total cover: _____ 20% of 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: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 20 | x 2 = | 40 |
| FAC species | 90 | x 3 = | 270 |
| FACU species | 70 | x 4 = | 280 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 180 (A) | | 590 (B) |

Prevalence Index = B/A = 3.27

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** _____

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

**SOIL**

Sampling Point: T3DP-1

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Redox Features Type[1] | Redox Features Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-24" | 7.5 YR 3/2 | 100 | | | | | Sandy Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: UDP-1

Investigator(s): Roger Willis Section, Township, Range: _____

Landform (hillslope, terrace, etc.): maintained lawn Local relief (concave, convex, none): None Slope (%): _____

Subregion (LRR or MLRA): MLRA 150A Lat: 29.932455 Long: -95.446437 Datum: WGS 1984

Soil Map Unit Name: Addicks loam NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 _____ | No X | **Is the Sampled Area within a Wetland?** **Yes** _____ **No** X |
| Hydric Soil Present? | Yes _____ | No X | |
| Wetland Hydrology Present? | Yes _____ | No X | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes _____ | No X | Depth (inches): _____ |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes _____ | No X | Depth (inches): _____ |

**Wetland Hydrology Present?** **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants.

Sampling Point: UDP-1

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Sapling/Shrub Stratum** (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Herb Stratum** (Plot size: 1 sq. meter ) | | | |
| 1. Cynodon dactylon | 80 | Y | FACU |
| 2. Digitaria ciliaris | 20 | N | FACU |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 100 = Total Cover | | |
| 50% of total cover: 50 | 20% of total cover: 20 | | |
| **Woody Vine Stratum** (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of 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: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 0 | x 3 = | 0 |
| FACU species | 100 | x 4 = | 400 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 100 (A) | | 400 (B) |

Prevalence Index = B/A = 4.00

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** ____ **No** X

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

**SOIL**

Sampling Point: UDP-1

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-24 | 7.5 YR 3/2 | 100 | | | | | Sandy Clay Loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: WDP-1a

Investigator(s): Roger Willis Section, Township, Range:

Landform (hillslope, terrace, etc.): Pond Local relief (concave, convex, none): None Slope (%):

Subregion (LRR or MLRA): MLRA 150A Lat: 29.932274 Long: -95.446519 Datum: WGS 1984

Soil Map Unit Name: Addicks loam NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil X, 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 X | No _____ | **Is the Sampled Area within a Wetland?** Yes X No _____ |
| Hydric Soil Present? | Yes X | No _____ | |
| Wetland Hydrology Present? | Yes X | No _____ | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes X | No _____ | Depth (inches): 3" |
| Water Table Present? | Yes X | No _____ | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes X | No _____ | Depth (inches): _____ |

**Wetland Hydrology Present?** Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants. Sampling Point: WDP-1a

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Pinus palustris | 20 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 20 = Total Cover | | |
| 50% of total cover: 10 | 20% of total cover: 4 | | |
| Sapling/Shrub Stratum (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| Herb Stratum (Plot size: 1 sq. meter ) | | | |
| 1. Cynodon dactylon | 60 | Y | FACU |
| 2. Ludwigia palustris | 25 | N | OBL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 85 = Total Cover | | |
| 50% of total cover: 42.5 | 20% of total cover: 17 | | |
| Woody Vine Stratum (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 25 | x 1 = | 25 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 20 | x 3 = | 60 |
| FACU species | 60 | x 4 = | 240 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 105 (A) | | 325 (B) |

Prevalence Index = B/A = 3.09

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

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

**SOIL**

Sampling Point: WDP-1a

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-4 | 10 YR 4/1 | 80 | 7.5 YR 4/6 | 20 | C | M | Silty clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: Clay Gravel

Depth (inches): 4"

**Hydric Soil Present?** **Yes** X **No** _____

Remarks:

Shallow soils are the result of a man-made and maintained pond. Wetland hydrology and hydrophytic plant community suggests the soils are located in a wetland.

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: WDP-1b

Investigator(s): Roger Willis Section, Township, Range:

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): None Slope (%):

Subregion (LRR or MLRA): MLRA 150A Lat: 29.932356 Long: -95.446250 Datum: WGS 1984

Soil Map Unit Name: Addicks loam NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No _____ | **Is the Sampled Area within a Wetland?** Yes X No _____ |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

Vegetation is mowed except for a central portion of the wetland leading to an overabundance of bermuda. Hydric soils and hydrology suggest the data point is in a wetland.

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes X | No _____ | Depth (inches): 2" |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes _____ | No X | Depth (inches): _____ |

**Wetland Hydrology Present?** Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants.

Sampling Point: WDP-1b

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Sapling/Shrub Stratum** (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Herb Stratum** (Plot size: 1 sq. meter ) | | | |
| 1. Cynodon dactylon | 80 | Y | FACU |
| 2. Diarrhena obovata | 25 | N | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 105 = Total Cover | | |
| 50% of total cover: 52.5 | 20% of total cover: 21 | | |
| **Woody Vine Stratum** (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of 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: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 25 | x 3 = | 75 |
| FACU species | 80 | x 4 = | 320 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 105 (A) | | 395 (B) |

Prevalence Index = B/A = 3.76

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

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

Vegetation is mowed except for a central portion of the wetland leading to an overabundance of bermuda. Hydric soils and hydrology suggest the data point is in a wetland.

**SOIL**

Sampling Point: WDP-1b

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

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-6" | 7.5 YR 3/4 | 90 | 10 YR 5/6 | 10 | C | M | Silty Clay | |
| 6-24" | 7.5 YR 3/2 | 100 | | | | | Silty Clay | No redox |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X **No** _____

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: WDP-2

Investigator(s): Roger Willis Section, Township, Range:

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): None Slope (%):

Subregion (LRR or MLRA): MLRA 150A Lat: 29.933060 Long: -95.434460 Datum: WGS 1984

Soil Map Unit Name: Clodine fine sandy loam, 0 to 1 percent slopes NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X | No _____ | **Is the Sampled Area within a Wetland?** Yes X No _____ |
| Hydric Soil Present? | Yes X | No _____ | |
| Wetland Hydrology Present? | Yes X | No _____ | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes X | No _____ | Depth (inches): 2 |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes _____ | No X | Depth (inches): _____ |

**Wetland Hydrology Present?** Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants.

Sampling Point: WDP-2

| Tree Stratum (Plot size: r=30') | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Triadica sebifera | 30 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 30 = Total Cover | | |
| 50% of total cover: 15 | 20% of total cover: 6 | | |
| **Sapling/Shrub Stratum** (Plot size: r=20') | | | |
| 1. Triadica sebifera | 5 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 5 = Total Cover | | |
| 50% of total cover: 2.5 | 20% of total cover: 1 | | |
| **Herb Stratum** (Plot size: 1 sq. meter) | | | |
| 1. Cyperus esculentus | 15 | N | FACW |
| 2. Tridens flavus | 10 | N | FACU |
| 3. Cynodon dactylon | 45 | Y | FACU |
| 4. Setaria pumila | 20 | N | FACU |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 90 = Total Cover | | |
| 50% of total cover: 40 | 20% of total cover: 18 | | |
| **Woody Vine Stratum** (Plot size: r=20') | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 15 | x 2 = | 30 |
| FAC species | 35 | x 3 = | 105 |
| FACU species | 75 | x 4 = | 300 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 125 (A) | | 435 (B) |

Prevalence Index = B/A = 3.48

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

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

**SOIL**

Sampling Point: WDP-2

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-24" | 5 YR 6/2 | 100 | | | | | Sandy Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X **No** _____

Remarks:

Depleted Sandy Matrix

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: WDP-3

Investigator(s): Roger Willis Section, Township, Range:

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): None Slope (%):

Subregion (LRR or MLRA): MLRA 150A Lat: 29.929034 Long: -95.435540 Datum: WGS 1984

Soil Map Unit Name: Clodine fine sandy loam, 0 to 1 percent slopes NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No _____ | **Is the Sampled Area within a Wetland?** Yes X No _____ |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☑ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes X | No _____ | Depth (inches): 3" |
| Water Table Present? | Yes X | No _____ | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes X | No _____ | Depth (inches): _____ |

**Wetland Hydrology Present?** Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants.

Sampling Point: WDP-3

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 30 = Total Cover | | |
| 50% of total cover: 15 | 20% of total cover: 6 | | |
| Sapling/Shrub Stratum (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| Herb Stratum (Plot size: 1 sq. meter ) | | | |
| 1. Pontederia cordata | 50 | Y | OBL |
| 2. Juncus tenuis | 15 | N | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 65 = Total Cover | | |
| 50% of total cover: 32.5 | 20% of total cover: 13 | | |
| Woody Vine Stratum (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of 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 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 50 | x 1 = | 50 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 15 | x 3 = | 45 |
| FACU species | 0 | x 4 = | 0 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 65 (A) | | 95 (B) |

Prevalence Index = B/A = 1.46

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

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

**SOIL**

Sampling Point: WDP-3

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-12" | 7.5 YR 4/2 | 70 | 7.5 YR 4/4 | 30 | C | PL | Sandy Clay | |
| 12-24" | 7.5 YR 4/2 | 100 | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X **No** _____

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: WDP-4

Investigator(s): Roger Willis Section, Township, Range:

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): None Slope (%):

Subregion (LRR or MLRA): MLRA 150A Lat: 29.926325 Long: -95.435021 Datum: WGS 1984

Soil Map Unit Name: Clodine fine sandy loam, 0 to 1 percent slopes NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No _____ | **Is the Sampled Area within a Wetland?** Yes _____ No X |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes _____ No X | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes _____ | No X | Depth (inches): _____ |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes _____ | No X | Depth (inches): _____ |

**Wetland Hydrology Present?** Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants.

Sampling Point: WDP-4

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Triadica sebifera | 25 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 25 = Total Cover | | |

50% of total cover: 12.5 20% of total cover: 5

| Sapling/Shrub Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. Triadica sebifera | 15 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 15 = Total Cover | | |

50% of total cover: 7.5 20% of total cover: 3

| Herb Stratum (Plot size: 1 sq. meter ) | | | |
|---|---|---|---|
| 1. Cynodon dactylon | 100 | Y | FACU |
| 2. Ambrosia psilostachya | 5 | N | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 65 = Total Cover | | |

50% of total cover: 32.5 20% of total cover: 13

| Woody Vine Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |

50% of total cover: _____ 20% of total cover: _____

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 35 | x 3 = | 105 |
| FACU species | 100 | x 4 = | 400 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 135 (A) | | 505 (B) |

Prevalence Index = B/A = 3.74

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** _____

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

**SOIL**

Sampling Point: WDP-4

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

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-10" | 7.5 YR 4/2 | 80 | 7.5 YR 4/6 | 20 | C | M | Sandy Clay | |
| 10-24" | 7.5 YR 4/2 | 100 | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X **No** _____

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: WDP-5

Investigator(s): Roger Willis Section, Township, Range:

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): None Slope (%):

Subregion (LRR or MLRA): MLRA 150A Lat: 29.926384 Long: -95.435825 Datum: WGS 1984

Soil Map Unit Name: Clodine fine sandy loam, 0 to 1 percent slopes NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No _____ | **Is the Sampled Area within a Wetland?** Yes X No _____ |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0"

**Wetland Hydrology Present?** Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants. Sampling Point: WDP-5

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Triadica sebifera | 75 | Y | FAC |
| 2. Celtis occidentalis | 20 | N | FACU |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 95 = Total Cover | | |
| 50% of total cover: 47.5 | 20% of total cover: 19 | | |
| **Sapling/Shrub Stratum** (Plot size: r=20' ) | | | |
| 1. Triadica sebifera | 10 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 10 = Total Cover | | |
| 50% of total cover: 5 | 20% of total cover: 2 | | |
| **Herb Stratum** (Plot size: 1 sq. meter ) | | | |
| 1. Cynodon dactylon | 15 | Y | FACU |
| 2. Ambrosia psilostachya | 5 | N | FAC |
| 3. Iva annua | 10 | Y | FACU |
| 4. Cyperus esculentus | 5 | N | FAC |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 35 = Total Cover | | |
| 50% of total cover: 17.5 | 20% of total cover: 7 | | |
| **Woody Vine Stratum** (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 105 | x 3 = | 315 |
| FACU species | | x 4 = | 400 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 135 (A) | | 505 (B) |

Prevalence Index = B/A = 3.74

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

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

**SOIL**

Sampling Point: WDP-5

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-1" | 7.5 YR 3/1 | 95 | 10 YR 6/6 | 5 | C | M | Sandy Clay | |
| 1-16" | 5 YR 4/2 | 80 | 7.5 YR | 20 | C | M | Sandy Clay | |
| 16-24" | 7.5 YR 4/2 | 100 | | | | | Sandy Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X **No** _____

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: WDP-6

Investigator(s): Roger Willis Section, Township, Range:

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): None Slope (%):

Subregion (LRR or MLRA): MLRA 150A Lat: 29.927648 Long: -95.437039 Datum: WGS 1984

Soil Map Unit Name: Clodine fine sandy loam, 0 to 1 percent slopes NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No _____ | **Is the Sampled Area within a Wetland?** Yes X No _____ |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes X | No _____ | Depth (inches): 3 |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes _____ | No X | Depth (inches): _____ |

**Wetland Hydrology Present?** Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants. Sampling Point: WDP-6

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Triadica sebifera | 20 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 20 = Total Cover | | |
| 50% of total cover: 10 | 20% of total cover: 4 | | |
| **Sapling/Shrub Stratum** (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| **Herb Stratum** (Plot size: 1 sq. meter ) | | | |
| 1. Cynodon dactylon | 45 | Y | FACU |
| 2. Ambrosia psilostachya | 15 | N | FAC |
| 3. Iva annua | 20 | N | FACU |
| 4. Cyperus esculentus | 45 | Y | FAC |
| 5. Rubus trivialis | 20 | N | FACU |
| 6. Toxicodendron radicans | 10 | N | FAC |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 155 = Total Cover | | |
| 50% of total cover: 77.5 | 20% of total cover: 31 | | |
| **Woody Vine Stratum** (Plot size: r=20' ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 80 | x 3 = | 240 |
| FACU species | 85 | x 4 = | 340 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 165 (A) | | 580 (B) |

Prevalence Index = B/A = 3.51

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

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

**SOIL**

Sampling Point: WDP-6

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-8" | 5 YR 5/3 | 90 | 7.5 YR 6/8 | 10 | C | M | Sandy Clay | |
| 8-24" | 5 YR 5/3 | 100 | | | | | Sandy Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X **No** _____

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: WDP-7

Investigator(s): Roger Willis Section, Township, Range:

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): None Slope (%):

Subregion (LRR or MLRA): MLRA 150A Lat: 29.927301 Long: -95.437186 Datum: WGS 1984

Soil Map Unit Name: Clodine fine sandy loam, 0 to 1 percent slopes NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X | No _____ | **Is the Sampled Area within a Wetland?** **Yes** _____ **No** X |
| Hydric Soil Present? | Yes _____ | No X | |
| Wetland Hydrology Present? | Yes X | No _____ | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes X | No _____ | Depth (inches): 2" |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes X | No _____ | Depth (inches): 0" |

**Wetland Hydrology Present?** **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants.

Sampling Point: WDP-7

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Triadica sebifera | 55 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 55 = Total Cover | | |

50% of total cover: 27.5 20% of total cover: 11

| Sapling/Shrub Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. Triadica sebifera | 20 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 20 = Total Cover | | |

50% of total cover: 10 20% of total cover: 4

| Herb Stratum (Plot size: 1 sq. meter ) | | | |
|---|---|---|---|
| 1. Cynodon dactylon | 35 | Y | FACU |
| 2. Sesbania vesicaria | 20 | N | FAC |
| 3. Iva annua | 10 | N | FACU |
| 4. Cyperus esculentus | 75 | Y | FAC |
| 5. Rubus trivialis | 20 | N | FACU |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 160 = Total Cover | | |

50% of total cover: 80 20% of total cover: 32

| Woody Vine Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |

50% of total cover: 20% of 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 (A/B)

**Prevalence Index worksheet:**

| | Total % Cover of: | Multiply by: |
|---|---|---|
| OBL species | 0 | x 1 = 0 |
| FACW species | 0 | x 2 = 0 |
| FAC species | 170 | x 3 = 510 |
| FACU species | 65 | x 4 = 260 |
| UPL species | 0 | x 5 = 0 |
| Column Totals: | 235 (A) | 770 (B) |

Prevalence Index = B/A = 3.27

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

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

**SOIL**

Sampling Point: WDP-7

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-24" | 7.5 YR 2/1 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X

Remarks:

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

Project/Site: Houston National Cemetery Wetland Delineation City/County: Houston, Harris County Sampling Date: 10/17/2018

Applicant/Owner: Gordon State: Texas Sampling Point: WDP-8

Investigator(s): Roger Willis Section, Township, Range:

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): None Slope (%):

Subregion (LRR or MLRA): MLRA 150A Lat: 29.931630 Long: -95.439266 Datum: WGS 1984

Soil Map Unit Name: Clodine fine sandy loam, 0 to 1 percent slopes NWI classification: wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No _____ | **Is the Sampled Area within a Wetland?** Yes _____ No X |
| Hydric Soil Present? | Yes _____ No X | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15) **(LRR U)**
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Sphagnum moss (D8) **(LRR T, U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes X | No _____ | Depth (inches): 1" |
| Water Table Present? | Yes _____ | No X | Depth (inches): _____ |
| Saturation Present? (includes capillary fringe) | Yes _____ | No X | Depth (inches): _____ |

**Wetland Hydrology Present?** Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**VEGETATION (Four Strata) –** Use scientific names of plants.

Sampling Point: WDP-8

| Tree Stratum (Plot size: r=30' ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | = Total Cover | | |

50% of total cover: _____ 20% of total cover: _____

| Sapling/Shrub Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. Triadica sebifera | 15 | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 15 = Total Cover | | |

50% of total cover: 7.5 20% of total cover: 3

| Herb Stratum (Plot size: 1 sq. meter ) | | | |
|---|---|---|---|
| 1. Cynodon dactylon | 70 | Y | FACU |
| 2. Heterotheca subaxillaris | 30 | N | FACU |
| 3. Iva annua | 55 | Y | FACU |
| 4. Ambrosia psilostachya | 15 | N | FAC |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| | 170 = Total Cover | | |

50% of total cover: 85 20% of total cover: 34

| Woody Vine Stratum (Plot size: r=20' ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |

50% of total cover: _____ 20% of 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 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 15 | x 3 = | 45 |
| FACU species | 155 | x 4 = | 620 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 170 (A) | | 665 (B) |

Prevalence Index = B/A = 3.91

**Hydrophytic Vegetation Indicators:**

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Four Vegetation Strata:**

**Tree** – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

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

**Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

**Woody vine** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?** **Yes** X **No** _____

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

**SOIL**

Sampling Point: WDP-8

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

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Redox Features Type[1] | Redox Features Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-24" | 7.5 YR 3/2 | 100 | | | | | Sandy Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ 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 Mucky 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[3]:**

- ☐ 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)

[3]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** X

Remarks:

# Appendix V: USACE Approved Jurisdictional Determination Form

**APPROVED JURISDICTIONAL DETERMINATION FORM**
**U.S. Army Corps of Engineers**

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

**SECTION I: BACKGROUND INFORMATION**

**A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): February 1, 2019**

**B. DISTRICT OFFICE, FILE NAME, AND NUMBER:Galveston District**

**C. PROJECT LOCATION AND BACKGROUND INFORMATION:**
State: Texas County/parish/borough: Harris County City: Houston
Center coordinates of site (lat/long in degree decimal format): Lat. 29.931266° **N**, Long. -95.438820° **W**.
Universal Transverse Mercator: Zone 14
Name of nearest waterbody: Halls Bayou
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Buffalo Bayou
Name of watershed or Hydrologic Unit Code (HUC): Halls Bayou watershed (120401040604)
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

**D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**
☐ Office (Desk) Determination. Date:
☐ Field Determination. Date(s):

**SECTION II: SUMMARY OF FINDINGS**

**A. RHA SECTION 10 DETERMINATION OF JURISDICTION.**

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

**B. CWA SECTION 404 DETERMINATION OF JURISDICTION.**

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Established by OHWM.**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
   Explain: .

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

## SECTION III: CWA ANALYSIS

### A. TNWs AND WETLANDS ADJACENT TO TNWs

**The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below**.

**1. TNW**
Identify TNW: .

Summarize rationale supporting determination: .

**2. Wetland adjacent to TNW**
Summarize rationale supporting conclusion that wetland is "adjacent": .

### B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

**This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.**

**The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.**

**A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.**

**If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.**

**1. Characteristics of non-TNWs that flow directly or indirectly into TNW**

**(i) General Area Conditions:**
Watershed size: **Pick List**
Drainage area: **Pick List**
Average annual rainfall: inches
Average annual snowfall: inches

**(ii) Physical Characteristics:**
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

Identify flow route to TNW[5]: .
Tributary stream order, if known: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

**Tributary** is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

**Tributary** properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

| | | |
|---|---|---|
| ☐ Silts | ☐ Sands | ☐ Concrete |
| ☐ Cobbles | ☐ Gravel | ☐ Muck |
| ☐ Bedrock | ☐ Vegetation. Type/% cover: | |
| ☐ Other. Explain: . | | |

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):

| | |
|---|---|
| ☐ clear, natural line impressed on the bank | ☐ the presence of litter and debris |
| ☐ changes in the character of soil | ☐ destruction of terrestrial vegetation |
| ☐ shelving | ☐ the presence of wrack line |
| ☐ vegetation matted down, bent, or absent | ☐ sediment sorting |
| ☐ leaf litter disturbed or washed away | ☐ scour |
| ☐ sediment deposition | ☐ multiple observed or predicted flow events |
| ☐ water staining | ☐ abrupt change in plant community |
| ☐ other (list): | |

☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

| | |
|---|---|
| ☐ High Tide Line indicated by: | ☐ Mean High Water Mark indicated by: |
| ☐ oil or scum line along shore objects | ☐ survey to available datum; |
| ☐ fine shell or debris deposits (foreshore) | ☐ physical markings; |
| ☐ physical markings/characteristics | ☐ vegetation lines/changes in vegetation types. |
| ☐ tidal gauges | |
| ☐ other (list): | |

**(iii) Chemical Characteristics:**
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

**(iv) Biological Characteristics. Channel supports (check all that apply):**

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

**2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

**(i) Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

**(ii) Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

**(iii) Biological Characteristics. Wetland supports (check all that apply):**

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

**3. Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

| Directly abuts? (Y/N) | Size (in acres) | Directly abuts? (Y/N) | Size (in acres) |
|---|---|---|---|

Summarize overall biological, chemical and physical functions being performed: .

## C. SIGNIFICANT NEXUS DETERMINATION

**A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.**

**Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:**

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

**Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:**

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

## D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

**E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]**
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

**Identify water body and summarize rationale supporting determination:** .

---

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
**[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

**F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):**
☒ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☒ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☒ Lakes/ponds: 15.58 acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☒ Wetlands: 1.96 acres.

**SECTION IV: DATA SOURCES.**

**A. SUPPORTING DATA. Data reviewed for JD (check all that apply -** checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: Aldine, Texas 2016; 1:24,000.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: Harris County, Texas 2017.
☒ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☒ FEMA/FIRM maps: FEMA FIRM Map Panels 48201C0470L and 48201C0465M.
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): Google Earth 2018.
or ☐ Other (Name & Date): .
☒ Previous determination(s). File no. and date of response letter:SWG-2009-01020, February 12, 2010.
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

**B. ADDITIONAL COMMENTS TO SUPPORT JD:** .

# Appendix VI: Aquatic Resources Data Sheet

| Waters_Name | State | Cowardin_Code | HGM_Code | Meas_Type | Amount | Units | Waters_Type | Latitude | Longitude | Local_Waterway |
|---|---|---|---|---|---|---|---|---|---|---|
| Wetland 1a | Texas | PUB | DEPRESS | Area | 1 | ACRE | ISOLATE | 29.93218500 | -95.44655000 | Halls Bayou |
| Wetland 1b | Texas | PEM | DEPRESS | Area | 1907 | FOOT | ISOLATE | 29.93231400 | -95.44625800 | Halls Bayou |
| Wetland 2 | Texas | PUB | DEPRESS | Area | 0.51 | ACRE | ISOLATE | 29.93283400 | -95.43457600 | Halls Bayou |
| Wetland 3 | Texas | PEM | DEPRESS | Area | 1349 | FOOT | ISOLATE | 29.92905600 | -95.43558300 | Halls Bayou |
| Wetland 5 | Texas | PFO | DEPRESS | Area | 1.72 | ACRE | ISOLATE | 29.92660500 | -95.43610000 | Halls Bayou |
| Wetland 6 | Texas | PUB | DEPRESS | Area | 0.34 | ACRE | ISOLATE | 29.92774300 | -95.43731000 | Halls Bayou |
| Wetland T2DP3 | Texas | PEM | DEPRESS | Area | 0.17 | ACRE | ISOLATE | 29.93431200 | -95.44148200 | Halls Bayou |
| Wetland 9 | Texas | PUB | DEPRESS | Area | 7 | ACRE | ISOLATE | 29.92897000 | -95.44391800 | Halls Bayou |
| Wetland 10 | Texas | PUB | DEPRESS | Area | 2.98 | ACRE | ISOLATE | 29.93051000 | -95.44336300 | Halls Bayou |
| Wetland 11 | Texas | PUB | DEPRESS | Area | 4.1 | ACRE | ISOLATE | 29.93230200 | -95.44410200 | Halls Bayou |

# Appendix VII: GPS Data Point Metadata

| Data Point | Lat | Long | # of satellites | PDOP | Distance from Previous Point (feet) | Date Recorded | Collected by | Receiver | Correction/Accuracy Status |
|---|---|---|---|---|---|---|---|---|---|
| T1DP1 | 29.934228814 | -95.437662711 | 17 | 1.1 | 1101 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| T1DP2 | 29.932102675 | -95.436456698 | 17 | 1.2 | 862 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| T2DP1 | 29.927799326 | -95.437858125 | 18 | 1.1 | 279 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| T2DP2 | 29.932649419 | -95.440703814 | 16 | 1.2 | 589 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| T2DP3 | 29.934085619 | -95.441572898 | 16 | 1.3 | 591 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| T3DP1 | 29.927932274 | -95.442623745 | 16 | 1.3 | 2275 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| UDP1 | 29.932459800 | -95.446435185 | 17 | 1.5 | 74 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| WDP-1a | 29.932275343 | -95.446514426 | 10 | 2 | N/A | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| WDP-1b | 29.932353871 | -95.446250645 | 17 | 1.3 | 71 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| WDP-2 | 29.933059252 | -95.434465070 | 16 | 1.2 | 3724 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| WDP-3 | 29.929033857 | -95.435539808 | 16 | 1.5 | 961 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| WDP-4 | 29.926323489 | -95.435020648 | 15 | 1.5 | 998 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| WDP-5 | 29.926375302 | -95.435824202 | 15 | 1.5 | 255 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| WDP-6 | 29.927647316 | -95.437039863 | 14 | 1.1 | 601 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| WDP-7 | 29.927296814 | -95.437180422 | 15 | 1.2 | 134 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |
| WDP-8 | 29.931630255 | -95.439267364 | 18 | 1.2 | 1467 | 10/17/2019 | Roger Willis | Trimble Geo 7X | 3D Realitime SBAS |

# APPENDIX E
# AGENCY / STAKEHOLDER CORRESPONDENCE

May 2, 2019

U.S. Environmental Protection Agency
Regional Environmental Review Coordinator
EPA Region 6 (6EN)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

**SUBJECT: Intergovernmental and Interagency Coordination of Environmental Planning (NEPA Scoping Letter) for the:**
**Department of Veterans Affairs (VA)**
**Proposed Houston National Cemetery Expansion**
**10410 Veterans Memorial Drive**
**Houston, Harris County, Texas**

To Whom It May Concern:

The US Department of Veterans Affairs (VA) – National Cemetery Administration (NCA) is preparing environmental documentation to assist in the Federal decision-making process concerning the proposed expansion of the existing Houston National Cemetery (HNC), located at 10410 Veterans Memorial Drive, Houston, Harris County, Texas. The approximately 38-acre expansion site (Proposed Project) is contiguous to the east of the HNC and is currently in use as a livestock pasture. The location of the Proposed Project is shown in **Figures 1 and 2.**

The cemetery is the 15th busiest in the nation and serves a FY 20 veterans population of approximately 318,000 within a 75-mile service area. VA NCA proposes to expand its capacity of crypts to meet the growing demand at the Houston National Cemetery and ensure no break in service to the veteran community. All proposed activities would be contained within the Houston National Cemetery boundary. The purpose of this project is to enable an existing national cemetery to continue to provide burial services for eligible veterans. The Proposed Project will develop approximately 38 acres of undeveloped land to provide approximately 24,800 gravesites, including both casket and cremation sites in new burial sections. This project will provide for an additional 10-year inventory of pre-placed crypts for casketed interments and both in ground sites and columbarium niches for cremated inurnments, as well as various cemetery improvements/enhancements.

VA NCA is preparing an Environmental Assessment (EA) to evaluate the environmental, cultural, and socioeconomic issues associated with the proposed acquisition, development, and operation of the Site as the expanded HNC pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S. Code (USC) §4321 *et seq*.); the Council on Environmental Quality (CEQ) Regulations Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508); and VA's Implementing Regulations (38 CFR Part 26, *Environmental Analysis of VA Actions*).

**Information Request:** *Information your agency can provide on any of the following environmental issue areas (at or in the vicinity of the proposed Site) would be appreciated*:

- Potential environmental concerns or issues;

- Surface and groundwater resources, including streams, wetlands, floodplains, open water features, wells, and local aquifers;
- Federally or state listed threatened or endangered species, or any species proposed for such listing, or critical habitat for such species that may occur within a one-mile radius around the proposed Site;
- Parks, nature preserves, conservation areas, designated wild or scenic rivers, migratory bird habitats, or special wildlife issues;
- Natural resource issues;
- Soils and geologic data, including lists of hydric soils;
- Prime and unique farmland (*National Resources Conservation Services only*);
- Traffic, noise, or socioeconomic concerns;
- Air quality concerns; and
- Additional environmental, cultural, land use, or socioeconomic information or concerns your agency may have with regard to the referenced Site.

Data that you make available will provide valuable and necessary input into the NEPA analytical process, and will serve to scope that analysis. As part of the NEPA process, local citizens, groups, and agencies, among others, will have opportunity to review and comment on the information and alternatives addressed in the document.

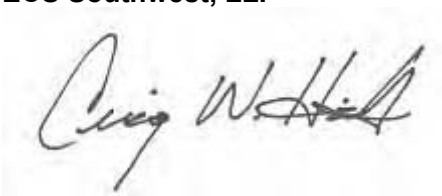
We look forward to and welcome your participation in this process. **Please respond on or before June 6, 2019** to enable us to complete this phase of the project within the scheduled timeframe. ECS Southwest, LLP is assisting VA NCA in conducting this NEPA process.

**Please send your written responses via regular or e-mail (preferred) to:**

ECS Southwest, LLP
14050 Summit Drive
Suite A-101
Austin, Texas 78728
ATTN: Craig W. Hiatt
Director of Environmental Services
chiatt@ecslimited.com

If you have any questions concerning this request, please direct them to Mr. Hiatt at (512) 837-8005.

Sincerely,
**ECS Southwest, LLP**



Craig W. Hiatt, M.S.
Director of Environmental Services

Attachments:

May 2, 2019

Federal Emergency Management Agency
Insurance and Mitigative Division Region VI
FRC 800 N Loop 288
Denton, Texas 76209-3698

**SUBJECT: Intergovernmental and Interagency Coordination of Environmental Planning (NEPA Scoping Letter) for the:**
**Department of Veterans Affairs (VA)**
**Proposed Houston National Cemetery Expansion**
**10410 Veterans Memorial Drive**
**Houston, Harris County, Texas**

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**Information Request:** *Information your agency can provide on any of the following environmental issue areas (at or in the vicinity of the proposed Site) would be appreciated*:

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- Surface and groundwater resources, including streams, wetlands, floodplains, open water features, wells, and local aquifers;
- Federally or state listed threatened or endangered species, or any species proposed for such listing, or critical habitat for such species that may occur within a one-mile radius around the proposed Site;
- Parks, nature preserves, conservation areas, designated wild or scenic rivers, migratory bird habitats, or special wildlife issues;
- Natural resource issues;
- Soils and geologic data, including lists of hydric soils;
- Prime and unique farmland (*National Resources Conservation Services only*);
- Traffic, noise, or socioeconomic concerns;
- Air quality concerns; and
- Additional environmental, cultural, land use, or socioeconomic information or concerns your agency may have with regard to the referenced Site.

Data that you make available will provide valuable and necessary input into the NEPA analytical process, and will serve to scope that analysis. As part of the NEPA process, local citizens, groups, and agencies, among others, will have opportunity to review and comment on the information and alternatives addressed in the document.

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**Please send your written responses via regular or e-mail (preferred) to:**

ECS Southwest, LLP
14050 Summit Drive
Suite A-101
Austin, Texas 78728
ATTN: Craig W. Hiatt
Director of Environmental Services
chiatt@ecslimited.com

If you have any questions concerning this request, please direct them to Mr. Hiatt at (512) 837-8005.

Sincerely,
**ECS Southwest, LLP**

Craig W. Hiatt, M.S.
Director of Environmental Services

Attachments:

U. S. Department of Homeland Security
FEMA Region 6
800 North Loop 288
Denton, TX 76209-3698

FEMA

FEDERAL EMERGENCY MANAGEMENT AGENCY
REGION 6
MITIGATION DIVISION

**RE: Intergovernmental and Interagency Coordination of Environmental Planning (NEPA Scoping Letter) for the: Department of Veterans Affairs (VA), Proposed Houston National Cemetery Expansion, 10410 Veterans Memorial Drive, Houston, Harris County, Texas**

**NOTICE REVIEW/ENVIRONMENTAL CONSULTATION**

---

☐ We have no comments to offer. ☒ We offer the following comments:

**WE WOULD REQUEST THAT THE COMMUNITY FLOODPLAIN ADMINISTRATOR BE CONTACTED FOR THE REVIEW AND POSSIBLE PERMIT REQUIREMENTS FOR THIS PROJECT. IF FEDERALLY FUNDED, WE WOULD REQUEST PROJECT TO BE IN COMPLIANCE WITH EO11988 & EO 11990.**

Jonathan Steiber
Floodplain Administrator
10555 Northwest Freeway, Suite 120
Houston, TX 77092
Jonathan.Steiber@eng.hctx.net
(713) 274-3842

---

REVIEWER:

*Colleen Sciano*
Floodplain Management and Insurance Branch
Mitigation Division
(940) 383-7257

DATE: June 4, 2019

May 2, 2019

Texas General Land Office
Governmental Relations
1700 Congress Avenue
Austin, Texas 78701-5001

**SUBJECT: Intergovernmental and Interagency Coordination of Environmental Planning (NEPA Scoping Letter) for the:**
**Department of Veterans Affairs (VA)**
**Proposed Houston National Cemetery Expansion**
**10410 Veterans Memorial Drive**
**Houston, Harris County, Texas**

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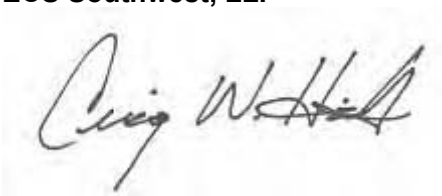
**Please send your written responses via regular or e-mail (preferred) to:**

ECS Southwest, LLP
14050 Summit Drive
Suite A-101
Austin, Texas 78728
ATTN: Craig W. Hiatt
Director of Environmental Services
chiatt@ecslimited.com

If you have any questions concerning this request, please direct them to Mr. Hiatt at (512) 837-8005.

Sincerely,
**ECS Southwest, LLP**



Craig W. Hiatt, M.S.
Director of Environmental Services

Attachments:

May 2, 2019

Harris County Historical Commission
1218 Webster Street
The Benjamin Building
Houston, Texas 77002-8841

**SUBJECT: Intergovernmental and Interagency Coordination of Environmental Planning (NEPA Scoping Letter) for the:**
**Department of Veterans Affairs (VA)**
**Proposed Houston National Cemetery Expansion**
**10410 Veterans Memorial Drive**
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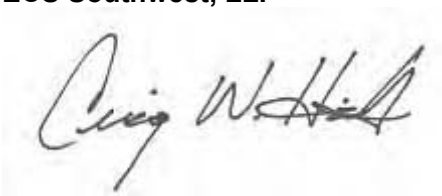

Craig W. Hiatt, M.S.
Director of Environmental Services

Attachments:

May 2, 2019

City of Houston Floodplain Management Office
Department of Public Works and Engineering
City of Houston
611 Walker
Houston, Texas 77002

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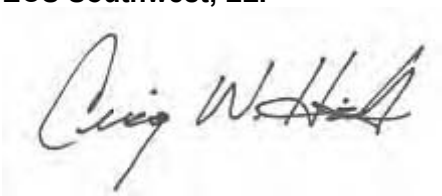

Craig W. Hiatt, M.S.
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May 2, 2019

Harris-Galveston Subsidence District
1660 West Bay Area Blvd
Friendswood, Texas 77546

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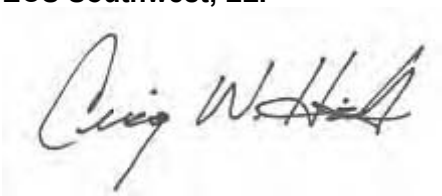

Craig W. Hiatt, M.S.
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Attachments:

# WATER WELL PERMIT

**Harris-Galveston Subsidence District**
1660 West Bay Area Blvd.
Friendswood, Texas 77546-2640
Phone: (281) 486-1105 Fax: (281) 218-3700

**I. PERMITTEE :** Veterans Affairs, Dept. of
Attn: Jim Parzych
C/O: Houston National Cemetery
10410 Veterans Memorial Dr.
Houston, Texas 77038

**PERMIT NO. : 207664**

**II. LOCATION OF WELL :**

LATITUDE 29° 56' 4"
LONGITUDE 95° 26' 30"

**III. WELL NO. :** 14780 **Well Owner:** Veterans Affairs, Dept. of
The authorized withdrawal below is the TOTAL COMBINED amount that may be withdrawn from the following wells:

4284, 6065, 14780



**IV. PERMIT TERM :** November 13, 2019 **THROUGH** May 31, 2020

**V. AUTHORIZED WITHDRAWAL:**

Only that which is required without being wasteful during the permit term, but not to exceed **120** million gallons (combined total for all wells listed above).

Any pumpage in excess of the amount authorized in this permit is a violation of the District's rules. Applications for an amendment to increase authorized withdrawal must be submitted prior to exceeding the permitted amount.

**VI. SPECIAL PROVISIONS :**

G7a, M, D1

( SEE SPECIAL PROVISIONS ON ATTACHED PAGES )

SUBJECT TO CONDITIONS AND REQUIREMENTS ON ATTACHED PAGE

APPROVED THIS 13th DAY OF November, 2019
**Harris-Galveston Subsidence District**

BY: _____
General Manager

**PROVISIONS FOR PERMIT # 207664**

D1 On January, 9, 2013 the Board of Directors of the Subsidence District adopted the 2013 District Regulatory Plan. There have been significant changes between the 1999 and the 2013 District Plans. As a result, some of the changes may directly affect you. You can obtain a copy of the 2013 District Plan at our web site – www.subsidence.org. If you have any questions or if you do not have access to the Internet, you can contact the Subsidence District's office.

G7a This permit is **exempt** from disincentive permit fees. However, when alternate water becomes available in the area the permittee may be required to reduce its groundwater usage at that time.

M Within sixty days of the beginning of the permit term, the permittee shall furnish the District with **proof** that the **meter is installed** according to the manufacturers specifications or a certified affidavit confirming the accuracy of the water meter in accordance with Rule 8.5 of the Rules of the District.

May 2, 2019

National Park Service
Planning and Environmental Quality
National Historic Landmarks Program
Intermountain Regional Office
12795 W. Alameda Parkway
Lakewood, CO 80228

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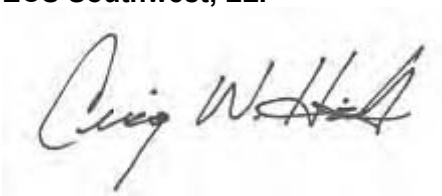

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Director of Environmental Services

Attachments:

## Craig William Hiatt

**From:** david_hurd@nps.gov on behalf of IMRextrev, NPS <imrextrev@nps.gov>
**Sent:** Friday, May 10, 2019 11:01 AM
**To:** Craig William Hiatt
**Subject:** Proposed Houston National Cemetery Expansion

Dear Mr. Hiatt,

The National Park Service (NPS) would like to thank you for the opportunity to be involved in your project. The NPS has reviewed this project and has no comment at this time.

Regards,

National Park Service
Intermountain Region External Review Team
Serving MT, UT, WY, CO, AZ, NM, OK, TX
imrextrev@nps.gov

May 2, 2019

Natural Resource Conservation Service
State Resource Conservationist
Ecological Sciences
101 South Main Street
Temple, Texas 76501-7682

**SUBJECT: Intergovernmental and Interagency Coordination of Environmental Planning (NEPA Scoping Letter) for the:**
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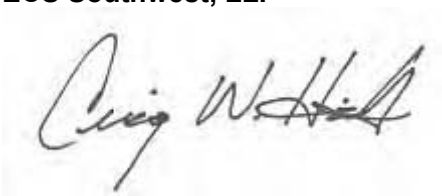

Craig W. Hiatt, M.S.
Director of Environmental Services

Attachments:

USDA
United States Department of Agriculture

Natural Resources
Conservation Service

State Office

101 S. Main Street
Temple, TX 76501
Voice 254.742.9800
Fax 254.742.9819

May 28, 2019

ECS Southwest, LLP.
*CHiatt@ecslimited.com*

Attention: Craig W. Hiatt, M.S., Director of Environmental Sciences, *via email*

Subject: LNU-Farmland Protection
Proposed Houston National Cemetery Expansion Project
NEPA/FPPA Evaluation
City of Houston, Harris County, Texas

We have reviewed the information provided in your correspondence dated May 2, 2019 concerning the proposed cemetery expansion project located in the City of Houston, Harris County, Texas. This review is part of the National Environmental Policy Act (NEPA) evaluation for the U.S. Department of Veterans Affairs (VA). We have evaluated the proposed site as required by the Farmland Protection Policy Act (FPPA).

The proposed site may involve areas of Prime Farmland; however, we consider the location to be "land committed to urban development" due to its location within the city limits of Houston, Texas. Additionally, the project site location is included within an area of land with a density of 30 structures per 40-acre area. Due to these reasons, this project is exempt from provisions of FPPA. We strongly encourage the use of acceptable erosion control methods during the construction of this project.

Please find the attached Custom Soil Resources Report. The soil physical and chemical properties are presented, along with additional restrictions or interpretations for the project area.

The major concerns within the study area involve potential wetlands and drainage restrictions. Each soil mapping unit contains a hydric soil inclusion which would serve as a potential wetland. We recommend that the entities developing these areas continue coordination with the Texas Parks and Wildlife Department and the US Fish and Wildlife Service to avoid adverse impacts to wetland ecosystems and habitats.

If you have further questions, please contact me at 254.742.9836 or by email at Carlos.Villarreal@usda.gov (Preferred).

Sincerely,

Carlos J. Villarreal
NRCS Soil Scientist

Attachment: **Custom Soil Resource Report for Harris County Texas**

May 2, 2019

Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711

**SUBJECT: Intergovernmental and Interagency Coordination of Environmental Planning (NEPA Scoping Letter) for the:**
**Department of Veterans Affairs (VA)**
**Proposed Houston National Cemetery Expansion**
**10410 Veterans Memorial Drive**
**Houston, Harris County, Texas**

To Whom It May Concern:

The US Department of Veterans Affairs (VA) – National Cemetery Administration (NCA) is preparing environmental documentation to assist in the Federal decision-making process concerning the proposed expansion of the existing Houston National Cemetery (HNC), located at 10410 Veterans Memorial Drive, Houston, Harris County, Texas. The approximately 38-acre expansion site (Proposed Project) is contiguous to the east of the HNC and is currently in use as a livestock pasture. The location of the Proposed Project is shown in **Figures 1 and 2.**

The cemetery is the 15th busiest in the nation and serves a FY 20 veterans population of approximately 318,000 within a 75-mile service area. VA NCA proposes to expand its capacity of crypts to meet the growing demand at the Houston National Cemetery and ensure no break in service to the veteran community. All proposed activities would be contained within the Houston National Cemetery boundary. The purpose of this project is to enable an existing national cemetery to continue to provide burial services for eligible veterans. The Proposed Project will develop approximately 38 acres of undeveloped land to provide approximately 24,800 gravesites, including both casket and cremation sites in new burial sections. This project will provide for an additional 10-year inventory of pre-placed crypts for casketed interments and both in ground sites and columbarium niches for cremated inurnments, as well as various cemetery improvements/enhancements.

VA NCA is preparing an Environmental Assessment (EA) to evaluate the environmental, cultural, and socioeconomic issues associated with the proposed acquisition, development, and operation of the Site as the expanded HNC pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S. Code (USC) §4321 *et seq*.); the Council on Environmental Quality (CEQ) Regulations Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508); and VA's Implementing Regulations (38 CFR Part 26, *Environmental Analysis of VA Actions*).

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- Additional environmental, cultural, land use, or socioeconomic information or concerns your agency may have with regard to the referenced Site.

Data that you make available will provide valuable and necessary input into the NEPA analytical process, and will serve to scope that analysis. As part of the NEPA process, local citizens, groups, and agencies, among others, will have opportunity to review and comment on the information and alternatives addressed in the document.

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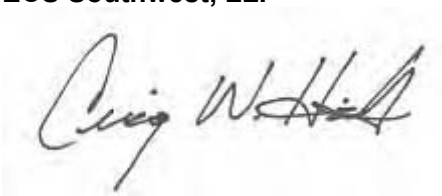
**Please send your written responses via regular or e-mail (preferred) to:**

ECS Southwest, LLP
14050 Summit Drive
Suite A-101
Austin, Texas 78728
ATTN: Craig W. Hiatt
Director of Environmental Services
chiatt@ecslimited.com

If you have any questions concerning this request, please direct them to Mr. Hiatt at (512) 837-8005.

Sincerely,
**ECS Southwest, LLP**



Craig W. Hiatt, M.S.
Director of Environmental Services

Attachments:

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

May 17, 2019

Craig Hiatt
Director of Environmental Services
ECS Southwest, LLP
14050 Summit Drive
Austin, Texas 78728

Via: E-mail

Re: TCEQ NEPA Request #2019-132. Expansion of Houston National Cemetery. Harris County.

Dear Mr. Hiatt,

The Texas Commission on Environmental Quality (TCEQ) has reviewed the above-referenced project and offers the following comments:

The proposed action is located in Harris County, which is designated nonattainment for the ozone National Ambient Air Quality Standards (NAAQS) with a classification of moderate for the 2008 eight-hour ozone NAAQS and a classification of marginal for the 2015 eight-hour ozone NAAQS. General Conformity regulations at 40 CFR Part 93 apply for federal actions in Harris County according to the higher, moderate classification.
Volatile organic compounds (VOC) and nitrogen oxides ($NO_x$) are precursor pollutants that lead to the formation of ozone. A general conformity demonstration may be required when the total projected direct and indirect VOC or $NO_x$ emissions from an applicable action are equal to or exceed the *de minimis* emissions level, which is 100 tons per year (tpy) for ozone NAAQS moderate nonattainment areas. Please let us know if you have questions concerning air quality as you develop the environmental assessment for this proposed project.

The Office of Water does not anticipate significant long term environmental impacts from this project as long as construction and waste disposal activities associated with it are completed in accordance with applicable local, state, and federal environmental permits, statutes, and regulations. We recommend that the applicant take necessary steps to ensure that best management practices are used to control runoff from construction sites to prevent detrimental impact to surface and ground water.

Any debris or waste disposal should be at an appropriately authorized disposal facility.

Thank you for the opportunity to review this project. If you have any questions, please contact the agency NEPA coordinator at (512) 239-3500 or NEPA@tceq.texas.gov

Sincerely,

Ryan Vise,
Division Director
External Relations

May 2, 2019

Texas Parks and Wildlife Department
Wildlife Habitat Assessment Program
4200 Smith School Road
Austin, Texas 78744-3291

**SUBJECT: Intergovernmental and Interagency Coordination of Environmental Planning (NEPA Scoping Letter) for the:**
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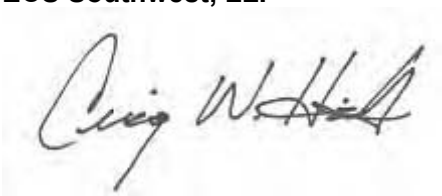

Craig W. Hiatt, M.S.
Director of Environmental Services

Attachments:

TEXAS PARKS & WILDLIFE

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Fort Worth

T. Dan Friedkin
Chairman-Emeritus
Houston

Carter P. Smith
Executive Director

May 9, 2019

Mr. Craig W. Hiatt
ECS Southwest, LLP
14050 Summit Drive, Suite 101
Austin, Texas 78728

RE: NEPA Scoping for Proposed Houston National Cemetery Expansion; Houston, Harris County, Texas

Dear Mr. Hiatt:

Texas Parks and Wildlife Department (TPWD) has received and reviewed the submitted documentation regarding the above-referenced project.

Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency may be required by state law. For further guidance, see the Texas Parks and Wildlife Code, Section 12.0011. For tracking purposes, please refer to TPWD project number 41891 in any return correspondence regarding this project.

## Project Description

The US Department of Veterans Affairs (VA)- National Cemetery Administration (NCA) is preparing environmental documentation concerning the proposed expansion of the existing Houston National Cemetery (HNC), located at 10410 Veterans Memorial Drive, Houston, Harris County, Texas. The approximately 38-acre expansion site is contiguous to the east of the HNC and is currently in use as a livestock pasture.

TPWD offers the following comments and recommendations concerning this project.

## Construction Recommendations

*General Construction Recommendations*

**Recommendation:** TPWD recommends the judicious use and placement of sediment control fence to exclude wildlife from the construction area. In many cases, sediment control fence placement for the purposes of controlling erosion and protecting water quality can be modified minimally to also provide the benefit of excluding wildlife access to construction areas. The exclusion fence should be buried at least six inches and be at least 24 inches high. The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated. Construction personnel

should be encouraged to examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities.

**Recommendation:** For soil stabilization and/or revegetation of disturbed areas within the proposed project area, TPWD recommends erosion and seed/mulch stabilization materials that avoid entanglement hazards to snakes and other wildlife species. Because the mesh found in many erosion control blankets or mats pose an entanglement hazard to wildlife, TPWD recommends the use of no-till drilling, hydromulching and/or hydroseeding rather than erosion control blankets or mats due to a reduced risk to wildlife. If erosion control blankets or mats will be used, the product should contain no netting or contain loosely woven, natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic mesh matting should be avoided.

**Recommendation:** If trenching or other excavation is involved in the project, TPWD recommends that contractors keep trenching/excavation and backfilling crews close together to minimize the amount of trenches/excavation areas left open at any given time during construction. TPWD recommends that any open trenches or excavation areas be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. Trenches left open for more than two daylight hours should be inspected for the presence of trapped wildlife prior to backfilling. If trenches/excavation areas cannot be backfilled the day of initial excavation, then escape ramps should be installed at least every 90 meters. Escape ramps can be short lateral trenches or wooden planks sloping to the surface at an angle less than 45 degrees (1:1).

**Recommendation:** During construction, operation, and maintenance of the proposed facility, TPWD recommends observing slow (25 miles per hour, or less) speed limits within the project site. Reduced speed limits would allow personnel to see wildlife in the vehicle path and avoid harming them.

*Federal Law: Migratory Bird Treaty Act*

The Migratory Bird Treaty Act (MBTA) prohibits direct and affirmative purposeful action that reduce migratory birds, their eggs, or their nests, by killing or capturing, to human control, except when specifically authorized by the Department of the Interior. This protection applies to most native bird species, including ground nesting species. The U.S. Fish and Wildlife Service (USFWS) Migratory Bird Office can be contacted at (505) 248-7882 for more information on potential impacts to migratory birds.

**Recommendation:** TPWD recommends any vegetation clearing be scheduled outside of the general bird nesting season of March 15th to September 15th; however, if clearing must occur during nesting season, nest surveys should be conducted prior to clearing. If nests are observed during surveys, a vegetation buffer area of no less than 150-feet in diameter should remain around the nest until all young have fledged.

*State Law: Parks and Wildlife Code – Chapter 64, Birds*

Texas Parks and Wildlife (TPW) Code Section 64.002, regarding protection of nongame birds, provides that no person may catch, kill, injure, pursue, or possess a bird that is not a game bird. TPW Code Section 64.003, regarding destroying nests or eggs, provides that no person may destroy or take the nests, eggs, or young and any wild game bird, wild bird, or wild fowl. TPW Code Chapter 64 does not allow for incidental take and; therefore, is more restrictive than the MBTA.

**Recommendation:** Please review the *Federal Law: Migratory Bird Treaty Act* section above for recommendations as they are also applicable for Chapter 64 of the TPW Code compliance.

*Species of Concern/Special Features*

TPWD provides online access to protected and rare species, or species of greatest conservation need (SGCN), information through the TPWD Rare, Threatened, and Endangered Species of Texas by County (RTEST) application. TPWD also maintains records of occurrence for these species within the Texas Natural Diversity Database (TXNDD) and these data are publicly available by request. TPWD actively promotes the conservation of SGCN and considers it important to evaluate and, if necessary, minimize impacts to rare species and their habitat to reduce the likelihood of endangerment and preclude the need to list.

Please note that the absence of TXNDD information in an area does not imply that a species is absent from that area. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive statement as to the presence, absence or condition of special species, natural communities, or other significant features within your project area. These data are not inclusive and cannot be used as presence/absence data. This information cannot be substituted for on-the-ground surveys. The TXNDD is updated continuously. As the project progresses and for future projects, please request the most current and accurate information at TexasNatural.DiversityDatabase@tpwd.texas.gov.

Based on a review of available resources, it appears the study area could provide habitat for multiple SGCN which could be impacted by the project:

- Cajun chorus frog (*Pseudacris fouquettei*)
- Southern crawfish frog (*Lithobates areolatus areolatus*)
- Strecker's chorus frog (*P. streckeri*)
- Woodhouse's toad (*Anxyrus woodhousii*)
- Western burrowing owl (*Athene cunicularia hypugaea*)
- Houston burrowing crayfish (*Fallicambarus houstonensis*)
- slender glass lizard (*Ophisaurus attenuatus*)
- western box turtle (*Terrapene ornata*)
- coastal gay-feather (*Liatris bracteata*)

- Houston daisy (*Rayjacksonia aurea*)
- Indianola beakrush (*Rhynchospora indianolensis*)
- Shinner's sunflower (*Helianthus occidentalis ssp. plantagineus*)
- Texas windmill grass (*Chloris texensis*)

**Recommendation:** TPWD recommends the VA include SGCN species in any survey efforts. Surveying the site prior to construction would aid in protecting SGCN species from potential impacts. Please be aware that species not occurring during site surveys may utilize the habitat within the project area at times beyond those during which the survey was conducted, such as seasonally or nocturnally.

**Recommendation:** If during construction, the project area is found to contain rare species, natural plant communities, or special features, TPWD recommends that precautions be taken to avoid impacts to them.

**Recommendation:** Implementation of the *General Construction Recommendations*, discussed above, would serve to minimize risk to many of the above-listed SGCN and other species of wildlife.

*Monarch and Pollinator Conservation*

There is widespread concern regarding the decline of monarch butterflies (*Danaus plexippus*) and other native insect pollinator species due to reductions in native floral resources. To support pollinators and migrating monarchs, TPWD encourages the establishment of native wildflower habitats on private and public lands. Establishing wildflower habitats in new developments can contribute to pollinator conservation. Greenspaces surrounding development can provide habitat for a diverse community of pollinators, providing forage for food and breeding or nesting opportunities. By acting as refugia for pollinators in otherwise inhospitable landscapes, this habitat can contribute to the maintenance of healthy ecosystems and provision of ecological services such as crop pollination services. Recent publications on conserving pollinators in Texas can be found at the TPWD Wildlife Habitat Assessment Program: Planning Tools and Best Management Practices webpage.

**Recommendation:** To contribute to pollinator conservation efforts, TPWD encourages the VA and HNC to consider incorporating pollinator habitat into the landscaping plans for the proposed cemetery expansion. Pollinator habitats can be designed to provide aesthetic benefits to cemetery visitors. Species appropriate for the project area can be found by accessing the Lady Bird Johnson Wildflower Center, working with TPWD biologists to develop an appropriate list of species, or utilizing resources found at the Xerces Society's Guidelines webpage.

**Recommendation:** TPWD advises against planting the non-native milkweed species black swallow-wort (*Cynanchum louiseae*) and pale swallow-wort (*C. rossicum*). Monarch butterflies will lay eggs on these plant species, but the larvae are unable to feed and complete their life cycle. Additionally, these plant species can be highly invasive. Additionally, TPWD advises against planting the non-native tropical milkweed (*Asclepias curassavica*), a popular commercial nursery milkweed

that can persist year-round in southern states. The year-round persistence of tropical milkweed fosters greater transmission of the protozoan *Ophryocystis elektroscirrha* (OE), increasing the likelihood that monarchs become infected with the debilitating parasite.

**Data Reporting and the Texas Natural Diversity Database**

As mentioned earlier in this letter, TPWD maintains records of occurrence for protected and rare species, or SGCN, within the TXNDD and these data are publicly available by request. The TXNDD is intended to assist users in avoiding harm to rare species or significant ecological features. The TXNDD is updated continuously, and relies partially on information submitted by private parties, such as partner agencies or their consultants. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state.

Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive statement as to the presence, absence, or condition of special species, natural communities, or other significant features within a project area. Determining the actual presence of a species in a given area depends on many variables including daily and seasonal activity cycles, environmental activity cues, preferred habitat, transiency, and population density (both wildlife and human). The absence of a species can be demonstrated only with great difficulty, and then only with repeated negative observations, taking into account all the variable factors contributing to the lack of detectable presence. Please note that the absence of TXNDD information in an area does not imply that a species is absent from that area. These data are not inclusive and cannot be substituted for field surveys.

**Recommendation:** To aid in the scientific knowledge of a species' status and current range, TPWD encourages reporting encounters of protected and rare species to the TXNDD according to the data submittal instructions found at the TPWD Texas Natural Diversity Database: Submit Data webpage.

Thank you for considering project impacts to Texas' fish and wildlife resources. If you have any questions, please contact me at Rachel.Lange@tpwd.texas.gov or (361) 412-9012.

Sincerely,

Rachel Lange

Rachel Lange
Wildlife Habitat Assessment Program
Wildlife Division

RAL/41891

May 2, 2019

U.S. Army Corps of Engineers
U. S. Army Engineer District, Galveston
CESWG-PE-R
P.O. Box 1229
Galveston, TX 77553-1229

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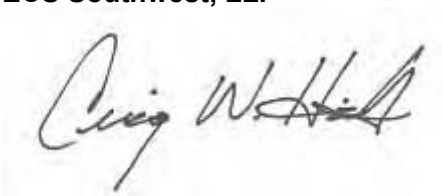

Craig W. Hiatt, M.S.
Director of Environmental Services

Attachments:

May 2, 2019

U.S. Fish and Wildlife Service
Division of Ecological Services
17629 El Camino Real, Suite 211
Houston, Texas 77058

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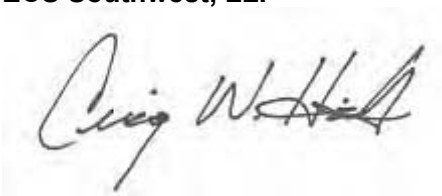
ATTN: Craig W. Hiatt
Director of Environmental Services
chiatt@ecslimited.com

If you have any questions concerning this request, please direct them to Mr. Hiatt at (512) 837-8005.

Sincerely,
**ECS Southwest, LLP**



Craig W. Hiatt, M.S.
Director of Environmental Services

Attachments: