

# **GROUND-TRUTH WETLAND MITIGATION ASSESSMENT**

**CLEAN WATER ACT SECTION 404**

**HOUSTON 8-COUNTY METRO REGION**

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**JUNE 2017**

**TEXAS COASTAL WATERSHED PROGRAM**

**TEXAS A&M AGRILIFE EXTENSION SERVICE**

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Permit: SWG-0-19244 (1991)

Location: 29°40'57.66"N, 95°0'44.30"W

Mitigation Location: 29 36'11.57"N, 95 2'58.42"W

Mitigation Type: Permittee responsible

Acres impacted: 0.6 acres

Mitigation acres completed: 0.6 acres

**PERMIT BACKGROUND:** This permit was a standard permit authorizing 7,000 cubic yards of fill material to be discharged into 0.6 acres of low quality tidal herbaceous wetlands adjacent to Barbours Cut. Impacts are associated with construction of new process units and utilities at the existing La Porte Tenneco Natural Gas Liquids Plant. The project will require construction of a wastewater treatment facility, water treatment system, and primary peripheral roads. To compensate for impacts to 0.6 acres of tidal wetlands, 0.6 acres of fringe herbaceous *Spartina alterniflora* tidal wetland will be created along Taylor Bayou at three separate pre-determined sites.

**INVESTIGATION RESULTS:** An on-site assessment was completed late Summer 2016.

Vegetation Data		
Species	Status	Total Site Coverage
<i>Spartina alternifolia</i>	OBL	58.0%
<i>Schoenoplectus robustus</i>	FACW, OBL	7.0%
<i>Spartina patens</i>	OBL	3.5%
<i>Iva spp.</i>	FACW	1.0%
<i>Typha latifolia</i>	OBL	0.5%
<i>Cyperus haspan</i>		0.1%
<i>Pluchea odorata</i>	OBL	0.1%
<b>Open Water</b>		24.0%
<b>Water With Floating/Submerged Vegetation</b>		0.0%
<b>Water with Emergent Vegetation</b>		57.6%
<b>Exposed Mineral Soil</b>		0.9%
<b>Exposed Gravel/ Cobble</b>		0.0%
<b>Exposed Rock</b>		0.0%
<b>High Water Depth (in.)</b>		
<b>Med. Water Depth (in.)</b>		
<b>Low Water Depth (in.)</b>		
<b>Vegetative Litter Cover</b>		
<b>Vegetative Litter Type</b>		
<b>Thatch Depth (in.)</b>		

Plot Sample	Soil Depth	Soil Color	Soil Texture
1	0-4"	5Y 3/2	Clay Loam
	3-10"	10Y 5/	Mucky Loam
2	0-4"	5Y 3/2	Clay Loam
	3-10"	10Y 5/	Mucky Loam

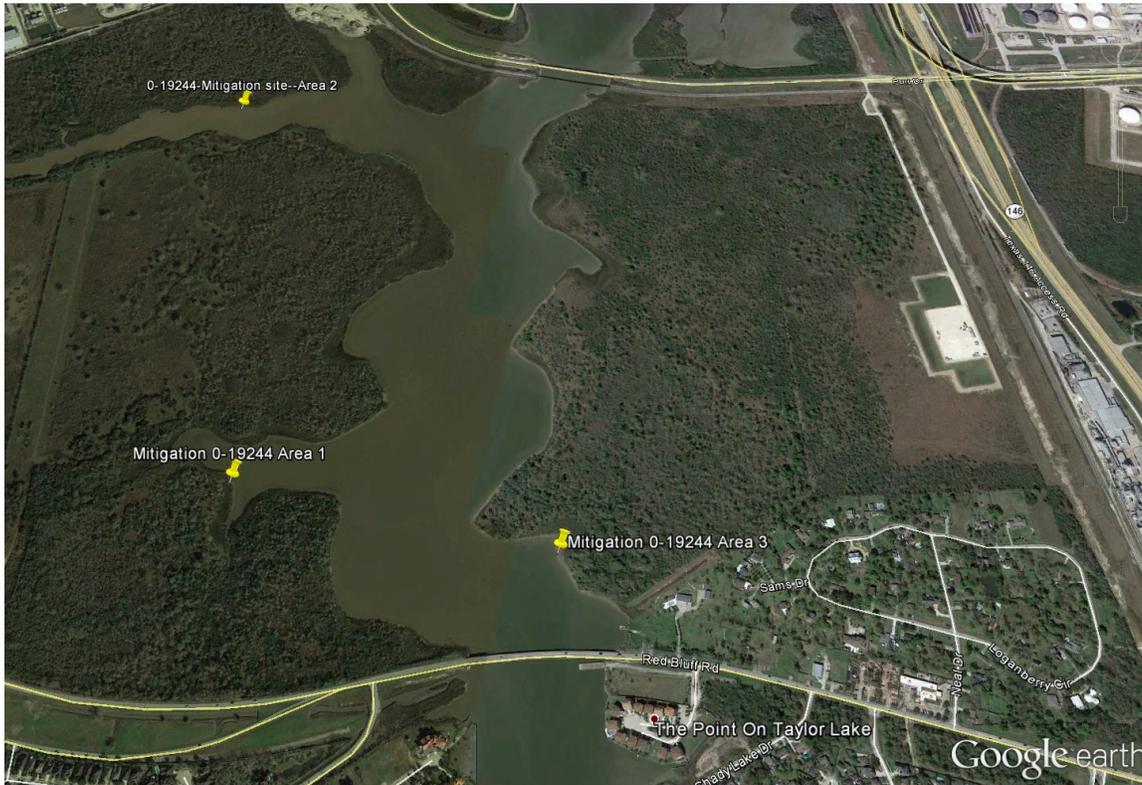
The evaluation of the mitigation site showed a successful mitigation completion. The sample sites were all dominated by facultative wet and obligate wetland vegetation indicative a well-established brackish to tidal marsh (58% *Spartina alterniflora*). The soil makeup of the site also indicated wetland conditions. Indicators were present to show tidal marsh hydrology (standing open water, 24%). This mitigation site appears to meet the conditions of the original permit.



Typical view of the creation portion of the mitigation site.



**AREA 1 IN TAYLOR LAKE BAYOU.** The outlined area is about 0.3 acres. It is a fringing area that does not appear in earlier photographs. This fringing area appears to be most prominent in Area 1



The three mitigation areas to be planted as mitigation. All three sites were visited. Site 2 was documented. The erosional scarp mentioned in the permit was present on all three sites. As with Armand Bayou, subsidence in the 1960's and 70's drowned existing wetlands. The stabilization of subsidence with the establishment of the Harris-Galveston Subsidence district makes it possible to reestablish wetlands such as these.

All indications are that the planting took place as required. The wetlands are still present and functioning well with a mature and healthy stand of *Spartina alterniflora*.

**Conclusion:** Mitigation was successful.

## Permit: SWG-1995-00406

Location: 29°47'35.92"N, 95°41'49.24"W

Mitigation Type: Permittee Responsible

Acres impacted: 5.5

Mitigation acres Required: 12.8

Mitigation Acres completed: None

**PERMIT BACKGROUND:** The completed residential development project impacted 5.5 acres of isolated jurisdictional wetlands very near the western edge of the Barker-Cypress Reservoir, on the south side. The permit was initiated in 1995, and the work appears to have been completed by 2002 (per available Google Earth imagery).

As compensatory mitigation, the permit required (1), 2.9 acres enhancement of an on-site historical wetland through the removal of Chinese Tallow trees and the establishment of native vegetation (presumably emergent herbaceous—prairie vegetation), and (2), a combination of creation (6.8 acres) and restoration (3.1 acres) of wetlands on a 16-acre block in the adjacent Addicks Reservoir.

### **RESULTS OF FIELD INVESTIGATION:**

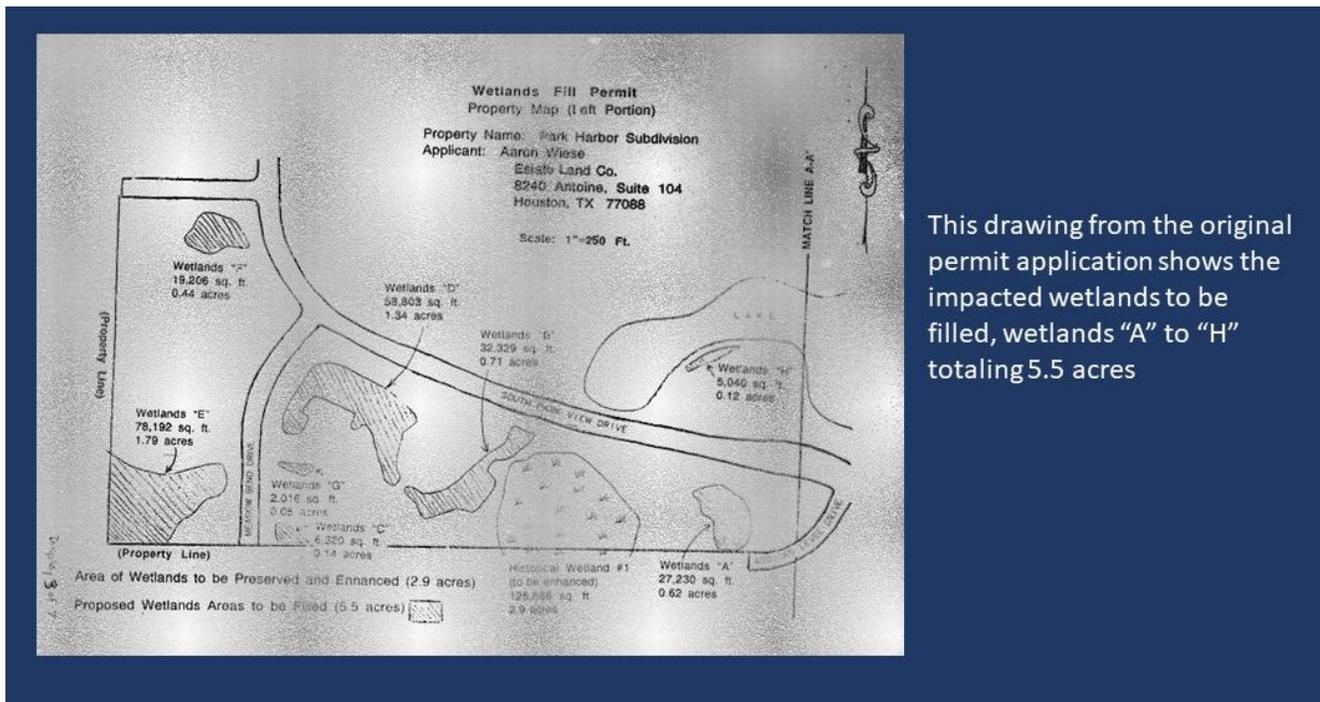
**On-Site Mitigation.** From the January 2017 Google Earth image, it is clear that the historical enhancement wetland is still present. Looking at older Google Earth photos this wetland depression was clearly a prairie pothole. The air photo signature on the 2017 photo is entirely consistent with the signature of Chinese Tallow. GE photos from 1995 forward show no evidence of any vegetation removal. The target wetland has not been filled, but there is no indication of any kind of easement preserving this site in perpetuity. No real increase in wetland functions and values was served by this mitigation.

**Off-Site mitigation.** Air photo interpretation of Google Earth imagery from 1995 (1/1995; 9/2002; 2/04; 5/05; 1/06) does not reveal any activities consistent with the kind of earth moving that would be required on nearly half of this 16-acre block (see below) for the creation of the stated amount of wetlands. Furthermore, there is no significant change in in the tonal pattern of the 3-acre wetland that was to be restored in this block, a tonal pattern consistent with Chinese Tallow since 1989. The last entry in the permit documentation stated that the permit was pending the permission to complete the mitigation. The permission was perhaps received but there is no evidence in the paper trail nor on the ground that any of the mitigation activities were ever completed in accordance with the permit. The site manager for the reservoir was contacted and he verified that there is no record that this portion of the proposed mitigation was ever completed (phone conversation, October 2016).

**Conclusion:** No effective mitigation for the wetland loss.



Impact site: South of South Park View Drive to the east-west property line, and from Meadow Bend on the west to Addicks Levee Drive on the east.



This drawing from the original permit application shows the impacted wetlands to be filled, wetlands "A" to "H" totaling 5.5 acres



16-acre mitigation site in the Addicks Reservoir. 1/23/17 Google Earth aerial photo. 3-acre restoration wetland is dark area just left of center. Scale bar is 500ft.

## Permit: SWG-1995-01666

Project location: 29 56'02.85"N, 95 32'18.64"W

Mitigation Location: 29 47'35.40"N, 95 52'30.91"W

Mitigation Type: Permittee Responsible

Acres impacted: 4.4

Compensatory Mitigation acres required: 6.4

Avoidance Acres Required: 6.4

Mitigation acres completed: 6.4 avoidance; 6.4 Mitigation (likely poor quality)

**PERMIT BACKGROUND:** This permit was an after-the-fact (ATF) Nationwide Permit (NWP) 26: Headwaters and Isolated Waters Discharges. SWG-1995-01666 authorized retention of fill in 1.4 acres of isolated wetlands for development of an 18-hole golf course in Harris County, Texas. Additionally, the permit authorized additional fill in 3 acres of on-site isolated wetlands for the golf course construction. 6.4 acres of on-site isolated wetlands were to be avoided by permit activities. As compensation for impacts to jurisdictional waters, the permittee would create 6.4 acres of palustrine emergent wetlands and preserve 3.6 acres of upland prairie as a buffer on a 10 acre site 23 miles to the southwest, as the crow flies. Both the impact site and the mitigation site are within the greater San Jacinto Watershed (HUC??), but the impact site is in the White Oak Bayou Watershed (HUC??) while the mitigation site is in the Barker Reservoir Watershed (HUC??).

No special conditions were issued in conjunction with SWG-1995-01666. The only requirements listed in the permit were that permitted work was to be completed within the 1 year verification period for the activity and that the mitigation was to be completed in accordance with approved plans. Permit issuance for SWG-1995-01666 issuance was dated 12/09/1996.

### RESULTS OF FIELD INVESTIGATIONS:

**Avoidance:** Recent aerial photography from Google Earth (GE) (2017) confirms the presence of the remnants of historical wetlands in the golf course, more or less consistent with the 6.4-acre requirement. The largest of these wetlands appear to be dominated by invasive Chinese Tallow trees. No enhancement was required in the permit. Wetlands preserved in an isolated condition within a highly-manicured golf course have a limited amount of ecological services that can be provided. Dossier analysis by R. Davanon in 2015 (on file with the Texas Coastal Watershed Program) revealed that some "avoided" wetlands were later filled.

**Off-Site Mitigation.** For permit SWG-1995-01666, the site owner of the mitigation site was contacted on multiple occasions but did not return calls. Permission to access and assess was therefore not obtained. Based on the aerial photography and the assessment completed during a previous project phase, it is obvious that wetlands were created on the mitigation site, between 1995 and 2002, based on available GE imagery. While we could not directly assess the quality of the wetland mitigation without on-the-ground inspection, we could make some observations based on the aerial photography. It would appear that the acreage requirement has been met, and that these created wetlands retain some wetland features and functionality. However, most of the excavated areas at the creation site show an open water aerial photo signature in nearly every photo available from Google Earth, including relatively drier times of the year (e.g., October). An open-water pond is not the same thing as a wetland. It is quite clear that most of the so-called wetlands at the mitigation site do not have mature stands of wetland vegetation.

**Conclusion:** Almost no significant wetland functionality mitigated with this project.



Impact Site. Green arrows point to some of the “preservation wetlands” required by the permit.



Mitigation site (green outline), Google Earth, 1/2017. Note open water signature of the putative wetlands.

## Permit: SWG-1995-01370

Location: 29°38'25.55"N, 95°09'58.19"W

Mitigation Location: 29 38'42.63"N, 95 06'32.82"W

Mitigation Type: Permittee Responsible

Acres impacted: 2.7 acres

Mitigation acres Required: 5.4 acres

Mitigation acres completed: 5.4 acres (quality dubious but unknown)

**PERMIT BACKGROUND:** The permit impacted 1.6489 acres of isolated wetlands (described as coastal prairie wetlands) in Harris County, Texas to complete a road extension (Crenshaw Road, Pasadena, Texas). The permit was issued in October 1995 with expiration in October 1997. The City of Pasadena executed a resolution on August 22, 1995, stating that the impacted wetlands would be compensated with a 5.4-acre mitigation site of similar wetland types by either creation, restoration or enhancement methods. The mitigation would be completed at one of two sites and the final location of the actual mitigation site would be determined 90 days after the date of the resolution and before October 1996. Additionally, the city agreed to provide appropriate management (i.e. Chinese Tallow and other exotic vegetation removal by mowing, herbicide application or controlled burns) of the mitigation site for fifteen (15) years after the date of the resolution (up to August 2010) and preserve the mitigation site in perpetuity with a conservation easement. The final location selected was city-owned property south of Fairmont Parkway and east of Willow Springs Bayou. The actual site was to be just to the east of a newly-constructed berm on the eastern side of Willow Springs Bayou, the berm extending 200 meters north of the CIWA raw water pipeline along Willow Springs Bayou.

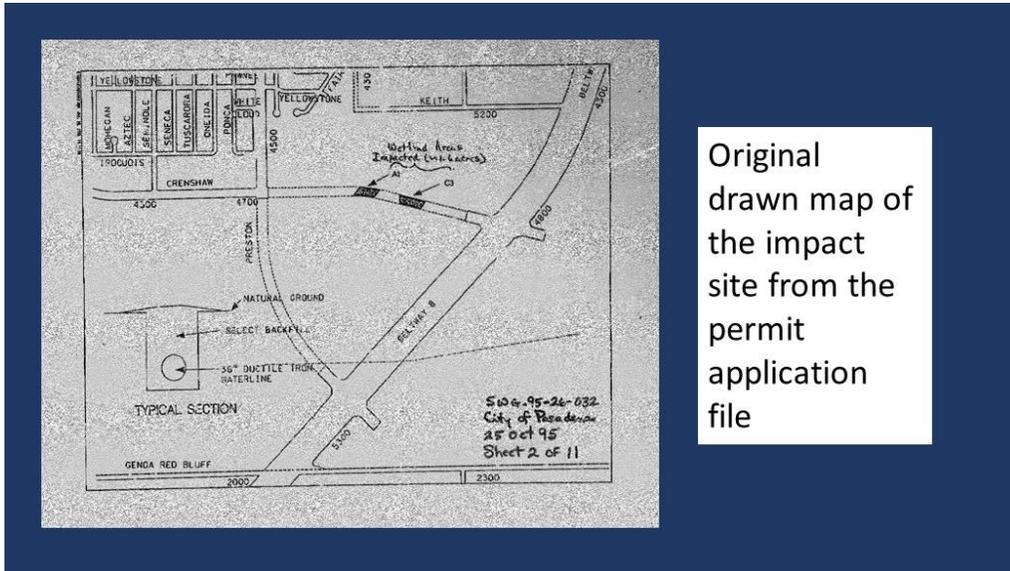
**RESULTS OF FIELD INVESTIGATIONS :** For permit SWG-1995-01370, the field investigations ended with no resolution as the permittee did not acknowledge or return phone inquiries regarding the permit. Because this permit is 22 years old, and the permittee is a municipality, the lack of communication is likely due to new staff who simply are ignorant of any actions/permits from 1995. The Google Earth imagery (2017) shows work at the impact site has been completed and no development has occurred at the off-site mitigation location (see images below).

The FOIA file is quite extensive with comments from reviewing agencies, in particular, Texas Parks and Wildlife Department and U.S. Fish and Wildlife Service, both of whom raise serious objections to the permit and the mitigation. Both commenters stated the value of the proposed impacted wetlands being "extremely rare and valuable" and while the proposed road expansion would only directly impact 1.65 acres, it would indirectly destroy 27 acres of associated wetlands and adjacent habitat. From the 2017 Google Imagery, the entire project area is now developed with the only set-aside area being mowed detention areas.

The mitigation site shows prairie vegetation in the latest available Google Earth (2017) imagery. Per the FOIA record, the mitigation site was to be set-aside in a conservation easement held by the City of Pasadena in perpetuity. There is no evidence of the easement on the permit record. A city council resolution was recorded approving the site for mitigation. It is not clear that a council resolution carries the same force of law as a recorded conservation easement.

The consultant record detailing the mitigation work to be accomplished stated that 5.4 acres of wetlands would be established/enhanced by the construction of the berm on the east side of Willow Springs Bayou as described above. It is difficult to establish from the available aerial photography for this time period (1995 and 2002) whether or not the berm was completed. There does appear to be a v-notch weir in the location described in the mitigation proposal. But there does not appear to be any enhanced wetland hydrology, as evidenced by a darker tonal pattern on the aerial photography.

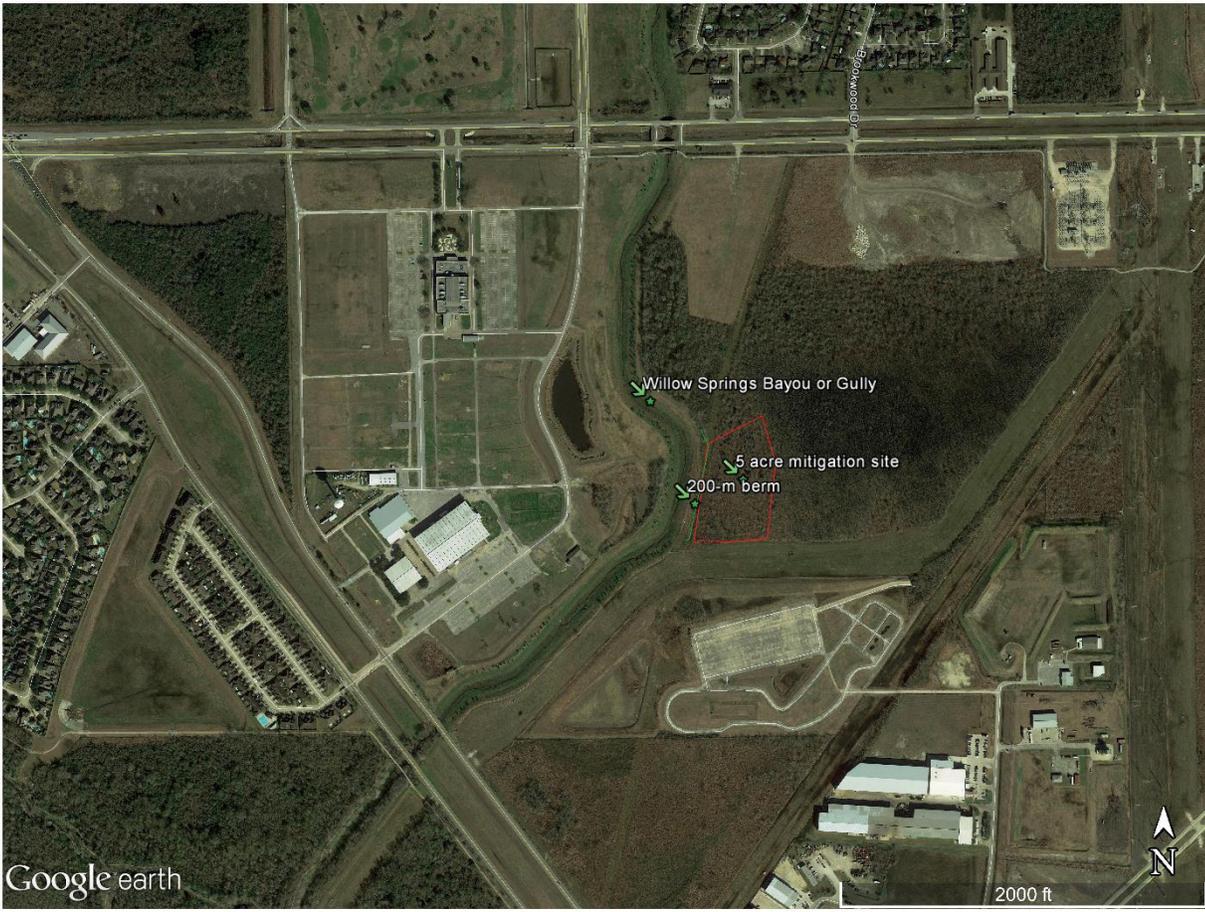
**CONCLUSION:** The area east of the putative berm is still a vegetated undeveloped track. But there is no indication of a conservation easement on this site, nor is there any indication from aerial photography that increased wetland functionality occurred at this site. The mitigation thus appears to be a failure. (Interestingly, a larger wetland (.15 acres) just to the east is present with a pronounced wetland signature. This area did not appear in the documentation for mitigation of this project).



Original drawn map of the impact site from the permit application file



Google Earth aerial of the impacted site, January 2017



Google Earth aerial of the mitigation site, January 2017, with relevant features associated with the permit.

## Permit: SWG-1998-01289

Location: 29°14'46.61"N, 94°52'21.14"W

Mitigation Type: Permittee Responsible

Acres impacted: 0.73

Mitigation acres Required: 1.43

Mitigation acres completed: 1.43

**PERMIT BACKGROUND:** The permit requested authorization of fill in 0.73 acres of wetlands for construction of a soccer field recreation area in Galveston, Galveston County Texas. 0.9 acres of onsite wetlands were avoided and enhanced as part of the project. To compensate for impacts to wetlands, 1.49 acres of freshwater marsh will be created on uplands onsite and seeded with seed bank excavated from the filled wetlands. The proposed park is primarily utilized as a soccer field park with associated parking for visitors. SWG-1998-01289 was approved 02/26/1999 and expired 12/31/2002. No special conditions are listed for SWG-1998-01289

**INVESTIGATION RESULTS:** An on-site evaluation of the mitigation was completed in Fall 2016.

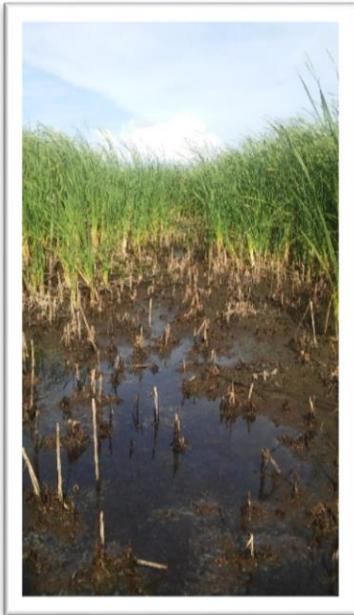
Summarized Vegetative Data		
Species	Status	Total Site Coverage
<i>Typha latifolia</i>	OBL	47.6%
<i>Cyperus virens</i>	FACW	0.02%
<i>Sesbania drummondii</i>	FACW	1.7%
<i>Ludwigia decurrens</i>	OBL	0.2%
<i>Lemna aequinoctialis</i>	OBL	3.3%
<i>Cyperus articulatus</i>	OBL	0.6%
<i>Polygonum hydropiperoides</i>	OBL	0.3%
<i>Panicum repens</i>	FACW (I)	14.3%
<i>Morella cerifera</i>	FAC	0.2%
<i>Baccharis halimifolia</i>	FAC	0.3%
<i>Lantana urticoides</i>	FACU	0.4%
<i>Triadica sebifera</i>	FAC (I)	0.0%
<i>Iva frutescens</i>	FACW	0.6%
<i>Rubus trivialis</i>	FACU	0.3%
<i>Andropogon glomeratus</i>	FACW	0.1%
<i>Ipomea wrightii</i>	FACW (I)	0.0%
<i>Solidago altissima</i>	FACU	1.2%
<i>Pluchea odorata</i>	FACW	0.0%
<i>Spartina patens</i>	FACW	0.8%
<i>Cyperus esculentus</i>	FAC	0.0%
<i>Ambrosia trifida</i>	FAC	0.4%
<i>Centella erecta</i>	FACW	0.1%
<i>Rumex crispus</i>	FAC (I)	0.0%
<i>Cyperus retrorsus</i>	FACU	0.0%
<i>Bacopa monnieri</i>	OBL	0.3%
<i>Phyla nodiflora</i>	FAC	0.4%

<i>Borrichia frutescens</i>	OBL	14.0%
<i>Paspalum Spp.</i>		3.9%
<b>Open Water</b>		7.2%
<b>Water With Floating/Submerged Vegetation</b>		3.3%
<b>Water with Emergent Vegetation</b>		34.2%
<b>Exposed Mineral Soil</b>		1.3%
<b>Exposed Gravel/ Cobble</b>		11.1%
<b>Exposed Rock</b>		0%

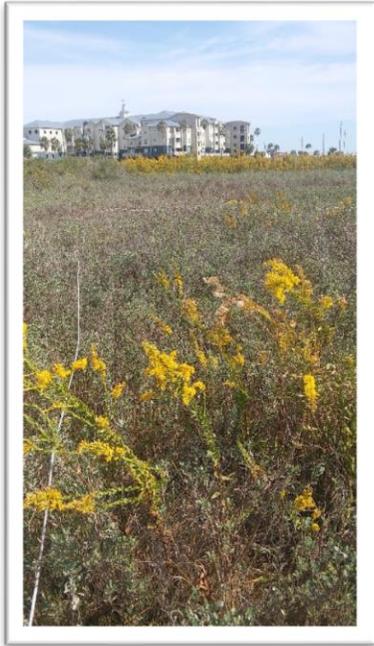
Soil Data			
<b>Site 1 to 3</b>			
<b>Depth (in)</b>	<b>Soil Texture</b>	<b>Soil Color</b>	
0-3	loam	10YR 3/2	
3-10	sandy loam	2.5Y 2/5	
<b>Site 5</b>			
<b>Depth (in)</b>	<b>Soil Texture</b>	<b>Soil Color</b>	<b>Description</b>
0-2"			organic matter of undecomposed plant stalks/roots
2-6"	Loam	2.5Y 3/1	
6-14"	sandy loam	2.5Y 4/1	common white / depleted zones, about 50% of matrix
<b>Site 6</b>			
<b>Depth (in)</b>	<b>Soil Texture</b>	<b>Soil Color</b>	<b>Description</b>
0-4"	silty clay loam	2.5Y 5/1	
4-9"	clay loam (CL)	2.5Y 5/1	3-5% distinct iron (Fe) channel coatings, few fine Mn nodules
<b>Site 7</b>			
<b>Depth (in)</b>	<b>Soil Texture</b>	<b>Soil Color</b>	<b>Description</b>
0-4	fine sandy loam	10YR 3/2	10% distinct iron pore coating
4-13	loamy sand	10YR 5/2	no redox features

Site 8			
Depth	Soil Texture	Soil Color	Description
0-10	loamy sand	2.5Y 2/	10% black stains -Fe/Mn
Site 9			
Depth (in)	Soil Texture	Soil Color	Description
0-4	sandy loam	40% 10yr 3/2	Variegated soil dodies present : spoil
		60 % 10Y 4/0	
4-12	loamy sand	20% 2.5Y 4/2, 60% 10Y 4/	5% Fe/Mn stains, 20% 10YR4/6 bodies and pure coating
Site 11			
Depth (in.)	Soil Texture	Soil Color	Description
0-4	loamy sand	2.5Y 4/2	few fine faint redox coatings
4-13	loamy sand	2.5Y 6/2	5% fine and medium redox coatings, faint to distinct

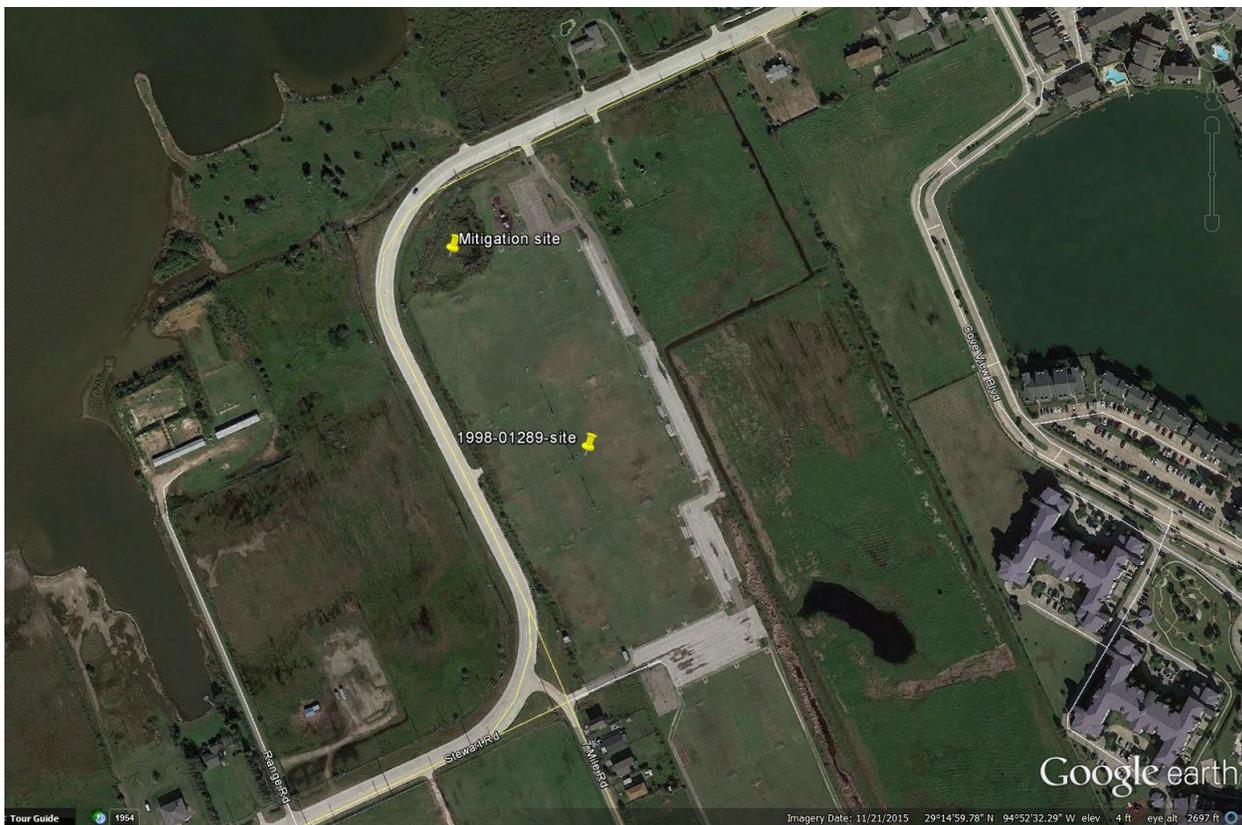
Soils features are consistent with wetland hydrology.



Typical view of the created portion of the wetland.



These photos reflect a typical view of the enhancement portion of the wetland.



Aerial of the ballfield site. The main mitigation wetland is in the NW corner of the tract.

The mitigation wetland was completed per the plan. Over half of the vegetation (52%) was obligate wetland species and up to 83.6% of the coverage was comprised of an obligate/facultative wet mixture of plants. It is important to

note that the dominant obligate plant for the majority of the mitigation site was cattail (*Typha latifolia*). It is clear that the site only receives fresh water input (rainfall) from the presence of cattail. Due to the extensive presence of cattail, other wetland vegetation is “crowded out”—a typical succession pattern for cattails in wetlands. Hydrology and hydrological features were present within the mitigation site for all locations (created and enhanced) (open water, 7.2%). Additionally, the soil characteristics were consistent with wetland conditions. There was no evidence of the planted wetland trees described in the mitigation plan. Overall, the created mitigation site is bordered by soccer fields on one side and open prairie mix on the opposite side (undeveloped land). The enhanced portion of the mitigation site was surrounded by more open undeveloped land. The site functions as a wetland but the dominance of cattails suggests a low quality functioning, albeit low quality due to the dominant persistence of cattails.

**CONCLUSION:** The mitigation is marginally successful. The project site vegetation list was not described in any detail, therefore, we do not know if the original wetland was a cattail marsh or not. However, given that cattail invade freshly exposed soils, it is not unreasonable to say that the site was invaded once the created areas were graded down and topped with the excavated soil.

Permit: SWG-1998-01358

Location: 29°31'12.35"N, 95°09'47.49"W

Mitigation Location: 29°35'02.51"N, 95°21'17.22"W

Mitigation Type: Mitigation Bank (owned by the permittee)

Acres impacted: 1.4

Mitigation acres required: 2.8

Mitigation acres completed: 2.8

**PERMIT BACKGROUND:** This permit requested authorization to fill 1.4 acres of isolated wetlands for the construction of a multi-family residential development. At the time of application, proposed mitigation would be located within a 47-acre area under development as a mitigation area. The mitigation included a 2.8-acre area in which 1.4 acres of depressional wetlands would be excavated and created, and 1.4 acres of upland buffer would be preserved. The permittee is Friendswood Development.

**INVESTIGATION RESULTS:** An on-site assessment was completed in winter 2017.

Vegetation Data		
Species	Indicator Status	Avg. % Cover
<i>Eleocharis quadrangulata</i>	OBL	25.2%
<i>Saccharum giganteum</i>	FACW	12.0%
<i>Eleocharis montana</i>	OBL	10.0%
<i>Eleocharis montevidensis</i>	FACW	3.2%
<i>Juncus effusus</i>	OBL	3.0%
<i>Ludwigia peploides</i>	OBL	2.2%
<i>Proserpinaca palustris</i>	OBL	1.6%
<i>Acer rubrum</i>	FAC	1.4%
<i>Hydrolea ovata</i>	OBL	1.2%
<i>Typha latifolia</i>	OBL	1.2%
<i>Triadica sebifera</i>	FAC	1.0%
<i>Callitriche heterophylla</i>	OBL	0.6%
<i>Eclipta prostrata</i>	FACW	0.4%
<i>Rhynchospora corniculata</i>	OBL	0.2%
<i>Andropogon virginicus</i>	FAC	0.2%
<i>Pluchea odorata</i>	FACW	0.2%
<i>Phyla nodiflora</i>	FAC	0.2%
<i>Juncus scirpoides</i>	FACW	0.2%
<i>Sagittaria spp.</i>		0.0%
<b>Open Water</b>		22.4%
<b>Water With Floating/Submerged Vegetation</b>		6.2%
<b>Water with Emergent Vegetation</b>		53.2%
<b>Exposed Mineral Soil</b>		0.2%

<b>Exposed Gravel/ Cobble</b>	0.0%
<b>Exposed Rock</b>	0.0%
<b>High Water Depth (in.)</b>	
<b>Med. Water Depth (in.)</b>	
<b>Low Water Depth (in.)</b>	
<b>Vegetative Litter Cover</b>	
<b>Vegetative Litter Type</b>	
<b>Thatch Depth (in.)</b>	

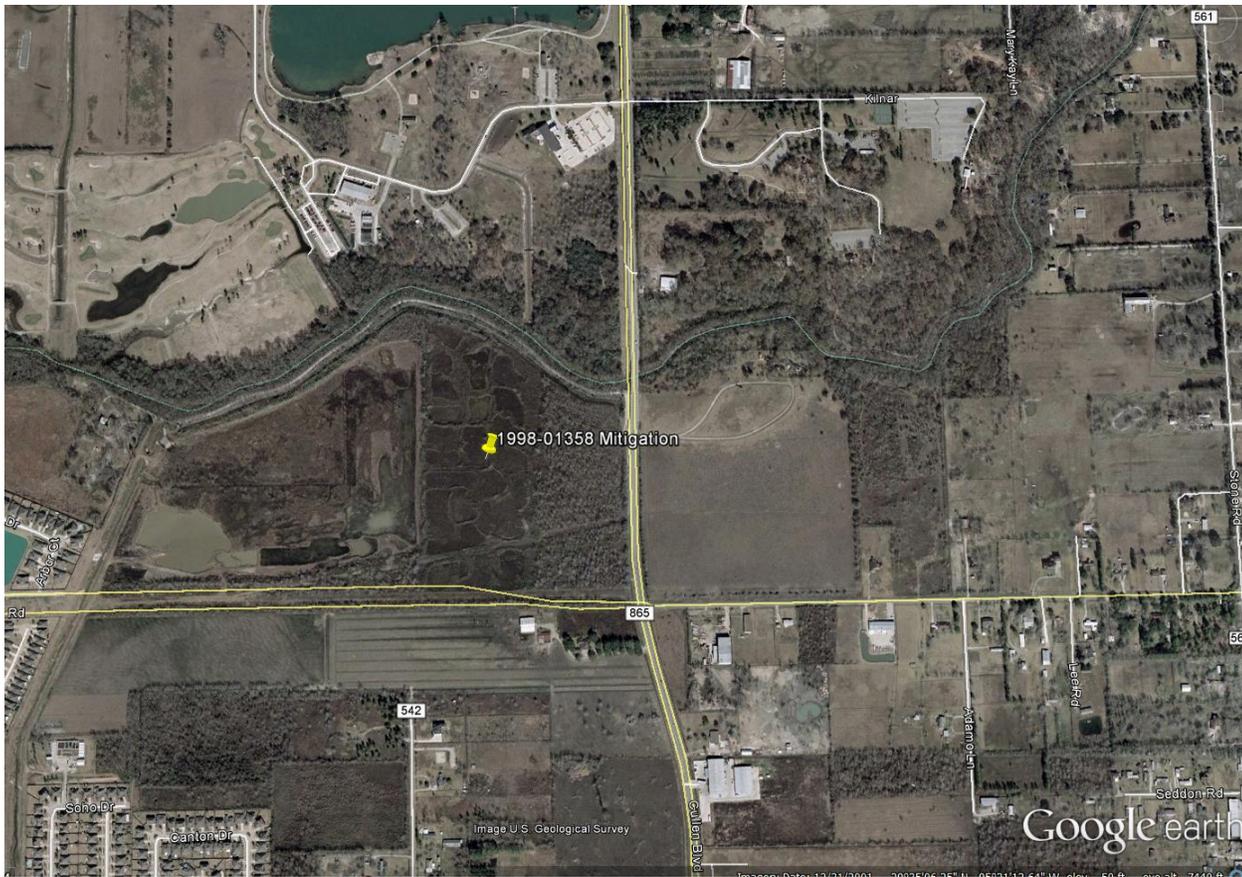
<b>Soil Data (surface horizons)</b>			
<b>Depth</b>	<b>Soil Texture</b>	<b>Soil Color</b>	<b>Description</b>
-	clay	gleyed	spoil pile, masses, no redox pore coatings or ped coatings
<b>Depth</b>	<b>Soil Texture</b>	<b>Soil Color</b>	<b>Description</b>
-	clay	gleyed	few redox pore coatings, common yellow masses
<b>Depth</b>	<b>Soil Texture</b>	<b>Soil Color</b>	<b>Description</b>
-	clay	gleyed	few faint pore coatings
<b>Depth</b>	<b>Soil Texture</b>	<b>Soil Color</b>	<b>Description</b>
-	clay	gleyed	common medium yellow masses

The mitigation site was a series of created ponds within a larger complex. The excavated areas were completely dominated by obligate to facultative wet plants (99.8%) and comprised of species typical to native freshwater prairie wetland systems. Hydrological conditions were present and evident (standing open water, 22% cover). Wetland soil characteristics were not pronounced, but the gleyed colors of the clays are consistent with wetland hydrology, at least at the drier end. \

**Conclusion:** Overall, the mitigation site functions as a wetland. The mitigation site, however, is quite some distance from the mitigation site. In addition, the mitigation site is full of wetlands in very close proximity, reducing their contribution on the landscape considerably.



Typical landscape view of the created wetlands, January 2017.



The mitigation site. Created wetlands are separated only by narrow berms. Natural wetlands do not occur in this pattern anywhere in the study area.

Permit: SWG-2001-01086

Location: 29°30'2.15"N, 95° 8'14.58"W

Mitigation Type: Permittee Responsible

Acres impacted: 1.178

Mitigation acres Required: 1.178 —of topsoil replacement

Mitigation acres completed: Topsoil replaced in a 1.6-acre basin. No Wetlands

**PERMIT BACKGROUND:** The permit application requested authorization to excavate 1.178 acres of adjacent wetlands for the creation of a detention basin for the future Magnolia Estates Subdivision in League City, Texas. As mitigation, the permittee was to stockpile the wetland soil and replace the topsoil once construction was complete, and allow the area to revegetate naturally. The replacement of the top soil was the only special permit condition and in lieu of mitigation monitoring plans. The permit was issued on September 17, 2001 and set to expire on September 17, 2003 and issued as a Nationwide permit 43.

**INVESTIGATION RESULTS:** An on-site assessment was completed in August 2016. The mitigation site functions as a detention pond. There apparently were no requirements on the permittee beyond topsoil replacement. The topsoil may indeed have been placed on the floor of this basin, but the water depth is clearly too deep to support wetland vegetation.

Seven plots were randomly selected for analysis outside of the pond.

Soil cores taken from sample plots and analyzed by Dr. John Jacob did not have any indicators of wetland soils. All soils analyzed from the sides of this pond were spoil or disturbed soils and sediments with no soil horizonation nor significant topsoils present.

Wetland vegetation was present only on the edge of the pond, consisting mainly of invasive and non-native *Bacopa monnieri* (Water hyssop).

In the original permit description, the area was described by the applicant (Dannenbaum Engineering Corporation) as a man-made stock pond. Review of aerial photographs, however, suggest that the area to be mitigated functioned as a wetland, and had not been converted to a stock pond prior to the disturbance associated with this permit.

**Conclusion:** Total failure

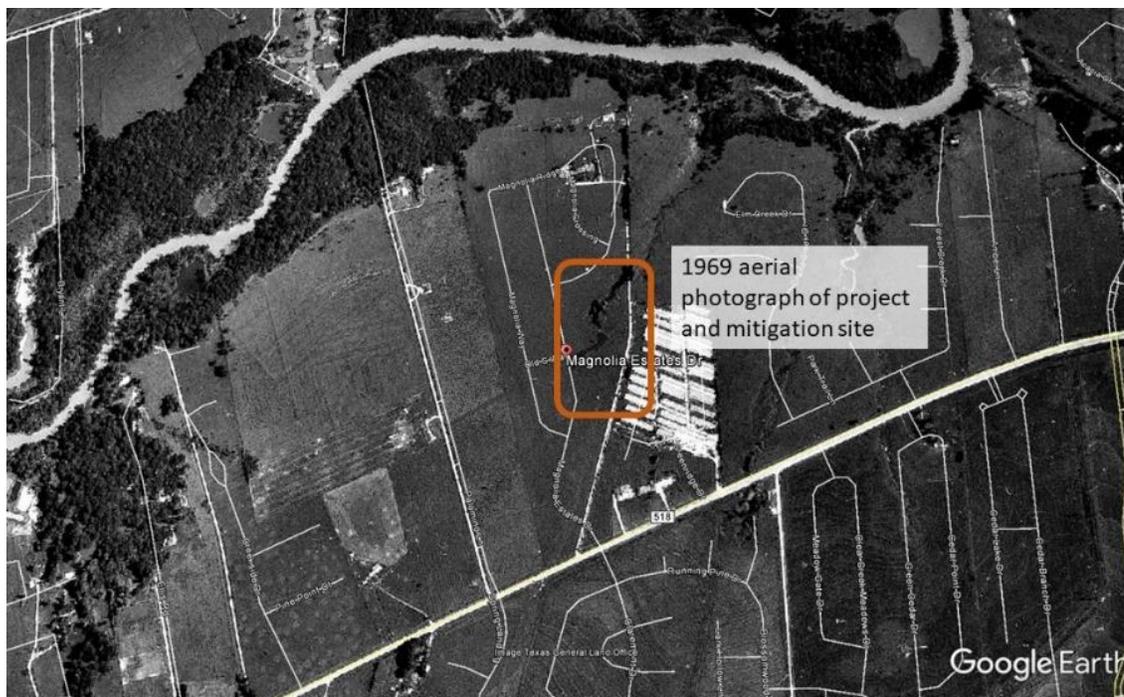
Summarized Vegetation Data					
Plot	Species	Status	Cover	Notes on Hydrology	Hydrophytic Indication
1	<i>Stenotaphrum secundatum</i>	FAC	1		NO
2	<i>Stenotaphrum secundatum</i>	FAC	0.4	no standing water	NO
2	<i>Mimosa microphylla</i>	FAC	0.001	moist soil	
2	<i>Cynodon dactylon</i>	FACU	0.01	On edge of pond	
2	<i>Eleocharis montevidensis</i>	FACW	0.05		
2	<i>Bacopa monnieri</i>	OBL	0.3		Yes
2	<i>Ludwigia palustris</i>	OBL	0.1		
3	<i>Bacopa monnieri</i>	OBL	0.55	possible mottling	YES
3	<i>Philoxeroides alternanthera</i>	OBL	0.45	Standing water	
4	<i>Stenotaphrum secundatum</i>	FAC	1		NO
5	<i>Stenotaphrum secundatum</i>	FAC	0.9	no hydrology	NO
5	<i>Brachiaria platyphylla</i>	FAC	0.05		
5	<i>Dichondra carolinensis</i>	FAC	0.05		
6	<i>Stenotaphrum secundatum</i>	FAC	0.25	moist soil	YES
6	<i>Cynodon dactylon</i>	FACU	0.05		
6	<i>Diodia virginiana</i>	FACW	0.1		
6	<i>Eleocharis montevidensis</i>	FACW	0.001		
6	<i>Bacopa monnieri</i>	OBL	0.5		
7	<i>Brachiaria platyphylla</i>	FAC	0.7		NO
7	<i>Cynodon dactylon</i>	FACW	0.25		
7	<i>Oxalis stricta</i>	UPL	0.001		



Landscape view of the mitigation site; it is clearly heavily manicured detention area.



A typical view of a sample plot showing mowed down vegetation, primarily *Bacopa monneri*, along the pond edge.





December 2002 aerial photograph of project and mitigation site



July 2015 aerial photograph of project and mitigation site

## Permit: SWG-2002-01358

Project Location: 29 08'46.25"N, 95 40'09.99"W

Mitigation Location: 28°57'55.55"N, 95°36'22.06"W

Mitigation Type: Mitigation Bank

Acres impacted: 0.42 acres to wetlands; 0.15 acres to waters

Mitigation acres/credits Required: 6 acre-credits

Mitigation acres completed: unverified

**PERMIT BACKGROUND:** The applicant proposed improvements along SH 35 for 8.4 miles from the intersection of SH 36 and FM 1301 in West Columbia west to FM 524 in Old Ocean. The proposed work would permanently impact jurisdictional wetland areas of approximately 2.212 acres and 0.381 acres permanent impacts to jurisdictional waters of the US. A later reassessment of the project impacts, determined by ACOE, concluded 0.42 acres of medium to high quality wetlands and 0.15 acres of waters of the US would be impacted. The applicant originally proposed to purchase credits from the Coastal Bottomlands Mitigation Bank at a 2:1 ratio. After reviewing comments and reassessing, the mitigation plan was altered to include a 6:1 ratio for credits in the mitigation bank, totaling 6-acres credits in the Coastal Bottomland Mitigation bank. Permit issuance occurred in October 2003 with special conditions:

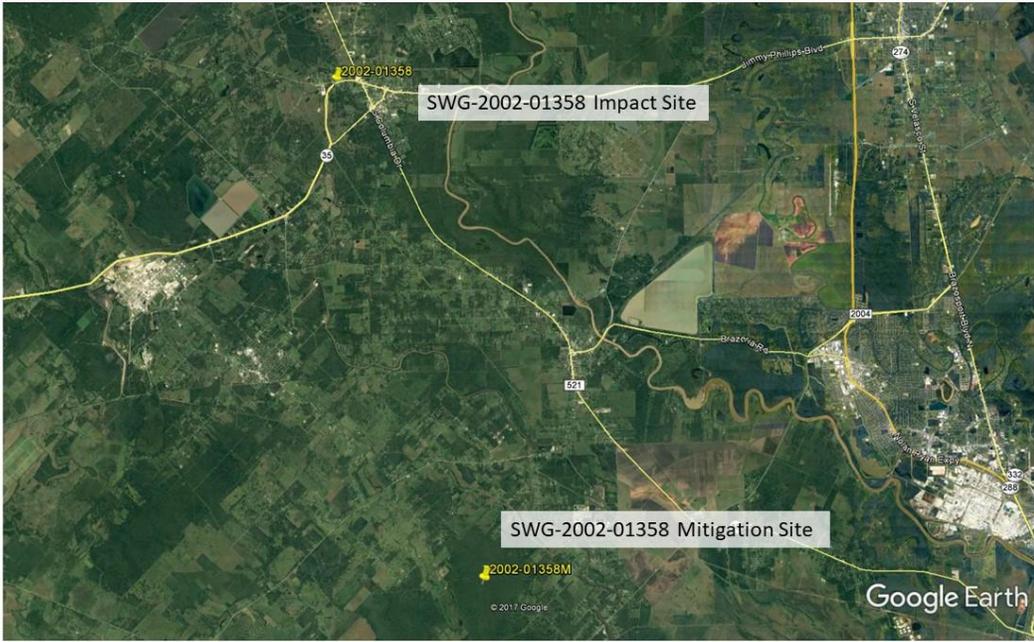
- TxDOT will debit 6 acre-credits from the Coastal Bottomlands Mitigation bank prior to the start of construction and submit documentation to the ACE prior to the start of construction;
- TxDOT will conduct a pre-construction meeting with the contract and notify the ACE of the meeting at least 2 weeks in advance.
- TxDOT will not initiate work within any jurisdictional waters of the US until they have submitted the requisite cultureal resources survey.
- Modification: 1. 1 acre credit must be reserved from CBMB and documentation submitted to ACE.
- District engineer must be notified when work is complete. No documentation in FOIA file.

**RESULTS OF FIELD INVESTIGATIONS:** The Coastal Bottomlands mitigation bank was contacted regarding the completed mitigation. The investigation started with a search in RIBITS to identify the bank manager, Ms. Susan Shuffield with TxDOT. The point of contact for the mitigation bank requested justification for access to the site for evaluation. Justification specifying the details of this project were provided. Upon trying to reach the site manager again, further inquiries were not acknowledged by the bank manager. It remains unclear why the bank manager would not continue communications.

The record also states that TxDOT provided mitigation for non-jurisdictional wetlands by designing for wetlands in several roadside detention basins. Given that these were not jurisdictional areas, they were not investigated for this report.

The ledger for the Coastal Bottomlands mitigation bank does show an entry for RAMS permit 22777 (corresponding to SWG-2002-01358) for 6 credits on 10-2-2003.

**CONCLUSION:** Mitigation cannot be verified.



Google Earth aerial location map for SWG-2002-01358, November 2015



Google Earth aerial image of part of the project site in 1995

## Permit: SWG-2006-00149

Location: 29°49'37.96"N, 95°28'46.03"W

Mitigation Location: 29°55'56.19"N, 95°12'45.78"W

Mitigation Type: Mitigation Bank

Acres impacted: 0.65 acres

Mitigation acres completed: 0.397 acres

**PERMIT BACKGROUND:** The permit requested authorization to discharge fill material into 0.65 acres of wetlands adjacent to Brickhouse Gully, Houston, Texas, to support the construction of a regional stormwater management facility. Harris County Flood Control District was to purchase 0.397-acre credits from the Greens Bayou Wetland Mitigation Bank prior to the start of construction and submit documentation verifying the purchase of credits. Letter of verification included in file, dated May 30, 2006. Google Earth aerial photos showed no evidence of modification on the site in January 2008, but by January 2009 construction had been begun and presumably completed by the completion date of December 31, 2011.

**INVESTIGATION RESULTS:** An on-site assessment was completed in Fall 2016.

Vegetation Data		
Species	Status	Avg. Species Cover
<i>Sagittaria platyphylla</i>	OBL	18.00%
<i>Carex cherokeensis</i>	FACW	11.15%
<i>Zizaniopsis miliacea</i>	OBL	11.00%
<i>Ilex vomitoria</i>	FAC	8.40%
<i>Quercus phellos</i>	FACW	8.00%
<i>Polygonon hydropeplodes</i>	OBL	7.60%
<i>Sabal minor</i>	FACW	5.10%
<i>Mikania scandens</i>	FACW	3.67%
<i>Typha latifolia</i>	OBL	3.20%
<i>Eleocharis montevidensis</i>	FACW	3.00%
<i>Pinus taeda</i>	FAC	2.65%
<i>Juncus effuses</i>	OBL	2.35%
<i>Leersia hexandra</i>	OBL	2.00%
<i>Eleocharis montana</i>	OBL	1.45%
<i>Callicarpa americana</i>	FACU	0.85%
<i>Rubus trivialis</i>	FACU	0.82%
<i>Sesbania drummondii</i>	FACW	0.70%
<i>Rhynchospora corniculata</i>	OBL	0.64%
<i>Liquidambar styraciflua</i>	FAC	0.60%
<i>Ampelopsis arborea</i>	FAC	0.60%
<i>Symphotrichum subulatus</i>	OBL	0.55%
<i>Sapium sebiferum</i>	FAC	0.52%

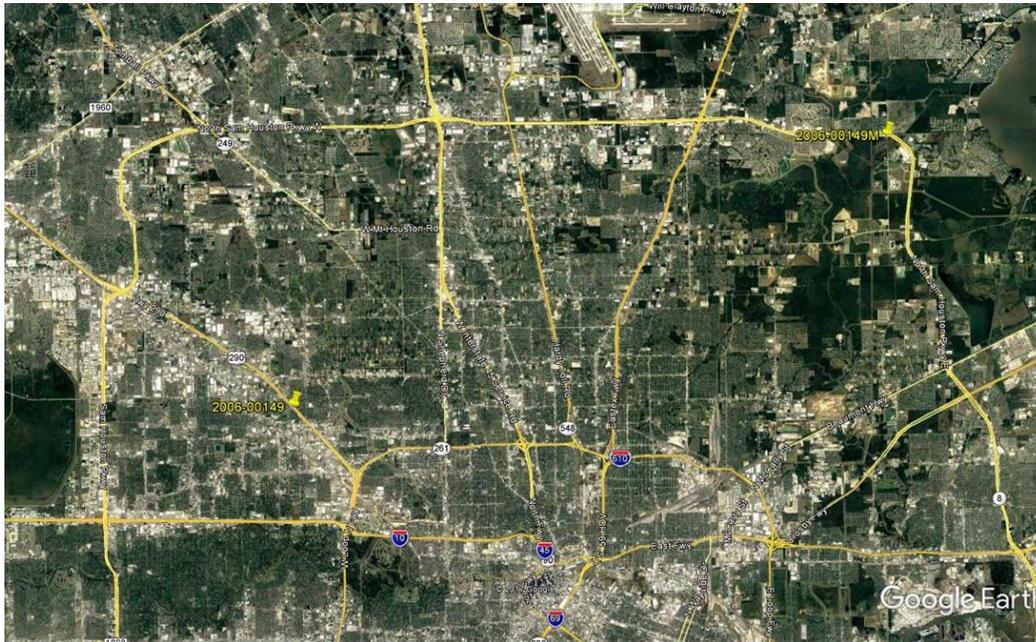
<i>Helianthus angustifolius</i>	FACW	0.50%
<i>Arnoglossum plantagineum</i>	FACU	0.40%
<i>Baccharis halimifolia</i>	FAC	0.34%
<i>Phyla nodiflora</i>	FAC	0.30%
<i>Poncirus trifoliata</i>	UP	0.22%
<i>Cyperus virens</i>	FACW	0.22%
<i>Rudbeckia texana</i>	UP	0.20%
<i>Oplismenus hirtellus</i>	UP	0.20%
<i>Steinchisma hians</i>	OBL	0.20%
<i>Dicanthelium accuminatum</i>	FAC	0.20%
<i>Sida rhombifolia</i>	FACU	0.20%
<i>Andropogon virginicus</i>	UP	0.12%
<i>Lemna aequinoctialis</i>	OBL	0.10%
<i>Cyperus esculentes</i>	FAC	0.06%
<i>Solidago altissima</i>	FACU	0.04%
<i>Diospyros virginiana</i>	FAC	0.04%
<i>Pluchea carolinensis</i>	FACW	0.02%
<i>Smilax rotundifolia</i>	FAC	0.02%
<i>Morella cerifera</i>	FAC	0.02%
<i>Ipomea hederacea</i>	FACU	0.02%
<i>Andropogon glomeratus</i>	UP	0.02%
Unk 3		0.02%
Unk 4		0.02%
<i>Acmella repens</i>	FACW	0.02%
<i>Cyperus ochracea</i>	FACW	0.02%
<i>Paspalum urvillei</i>	FAC	0.02%
<i>Eupatorium rotundifolium</i>	UP	0.00%
<i>Fraxinus pennsylvanica</i>	FACW	0.00%
<b>Open Water</b>		0.00%
<b>Water with Floating/Submerged Vegetation</b>		0.10%
<b>Water with Emergent Vegetation</b>		96.00%
<b>Exposed Mineral soil</b>		0.00%
<b>Exposed Gravel/Cobble</b>		0.00%
<b>Exposed Rock</b>		0.00%
<b>Vegetative Litter Cover</b>		0.80%

The mitigation site was completed as credits within a mitigation bank. The lower credit versus the impact acreage was calculated using a coefficient thought to account for the less-than-fully functioning nature of the impact wetlands.

The mitigation bank record documents that the credit were purchased and recorded—verified by the then-site manager. The on-site evaluation of the mitigation bank shows the area to be a mixture of facultative areas which grade into open canopied wetlands, dominated by obligate wetland vegetation. It is important to note that for the credit makeup of the mitigation bank, up to 10% of the site (and therefore) credits could be satisfied with upland areas (per ACOE letter). As the bank is an approved bank, this allowance for

compensation has been considered permissible, but still leaves open the broader question of whether this allowance should be acceptable at all for compensating wetland losses.

**CONCLUSION:** Successful.



Permit: SWG-2009-00988

Location: 29°38'36.41"N, 95°38'27.91"W

Mitigation Location: 30° 2'20.42"N, 96°33'54.36"W

Mitigation Type: Mitigation Bank

Acres impacted: 1.03

Mitigation acres Required: 0.6 acre-credits

Mitigation acres completed: 0.6 acre-credits

**PERMIT BACKGROUND:** This permit was a standard permit issued on October 08, 2010 for discharge of fill material into 1.03 acres of non-tidal emergent wetlands for the creation of a sewage treatment plant with an 18-acre forebay along Oyster Creek in Sugar Land, Texas. The permit expired on December 31, 2015. Compensation for impacts required the purchase of 0.6 credits from the Katy-Cypress Mitigation Bank or another ACOE approved alternative bank. The final permit was the last record in the administrative file. There is no evidence of purchase of credits from KCMB or other mitigation bank in the administrative file.

A record of 0.3 credits purchased from Mill Creek Mitigation Bank under permit SWG-2009-00988 was found on the RIBITS web site. The date of purchase is 03/08/2011. The 0.3 credits purchased is noted to be for Riverine Forested iHGM Physical credits. There is a purchase of an additional 0.8 credits noted to be for Riverine Forested iHGM Biological credits on the same day for the same permit. The permittee is listed as City of Sugarland.

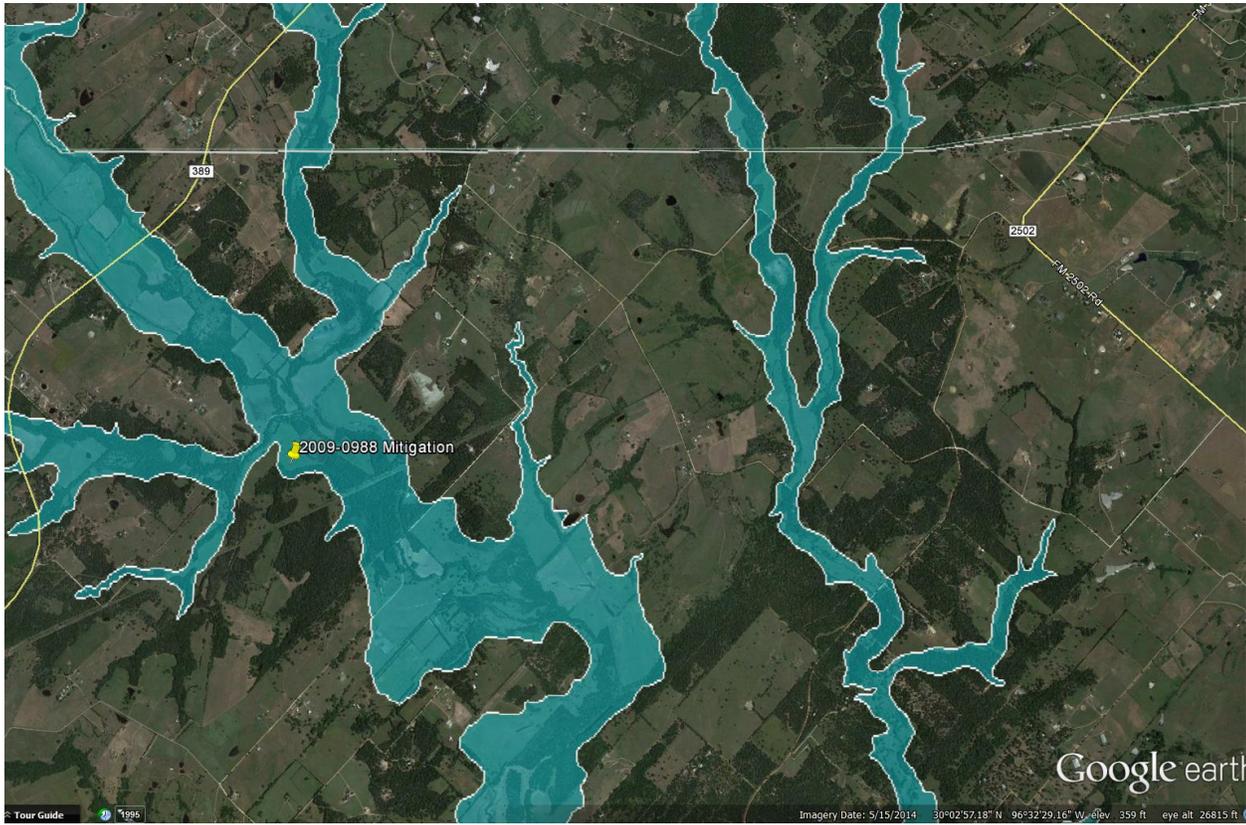
**INVESTIGATION RESULTS:** An on-site evaluation of the mitigation was completed in early 2017.

Summarized Vegetation Data, Mitigation Site		
Species	Indicator Status	Avg. % Cover
<i>Unknown grass</i>		34.0%
<i>Cyperus entrerianus</i>	FACW	20.4%
<i>Symphyotrichum divaricatum</i>	OBL	19.0%
<i>Ilex vomitoria</i>	FAC	16.0%
<i>Carex cherokeensis</i>	FACW	14.0%
<i>Ulmus crassifolia</i>	FAC	8.0%
<i>Chaerophyllum tainturieri</i>	FAC	6.0%
<i>Rubus trivialis</i>	FACU	3.0%
<i>Smilax spp.</i>		3.0%
<i>Centella erecta</i>	FACW	2.4%
<i>Celtis occidentalis</i>	FACU	2.0%

<i>Galium aparine</i>	FACU	2.0%
<i>Eclipta prostrata</i>	FACW	1.6%
<i>Ambrosia psilostachya</i>	FAC	1.0%
<i>Carex spp.</i>		0.8%
<i>Fraxinus pennsylvanica</i>	FACW	0.4%
Unknown oak sapling		0.4%
<i>Sanicula canadensis</i>	FACU	0.2%
<i>Stellaria media</i>	FACU	0.2%
<i>Dichanthelium sp.</i>		0.2%
<i>Quercus virginiana</i>	FACU	0.2%
<i>Eleocharis montevidensis</i>	FACW	0.2%
<i>Nothoscordum bivalve</i>	FACU	0.2%
<i>Crataegus spp.</i>		0.1%
<b>Open Water</b>		0.0%
<b>Water With Floating/Submerged Vegetation</b>		0.0%
<b>Water with Emergent Vegetation</b>		6.0%
<b>Exposed Mineral Soil</b>		1.4%
<b>Exposed Gravel/ Cobble</b>		0.0%
<b>Exposed Rock</b>		0.0%
<b>High Water Depth (in.)</b>		
<b>Med. Water Depth (in.)</b>		
<b>Low Water Depth (in.)</b>		
<b>Vegetative Litter Cover</b>		
<b>Vegetative Litter Type</b>		
<b>Thatch Depth (in.)</b>		
<b>DWD course % cover</b>		
<b>DWD fine % cover</b>		

Soil Data (surface)			
Sample	Soil Texture	Soil Color	Description
2	fine sandy loam	10 YR 4/3	no redox features
Sample	Soil Texture	Soil Color	Description
3	dark clay	10 YR 2/1	no redox features
Sample	Soil Texture	Soil Color	Description
4	clay	2.5 Y 5/1	Gleyed colors, pockets of 5/2, shot-gray color
Sample	Soil Texture	Soil Color	Description
5	clay loam	10 YR 3/2	no redox

The soil and vegetation are consistent with a riverine bottomland situation. The area is mapped as Trinity, with a “frequent” flooding class (or about a 50% chance of flooding in any given year). The mitigation can be labeled as successful, mainly from meeting the basic requirements. The question here, though, concerns the value of mitigating a real wetland loss with mitigation in a bottomland not remotely threatened by development.



Site of the Mill Creek Mitigation Bank. 100-year FEMA floodplain overlay.



These pictures show typical landscape views of the mitigation site, January 2017.

Permit: SWG-2009-01124

Location: 29°04'16.62"N, 95°43'57.76"W

Mitigation Type: Permittee Responsible

Acres impacted: 0.4 acres

Mitigation acres required: 0.34 acres creation; 0.17 acres conservation.

Mitigation acres completed

**PERMIT BACKGROUND:** This permit was a Nationwide Permit (NWP) 14 verified for realignment of FM 524 in Brazoria County, TX. A preconstruction notice (PCN) for this permit was required because discharge occurred in wetlands. 0.4 acres of wetlands were impacted along Stevenson Slough as a result of the realignment. As compensation for the impacts, 0.17 acres of avoided wetlands will be preserved via conservation easement, and a 0.34 acre site adjacent to the avoided wetlands will be converted to wetlands. The permit was issued on February 17, 2010 and expired February 17, 2012.

The permit was verified under NWP 14 with 3 special conditions:

1. All construction of mitigation, including planting must be completed within 180 days (6 months) after the start of construction in jurisdictional areas. The permittee will notify ACOE in writing when work in jurisdictional areas begins. Monitoring and maintenance will proceed according to approved mitigation plan
2. The mitigation success criteria, per the approved mitigation plan, must be achieved for the mitigation requirement to be considered complete
3. Should mitigation be determined to be unsuccessful by ACOE at the end of the monitoring period, corrective measures must be taken to achieve mitigation success

The final permit is the last record on file in the administrative record.

**INVESTIGATION RESULTS:** An on-site assessment of the creation site was completed Fall 2016.

Summarized Vegetation Data			
Species	Status	Plot 1	
		Ht. Class	% Cover
<i>Paspalum notatum</i>	FACU	1	35.0%
<i>Iva annua</i>	FAC	2	15.0%
<i>Panicum hemitomon</i>	OBL	2	11.0%
<i>Bothriochloa ischaemum</i>	UPL (I)	2	8.0%
<i>Solidago altissima</i>	FACU	2	5.0%
<i>Melochia corchorifolia</i>	FAC (I)	1	4.0%
<i>Ampelopsis arborea</i>	FAC	1	3.0%
<i>Croton capitatus</i>	UPL	2	3.0%
<i>Cynodon dactylon</i>	UPL	1	3.0%
<i>Unknown fern</i>		1	3.0%
<i>Sesbania herbacea</i>	FACW	2	2.0%
<i>Sorghum halepense</i>	FACU (I)	2	1.0%
<i>Rubus trivialis</i>	FACU	1	1.0%
<i>Polygonon hydropeplodes</i>	OBL	1	1.0%

<i>Alternanthera philoxeroides</i>	OBL (I)	1	1.0%
<i>Andropogon glomeratus</i>	FACW	2	1.0%
<i>Cyperus entreianus</i>	FACW (I)	2	0.1%
<i>Symphotrichum subulatus</i>	OBL	1	0.1%
<i>Echinochloa muricata</i>	UPL	2	0.1%
<i>Cyperus retrorsus</i>	FACU	1	0.1%
<b>Open Water</b>		0.0%	
<b>Water With Floating/Submerged Vegetation</b>		0	
<b>Water with Emergent Vegetation</b>		0	
<b>Exposed Mineral Soil</b>		5.0%	
<b>Exposed Gravel/ Cobble</b>		0	
<b>Exposed Rock</b>		0	
<b>High Water Depth (in.)</b>		0	
<b>Med. Water Depth (in.)</b>		0	
<b>Low Water Depth (in.)</b>		0	
<b>Vegetative Litter Cover</b>		15.0%	
<b>Vegetative Litter Type</b>		Dead Graminoid	
<b>Thatch Depth (in.)</b>		0-12	

Soil Data			
Depth (in)	Soil Texture	Soil Color	Description
0-10	fine sandy loam	50% 10YR 3/2	Varigated soil bodies consistent with spoil
		50% 10YR 4/3	
10+	fine sandy loam	10YR 5/6	

\* at 6" deep calcium carbonate masses

It should be noted that the planting plan for the mitigation site included obligate wetland plants such as Pickerel weed, Canna, Arrowheads and Iris. None of this vegetation was present at the site within the vegetative plot samples.

The mitigation site was dominated by facultative and facultative upland species comprising 73% of the sampled area. Bahiagrass (*Paspalum notatum*) was the dominating species for this area, along with lesser amounts other weedy species such as *Cynodon dactylon* (Bermuda grass), *Iva annua* and several exotic species (e.g., *Melochia* and *Alternanthera*). Although obligate wetland plants were present, the percent coverage was minimal compared to the more upland areas.

At the time of the survey, hydrology was not present and hydrological were minimal at a time of the year when the site should have definite hydrological presence

Conclusion: This site cannot really be considered a successful functioning wetland. The vast majority of the plants are upland. The 11% presence of *Panicum hemitomon* (Maindencane) is an outlier, but its presence is significant, suggesting the presence of at least some hydrology.



A typical landscape view of the creation portion of the mitigation site.



Creation and avoidance mitigation areas, and impact area pre-construction (1995, Google Earth)

Permit: SWG-2010-00225

Location: 29°35'18.96N, 95°33'01.41"W

Mitigation Type: Permittee Responsible

Acres impacted: 0.02 acres

Mitigation acres Required: 0.1 acres

Mitigation acres completed: Significantly less than 0.1 acres

**PERMIT BACKGROUND:** This permit was a standard permit authorizing placement of 1,760 cubic yards of fill into 0.5 acres of jurisdictional Waters of the US for restoration of an 834 linear foot berm. The berm will be used to separate low-water flow of Stafford Run Creek from the adjoining pond. This separation was required for water quality associated with upstream water treatment facilities. A total of 0.48 acres of open waters of Stafford Run Creek and 0.02 acres of herbaceous wetlands adjacent to Stafford Run Creek were impacted. To offset impacts to 0.02 acres of herbaceous wetlands, 0.1 acres of herbaceous wetlands was required to be planted along a 5-foot wide strip on the Stafford Run Creek section of the berm. SWG-2010-00225 was approved 08/19/2010 and with an expiration date of 12/31/2015. No special conditions are associated with issuance of SWG-2010-00225.

**INVESTIGATION RESULTS:** An onsite evaluation was completed in September 2016.

Summarized Vegetation Data			
Species	Status	Ht. Class	Percent Cover
<i>Polygonum hydropiperoides</i>	OBL	2	27.0%
<i>Alternanthera philoxeroides</i>	OBL	1	10.0%
<i>Echinochloa colona</i>	FACW (I)	2	10.0%
<i>Eragrostis elliotii</i>	FACW	2	9.0%
<i>Bacopa monerii</i>	OBL	1	3.0%
<i>Echinachloa muricata</i>	UPL	2	2.0%
<i>Sphenoclea zeylanica</i>	FACW (I)	2	1.0%
<i>Leersia hexandra</i>	OBL	2	1.0%
<i>Physalis longifolia</i>	UPL	1	1.0%
<i>Cyperus esculentus</i>	FAC	2	0.1%
<i>lemna aequinoctialis</i>	OBL	1	0.1%
<i>Impatiens capensis</i>	FACW	2	0.1%
<i>Panicum spp.</i>		2	0.1%
<b>Open Water</b>			33.0%
<b>Water With Floating/Submerged Vegetation</b>			0.1%
<b>Water with Emergent Vegetation</b>			57.0%
<b>Exposed Mineral Soil</b>			0
<b>Exposed Gravel/ Cobble</b>			0
<b>Exposed Rock</b>			0
<b>High Water Depth (in.)</b>			16
<b>Med. Water Depth (in.)</b>			7
<b>Low Water Depth (in.)</b>			0
<b>Vegetative Litter Cover</b>			-
<b>Vegetative Litter Type</b>			-

Thatch Depth (in.)	-
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Soil Data			
Depth	Soil Texture	Soil Color	Description
0-4	mucky loam	2Y 3/1	
4-10	clay loam	5Y 4/2	3-4% depletion zones, few distinct redox coatings

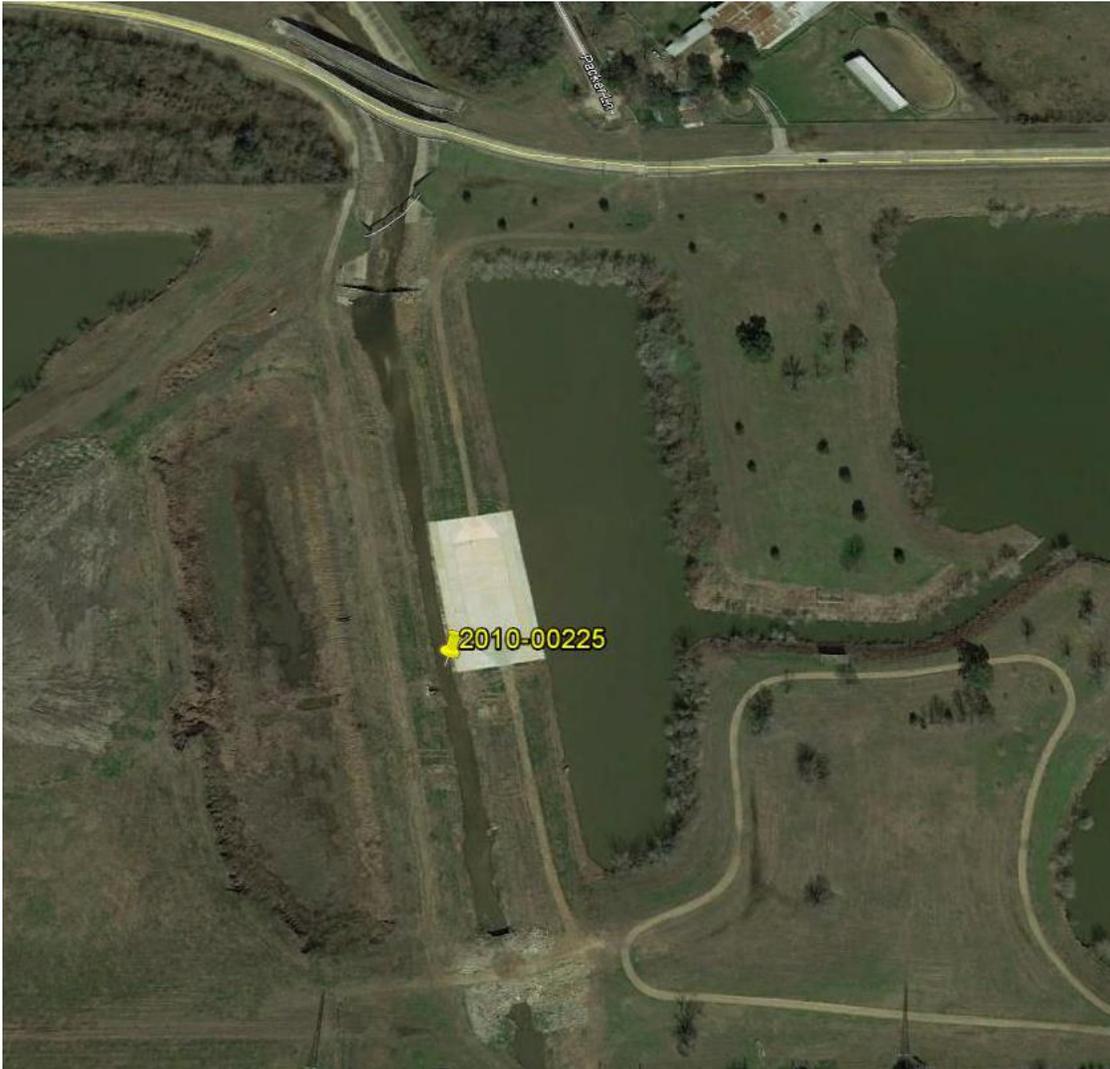


Ground view of mitigation site, October 2016



View of the site from the top of the adjacent slope, October 2016

The mitigation site was completed per the proposed plan at the site. Approximately 61% of the vegetative cover was dominated by obligate to facultative wetland plants and 33% of the site is open water, demonstrating the hydrology for the site. Additionally, the soil samples show wetland features typical of fresh water systems. This wetland mitigation site is a fringing marsh area that creeps into the open channel and runs the length of the channelized area (800 ft). It is also bordered by steep slopes on either side and a concrete weir in the middle of one side.



Google Earth aerial view of the project/mitigation site, January 2017

Although the site has obligate and facultative wetland plants, the plants present are considered opportunistic colonizing plants. For example, *Polygonum hydropiperoides* is a floating aquatic species that can root at any of the nodes, or can break off from the main plant structure and re-root on bare soil in another location. The original summary completed during a previous phase of this project indicated that 700 sprigs of *Polygonum hydropiperoides* and *Pontedaria cordata* would be planted. There is no trace of the *Pontedaria* along the channel. It seems reasonable to speculate that the current established vegetation is an outcome of opportunistic plants colonizing the mitigation site, rather than a result of the mitigation design plan. Additionally, the original planting area (or what we speculate was the planting area) is no longer 5 feet in width. The planted strip is at maximum 1 to 3 feet wide and large sections are bare with signs of heavy erosion. In contrast to the mitigation site, the pond east of the the concrete weir had more consistent wetland vegetation and wetland wildlife (i.e. herons and egrets) present. Overall, the mitigation site retains minimal characteristics as a wetland.

**Conclusion:** The site provides minimal to no ecological wetland functions, and the wetland fringe is eroding due to the flowing water.

Permit: SWG-2011-00068

Location: 29°41'12.02"N, 94°31'53.70"W

Mitigation Location: 30°11'48.78"N, 94°8'15.30"W

Mitigation Type: Conservation Easement/ Permittee Responsible.

Acres impacted: 0.52 acres

Mitigation acres Required: 11.22 acres

Mitigation acres completed:

**PERMIT BACKGROUND:** SWG-2011-00068 is a standard permit issued 08/19/2011 for authorization of impacts associated with oil exploration and potential production of a well at Oyster Bayou Oil Field, Chambers County, TX. An exploration well pad resulted in temporary impacts of 2.81 acres. When successful, the exploration well pad would be reduced to a production pad permanently impacting 0.52 acres. Compensatory mitigation for this project will be preservation of 11.22 acres of cypress-tupelo swamp and protection of a non-jurisdictional 4.705 acre upland buffer in Hardin County adjacent to the Big Thicket National Preserve. The preservation will be via donation of the parcel to the Big Thicket National Preserve. The permittee is Denbury Onshore, LLC.

**INVESTIGATION RESULTS:** An on-site assessment was completed in Winter 2017.

Vegetation Data		
Species	Wetland Status	Avg. % Cover
<i>Taxodium distichum</i>	OBL	35.0%
<i>Carpinus caroliniana</i>	FAC	14.0%
<i>Ilex opaca</i>	FAC	9.0%
<i>Liquidambar styraciflua</i>	FAC	8.0%
<i>Magnolia grandiflora</i>	FACU	4.4%
<i>Quercus laurifolia</i>	FACW	4.0%
<i>Quercus spp.</i>		2.0%
<i>Triadica sebifera</i>	FAC	1.4%
<i>Pinus taeda</i>	FAC	1.2%
<i>Carex cherokeensis</i>	FACW	0.8%
<i>Vaccinium corymbosum</i>	FACW	0.8%
<i>Quercus phellos</i>	FACW	0.8%
<i>Quercus lyrata</i>	OBL	0.4%
<i>Carex spp.</i>		0.4%
<i>Ilex vomitoria</i>	FAC	0.4%
<i>unknown bud tree</i>		0.2%
<i>Viburnum dentatum</i>	FAC	0.2%
<i>Smilax spp.</i>		0.0%
<i>Dicanthelium spp.</i>		0.0%
<i>Lygodium japonicum</i>	FAC	0.0%

<i>Commelina spp.</i>		0.0%
<i>Viola spp.</i>		0.0%
<i>Morella cerifera</i>	FAC	0.0%
<i>Prunus angustifolia</i>		0.4%
<b>Open Water</b>		31.0%
<b>Water With Floating/Submerged Vegetation</b>		0.0%
<b>Water with Emergent Vegetation</b>		7.0%
<b>Exposed Mineral Soil</b>		2.6%
<b>Exposed Gravel/ Cobble</b>		0.0%
<b>Exposed Rock</b>		0.0%
<b>High Water Depth (in.)</b>		
<b>Med. Water Depth (in.)</b>		
<b>Low Water Depth (in.)</b>		
<b>Vegetative Litter Cover</b>		
<b>Vegetative Litter Type</b>		
<b>Thatch Depth (in.)</b>		

Soil Data (surface unless otherwise noted)			
Depth	Soil Texture	Soil Color	Description
-	loam	2.5YR 2/	Saturated, no redox features
Depth	Soil Texture	Soil Color	Description
-	clay loam	10YR 4/3	no redox
Depth	Soil Texture	Soil Color	Description
-	clay loam	2.5Y 6/2	matrix color, mini (20-30%) prominent iron ped coatings
Depth	Soil Texture	Soil Color	Description
0-5"	clay loam	2.5Y 4/2	mini distinct iron pore and ped coatings
5"+	clay loam	10YR 6/2	20% 7.5 YR 4/6 masses, fine sandy loam. few pore coats

The mitigation site was clearly a swamp, where the majority of the area was covered by Cypress trees and open water (66% of the total coverage). The area showed clear hydrology, as the water made much of the area impassable by foot and would require a boat. Soil characteristics were consistent with wetland characteristics. The concern for this permit was the offsetting of impacts in a different area as well as no creation of new wetlands to compensate for the lost, impacted wetlands, nor protection of a threatened area. The donated parcel is in a deep bottomland unlike to be filled.

