INTERIM HYDROGEOMORPHIC FUNCTIONAL ASSESSMENT REPORT FOR THE GARDEN AND LEGEND SUBSTATIONS PROJECT JEFFERSON COUNTY, TEXAS

Prepared for

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SWCA Project No. 41872

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APPENDICES

TABLES

1. INTRODUCTION

On behalf of Entergy Texas, Inc. (ETI), SWCA Environmental Consultants (SWCA) performed an interim hydrogeomorphic (iHGM) functional assessment of wetlands within the proposed Garden and Legend Substations Project work areas in Jefferson County, Texas (project area). The project area consist of two areas measuring approximately 12.544 and 5.944 acres for the Garden Substation and Legend Substation, respectively. Environmental data for these sites were gathered from larger tract delineation efforts (survey area). The proposed Garden and Legend substation sites will include an approximately 4.0-acre substation and an approximately 1.8-acre substation site along with associated access roads and power poles necessary to power the substations from existing transmission lines. The proposed Garden Substation is located approximately 0.72 mile east-southeast from the intersection of U.S. Highway 69 and Farm-to-Market Road 3514 in Jefferson County, Texas (Garden project area). The proposed Legend Substation is located approximately 0.59 mile from the intersection of State Highway 73 and State Highway 82 (Legend survey area) (Appendix A).

The purpose of this functional assessment is to determine the functional capacities of wetlands that may be filled, converted, or temporarily impaired by construction activities and determine the corresponding mitigation credits. In February 2017, SWCA conducted an on-site iHGM functional assessment concurrent with the wetland delineation. Field personnel collected data to determine the sub-index values for the variables associated with the Herbaceous/Shrub and Forested iHGM models. The iHGM model provides a mechanism through which generally defined functions are quantified for comparative purposes. Within this framework, major classes of wetland functions are described as indices, which can be compared to other wetlands. This report describes the methods and results of the functional assessment conducted for the Garden and Legend Substations Project.

2. METHODS

2.1. iHGM Assessment

The iHGM uses multiple variables to evaluate three ecological functions that describe and measure forested and herbaceous/shrub riverine wetlands in the U.S. Army Corps of Engineers (USACE) Galveston District. These three functional capacity indices (FCI) are used to quantify potential impacts for each wetland assessment area (WAA) associated with a project. For this project, SWCA applied the Riverine Herbaceous/Shrub functional assessment (USACE 2010a). The FCI quantify temporary storage of surface water (TSSW), maintenance of plant and animal communities (MPAC), and removal and sequestration of elements and compounds (RSEC) for each wetland to determine physical, biological, and chemical functions, respectively.

The Riverine Herbaceous/Shrub iHGM functional assessment uses 10 variables to evaluate non-forested (herbaceous or scrub-shrub) riverine wetlands. The three indices are expressed as

$$TSSW = \sqrt{\left[\sqrt{(V_{dur} * V_{freq})} * \left(\frac{(V_{topo} + \frac{V_{herb} + V_{mid}}{2})}{3}\right)\right]}$$

$$MPAC = \frac{[V_{mid} + V_{herb} + V_{connect}]}{3}$$

$$RSEC = \frac{\left[V_{wood} + V_{freq} + V_{dur} + \left(\frac{V_{topo} + V_{herb} + V_{wood}}{3}\right) + \left(\frac{V_{detritus} + V_{redox} + V_{sorpt}}{3}\right)\right]}{5}$$

with the variables

- V_{dur} - Duration of flooding and ponding in an average year
- V_{freq} - Frequency of flooding and ponding
- V_{topo} - Percent containing topographic features
- V_{herb} - Percent of herbaceous cover
- V_{mid} - Percent of relative cover between the herbaceous and tree strata
- V_{wood} - Percent covered by woody vegetation
- $V_{detritus}$ - Percent of area with detritus at the soil surface
- V_{redox} - Abundance of redox features within the top 12 inches of soil
- V_{sorpt} - Absorptive properties of the soil
- $V_{connect}$ - Number of habitat types found within 600 feet

ranging from 0 to 1 based on site conditions at the time of the assessment.

Thus, a wetland scoring closer to 1 for each variable will generate a higher FCI score for each ecological function (TSSW, MPAC, and RSEC) than one in which variable values are near 0. Once an FCI has been calculated for each wetland, the corresponding functional capacity units (FCU) can be determined based on the product of the total acreage of a wetland and its corresponding FCI values.

2.2. Field Survey

SWCA completed the on-site iHGM functional assessment following the guidelines provided in the USACE 2010 Riverine Herbaceous/Shrub iHGM guidance documents. Wetlands as identified by the wetland delineation were divided into WAAs, or physically continuous and hydrogeomorphically homogeneous wetlands (USACE 1995). Vegetation communities were classified following the Cowardin et al. (1979) system. Most wetlands within the project area were defined as separate WAAs based on differences in physical, biological, and chemical functions. However, the similarities of some wetlands were deemed homogeneous and were combined and assessed as a single WAA. See Appendix A for maps depicting the location of WAAs within the project area.

A circular 37.2-foot-radius plot (i.e., 0.1 acre) was established for each wetland to assess field variables of the appropriate iHGM functional assessment model. For wetlands less than 0.1 acre, the entire wetland was assessed. Variables that are not amenable to field survey (e.g., $V_{connect}$, V_{dur}, and V_{freq}) were assessed using recent aerial images, topographic information, Federal Emergency Management Agency (FEMA) Floodplain maps, and the U.S. Geological Survey (USGS) 7.5-minute digital orthophoto quadrangle for Port Acres, Texas and Port Arthur North, Texas for the Garden survey area and Legend survey area, respectively.

SWCA assessed two palustrine emergent (PEM) wetlands (Table 1) that have a minimal tree stratum and are typified by a thick herbaceous layer with scattered shrubs. Commonly observed herbaceous species include bushy bluestem (*Andropogon glomeratus*), woodrush flat sedge (*Cyperus entrerianus*), sand spike-rush (*Eleocharis montevidensis*), lamp rush (*Juncus effusus*), short-bristle horned beak sedge (*Rhynchospora cornicultata*), and salt-meadow cord grass (*Spartina patens*).

One palustrine scrub-shrub (PSS) wetland areas (Table 1) was identified during the wetland delineation. These PSS wetlands consist of vegetation communities with at least 30 percent sapling and shrub cover. Throughout the project area, these wetlands are dominated by eastern baccharis (*Baccharis halimifolia*), sugarberry (*Celtis laevigata*), yaupon (*Ilex vomitoria*), Chinese privet (*Ligustrum sinense*), southern bayberry (*Morella cerifera*), water oak (*Quercus nigra*), and Chinese tallowtree (*Triadica sebifera*). When found, herbaceous cover consists of yaupon, lamp rush (*Juncus effusus*), Japanese honey suckle (*Lonicera japonica*).

Table 1. Wetlands delineated in the parcels associated with the proposed project.

Wetland ID	Associated Survey Area	Vegetation Community Type	Acreage within Survey Area*	Acreage within Project Area
W01A	Garden Survey Area	PEM	11.830	2.482
W01B	Garden Survey Area	PSS	39.260	10.062
W01C	Garden Survey Area	PSS	0.551	0.000
W01D	Garden Survey Area	PSS	0.533	0.000
W02	Legend Survey Area	PEM	19.141	5.944
		PEM Wetlands Subtotal	**30.971**	**8.426**
		PSS Wetlands Subtotal	**40.344**	**10.062**
		Total	**71.315**	**18.488**

* Acreages were rounded to the nearest 0.001 acre.

3. RESULTS

3.1. Existing Conditions

Three herbaceous riverine wetlands totaling 18.488 acres were assessed within the project area. Because each wetland is relatively homogeneous and consists of a single vegetative class (i.e., emergent or scrub/shrub), each wetland was treated as a WAA using the iHGM analyses. Table 1 shows the sub-index values assigned for each WAA within the project area. Although specific measured values for the assessed WAA are provided in Appendix B, the following paragraphs provide general descriptions.

Duration of flooding (V_{dur}) is estimated using hydrology indicators listed in the *Corps of Engineers Wetlands Delineation Manual* (Manual; USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Atlantic and Gulf Coastal Region (Version 2.0)* (Regional Supplement; USACE 2010b). Both the Garden and Legend substations are within the 500-year floodplain, indicating that both areas flood semi-regularly. The Garden Substation project area is immediately east of a modified canal associated with Rhodair Gully and Legend Substation project area is northeast of Taylor Bayou. In an average year, the duration of flooding events in all WAAs occur for at least seven consecutive days, resulting in sub-index values ranging from 0.5 to 0.75.

Frequency of flooding (V_{freq}) uses indicators listed in the Manual (USACE 1987), the Regional Supplement (USACE 2010b), and FEMA floodplain maps. The project areas lying within the 500-year floodplain and the geography of the sites are such that much of these areas are inundated by periodic flooding. Based on field observation, SWCA believes that all WAAs flood or pond annually at least two out of five times a year. Therefore, each WAA warrants a sub-index scores of 0.25 to 0.5.

Topography (V_{topo}) relies on visual estimates conducted in the field to determine what percent of the project area is composed of heterogeneous topographic features (e.g., dips, hummocks, channel sloughs). Some topographic features observed within the project area include fluvial terraces and hummocks. The Garden Substation wetlands bore topographic features over less than 15 percent of the WAA; however, the Legend Substation's topography was greater than 15 percent of the WAA. Therefore, these wetlands were assigned sub-index values of 0.4 to 0.7, respectively.

Woody vegetation (V_{wood}) can be assessed using aerial imagery, field data, and visual observations. Woody vegetation dominated the PSS wetlands, with cover averaging 90 percent, warranting a score of 0.75. The PEM wetlands were marked by a paucity of tree stratum cover and, therefore, warranted scores of 0.1 and 0.25, indicating that woody vegetation cover ranged between 0 and 33 percent.

Midstory (V_{mid}) describes the shrub and sapling vegetation layer found between ground level and an upper forest canopy. The midstory stratum covers between 50 and 75 percent of PSS WAA, warranting a sub-index value 0.75. The herbaceous WAAs bore midstory strata ranging from less than 1 to 25 percent, leading to sub-index values of 0.1 to 0.25.

Herbaceous (V_{herb}) describes the average herbaceous vegetation cover in each WAA. The most common sub-index value was 1.0 but ranged as low as 0.25 for Garden's PSS wetland. These values indicate that the herbaceous stratum ranged from less than 25 percent to greater than 75 percent of most herbaceous wetlands.

Connectivity to other habitat types ($V_{connect}$) was assessed using aerial imagery extending 600 feet from the project area. The Garden and Legend project area included two habitat types and one habitat (including wetland), respectively. Based on this, sub-index scores of 0.50 and 0.25 were assigned, respectively.

Detritus ($V_{detritus}$) refers to the presence of either an O or A horizon associated with the WAAs. Frequent flooding within the project area saturates soils, decreasing the rate at which organic carbon is naturally utilized thereby allowing for the accumulation of organic matter. Sub-index values of 0.3 and 1.0 were assigned to Garden and Legend, respectively.

Redoximorphic process (V_{redox}) is based on extent to which pedons within the WAA that exhibit redoximorphic features as an indication of alternating oxidizing and reducing conditions. Periodic flooding within saturates soils, causing vacillation between anaerobic and aerobic conditions which allows the reduction and translocation of iron and manganese within the upper portions of the soil. Soils within all WAAs contained redoximorphic concentrations that represent less than 20 percent of the pedon, warranting a sub-index score of 0.1.

Sorptive soil properties (V_{sorpt}) are determined using the Natural Resources Conservation Service (NRCS) Soil Survey (U.S. Department of Agriculture [USDA] 2016) and data recorded in the field. According to the USDA Soil Survey, Beaumont clay, 0 to 1 percent slopes; Harris clay, 0 to 1 percent slopes, frequently flooded, tidal; and League-Urban land complex, 0 to 1 percent slopes are present in the project area. Field surveys confirmed that clay soils (sub-index score of 1.0) dominated all WAAs.

Table 2. Assigned sub-index values for PEM and PSS wetlands within the project area.

WAA ID	Wetland ID	V_{dur}	V_{freq}	V_{topo}	V_{wood}	V_{mid}	V_{herb}	$V_{connect}$	$V_{detritus}$	V_{redox}	V_{sorpt}
WAA 1	W01A	0.75	0.50	0.40	0.10	0.10	1.00	0.50	0.30	0.10	1.00
WAA 2	W01B	0.50	0.25	0.40	0.75	0.75	0.25	0.50	0.30	0.10	1.00
WAA 3	W02	0.75	0.25	0.70	0.25	0.25	1.00	0.25	1.00	0.10	1.00

WAA functional assessment worksheets are provided in Appendix B.

3.2. Impact Assessment

Based on the sub-index values in Table 2, SWCA calculated the FCIs and, by extension, FCUs corresponding to the planned fills for the project (Table 3).

Table 3. Existing PEM and PSS acreage, wetland FCI values, and FCU values for the project area.

WAA ID	Wetland ID	Project Area	Acreage	TSSW (physical)		MPAC (biological)		RSEC (chemical)	
				FCI	FCU	FCI	FCU	FCI	FCU
WAA 1	W01A	Garden Substation	0.128	0.539	0.069	0.533	0.068	0.463	0.059
WAA 2	W01B	Garden Substation	4.449	0.399	1.775	0.500	2.225	0.487	2.165
WAA 3	W02	Legend Substation	2.142	0.536	1.147	0.500	1.071	0.520	1.114
Total			**6.719**		**2.991**		**3.364**		**3.338**

In addition, the project plan for Garden Substation will require conversion of 5.613 acres of PSS to PEM wetlands, resulting in the permanent loss of wetland functions. To calculate the functional loss associated with the conversion of PSS to PEM wetlands, SWCA recomputed the FCI scores for the PSS wetlands to be converted using vegetation variables (e.g., V_{wood} = 0.10, V_{mid} = 0.10, and V_{herb} = 1.00) from adjacent PEM wetlands while leaving all other variables unchanged. Based on this revision, conversion of PSS to PEM wetlands will increase the physical and biological functional FCI scores by 0.011 and 0.033, respectively; however, the chemical FCI score will decrease by 0.123. Thus, the 5.613 acres of converted wetlands will result in the loss of an additional 0.692 RSEC FCU.

4. SUMMARY AND CONCLUSIONS

Two wetlands consisting of three identified WAAs were identified during the field assessment. These wetlands include 30.971 and 40.344 acres of PEM and PSS wetlands, respectively. Within these wetlands, 18.488 acres of wetlands are within the planned project area. Of these wetlands, 6.719 acres will be permanently lost to fill, 5.613 acres will be converted from PSS to PEM wetlands, and 6.156 acres of PEM wetlands may be temporarily impacted by construction activities. According to calculation using the iHGM, the fill and conversion of wetlands will result in the loss of 2.991 TSSW, 3.364 MPAC, and 4.031 RSEC FCUs, all of which will require mitigation.

The findings presented in this report are restricted to and are based upon SWCA's professional opinion. These values are subject to alterations in project plans, verification of the wetland delineation, and verification of the iHGM. Only the USACE and the U.S. Environmental Protection Agency have final legal authority to determine the location, extent, and functional value of waters of the United States.

5. REFERENCES

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* FWS/OBS-79/31. Washington, D.C.: U.S. Fish and Wildlife Service.

U.S. Army Corps of Engineers (USACE) 1987. *Corps of Engineers Wetlands Delineation Manual.* Technical Report Y-87-1. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center.

———. 1995. *An Approach for Assessing Wetland Functions Using Hydrogeomorphic Classification, Reference Wetlands, and Functional Indices.* Technical Report WRP-DE-9. October, 1995.

———. 2010a. USACE: Southwest Galveston District. SWG Herbaceous Riverine iHGM, Wetland Functional Assessments [online document]. Available at: http://www.swg.usace.army.mil/BusinessWithUs/Regulatory/Wetlands/FunctionalAssessment.aspx. Accessed February 2017.

———. 2010b. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0).* ERDC/EL TR-10-20. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center.

U.S. Department of Agriculture (USDA). 2016. Web Soil Survey. U.S. Department of Agriculture, Natural Resources Conservation Service. Available at: http://websoilsurvey.nrcs.usda.gov. Accessed February 2017.

APPENDIX A

Vicinity and Wetland Assessment Maps

Path: S:\Projects\41872 - Garden and Legend Substations\MAPS\NRREPORT MAPS\Vicinity\F1 P1 - Vicinity Map.mxd

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GARDEN & LEGEND SUBSTATIONS
VICINITY MAP
JEFFERSON COUNTY, TEXAS

FIGURE 1 - PAGE 1

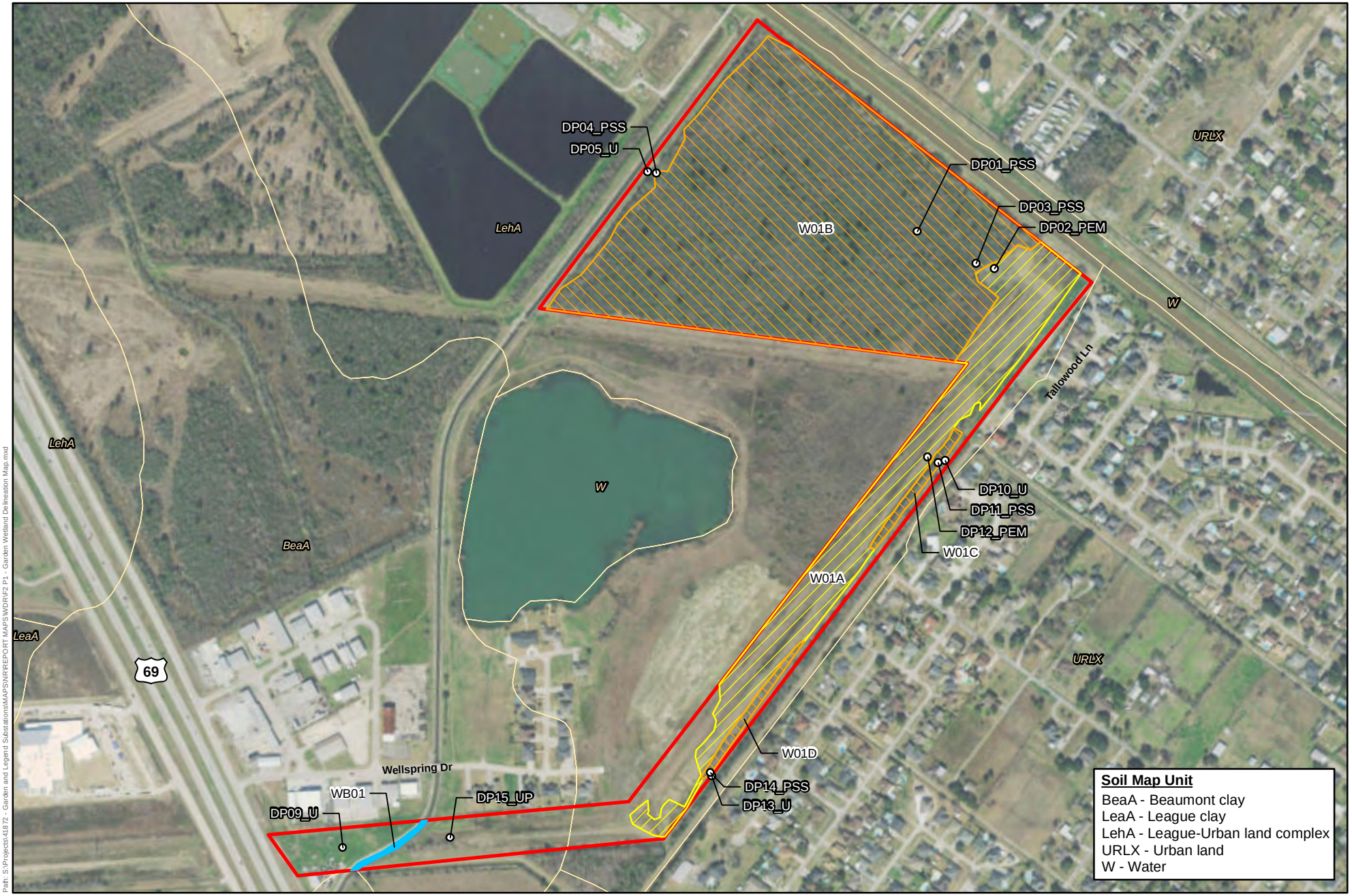
Project Boundary

Background:	ESRI Street Map
Scale:	1:120,000
Created By:	JS
Approved By:	CF
SWCA Project No.:	41872
Date Produced:	February 27, 2017

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

0 1 2 Miles

0 1 2 3 Kilometers



Path: S:\Projects\41872 - Garden and Legend Substations\MAPS\NR\REPORT MAPS\WDRIF2 P1 - Garden Wetland Delineation Map.mxd

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GARDEN SUBSTATION
WETLAND DELINEATION MAP
JEFFERSON COUNTY, TEXAS

FIGURE 2 - PAGE 1

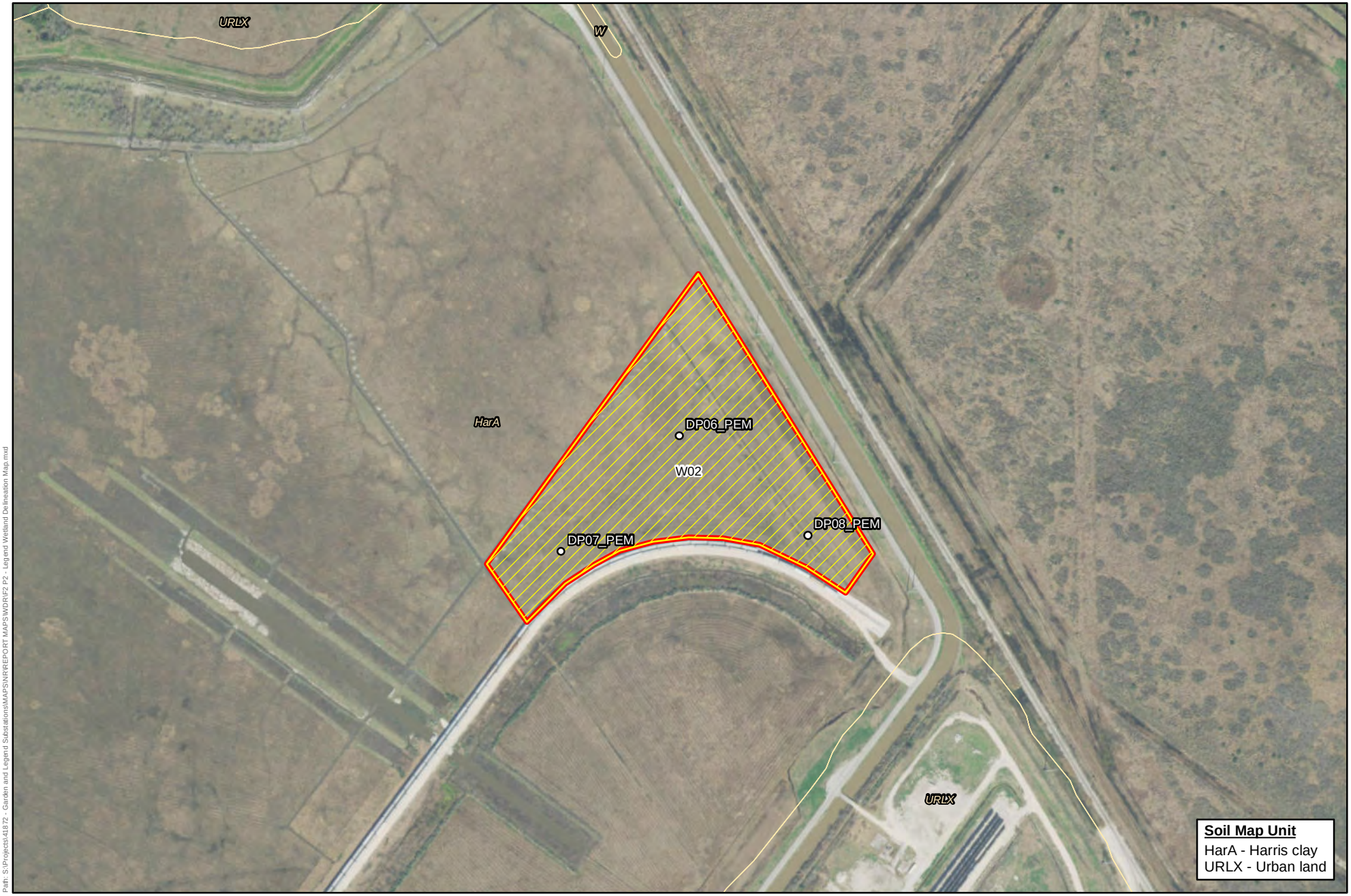
Project Boundary
Data_Points
Waterbody
Emergent Wetland
Scrub-Shrub Wetland
Soil Map Unit Boundary

Background:	ESRI Aerial Imagery (2015)
Scale:	1:7,000
Created By:	JS
Approved By:	CF
SWCA Project No.:	41827
Date Produced:	February 27, 2017

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

0 250 500 Feet

0 50 100 150 Meters



Path: S:\Projects\41872 - Garden and Legend Substations\MAPS\NRIREPORT MAPS\WDRIF2 P2 - Legend Wetland Delineation Map.mxd

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LEGEND
SUBSTATION
WETLAND DELINEATION MAP
JEFFERSON COUNTY, TEXAS

FIGURE 2 - PAGE 2

- Project Boundary
- Data Point
- Emergent Wetland
- Soil Map Unit Boundary

Background:	ESRI Aerial Imagery (2015)
Scale:	1:6,000
Created By:	JS
Approved By:	CF
SWCA Project No.:	41827
Date Produced:	February 27, 2017

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

0 250 500 Feet

0 50 100 150 Meters

APPENDIX B

iHGM Worksheets

Riverine Herbaceous/Shrub HGM (Interim) Functional Assessment Data Form

Project/Site: Garden and Legend Substations Project County: Jefferson Assessment Date: February 16, 2017
Applicant/Owner: Entergy Texas, Inc. State: Texas WAA ID: WAA 1
Investigator(s): SWCA Environmental Consultants WAA Acreage: 0.128
Associated Wetland ID: W01A

VARIABLE	CATEGORICAL DECISION	COMMENTS	SUBINDEX
Vdur: Percent of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway	*In an average year, at least 80% of the WAA either floods and/or ponds for at least 7 consecutive days.*	In an average year, at least 80% of the WAA either floods and/or ponds for at least 7 consecutive days.	0.75
Vfreq: Frequency that the WAA is flooded and/or ponded by the nearby waterway	*Floods or ponds 2 out of 5 years (100-year floodplain).*	Floods or ponds 2 out of 5 years (100-year floodplain).	0.50
Vtop: Roughness associated with the WAA	*Less than 15% of the WAA is represented by dips, hummocks, channel sloughs, and/or other topographic features.*	The WAA is within the fluvial terrace of Rhodair Gully.	0.40
Vwood: Percentage of the WAA that is covered by woody vegetation	*0-10% of the WAA is covered with woody vegetation.*	No woody vegetation is within the WAA.	0.10
Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA	*Midstory coverage of the WAA is equal to or less than 1%.*	Midstory cover is absent from the WAA.	0.10
Vherb: The average/mean coverage of the herbaceous layer in the WAA	*Herbaceous cover in the WAA averages greater than 75%.*	Herbaceous cover averages 95%.	1.00
Vconnect: Number of habitat types within 600 feet of the perimeter of the WAA (must be ≥5% of the size of the WAA)	*Wetland plus one other habitat type or two other habitat types.*	Wetland plus herbaceous habitat.	0.50
Vdetritus: The amount of detritus on the WAA (The A-horizon has to have a Munsell value of 4 or less)	*Less than 10% of the area possesses an O or A horizon.*	Soils in the WAA was 5/1 value and chroma.	0.30
Vredox: The amount of the WAA that exhibits redox features as an indication of the chemical exchange	*Redox features less than 20%.*	Redox concentrations represent 10% of the pedon within the top 20 inches of the soil surface.	0.10
Vsorpt: The absorptive properties of the soils in the WAA	*The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, or 3/1).*	The WAA is dominated by clayey soils.	1.00

Functional Capacity Indices (FCI) and Units (FCU=FCI*WAA Acreage)	FCI	FCU
Temporary Storage & Detention of Storage Water (Physical Function) [{Vdur * Vfreq} 1/2 * {Vtopo + {Vherb + Vmid/2}/2] 1/2	0.539	0.069
Maintain Plant & Animal Community (Biological Function) {Vmid + Vherb + Vconnect}/3	0.533	0.068
Removal & Sequestrian of Elements & Compounds (Chemical Function) [[Vwood + Vfreq + Vdur + [{Vtopo + Vherb + Vmid}/3] + [{Vdetritus + Vredox + Vsorpt}/3]]/5	0.463	0.059

Riverine Herbaceous/Shrub HGM (Interim) Functional Assessment Data Form

Project/Site: Garden and Legend Substations Project County: Jefferson Assessment Date: February 16, 2017
Applicant/Owner: State: Texas WAA ID: WAA 2 (prior to conversion)
Investigator(s): SWCA Environmental Consultants WAA Acreage: 5.613
Associated Wetland ID: W01B

VARIABLE	CATEGORICAL DECISION	COMMENTS	SUBINDEX
Vdur: Percent of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway	*In an average year, at least 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days.*	In an average year, at least 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days.	0.50
Vfreq: Frequency that the WAA is flooded and/or ponded by the nearby waterway	*Floods or ponds less than 2 out of 5 years (100-500-year floodplain [grey without elevations]).*	Floods or ponds 2 out of 5 years (100-year floodplain).	0.25
Vtop: Roughness associated with the WAA	*Less than 15% of the WAA is represented by dips, hummocks, channel sloughs, and/or other topographic features.*	The WAA is within the fluvial terrace of Rhodair Gully.	0.40
Vwood: Percentage of the WAA that is covered by woody vegetation	*67-90% of the WAA is covered with woody vegetation.*	Woody vegetation averages 90% of the WAA.	0.75
Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA	*Midstory coverage of the WAA is between 50-75%.*	Midstory cover averages 70% within the WAA.	0.75
Vherb: The average/mean coverage of the herbaceous layer in the WAA	*Herbaceous cover in the WAA averages between 1-25%.*	Herbaceous cover averages 10%.	0.25
Vconnect: Number of habitat types within 600 feet of the perimeter of the WAA (must be ≥5% of the size of the WAA)	*Wetland plus one other habitat type or two other habitat types.*	Wetland plus herbaceous habaitat.	0.50
Vdetritus: The amount of detritus on the WAA (The A-horizon has to have a Munsell value of 4 or less)	*Less than 10% of the area possesses an O or A horizon.*	Soils in the WAA were of 5/1 value and chroma.	0.30
Vredox: The amount of the WAA that exhibits redox features as an indication of the chemical exchange	*Redox features less than 20%.*	Redox concentrations represent 15% of the pedon within the top 20 inches of the soil surface.	0.10
Vsorpt: The absorptive properties of the soils in the WAA	*The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, or 3/1).*	The WAA is dominated by clayey soils.	1.00

Functional Capacity Indices (FCI) and Units (FCU=FCI*WAA Acreage)	FCI	FCU
Temporary Storage & Detention of Storage Water (Physical Function) [{Vdur * Vfreq} 1/2 * {Vtopo + {Vherb + Vmid/2}/2] 1/2	0.399	2.239
Maintain Plant & Animal Community (Biological Function) {Vmid + Vherb + Vconnect}/3	0.500	2.807
Removal & Sequestrian of Elements & Compounds (Chemical Function) [[Vwood + Vfreq + Vdur + [{Vtopo + Vherb + Vmid}/3] + [{Vdetritus + Vredox + Vsorpt}/3]]/5	0.487	2.732

Riverine Herbaceous/Shrub HGM (Interim) Functional Assessment Data Form

Project/Site: Garden and Legend Substations Project County: Jefferson Assessment Date: February 16, 2017
Applicant/Owner: State: Texas WAA ID: WAA 2 (converted to PEM)
Investigator(s): SWCA Environmental Consultants WAA Acreage: 5.613
Associated Wetland ID: W01B

VARIABLE	CATEGORICAL DECISION	COMMENTS	SUBINDEX
Vdur: Percent of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway	*In an average year, at least 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days.*	In an average year, at least 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days.	0.50
Vfreq: Frequency that the WAA is flooded and/or ponded by the nearby waterway	*Floods or ponds less than 2 out of 5 years (100-500-year floodplain [grey without elevations]).*	Floods or ponds 2 out of 5 years (100-year floodplain).	0.25
Vtop: Roughness associated with the WAA	*Less than 15% of the WAA is represented by dips, hummocks, channel sloughs, and/or other topographic features.*	The WAA is within the fluvial terrace of Rhodair Gully.	0.40
Vwood: Percentage of the WAA that is covered by woody vegetation	*0-10% of the WAA is covered with woody vegetation.*	Woody vegetation will likely average less than 10% of the WAA.	0.10
Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA	*Midstory coverage of the WAA is equal to or less than 1%.*	Midstory cover will likely be equal to or less than 1% of the WAA.	0.10
Vherb: The average/mean coverage of the herbaceous layer in the WAA	*Herbaceous cover in the WAA averages greater than 75%.*	Herbaceous cover will likely average greater than 75% of the WAA.	1.00
Vconnect: Number of habitat types within 600 feet of the perimeter of the WAA (must be ≥5% of the size of the WAA)	*Wetland plus one other habitat type or two other habitat types.*	Wetland plus herbaceous habaitat.	0.50
Vdetritus: The amount of detritus on the WAA (The A-horizon has to have a Munsell value of 4 or less)	*Less than 10% of the area possesses an O or A horizon.*	Soils in the WAA were of 5/1 value and chroma.	0.30
Vredox: The amount of the WAA that exhibits redox features as an indication of the chemical exchange	*Redox features less than 20%.*	Redox concentrations represent 15% of the pedon within the top 20 inches of the soil surface.	0.10
Vsorpt: The absorptive properties of the soils in the WAA	*The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, or 3/1).*	The WAA is dominated by clayey soils.	1.00

Functional Capacity Indices (FCI) and Units (FCU=FCI*WAA Acreage)	FCI	FCU
Temporary Storage & Detention of Storage Water (Physical Function) [{Vdur * Vfreq} 1/2 * {Vtopo + {Vherb + Vmid/2}/2] 1/2	0.410	2.300
Maintain Plant & Animal Community (Biological Function) {Vmid + Vherb + Vconnect}/3	0.533	2.994
Removal & Sequestrian of Elements & Compounds (Chemical Function) [[Vwood + Vfreq + Vdur + [{Vtopo + Vherb + Vmid}/3] + [{Vdetritus + Vredox + Vsorpt}/3]]/5	0.363	2.039

Riverine Herbaceous/Shrub HGM (Interim) Functional Assessment Data Form

Project/Site: Garden and Legend Substations Project County: Jefferson Assessment Date: February 16, 2017
Applicant/Owner: State: Texas WAA ID: WAA 2
Investigator(s): SWCA Environmental Consultants WAA Acreage: 4.449
Associated Wetland ID: W01B

VARIABLE	CATEGORICAL DECISION	COMMENTS	SUBINDEX
Vdur: Percent of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway	*In an average year, at least 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days.*	In an average year, at least 50-79% of the WAA either floods and/or ponds for at least 7 consecutive days.	0.50
Vfreq: Frequency that the WAA is flooded and/or ponded by the nearby waterway	*Floods or ponds less than 2 out of 5 years (100-500-year floodplain [grey without elevations]).*	Floods or ponds 2 out of 5 years (100-year floodplain).	0.25
Vtop: Roughness associated with the WAA	*Less than 15% of the WAA is represented by dips, hummocks, channel sloughs, and/or other topographic features.*	The WAA is within the fluvial terrace of Rhodair Gully.	0.40
Vwood: Percentage of the WAA that is covered by woody vegetation	*67-90% of the WAA is covered with woody vegetation.*	Woody vegetation averages 90% of the WAA.	0.75
Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA	*Midstory coverage of the WAA is between 50-75%.*	Midstory cover averages 70% within the WAA.	0.75
Vherb: The average/mean coverage of the herbaceous layer in the WAA	*Herbaceous cover in the WAA averages between 1-25%.*	Herbaceous cover averages 10%.	0.25
Vconnect: Number of habitat types within 600 feet of the perimeter of the WAA (must be ≥5% of the size of the WAA)	*Wetland plus one other habitat type or two other habitat types.*	Wetland plus herbaceous habaitat.	0.50
Vdetritus: The amount of detritus on the WAA (The A-horizon has to have a Munsell value of 4 or less)	*Less than 10% of the area possesses an O or A horizon.*	Soils in the WAA were of 5/1 value and chroma.	0.30
Vredox: The amount of the WAA that exhibits redox features as an indication of the chemical exchange	*Redox features less than 20%.*	Redox concentrations represent 15% of the pedon within the top 20 inches of the soil surface.	0.10
Vsorpt: The absorptive properties of the soils in the WAA	*The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, or 3/1).*	The WAA is dominated by clayey soils.	1.00

Functional Capacity Indices (FCI) and Units (FCU=FCI*WAA Acreage)	FCI	FCU
Temporary Storage & Detention of Storage Water (Physical Function) [{Vdur * Vfreq} 1/2 * {Vtopo + {Vherb + Vmid/2}/2] 1/2	0.399	1.775
Maintain Plant & Animal Community (Biological Function) {Vmid + Vherb + Vconnect}/3	0.500	2.225
Removal & Sequestrian of Elements & Compounds (Chemical Function) [[Vwood + Vfreq + Vdur + [{Vtopo + Vherb + Vmid}/3] + [{Vdetritus + Vredox + Vsorpt}/3]]/5	0.487	2.165

Riverine Herbaceous/Shrub HGM (Interim) Functional Assessment Data Form

Project/Site: Garden and Legend Substations Project County: Jefferson Assessment Date: February 16, 2017
Applicant/Owner: Entergy Texas, Inc. State: Texas WAA ID: WAA 3
Investigator(s): SWCA Environmental Consultants WAA Acreage: 2.142
Associated Wetland ID: W02

VARIABLE	CATEGORICAL DECISION	COMMENTS	SUBINDEX
Vdur: Percent of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the nearby waterway	*In an average year, at least 80% of the WAA either floods and/or ponds for at least 7 consecutive days.*	In an average year, at least 80% of the WAA either floods and/or ponds for at least 7 consecutive days.	0.75
Vfreq: Frequency that the WAA is flooded and/or ponded by the nearby waterway	*Floods or ponds less than 2 out of 5 years (100-500-year floodplain [grey without elevations]).*	Floods or ponds 2 out of 5 years (100-year floodplain).	0.25
Vtop: Roughness associated with the WAA	*15-30% of the WAA is represented by dips, hummocks, channel sloughs, and/or other topographic features.*	The WAA is within the fluvial terrace of Taylor Bayou.	0.70
Vwood: Percentage of the WAA that is covered by woody vegetation	*11-33% of the WAA is covered with woody vegetation.*	Woody vegetation averages 20% of the WAA.	0.25
Vmid: The average/mean coverage of the midstory (shrub/sapling) layer in the WAA	*Midstory coverage of the WAA is between 1-25%.*	Midstory cover is minimal within the WAA.	0.25
Vherb: The average/mean coverage of the herbaceous layer in the WAA	*Herbaceous cover in the WAA averages greater than 75%.*	Herbaceous cover averages 85%.	1.00
Vconnect: Number of habitat types within 600 feet of the perimeter of the WAA (must be ≥5% of the size of the WAA)	*One other habitat types other than urban habitat.*	Wetland plus herbaceous, besides urban habitat.	0.25
Vdetritus: The amount of detritus on the WAA (The A-horizon has to have a Munsell value of 4 or less)	*Greater than 85% of the area possesses an O or A horizon.*	Soils in the WAA were of 2/1 and 3/1 value and chroma.	1.00
Vredox: The amount of the WAA that exhibits redox features as an indication of the chemical exchange	*Redox features less than 20%.*	Redox concentrations represent 5% of the pedon within the top 20 inches of the soil surface.	0.10
Vsorpt: The absorptive properties of the soils in the WAA	*The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, or 3/1).*	The WAA is dominated by clayey soils with 2/1 and 3/1 value and chroma.	1.00

Functional Capacity Indices (FCI) and Units (FCU=FCI*WAA Acreage)	FCI	FCU
Temporary Storage & Detention of Storage Water (Physical Function) [{Vdur * Vfreq} 1/2 * {Vtopo + {Vherb + Vmid/2}/2] 1/2	0.536	1.147
Maintain Plant & Animal Community (Biological Function) {Vmid + Vherb + Vconnect}/3	0.500	1.071
Removal & Sequestrian of Elements & Compounds (Chemical Function) [[Vwood + Vfreq + Vdur + [{Vtopo + Vherb + Vmid}/3] + [{Vdetritus + Vredox + Vsorpt}/3]]/5	0.520	1.114