Functional Assessment

In accordance with the Compensatory Mitigation for Losses of Aquatic Resources (73 Fed. Ref. 19594, 10 April 2008) the Galveston District Corps has developed a functional assessment method, known as the Galveston District Corps Standard Operating Procedures (SOP) approach. The SOP implements the use of Hydrogeomorphic Approach for Assessing Wetland Functions (HGM) to determine the potential wetland functions and the appropriate compensatory mitigation for unavoidable wetland impacts. The Interim-HGM (iHGM) model was developed in order to efficiently assess specific priority wetland functions.

The results of these models are a number called a Functional Capacity Index (FCI). This FCI is a quantitative number that estimated the capacity of the wetland to perform a function as it related to the adjacent water body. A FCI is calculated for three wetland perimeters; 1) Temporary Storage and Detention of Storage Water (TSSW), 2) Maintain Plant and Animal Community (MPAC), and 3) Removal and Sequestration of Elements and Compounds (RSEC). In determining the amount of mitigation required, the Functional Capacity Units (FCU) are calculated by multiplying the FCI by the acreage of the wetland. Functional capacity is defined as the degree to which an area of wetland performs a specific function. Below, Table 2 summarizes the functional capacity of the emergent and shrub/scrub wetlands located onsite.

Riverine Herbaceous/Shrub FCI Equations:

Temporary Storage & Detention of Storage Water:

$$[\{V_{dur} \times V_{freq}\}^{1/2} X \{V_{topo} + \{V_{herb} + V_{mid}/2\}/2] 1/2$$

Maintain Plant and Animal Community:

$$\{V_{mid} + V_{herb} + V_{connect}\}/3$$

Removal & Sequestrian of Elements & Compounds:

$$[[V_{wood} + V_{freq} + V_{dur} + [\{V_{topo} + V_{herb} + V_{mid}\}/3] + [\{V_{detritus} + V_{redox} + V_{sorpt}\}/3]]/5$$

Emergent Wetland 1 (EW1 - WAA 1)

Galveston District
Riverine Herbaceous/Shrub HGM Interim

WAA 1: Pre-Construction Scores

Variable	Subindex
Vdur	1.00
Vfreq	1.00
Vtopo	0.40
Vwood	1.00
Vmid	0.10
Vherb	0.10
Vdetritus	0.50
Vredox	1.00
Vsorpt	1.00
Vconnect	0.50

Temporary Storage & Dentention of Storage Water
pre 0.5000
post 0.0000

Maintain Plant & Animal Communities
pre 0.2333
post 0.0000

Removal & Sequestrian of Elements & Compounds
pre 0.8067
post 0.0000

WAA 1: Post Construction Scores

Variable	Subindex
Vdur	0.00
Vfreq	0.00
Vtopo	0.00
Vwood	0.00
Vmid	0.00
Vherb	0.00
Vdetritus	0.00
Vredox	0.00
Vsorpt	0.00
Vconnect	0.00

FCU; FCI x wetland acres per WAA: acres= 0.30

WAA#	Pre-project FCUs	Post Project FCUs
Temp Storage of Water	0.15	0.00
Maintain Plant & Animal	0.07	0.00
Removal of Elements	0.24	0.00

Potential Functional Capacity Impacts or Improvements

Temp Storage of Water	-0.15
Maintain Plant & Animal	-0.07
Removal of Elements	-0.24

Variable	Subindex	Description	Observations
Vdur	1.00	In an avg. year at 80% of the WAA either floods or ponds for at least 14 consecutive days.	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 139-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vfreq	1.00	Floods or pond annually 5 out of 5 years (floodway)	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 139-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vtopo	0.40	Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or	Dips were observed in the field, but topographic features made up less than 15% of the WAA.
Vwood	1.00	Greater than 90% of the WAA is covered with woody vegetation	Within the WAA, 90-95% cover by woody vegetation was observed in the field.
Vmid	0.10	Midstory coverage of the WAA is equal to or less than 1%	Within the WAA, minimal (less than 1%) midstory was observed in the field.
Vherb	0.10	Herbaceous cover in the WAA is equal to or less than 1% (barren soil or all shrub)	Within the WAA, minimal (less than 1%) herbaceous cover was observed in the field.
Vdetritus	0.50	From 11-84% of the area possesses an O or A horizon	Based on soil samples, between 70-80% of the WAA contained detritus in the upper soil layers. The WAA did contain minimal areas 'washed by high velocity flood water'.
Vredox	1.00	Redox concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature masked due to parent material but conditions are conducive to redoximorphic processes. (many mottles)	Based on soil samples, redox composition observed in the field ranged from 20-30%.
Vsorpt	1.00	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)	Based on soil samples, the WAA was dominated by silty clay soils.
Vconnect	0.50	Wetland plus one other habitat types or two other habitat types	Based on GIS analysis, the WAA was surrounded by two other habitat types: forest and scrub/shrub wetland.

Emergent Wetland 2 (EW 2 - WAA 1)

Galveston District
Riverine Herbaceous/Shrub HGM Interim

WAA 1: Pre-Construction Scores

Variable	Subindex
Vdur	1.00
Vfreq	1.00
Vtopo	1.00
Vwood	0.10
Vmid	0.25
Vherb	0.25
Vdetritus	0.30
Vredox	0.10
Vsorpt	0.50
Vconnect	1.00

Temporary Storage & Dentention of Storage Water

pre 0.7906
post 0.0000

Maintain Plant & Animal Communities

pre 0.5000
post 0.0000

Removal & Sequestrian of Elements & Compounds

pre 0.5800
post 0.0000

WAA 1: Post Construction Scores

Variable	Subindex
Vdur	0.00
Vfreq	0.00
Vtopo	0.00
Vwood	0.00
Vmid	0.00
Vherb	0.00
Vdetritus	0.00
Vredox	0.00
Vsorpt	0.00
Vconnect	0.00

FCU; FCI x wetland acres per WAA: acres= 0.02

WAA#	Pre-project FCUs	Post Project FCUs
Temp Storage of Water	0.02	0.00
Maintain Plant & Animal	0.01	0.00
Removal of Elements	0.01	0.00

Potential Functional Capacity Impacts or Improvements

Temp Storage of Water	-0.02
Maintain Plant & Animal	-0.01
Removal of Elements	-0.01

Variable	Subindex	Description	Observations
Vdur	1.00	In an avg. year at 80% of the WAA either floods or ponds for at least 14 consecutive days.	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 140-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vfreq	1.00	Floods or pond annually 5 out of 5 years (floodway)	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 140-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vtopo	1.00	Greater than 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	WAA is highly channelized and holds water.
Vwood	0.10	0-10% if the WAA is covered with woody vegetation	Within the WAA, 5-10% cover by woody vegetation was observed in the field.
Vmid	0.25	Midstory coverage of the WAA is between 1-25%	Within the WAA, 5-15% midstory was observed in the field.
Vherb	0.25	Herbaceous cover in the WAA averages between 1-25%	Within the WAA, 10-15% herbaceous cover was observed in the field.
Vdetritus	0.30	Less than 10% of the area possesses an O or A horizon	Based on soil samples, less than 10% of the WAA contained detritus in the upper soil layers. The WAA did contain areas 'washed by high velocity flood water'.
Vredox	0.10	Redox features less than 20%	Area holds water majority of year. Fluctuations in water levels are limited.
Vsorpt	0.50	WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non- montmorillonitic clays	Based on soil samples, the WAA was dominated by loam soils.
Vconnect	1.00	Wetland plus four habitats and/or surrounded by forested	Based on GIS analysis, the WAA was surrounded by forest.

Emergent Wetland 3 (EW 3 - WAA 1)

Galveston District
Riverine Herbaceous/Shrub HGM Interim

WAA 1: Pre-Construction Scores

Variable	Subindex
Vdur	1.00
Vfreq	1.00
Vtopo	0.40
Vwood	0.25
Vmid	0.25
Vherb	0.75
Vdetritus	0.50
Vredox	0.10
Vsorpt	0.50
Vconnect	1.00

Temporary Storage & Dentention of Storage Water

pre 0.6708
post 0.0000

Maintain Plant & Animal Communities

pre 0.6667
post 0.0000

Removal & Sequestrian of Elements & Compounds

pre 0.6167
post 0.0000

WAA 1: Post Construction Scores

Variable	Subindex
Vdur	0.00
Vfreq	0.00
Vtopo	0.00
Vwood	0.00
Vmid	0.00
Vherb	0.00
Vdetritus	0.00
Vredox	0.00
Vsorpt	0.00
Vconnect	0.00

FCU; FCI x wetland acres per WAA: acres= 4.40

WAA#	Pre-project FCUs	Post Project FCUs
Temp Storage of Water	2.95	0.00
Maintain Plant & Animal	2.93	0.00
Removal of Elements	2.71	0.00

Potential Functional Capacity Impacts or Improvements

Temp Storage of Water	-2.95
Maintain Plant & Animal	-2.93
Removal of Elements	-2.71

Variable	Subindex	Description	Observations
Vdur	1.00	In an avg. year at 80% of the WAA either floods or ponds for at least 14 consecutive days.	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 139-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vfreq	1.00	Floods or pond annually 5 out of 5 years (floodway)	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 139-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vtopo	0.40	Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	Dips were observed in the field, but topographic features made up less than 15% of the WAA.
Vwood	0.25	11 to 33% of the WAA is covered with woody vegetation	Within the WAA, 15-20% cover by woody vegetation was observed in the field.
Vmid	0.25	Midstory coverage of the WAA is between 1-25%	Within the WAA, 5-15% midstory was observed in the field.
Vherb	0.75	Herbaceous cover in the WAA averages between 50-75%	Within the WAA, 55-60% herbaceous cover was observed in the field.
Vdetritus	0.50	From 11-84% of the area possesses an O or A horizon	Based on soil samples, between 70-80% of the WAA contained detritus in the upper soil layers. The WAA did contain minimal areas 'washed by high velocity flood water'.
Vredox	0.10	Redox features less than 20%	Based on soil samples, redox composition observed in the field were 5%.
Vsorpt	0.50	WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non- montmorillonitic clays	Based on soil samples, the WAA was dominated by silty clay soils.
Vconnect	1.00	Wetland plus four habitats and/or surrounded by forested	Based on GIS analysis, the WAA was surrounded by forest.

Emergent Wetland 4 (EW 4 - WAA 1)

Galveston District
Riverine Herbaceous/Shrub HGM Interim

WAA 1: Pre-Construction Scores

Variable	Subindex
Vdur	1.00
Vfreq	1.00
Vtopo	0.40
Vwood	0.25
Vmid	0.25
Vherb	0.75
Vdetritus	0.50
Vredox	0.10
Vsorpt	0.50
Vconnect	1.00

Temporary Storage & Dentention of Storage Water

pre 0.6708
post 0.0000

Maintain Plant & Animal Communities

pre 0.6667
post 0.0000

Removal & Sequestrian of Elements & Compounds

pre 0.6167
post 0.0000

WAA 1: Post Construction Scores

Variable	Subindex
Vdur	0.00
Vfreq	0.00
Vtopo	0.00
Vwood	0.00
Vmid	0.00
Vherb	0.00
Vdetritus	0.00
Vredox	0.00
Vsorpt	0.00
Vconnect	0.00

FCU; FCI x wetland acres per WAA: acres= 7.90

WAA#	Pre-project FCUs	Post Project FCUs
Temp Storage of Water	5.30	0.00
Maintain Plant & Animal	5.27	0.00
Removal of Elements	4.87	0.00

Potential Functional Capacity Impacts or Improvements

Temp Storage of Water	-5.30
Maintain Plant & Animal	-5.27
Removal of Elements	-4.87

Variable	Subindex	Description	Observations
Vdur	1.00	In an avg. year at 80% of the WAA either floods or ponds for at least 14 consecutive days.	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 140-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vfreq	1.00	In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 140-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vtopo	0.40	Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	Dips were observed in the field, but topographic features made up less than 15% of the WAA.
Vwood	0.25	11 to 33% of the WAA is covered with woody vegetation	Within the WAA, 15-20% cover by woody vegetation was observed in the field.
Vmid	0.25	Midstory coverage of the WAA is between 1-25%	Within the WAA, 15-20% midstory was observed in the field.
Vherb	0.75	Herbaceous cover in the WAA averages between 50-75%	Within the WAA, 60-65%herbaceous cover was observed in the field.
Vdetritus	0.50	From 11-84% of the area possesses an O or A horizon	Based on soil samples, between 70-80% of the WAA contained detritus in the upper soil layers. The WAA did contain minimal areas 'washed by high velocity flood water'.
Vredox	0.10	Redox features less than 20%	Based on soil samples, redox composition observed in the field ranged from 5-10%.
Vsorpt	0.50	WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays	Based on soil samples, the WAA was dominated by loams and silty loams.
Vconnect	1.00	Wetland plus four habitats and/or surrounded by forested	Based on GIS analysis, the WAA was surrounded by forest.

Emergent Wetland 5 (EW 5 - WAA 1)

Galveston District
Riverine Herbaceous/Shrub HGM Interim

WAA 1: Pre-Construction Scores

Variable	Subindex
Vdur	1.00
Vfreq	1.00
Vtopo	0.10
Vwood	0.10
Vmid	0.25
Vherb	1.00
Vdetritus	0.50
Vredox	0.10
Vsorpt	0.50
Vconnect	1.00

Temporary Storage & Dentention of Storage Water

pre 0.6021
post 0.0000

Maintain Plant & Animal Communities

pre 0.7500
post 0.0000

Removal & Sequestrian of Elements & Compounds

pre 0.5833
post 0.0000

WAA 1: Post Construction Scores

Variable	Subindex
Vdur	0.00
Vfreq	0.00
Vtopo	0.00
Vwood	0.00
Vmid	0.00
Vherb	0.00
Vdetritus	0.00
Vredox	0.00
Vsorpt	0.00
Vconnect	0.00

FCU; FCI x wetland acres per WAA: acres= 0.08

WAA#	Pre-project FCUs	Post Project FCUs
Temp Storage of Water	0.05	0.00
Maintain Plant & Animal	0.06	0.00
Removal of Elements	0.05	0.00

Potential Functional Capacity Impacts or Improvements

Temp Storage of Water	-0.05
Maintain Plant & Animal	-0.06
Removal of Elements	-0.05

Variable	Subindex	Description	Observations
Vdur	1.00	In an avg. year at 80% of the WAA either floods or ponds for at least 14 consecutive days.	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 140-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vfreq	1.00	In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 140-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vtopo	0.10	Smooth, flat, or very gentle undulating with little or no topographic features	Within the WAA, topography included tree falls but was relatively flat.
Vwood	0.10	0-10% if the WAA is covered with woody vegetation	Within the WAA, 0-5% cover by woody vegetation was observed in the field.
Vmid	0.25	Midstory coverage of the WAA is between 1-25%	Within the WAA, 15-20% midstory was observed in the field.
Vherb	1.00	Herbaceous cover in the WAA averages greater than 75%	Within the WAA, 85-95%herbaceous cover was observed in the field.
Vdetritus	0.50	From 11-84% of the area possesses an O or A horizon	Based on soil samples, between 70-80% of the WAA contained detritus in the upper soil layers. The WAA did contain minimal areas 'washed by high velocity flood water'.
Vredox	0.10	Redox features less than 20%	Based on soil samples, redox composition observed in the field ranged from 15-20%.
Vsorpt	0.50	WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays	Based on soil samples, the WAA was dominated by silty loams.
Vconnect	1.00	Wetland plus four habitats and/or surrounded by forested	Based on GIS analysis, the WAA was surrounded by forest.

Emergent Wetland 6 (EW 6 - WAA 1)

Galveston District
Riverine Herbaceous/Shrub HGM Interim

WAA 1: Pre-Construction Scores

Variable	Subindex
Vdur	1.00
Vfreq	1.00
Vtopo	0.10
Vwood	0.10
Vmid	0.25
Vherb	0.25
Vdetritus	0.30
Vredox	0.10
Vsorpt	0.50
Vconnect	1.00

Temporary Storage & Dentention of Storage Water

pre 0.4183
post 0.0000

Maintain Plant & Animal Communities

pre 0.5000
post 0.0000

Removal & Sequestrian of Elements & Compounds

pre 0.5200
post 0.0000

WAA 1: Post Construction Scores

Variable	Subindex
Vdur	0.00
Vfreq	0.00
Vtopo	0.00
Vwood	0.00
Vmid	0.00
Vherb	0.00
Vdetritus	0.00
Vredox	0.00
Vsorpt	0.00
Vconnect	0.00

FCU; FCI x wetland acres per WAA: acres= 0.01

WAA#	Pre-project FCUs	Post Project FCUs
Temp Storage of Water	0.00	0.00
Maintain Plant & Animal	0.01	0.00
Removal of Elements	0.01	0.00

Potential Functional Capacity Impacts or Improvements

Temp Storage of Water	0.00
Maintain Plant & Animal	-0.01
Removal of Elements	-0.01

Variable	Subindex	Description	Observations
Vdur	1.00	In an avg. year at 80% of the WAA either floods or ponds for at least 14 consecutive days.	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 140-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vfreq	1.00	In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 140-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vtopo	0.10	Smooth, flat, or very gentle undulating with little or no topographic features	Within the WAA, topography included tree falls but was relatively flat.
Vwood	0.10	0-10% if the WAA is covered with woody vegetation	Within the WAA, 0-5% cover by woody vegetation was observed in the field.
Vmid	0.25	Midstory coverage of the WAA is between 1-25%	Within the WAA, 15-20% midstory was observed in the field.
Vherb	0.25	Herbaceous cover in the WAA average is between 1-25%	Within the WAA, 10-15% herbaceous cover was observed in the field.
Vdetritus	0.30	Less than 10% of the area possesses an O or A horizon	Based on soil samples, less than 10% of the WAA contained detritus in the upper soil layers. The WAA did contain areas 'washed by high velocity flood water'.
Vredox	0.10	Redox features less than 20%	Based on soil samples, redox composition observed in the field ranged from 15-20%.
Vsorpt	0.50	WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays	Based on soil samples, the WAA was dominated by silty loams.
Vconnect	1.00	Wetland plus four habitats and/or surrounded by forested	Based on GIS analysis, the WAA was surrounded by forest.

Emergent Wetland 7 (EW 7 - WAA 1)

Galveston District
Riverine Herbaceous/Shrub HGM Interim

WAA 1: Pre-Construction Scores

Variable	Subindex
Vdur	1.00
Vfreq	1.00
Vtopo	0.10
Vwood	0.25
Vmid	0.75
Vherb	0.25
Vdetritus	0.50
Vredox	0.10
Vsorpt	0.50
Vconnect	1.00

Temporary Storage & Dentention of Storage Water

pre 0.5477
post 0.0000

Maintain Plant & Animal Communities

pre 0.6667
post 0.0000

Removal & Sequestrian of Elements & Compounds

pre 0.5967
post 0.0000

WAA 1: Post Construction Scores

Variable	Subindex
Vdur	0.00
Vfreq	0.00
Vtopo	0.00
Vwood	0.00
Vmid	0.00
Vherb	0.00
Vdetritus	0.00
Vredox	0.00
Vsorpt	0.00
Vconnect	0.00

FCU; FCI x wetland acres per WAA: acres= 0.01

WAA#	Pre-project FCUs	Post Project FCUs
Temp Storage of Water	0.01	0.00
Maintain Plant & Animal	0.01	0.00
Removal of Elements	0.01	0.00

Potential Functional Capacity Impacts or Improvements

Temp Storage of Water	-0.01
Maintain Plant & Animal	-0.01
Removal of Elements	-0.01

Variable	Subindex	Description	Observations
Vdur	1.00	In an avg. year at 80% of the WAA either floods or ponds for at least 14 consecutive days.	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 139-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vfreq	1.00	In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 139-ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur during a high rainfall event.
Vtopo	0.10	Smooth, flat, or very gentle undulating with little or no topographic features	Within the WAA, topography included tree falls but was relatively flat.
Vwood	0.25	11 to 33% of the WAA is covered with woody vegetation	Within the WAA, 15-20% cover by woody vegetation was observed in the field.
Vmid	0.75	Midstory coverage of the WAA is between 50-75%	Within the WAA, 65-70% midstory was observed in the field.
Vherb	0.25	Herbaceous cover in the WAA average is between 1-25%	Within the WAA, 15-20% herbaceous cover was observed in the field.
Vdetritus	0.50	From 11-84% of the area possesses an O or A horizon	Based on soil samples, between 70-80% of the WAA contained detritus in the upper soil layers. The WAA did contain minimal areas 'washed by high velocity flood water'.
Vredox	0.10	Redox features less than 20%	Based on soil samples, redox composition observed in the field ranged from 5-10%.
Vsorpt	0.50	WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays	Based on soil samples, the WAA was dominated by loams and silty loams.
Vconnect	1.00	Wetland plus four habitats and/or surrounded by forested	Based on GIS analysis, the WAA was surrounded by forest.

Shrub/Scrub Wetland 1 (SW1 - WAA 1)

Galveston District
Riverine Herbaceous/Shrub HGM Interim

WAA 1: Pre-Construction Scores

Variable	Subindex
Vdur	1.00
Vfreq	1.00
Vtopo	0.40
Vwood	0.75
Vmid	0.75
Vherb	0.75
Vdetritus	1.00
Vredox	0.10
Vsorpt	0.10
Vconnect	1.00

Temporary Storage & Dentention of Storage Water

pre 0.7583
post 0.0000

Maintain Plant & Animal Communities

pre 0.8333
post 0.0000

Removal & Sequestrian of Elements & Compounds

pre 0.7567
post 0.0000

WAA 1: Post Construction Scores

Variable	Subindex
Vdur	0.00
Vfreq	0.00
Vtopo	0.00
Vwood	0.00
Vmid	0.00
Vherb	0.00
Vdetritus	0.00
Vredox	0.00
Vsorpt	0.00
Vconnect	0.00

FCU; FCI x wetland acres per WAA: acres= 4.60

WAA#	Pre-project FCUs	Post Project FCUs
Temp Storage of Water	3.49	0.00
Maintain Plant & Animal	3.83	0.00
Removal of Elements	3.48	0.00

Potential Functional Capacity Impacts or Improvements

Temp Storage of Water	-3.49
Maintain Plant & Animal	-3.83
Removal of Elements	-3.48

Variable	Subindex	Description	Observations
Vdur	1.00	In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 140ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur only during a high rainfall event.
Vfreq	1.00	Floods or pond annually 5 out of 5 years (floodway)	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 140ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur only during a high rainfall event.
Vtopo	0.40	Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	Dips were observed in the field, but topographic features made up less than 15% of the WAA.
Vwood	0.75	67 to 90 % of the WAA is covered with woody vegetation	Within the WAA, approximately 70% cover by woody vegetation was observed in the field.
Vmid	0.75	Midstory coverage of the WAA is between 50-75%	Within the WAA, approximately 60% cover by the midstory was observed in the field.
Vherb	0.75	Herbaceous cover in the WAA averages between 50-75%	Within the WAA, approximately 60-70% cover by the herbaceous layer was observed in the field.
Vdetritus	1.00	Greater than 85% of the area possesses an O or A horizon	Based on soil samples, greater than 85% of the WAA contained detritus in the upper soil layers. The WAA did not contain areas 'washed by high velocity flood water'.
Vredox	0.10	Redox features less than 20%	Based on soil samples, redox composition observed in the field ranged from 0-10%.
Vsorpt	0.10	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)	Based on soil samples, the WAA was dominated by a combination of clay loam and clay soil types.
Vconnect	1.00	Wetland plus two or more habitat type (other than forested) OR three or more habitat types	Based on GIS analysis, the WAA was surrounded by forest.

Shrub/Scrub Wetland 2 (SW2 - WAA 1)

Galveston District
Riverine Herbaceous/Shrub HGM Interim

WAA 1: Pre-Construction Scores

Variable	Subindex
Vdur	1.00
Vfreq	1.00
Vtopo	0.70
Vwood	0.75
Vmid	0.75
Vherb	0.50
Vdetritus	1.00
Vredox	0.10
Vsorpt	0.50
Vconnect	1.00

Temporary Storage & Dentention of Storage Water

pre 0.8139
post 0.0000

Maintain Plant & Animal Communities

pre 0.7500
post 0.0000

Removal & Sequestrian of Elements & Compounds

pre 0.7867
post 0.0000

WAA 1: Post Construction Scores

Variable	Subindex
Vdur	0.00
Vfreq	0.00
Vtopo	0.00
Vwood	0.00
Vmid	0.00
Vherb	0.00
Vdetritus	0.00
Vredox	0.00
Vsorpt	0.00
Vconnect	0.00

FCU: FCI x wetland acres per WAA: acres= 0.90

WAA#	Pre-project FCUs	Post Project FCUs
Temp Storage of Water	0.73	0.00
Maintain Plant & Animal	0.68	0.00
Removal of Elements	0.71	0.00

Potential Functional Capacity Impacts or Improvements

Temp Storage of Water	-0.73
Maintain Plant & Animal	-0.68
Removal of Elements	-0.71

Variable	Subindex	Description	Observations
Vdur	1.00	In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 140ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur only during a high rainfall event.
Vfreq	1.00	Floods or pond annually 5 out of 5 years (floodway)	The WAA is located within the 100-year floodplain, and the base flood elevation for the nearby waterway is approximately 143-ft (Alligator Creek). According to LiDAR provided by the Corps (Emily Drastata), the elevation of the WAA is approximately 140ft. Alligator Creek is at an elevation of less than 137-ft., which suggests that flooding within the WAA would occur only during a high rainfall event.
Vtopo	0.70	15 - 30% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features	Dips were observed in the field, but topographic features made up of 15-20% of the WAA.
Vwood	0.75	67 to 90 % of the WAA is covered with woody vegetation	Within the WAA, approximately 70% cover by woody vegetation was observed in the field.
Vmid	0.75	Midstory coverage of the WAA is between 50-75%	Within the WAA, approximately 60% cover by the midstory was observed in the field.
Vherb	0.50	Herbaceous cover in the WAA averages between 25-50%	Within the WAA, approximately 30-40% cover by the herbaceous layer was observed in the field.
Vdetritus	1.00	Greater than 85% of the area possesses an O or A horizon	Based on soil samples, greater than 85% of the WAA contained detritus in the upper soil layers. The WAA did not contain areas 'washed by high velocity flood water'.
Vredox	0.10	Redox features less than 20%	Based on soil samples, redox composition observed in the field ranged from 0-10%.
Vsorpt	0.50	WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non-montmorillonitic clays	Based on soil samples, the WAA was dominated by a combination of loam and sandy loam soil types.
Vconnect	1.00	Wetland plus two or more habitat type (other than forested) OR three or more habitat types	Based on GIS analysis, the WAA was surrounded by forest.

Table 2: Summary of functional capacity units for the residential development's permanent impacts to potential Waters of the U.S.

Feature ID	Functional Capacity Index (FCI)			Acres	Service Area (N/A)	Functional Capacity Units (FCU)			Total FCUs
	TSSW	MPAC	RSEC			TSSW	MPAC	RSEC	
EW1	0.50	0.23	0.81	0.24 ac	1.0	0.12	0.06	0.19	
EW2	0.79	0.50	0.58	0.02 ac	1.0	0.02	0.01	0.01	
EW3	0.67	0.67	0.62	2.29 ac	1.0	1.54	1.53	1.41	
EW4	0.67	0.67	0.62	2.98 ac	1.0	2.00	1.99	1.84	
EW5	0.67	0.67	0.62	0.04 ac	1.0	0.03	0.03	0.02	
EW6	0.42	0.50	0.52	0.01 ac	1.0	0.00	0.01	0.01	
EW7	0.55	0.67	0.60	0.01 ac	1.0	0.01	0.01	0.01	
SW1	0.76	0.83	0.76	4.14 ac	1.0	3.14	3.45	3.132	
SW2	0.76	0.83	0.76	0.9 acre	1.0	0.68	0.75	0.68	
Total	5.79	5.57	5.89	**10.63 ac**	**N/A**	**7.54**	**7.84**	**7.30**	
					FCU Required	**7.54**	**7.84**	**7.30**	**22.68**

Table 2. Shows updated FCU values for project as of 27 February 2019