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Lake Houston Mitigation Bank Prospectus swg-2019-00077



TABLE OF CONTENTS

1	Int	roduction1				
1	.1	Sponsor Contact Information1				
2	Qu	alifications of Sponsor1				
2	.1	Qualifications of Sponsor's Consultant4				
3	Go	als and Objectives5				
4	Est	tablishment and Operations6				
5	Pro	oposed Service Area7				
6	Ge	neral Need9				
7	Eco	ological Suitability12				
7	.1	Site Selection12				
7	.2	Delineation of Potential Waters of the U.S12				
7	.3	Physical Characteristics14				
7	.4	Chemical Characteristics				
7	.5	Biological Characteristics				
7	.6	Cultural Resources22				
8	Te	chnical Feasibility				
9	Lo	ng-Term Management25				
10	0 Water Rights					
11		Mineral Rights				
12	References					

LIST OF FIGURES

Figure 1 – View of severely entrenched, actively eroding Camp Branch	15
Figure 2 – View of Camp Branch East Fork at confluence with Camp Branch West Fork. Note entrenchment, active erosion, and recent sediment deposition within the channel	15
Figure 3. Representative view of upland mixed pine/hardwood found within the tract	19
Figure 4. Representative view of small wetland area near East Fork San Jacinto River	20

LIST OF TABLES

Table 1.	Sponsor and Sponsor's Agent contact information.	.1
Table 2.	Project sponsor mitigation experience.	. 3
Table 3.	LHMB Mitigation Objectives	.6
Table 4.	2010 – 2017 population growth within counties in the service area.	10
Table 5.	Competing approved mitigation banks within the service area.	11
Table 6.	Summary of Delineated Wetlands	13
Table 7.	Summary of Delineated Streams	13
Table 8.	Soil types within proposed LHMB.	17
Table 9.	TPWD Threatened and Endangered Species List for Harris and Liberty Counties.	22

LIST OF APPENDICES

- Appendix A Exhibits
- Appendix B Survey and Title Records
- Appendix C Baseline Delineations and Functional Assessments
- Appendix D Texas Natural Diversity Database Report
- Appendix E Cultural Resources Report
- Appendix F Stream and Wetland Design

1 INTRODUCTION

LH Ranch, Ltd. (LHR or Sponsor) proposes to establish the Lake Houston Mitigation Bank (LHMB or Bank) in Harris and Liberty Counties, Texas. LHMB is anticipated to provide both wetland and stream compensatory mitigation credits within the U.S. Army Corps of Engineers (USACE) Galveston District (SWG). The proposed Bank is situated on either side of FM 2100 (Huffman-Cleveland Road) and approximately 3.7 miles north of Lake Houston. The western portion of the mitigation bank is bound by the East Fork San Jacinto River, directly adjacent to the Lake Houston Wilderness Park and is within Harris County. The approximate center point of the western portion of the mitigation bank is located at 30.11828443, -95.12664702. The eastern portion of the mitigation bank contains nearly a mile of Luce Bayou and is within Liberty County. The approximate center point of the eastern portion of the mitigation bank is located at 30.12180822, -95.05316633. Reference Appendix A - Exhibits 1 and 2 for general location and tract overview maps.

1.1 SPONSOR CONTACT INFORMATION

LH Ranch, Ltd. is the Sponsor and the surface owner of the bank. Reference Appendix B for a copy of the title policy indicating current ownership and draft survey of the mitigation boundary. The Sponsor is the responsible entity for providing the necessary financial resources; the technical and scientific expertise for the design and implementation; and financial management and long-term maintenance for the Bank. The contact information for the Sponsor and primary agent are shown in Table 1.

Sponsor	Sponsor's Agent
Bill Goodrum	Neil Boitnott, PWS
LH Ranch, Ltd.	Endeavor Real Estate Group, L.P.
500 West 5th Street, Suite 700	500 West 5th Street, Suite 700
Austin, TX 78701	Austin, TX 78701
BGoodrum@ENDEAVOR-RE.com	NBoitnott@ENDEAVOR-RE.com
936-366-0800 (cell)	903-245-0592 (cell)

Table 1. Sponsor and Sponsor's Agent contact information.

2 QUALIFICATIONS OF SPONSOR

Endeavor Real Estate Group, L.P. (Endeavor) is managing the proposed Bank on behalf of LH Ranch, Ltd. Endeavor has hired Bill Goodrum and Neil Boitnott to develop and manage the Bank. Mr. Goodrum and Mr. Boitnott have been actively involved in permitting numerous mitigation banks and permittee responsible mitigation (PRM) sites in SWG as well as other USACE districts. A table of mitigation experience is provided in Table 2 below showing the numerous projects which Bill and Neil have been involved with as the owner, operator, manager, or consultant. Highlights to this experience include the recent permitting of the Houston-Conroe and Tarkington Bayou Mitigation Banks (HCMB and TBMB respectively) and Metropark PRM offset. It should be noted that these assets are owned and managed by entities no longer associated with the Sponsor or Sponsor's personnel. Houston-Conroe consists of nearly 30,000 linear feet (Lf.) of stream restoration. Construction on Houston-Conroe has been completed and verified by the USACE. The first phase of construction withstood the torrential rainfall event associated with Hurricane Harvey in 2017 and received a Bankfull credit release for meeting performance standards after this event even though construction had been completed only days before the Hurricane. The 1,400 Ac. Tarkington Bayou Mitigation bank was permitted in 2018 and consisted of a complex mitigation plan involving wetland establishment, re-establishment, restoration, and enhancement, as well as stream buffer enhancement. Construction on TBMB has also been completed. The Metropark mitigation plan includes a total of 35 Ac. of wetland establishment directly adjacent to the Houston-Conroe Mitigation Bank. These two mitigation banks, combined with the other PRM sites, have provided nearly 2,000 Ac. of restored wetlands and streams in the North Houston Area and Lake Houston watershed.

Also noteworthy are the Good Neighbor Creek and Cochran's Creek mitigation sites in Georgia. These banks were permitted and constructed under the supervision of Bill Goodrum while at Forestar. Together, those banks have restored over 50,000 LF. of streams and have successfully received multiple post-construction credit releases. CS Britton was the construction contractor and Engineering 303 was involved in the construction surveying, and as-built surveys.

	Project	Project Type	State	USACE District	Year Initiated	Status	Mitigation Type	Credits/Acres/Ft.
1	Houston/Conroe	Bank	тх	SWG	2012	Permitted & Construction Complete	Stream	109,000 Stream Credits
2	Tarkington Bayou	Bank	тх	SWG	2015	Permitted & Construction Complete	Stream & Wetland	1,100 Wetland & 17,000 Stream Credits
3	Lake Houston	Bank & PRM	тх	SWG	2018	Permtting In Progress	Stream & Wetland	132,000 Stream & 700 Wetland
4	Metropark	PRM	тх	SWG	2018	Permitted & Construction Completed	Wetland	50 Ac.
5	Cypress Slough	Bank	тх	SWG	2012	Permitted	Wetland	50 Wetland TxRAM Credits
6	Lufkin Stream	Bank	тх	SWG/SWF	2012	Property Sold (DBI Submitted/IRT Site Visit)	Stream	7,000 Ft.
7	Upper Neches	Bank	тх	SWF	2012	Property Sold (DBI Submitted/IRT Site Visit)	Stream & Wetland	TBD
8	Tonyard Creek	PRM	тх	SWF	2017	Permitted and Construction Complete	Stream	2,000 Ft.
9	Amazing Spaces	PRM	тх	SWG	2015	Permitted and Construction Complete	Wetland	5 Ac.
10	City of Texarkana	PRM	тх	SWT	2010	Permitted	Wetland	100 Ac.
11	Schuler Drilling	PRM	AR	MVK	2011	Permitted	Wetland	10 Ac.
12	Sabine Investment	PRM	ΤХ	SWF	1996	Permitted	Wetland	14 Ac.
13	Humble Independent School District PRM	PRM	тх	SWG	2005	Permitted	Wetland	50 Ac.
14	Silver Stone III	PRM	тх	SWF	2006	Permitted	Wetland	15 Ac.
15	Home Depot Lufkin	PRM	тх	SWF	2007	Permitted	Stream	5,000 Ft.
16	242-LLC	PRM	тх	SWG	2008	Permitted	Wetland	190 Ac.
17	Lufkin Garden District	PRM	ΤХ	SWF	2010	Permitted	Stream	5,600 Ft.
18	Tower Road	Bank	GA	SAS	1995	Received Final Credit Release	Stream	32,000 Stream Credits
19	Tower Road Phase II	Bank	GA	SAS	2011	Permitted	Stream & Wetland	304,000 Stream and 260 Wetland Credits
20	Good Neighbor Creek	Bank	GA	SAS	2009	Permitted Received 2nd Credit Release	Stream	462,000 Stream Credits
21	Cochran's Creek	Bank	GA	SAS	2009	Permitted Received 2nd Credit Release	Stream	235,000 Stream Credits

Table 2.	Project s	ponsor	mitigation	experience.
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2.1 QUALIFICATIONS OF SPONSOR'S CONSULTANT

The Sponsor has a history of hiring highly qualified permitting, design, and construction contractors. While the Sponsor may choose other qualified contractors, we are providing qualifications of selected contractors below. If other contractors are chosen, the Sponsor will provide their qualifications at the appropriate time.

DAVE ROSGEN, PHD

Dave Rosgen P.H., Ph.D. has agreed to provide technical review and oversight of the stream design as well as on-the-ground guidance at LHMB. Dave is a hydrologist/geomorphologist and is a Principal of Wildland Hydrology in Fort Collins, Colorado. He has field experience in river work spanning over five decades. Dave has designed and implemented over 70 large-scale river restoration projects. Dave developed a stream classification system, the BANCS streambank erosion model, the FLOWSED/POWERSED sediment transport models, the WARSSS methodology for cumulative watershed assessments, and a geomorphic approach to river restoration using a Natural Channel Design methodology. Dave utilizes his extensive experience to conduct comprehensive, hands-on courses in watershed management, river morphology, restoration, and wildland hydrology applications. Dave has also authored two textbooks and over 70 reports and articles in research journals, symposia, and federal agency manuals.

ENGINEERING 303

The staff of Engineering 303, LLC (E303) has more than 40 years combined experience in over 1,800 projects. Their client services include land surveying ("ALTA/ACSM" surveys including title examination), stream mitigation design, 303(d) jurisdictional consulting, and civil engineering construction plan design. They have designed 152,879 LF. of stream restoration in 30 different counties. To date over 75,000 Lf of these designs have been built, and they have supervised the construction of 60,330 Lf of stream restoration. Members of Engineering 303 have worked as team members with private mitigation banking and environmental assessment/permitting companies to design and supervise the construction of 16 privately held mitigation banks and 10 stream restoration/stabilization projects. They have been identifying and then directing the data collection on several "reference reach streams" for use in the ongoing and future design of stream restoration and mitigation banks in the State of Georgia.

CS BRITTON INC.

CS Britton, Inc. is a specialty stream and wetland restoration construction contractor. CS Britton, Inc. has constructed over 100,000 LF. of natural channel designed streams, including 30,000 LF. on the nearby Houston-Conroe Mitigation Bank and nearly 40,000 LF. for Bill Goodrum and Forestar Real Estate Group in Georgia. CS Britton Inc. also constructed the established and re-established wetlands on the Tarkington Bayou Mitigation Bank. The President of the company, Scott Britton has been to all levels of Rosgen stream restoration training and is actively participating as an instructor in these courses. Additionally, all primary equipment operators on the construction team have been through multiple levels of Rosgen training.

3 GOALS AND OBJECTIVES

The primary goals of the Bank are to protect the water quality of the San Jacinto system including Luce Bayou and Lake Houston (restoration at the proposed bank is anticipated to reduce sediment contribution into Lake Houston by 4,000 - 6,000 tons per year); increase flood storage and reduce pulse flows that exit the property; restore the ability to transport an amount of sediment adequate for the stream's watershed; provide habitat and refuge to wildlife; establish a dynamically stable forest both resistant and resilient to disturbance events; and to ensure the longevity and function of the system through long-term conservation measures.

Another purpose of the Bank is to provide the necessary resources to allow for compensation of authorized/unavoidable impacts to aquatic resources and meet the need for stream and wetland mitigation credits within the geographic service areas of the Bank and in areas outside the service area as approved by the USACE in coordination with the Interagency Review Team (IRT). Credits generated by the Bank will (a) reduce uncertainties on behalf of the USACE when gauging the ecological benefit and success of required mitigation; (b) decrease the time necessary to permit projects with aquatic resource impacts; and (c) reduce the strain on the limited resources of the agencies for review and compliance monitoring for non-bank mitigation credits.

These goals will be achieved by accomplishing the following objectives which are also shown on Appendix A – Exhibit 3 and Table 3:

- Place the entire 952.65 Ac. mitigation bank within a perpetual conservation easement held by an accredited land trust.
- Natural Channel Design restoration of 53,264 LF. of severely entrenched, intermittent stream channels that currently have limited access to a floodplain and are actively eroding large amounts of sediment (estimated 4,000 to 6,000 tons/yr.) into the Luce Bayou/San Jacinto/Lake Houston system.
- In-channel stream enhancement on 1,342 Lf. of severely entrenched, intermittent stream channels. Enhancement, instead of restoration, was chosen within these channels to reduce the impacts to adjacent wetlands associated with Luce Bayou floodplain.
- Note, the mitigation bank is proposed to protect over 10,000 Lf. of Luce Bayou, over 10,000 ft. of high-quality, unimpaired intermittent tributaries to Luce Bayou, and nearly 5,000 Lf. of ephemeral streams. Credit is not being requested for these streams in order to generate wetland credits within the buffer, or in the case of ephemeral streams, because they are assumed to be nonjurisdictional.
- Enhance 315.44 Ac. of stream buffers to reduce erosion and sediment contribution and increase flood storage and wildlife habitat to the restored and enhanced intermittent stream channels.
- Establishment of 150.64 Ac. of wetlands to increase flood storage, water quality, and wildlife habitat with the bank. These established wetlands consist of 73.67 Ac. of forested and 76.97 Ac. of non-forested wetland habitats.
- Restoration of 6.58 Ac. of currently isolated, non-jurisdictional wetlands, to wetlands that have restored riverine hydrology and a significant hydrologic connection with restored, intermittent stream channels.

- Enhancement of 107.75 Ac. of wetland impacted by previous silviculture operations and invasive species infestation. Enhancement will be conducted on 106.36 Ac. of forested and 1.39 Ac. of non-forested (scrub/shrub) wetland.
- Preserve 53.46 Ac. of high-quality forested wetland habitat associated with the floodplain of Luce Bayou.
- Enhance 280.07 Ac. of forested upland buffer habitat to provide additional protection for wetlands and streams within the Bank.
- Note, there ae 12.43 Ac. of stream channels (ordinary high-water mark), and 26.28 Ac. of "exclusions" where no credit is being requested for road/access corridors, constructed levees for wetland establishment, pipeline right-of-way, etc.

Resource Type	Restored	Enhanced	Created	Preserved
Streams (Lf.)	53,264	1,342	-	-
Riparian Buffer (Ac) (For Stream Credit Generation)	-	315.44	-	_
Forested Wetland (Ac.)	6.58	106.36	73.67	53.46
Non-Forested Wetland (Ac.)	-	1.39	76.97	-
Upland Buffer (Ac.) (For Wetland Credit Generation)	-	280.07	-	-

Table 3. LHMB Mitigation Objectives

4 ESTABLISHMENT AND OPERATIONS

The Sponsor will use Galveston District's Stream Condition Assessment 2013 (Galveston SOP) for evaluating all streams and associated riparian buffers within the Bank (USACE Galveston, 2013). A Level I assessment (Section 1) will be used to evaluate ephemeral and intermittent streams without perennial pools. An interim Level II assessment (Section 2) will be used to evaluate intermittent streams with perennial pools and perennial streams proposed for restoration. Following the baseline assessment, the Galveston SOP, Section 3 (Evaluating Avoidance, Minimization, Stream Restoration Projects and Compensatory Mitigation Plans), as well as reference reach data and primary literature, the restoration design provided in Appendix F was developed. The amount of credits the stream restoration plan will generate will be determined using the Galveston SOP, Section 5 (Determination of Compensation).

Galveston District's Interim Riverine Hydrogeomorphic Method (Forested and Herbaceous) (iHGM) will be used as the functional assessment/credit generation mechanism for wetlands within the Bank (USACE Galveston, 2008a) (USACE Galveston, 2008b). Specifically, the Bank will use the iHGM to assess the ecological value currently within the riparian corridors and wetlands (Baseline Condition). In order to adequately identify functional gain and ensure restorative efforts are achievable, quality reference sites will be assessed and will serve as a target for restoration activities. This ecological gain will be utilized to quantify the amount of mitigation credits the wetland bank will generate. The Mitigation Accounting System will be fundamentally based on the units of trade referred to as credits and debits. "Credits" are the accrued value of ecologic functional gain of aquatic resources associated with the development of the Bank, and "debits" are to refer to the unavoidable losses to aquatic resources from authorized impacts. As the Bank Sponsor we will create, maintain, and report a ledger of all credit/debit transactions under the oversight of the USACE. In an effort to ensure fair compensatory mitigation, all debit calculations will need to be performed using iHGM scoring to insure equality, or a USACE approved conversion.

The Sponsor shall be responsible for the management of the compensatory mitigation credit accounting system that documents all credit transactions. All credit and debit transactions will be recorded in a ledger database and submitted to the appropriate agencies (i.e. the USACE/IRT) upon sale/receipt. The ledger will include:

- Permit applicant name, address and telephone number
- Permit number
- 8-digit HUC and county locations
- Brief description of the project impacts
- Number of credits provided
- Remaining balance of Bank credits
- Date of Transaction

Permittees will use the Galveston SOP, Section 4 (Impact Assessment) to determine the amount of credits to be purchased to compensate for unavoidable impacts to WOUS (USACE Galveston, 2013) or other methodology approved by the USACE. In general, transactions will be debited at a 1:1 ratio within the primary service area and a 1.5:1 ratio within the secondary service area, however all credit requirements for permittees are established by the USACE on a project specific basis. The Bank and the Sponsor will provide credits for purchase, but it is the responsibility of the permittee to coordinate with the USACE and any other appropriate authorities to determine the number and kind of credits required for their project. The Sponsor shall provide the USACE with a copy of the completed credit transaction within 30 days of transaction. The Sponsor shall provide an annual statement of the ledger to the USACE by January 31st of each year until all credits have been withdrawn and/or the Bank is closed.

A credit release schedule will be developed after coordination with the USACE and IRT. A portion of the total credits will be released upon signing of the conservation easement and execution of the MBI as these activities have an immediate effect, whereas the remainder of the credit releases will be dependent on milestones and the achievement of the overall success criteria.

5 PROPOSED SERVICE AREA

The Sponsor is requesting the designation of the Bank as a high-quality restoration area to provide compensatory stream and wetland mitigation credits for the Lake Houston and Galveston Bay geographic areas. The Bank is located within the East Fork San Jacinto Sub-basin (8-digit HUC 12040103), which is a sub-basin of the San Jacinto Basin (6-digit HUC 120401).

The following guidelines were utilized in the designation of primary and secondary service areas. All service area designations are limited to the Galveston District of the USACE. This service area is guided

and bound first and foremost by the watershed approach, by hydrologic connectivity, and ecosystem function as supported by substantial scientific data. Similar service areas have also been recently approved on stream and wetland mitigation banks in the area. During the HCMB and TBMB permitting the hydrologic connectivity associated with the proposed primary service areas/HUCS was justified via substantial lidar and ground verification. Further, that the streams from these watersheds/HUCS flow into the same receiving waters of Lake Houston and ultimately the Upper Galveston Bay. It is noteworthy that the 73,000+ Lf. of stream restoration/enhancement and 1,500+ acres of wetland restoration/enhancement resulting from the LHMB, HCMB, and TBMB will provide water quality improvement to the receiving waters of the proposed LHMB service areas (report/evaluation available through FOIA or request). The proposed primary service area consists of the Lake Houston Watershed excluding the Western Gulf Coastal Plain Level III Ecoregion. The proposed secondary service area consists of 8-digit HUCs, or portion thereof, adjacent to the primary service area with proven hydrologic connection to the primary service area. Appendix A - Exhibit 4 illustrates the proposed service area.

The primary service area is the Lake Houston Watershed excluding the Western Gulf Coastal Plain Level III Ecoregion, which includes portions of the following sub-basins (8-digit HUCs):

- East Fork San Jacinto (8-digit HUC 12040103);
- West Fork San Jacinto (8-digit HUC 12040101);
- Spring (8-digit HUC 12040102), within South Central Plains Ecoregion.

The secondary service area includes all or portions of the following sub-basins (8-digit HUCs) adjacent to the primary service area:

• Spring (8-digit HUC 12040102), outside of South Central Plains Ecoregion;

The Geographic Service Areas were determined by utilizing first and foremost the watershed approach combined with ecological, hydrological, and finally, economic considerations for compensatory mitigation. The following is the rationale for determination of the service area for LHMB:

- A watershed approach was utilized to determine all service areas.
 - Primary Service Area flows into one common waterbody (Lake Houston).
 - Secondary Service Areas flow into the following waterbodies:
 - Lake Houston Spring (portion outside of South-Central Plains Ecoregion).
 - Significant hydrologic connectivity exists between mapped HUC boundaries within the proposed service area. See Appendix A – Exhibit 5 for examples of hydrologic connections within the service area.
 - The watershed approach was in accordance with locally developed standards and practices and existing permitted bank precedence.
- Aquatic resource restoration within the Bank will provide direct and tangible benefits to the service area.
 - LHMB will provide a substantial benefit to Luce Bayou, one of the few remaining unimpaired streams in the area and one of the few watersheds lacking a Total Maximum Daily Load (TMDL) (TCEQ, 2016)
 - LHMB will provide water quality benefits such as sediment attenuation to Luce Bayou, the San Jacinto River, and Lake Houston. Based on preliminary calculations and measurements, it's estimated that streams within the bank erode 4,000 – 6,000 tons of

sediment per year into the East Fork of the San Jacinto River or Luce Bayou and ultimately into Lake Houston. Stream restoration will substantially reduce this excessive sediment erosion.

- Wetland establishment and stream restoration will provide for additional flood storage, reducing flooding and pulse flows to Luce Bayou, the San Jacinto River and Lake Houston.
- Stream restoration and wetland establishment will provide water quality improvement and protection for Luce Bayou, East Fork of the San Jacinto as well as Lake Houston. This can mitigate the inputs from the more impacted West Fork of the San Jacinto and Spring Sub-basins.
- Proposed Service Area is based on needs within the watershed.
 - Proposed service area has experienced significant growth with limited mitigation banking options.
 - Due to credit demands within the watershed, it is anticipated many wetland/stream credits will be purchased/reserved by the time LHMB is permitted. Another mitigation bank will be necessary to avoid the use of less desirable PRM to offset permitted impacts.
 - The Bank is strategically located within a series of hydrologically connected preservation areas, thereby making the overall benefits to the watershed greater than if it were a stand-alone bank/conservation area (e.g. Lake Houston Park, TBMB, HCMB).
- Proposed service area is supported by the watershed approach analysis and is necessary for the economic viability of the bank. The economic viability is substantiated by the current demand analysis and associated geographic location of impacts, historical demand/absorption (USACE permitting database), as well as the credit sale history of the HCMB and TBMB.

6 GENERAL NEED

Given the tremendous populations growth, and associated infrastructure development in the Houston area, including large portion of the proposed service area, additional mitigation banks are necessary to meet the demand. As evidenced by the recent flooding events, it is noteworthy that in general this geographic area also possesses a higher degree of low-lying wetland areas as well as a high density of streams compared to areas of higher elevations. Counties within the proposed service area have added nearly 1-million people with an average 16% growth rate from 2010 to 2017 as seen in Table 2 (US Census Bureau, 2018). Due to this population growth, Montgomery County passed a \$280-million road bond to fund a variety of transportation projects (Mendoza, 2015), Harris County Flood Control District, 2018), and TxDOT approved \$70 Billion worth of projects in the 2017 Unified Transportation Program, over doubling the 2016 plan of \$33 Billion (TxDOT, 2016)

County	2010 Population	2017 Population	Population Change	Percent Change
Fort Bend	585,375	764,828	179,453	31%
Harris	4,092,459	4,652,980	560,521	14%
Liberty	75,643	83,658	8,015	11%
Montgomery	455,746	570,934	115,188	25%
San Jacinto	26,384	28,270	1,886	7%
Walker	67,861	72,245	4,384	6%
Waller	43,205	51,307	8,102	19%
TOTAL	5,346,673	6,224,222	877,549	16%

Table 4	2010 - 2	017 non	ulation	growth	within	counties	in the	service a	area
	2010 2	01 $p0p$	ulation	giowuii	WILIIII	counties	in the	SELVICE C	area.

There is a need for additional stream and wetland mitigation credits within the proposed service areas of the LHMB. There are 9 currently permitted mitigation banks that will compete with portions of the proposed service area as shown in Table 3 (USACE, 2018). Only three mitigation banks, Houston-Conroe, Katy Prairie Stream, and Tarkington Bayou provide stream credits within the service area. Katy Prairie stream primarily competes with the secondary service area as proposed and Tarkington Bayou has limited stream credit potential. Of the banks providing wetland credits, Blue Elbow Swamp is a TxDOT only bank, and Gin City, and Pineywoods only compete with the proposed secondary service area. Further, only TBMB provides non-forested wetland credits within the primary service area. Additional mitigation banks have been proposed, but none to the Sponsor's knowledge, provide stream or non-forested wetland credits in the primary service area while substantial infrastructure development is anticipated to deplete current supplies by the time the LHMB has permitted credits.

Bank Name	Bank Type	Sponsor	Competing Service Area	Available Wetland Credits	Withdrawn Wetland Credits	Released Credits	Potential Wetland Credits	Available Stream Credits	Withdrawn Stream Credits	Potential Stream Credits	Comments
Blue Elbow Swamp	Single-Client (DOT)	Texas Department of Transportation (TxDOT)	Primary/ Secondary	2,334	507	2,841	2,841	NA	NA	NA	
Gin City	Public (Approved)	Gin City Restoration, LLC	Secondary	423	68	491	514	NA	NA	NA	Forested
Greens Bayou	Public (Approved)	Harris County Flood Control District	Primary/ Secondary	200	112	312	456	NA	NA	NA	Forested and Non-Forested
Houston- Conroe	Public (Approved)	HCMB, LLC	Primary/ Secondary	NA	NA	NA	NA	37,277	14,824	109,820	Stream Only
Katy Prairie Stream	Public (Approved)	Prairie Creek Ventures	Primary/ Secondary	NA	NA	NA	NA	25,604	3,167	28,771	Stream Only
Mill Creek	Public (Approved)	Wetlands Conservation Partners Ltd	Primary/ Secondary	5	60	65	204	225	295	520	No Transactions since 2013.
Pineywoods	Public (Approved)	Pineywoods East Texas Investment Partners, LLC	Secondary	3,321	916	4,236	5,295	NA	NA	NA	Forested and Non-Forested
Spellbottom	Public (Approved)	Mitigation Management, LLC (Mitigation Solutions)	Primary/ Secondary	21	327	349	851	NA	NA	NA	Forested Wetland
Tarkington Bayou	Public (Approved)	Tarkington Bayou Mitigation, LLC	Primary/ Secondary	133	2	135	1,426	3,438	-	17,190	Forested and Non-Forested
*Table Based on	Table Based on RIBITS as of March 10, 2020										

Table 5. Competing approved mitigation banks within the service area.

Prospectus

7 ECOLOGICAL SUITABILITY

7.1 SITE SELECTION

The primary purpose for the purchase of this site was the development of a wetland and stream mitigation bank. This site exhibits impaired wetland and stream resources, is located in one of the fastest developing areas in the nation, and is one of the few remaining large tracts of land in close proximity to the Houston metroplex. Additionally, this site was selected due to the potential to benefit the watershed through directly benefitting the water quality, flood storage, sediment contributions, among other benefits to the East Fork of the San Jacinto River, Luce Bayou, and Lake Houston.

7.2 DELINEATION OF POTENTIAL WATERS OF THE U.S.

The proposed 952.65 Ac. mitigation bank was split into "blocks" for purposes of verifying the delineation and functional assessment. The delineation and functional assessment reports, as well as an addendum to these reports can be reference in Appendix C. The amount of delineated wetlands and streams can be referenced in Table 6 and Table 7 respectively. The Jurisdictional Determination (JD) field visit was conducted on November 12 and 13, 2019, an addendum was provided on January 14, 2020 to address items noted during the field visit, and we are awaiting the final JD.

The Block 1 (251 Ac.) Delineation and Functional Assessment was submitted on January 18, 2019 and identified 14.75 acres of potential waters of the U.S., including wetlands. This consisted of 10.90 Ac. of wetland (9.41 Ac. of forested wetland, and 1.49 Ac. of scrub/shrub wetland), and 21,809 Lf. of streams (3.85 Ac.) consisting of 19,385 Lf. (3.70 Ac.) of intermittent streams and 2,451 Lf. (0.16 Ac.) of ephemeral streams. Block 2 is the remaining 708.3 Ac. within the proposed mitigation bank and was submitted on July 2, 2019. Based on the findings of the Block 2 Delineation and Functional Assessment, there were 213.79 Ac. of potential waters of the U.S., including wetlands, located within the Block 2 Delineation Area. This consisted of 196.12 Ac. of forested wetland, and 54,121 linear feet Lf. of streams (17.67 Ac.) exhibiting an ordinary high water mark (OHWM) consisting of 2,407 Lf. (0.16 Ac.) of ephemeral streams, 41,301 Lf. (6.55 Ac.) of intermittent streams and 10,413 Lf. (10.97 Ac.) of perennial streams (Luce Bayou).

Wetland Name	Wetland Type	Acreage	Lat	Long	Description
			BLOCK 1		
Wetland 1	Forested	4.69	30.130466	-95.069304	Isolated Depression
Wetland 2a	Forested	2.80	30.126832	-95.060295	Headwater to CBE Trib 1
Wetland 2b	Scrub/Shrub	1.49	30.126251	-95.060581	Headwater to CBE Trib 1
Wetland 3	Forested	1.80	30.124860	-95.066045	Isolated Depression
Wetland 4	Forested	0.12	30.122231	-95.063033	Depression in Luce Bayou Floodplain
			BLOCK 2		
Wetland 5	Forested	69.63	30.11890	-95.12940	East Fork San Jacinto Floodplain
Wetland 6	Forested	35.66	30.11920	-95.11640	Headwater to ESFJ Trib 2
Wetland 7	Forested	7.00	30.11460	-95.11270	Headwater to ESFJ Trib 2-4
Wetland 8	Forested	82.50	30.12380	-95.05230	Luce Bayou Floodplain
Wetland 9	Forested	1.19	30.12870	-95.05450	Headwater to LB Trib
Wetland 10	Forested	0.13	30.12190	-95.04680	Depression
Subtotal	Forested	205.54			
Subtotal	Scrub/Shrub	1.49			
TOTAL	WETLAND	207.03			

Table 6. Summary of Delineated Wetlands

Table 7. Summary of Delineated Streams

Stream Type	Length	Acreage	Comments
		Block 1	
Intermittent	19,358	3.70	Camp Branch (Main Channel
	,		and East and West Forks)
Enhemeral	2 451	0.16	Various Tributaries. Assumed
Ephemeral	2,431	0.10	Non-Jurisdictional
		Block 1	
Perennial	10,413	10.97	Luce Bayou
Intermittent	41 201		Tributaries to Luce Bayou and
mermittent	41,301	0.55	East Fork San Jacinto
Finite and a real	2 407	0.10	Various Tributaries. Assumed
Ephemeral	2,407	0.16	Non-Jurisdictional
		TOTALS	
Perennial	10,413	10.97	
Intermittent	60,659	10.24	
Ephemeral	4,858	0.31	
TOTAL	75,930	21.52	

7.3 PHYSICAL CHARACTERISTICS

Elevation and Topography

The physical characteristics of the site are suitable for establishment of a wetland and stream mitigation bank. The entire site is generally flat (slopes of 0-1%) except in areas of the severely entrenched stream systems such as Camp Branch and tributaries. Elevations of approximately 50 ft. above mean sea level (MSL) occur along the western edge of the property near the East Fork of the San Jacinto River. This area of the property is within the floodplain with the 100-year elevation extending to approximately 65 ft. in elevation and the 500-year extending to an elevation of approximately 70 ft. Moving east, once leaving the floodplain of the San Jacinto, the elevation rises to 80 - 100 ft near Farm to Market (FM) Road 2100. The elevation of the mitigation bank drops to 60 - 70 ft. when nearing the severely entrenched Camp Branch system. Camp Branch flows into Luce Bayou near the southern property boundary. The elevations with the Luce Bayou system area in the 50-60 ft. range. The area around Luce Bayou and lower Camp Branch are listed as floodplain with the 100-year elevation extending to approximately 75 ft. and the 500-year elevation extending to approximately 80 ft. Reference Appendix A – Exhibit 6 for a USGS topography map and Exhibit 7 for a Light Detecting and Ranging (LiDAR) map.

Hydrology

The site is divided into two main drainage basins (Exhibit 8). The western portion of the mitigation bank drains to the East Fork of the San Jacinto River which flows south along the western property line and drains into Lake Houston, approximately 3 miles to the south. The eastern portion of the mitigation bank drains to the into Luce Bayou, either directly or through the Camp Branch tributary system. Luce Bayou flows southwest through the eastern corner of the property and flows into Lake Houston approximately 6 miles downstream. The historic drainage patterns and watersheds have been altered by a drainage ditch along the northern portion of the property. It appears this ditch is diverting a large portion of the historic watershed away from Key Gully (a stream not included in the mitigation) into Camp Branch West Fork (stream proposed for restoration within LHMB).

Camp Branch and associated tributaries (Camp Branch East Fork, Camp Branch West Fork, and multiple unnamed tributaries) were observed to be severely entrenched and lacking access to the historic floodplain (Figure 1 and Figure 2). Substantial, active erosion was also observed along these reaches. This was further confirmed by evaluations by Brian King (Engineering 303) and Dave Rosgen. **Based on preliminary calculations and measurements, it's estimated that streams within the bank erode 4,000 – 6,000 tons of sediment per year into the East Fork of the San Jacinto River or Luce Bayou and ultimately into Lake Houston. The streams observed were severely entrenched with highly erosive streambanks ranging in heights from 5 feet to 15 feet. The middle section of the East Fork of Camp Branch is the most deeply entrenched and unstable. The streams observed were either type "G5" or "F5" as described by Rosgen Classification of Natural Rivers (Rosgen, 1994). These sand bed streams are currently considered to be highly unstable erosive systems with little to no connection to their floodplains. It is E303 and Rosgen's opinion that by stabilizing these streams they will transition to gravel bed systems as the streambank erosion is reduced. Remnant gravel bed substrate can be observed in multiple locations along Camp Branch.**



Figure 1 – View of severely entrenched, actively eroding Camp Branch.



Figure 2 – View of Camp Branch East Fork at confluence with Camp Branch West Fork. Note entrenchment, active erosion, and recent sediment deposition within the channel.

Based on recent field verifications as well as the previous jurisdictional delineations, the areas proposed for wetland establishment within the Bank are lacking adequate hydrology indicators to meet the current jurisdictional wetlands criteria. As further described in the soils and vegetation subsections, hydric soils and hydrophytic vegetation are present within the majority of these areas, which justifies the proposal for wetland establishment and/or restoration. Wetland establishment and/or restoration is also supported by the previous altered watershed and associated hydrologic flow (including overbank flooding frequency).

Soils

Soils within the site are suitable for establishing a wetland and stream mitigation bank. As seen in Table 8 and Appendix A – Exhibit 9, hydric soils are present, and most are poorly drained or have poorly drained components and/or flats/depressional features (USDA, NRCS, 2014) (USDA, NRCS, 2016). The wetland establishment areas within the eastern portion of the site (Liberty County) are primarily within the Waller-Tarkington Complex 0 to 1 percent slopes, and Texla silt loam, 0 to 2 percent slopes. These soils are hydric or partially hydric and poorly drained. Field investigations further verified these hydric soils and hydrology characteristics. Soils along the stream restoration reaches within the western portion of the site (Harris County) are predominately Atasco fine sandy loam, 2 to 5 percent slopes, and Kenefick-Caneyhead frequently ponded complex, 0 to 1 percent slopes, with some areas of Bissonnet loam, 0 to 1 percent slopes. Soils along stream restoration reaches within the eastern portion of the bank (Liberty County) are predominately Atasco fine sandy loam, 2 to 5 percent slopes are conducive to stream restoration / construction. Every effort will be made to construct during appropriate times of the year to reduce erosion and damage to vegetation.

Western Block - Harris County										
Map Unit Symbol	Map Unit Name	Hydric Rating	Hydric Percent	Hydric Landform	Drainage Classification	Acreage				
AtaC	Atasco fine sandy loam, 2 to 5 percent slopes	Non- Hydric	0%	NA	Moderately well drained	27.3				
BisA	Bissonnet loam, 0 to 1 percent slopes	Hydric	90%	Flats	Poorly drained	77.9				
HatA	Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded	Partially Hydric	35%	Floodplains	Well drained (Hatliff), poorly drained (Pluck and Kian)	16.4				
KenA	Kenefick-Caneyhead frequently ponded complex, 0 to 1 percent slopes	Partially Hydric	40%	Terraces	Well drained (Kenefick) Very poorly drained (Caneyhead)	183.9				
SegB	Segno fine sandy loam, 1 to 3 percent slopes	Non- Hydric	0%	NA	Well drained	5.8				
SosA	Sorter-Tarkington complex, 01 percent slopes	Partially Hydric	60%	Flats	Poorly drained (Sorter), moderately well drained (Tarkington)	17.1				
SplB	Splendora fine sandy loam, 0 to 2 percent slopes	Partially Hydric	7%	Flats	Moderately well to somewhat poorly drained	14.0				
WesA	Westcott very fine sandy loam, 0 to 1 percent slopes	Partially Hydric	5%	Flats	Moderately well drained	9.0				
Map Unit Symbol	East Map Unit Name	ern Block Hydric Rating	- Liberty C Hydric Percent	lounty Hydric Landform	Drainage Classification	Acreage				
AtaC	Atasco fine sandy loam, 2 to 5 percent slopes	Non- Hydric	0%	NA	Moderately well drained	145.8				
BisA	Bissonnet loam, 0 to 1 percent slopes	Hydric	90%	Flats	Poorly drained	17.2				
BunD	Buna very fine sandy loam, 3 to 8 percent slopes	Non- Hydric	0%	NA	Well drained	60.8				
HatA	Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently	Partially Hydric	35%	Floodplains	Well drained (Hatliff), poorly drained (Pluck and Kian)	118.1				
LeIA	Lelavale silt loam, 0 to 1 percent slopes, ponded	Hydric	100%	Depressions	Very Poorly Drained	7.5				
OrcB	Orcadia silt loam, 0 to 2 percent slopes	Hydric	8%	Flats	Somewhat poorly drained	6.5				
SegB	Segno fine sandy loam, 1 to 3 percent slopes	Non- Hydric	0%	NA	Well Drained	0.6				
SplB	Splendora fine sandy loam, 0 to 2 percent slopes	Partially Hydric	7%	Flats	Moderately well to somewhat poorly drained	17.9				
SpuB	Spurger very fine sandy loam, 0 to 3 percent slopes	Partially Hydric	5%	Terraces	Moderately well drained	14.3				
TelB	Texla silt loam, 0 to 2 percent slopes	Partially Hydric	5%	Meanders	Somewhat poorly drained	63.9				
WatA	Waller-Tarkington complex, 0 to 1 percent slopes	Partially Hydric	65%	Flats	Poorly drained (Waller), moderately well drained (Tarkington)	114.3				
WetA	Plumgrove complex, 0 to 1 perce	rtially Hyd	10	Flats	Moderately well drained (Westcott) and somewhat poorly drained (Plumgrove)	34.4				

Table 8. Soil types within proposed LHMB.

7.4 CHEMICAL CHARACTERISTICS

There are no chemical hinderances to establishing a wetland and stream mitigation bank on the property. A Phase I Environmental Site Assessment was conducted prior to purchasing the property in 2017 and no recognized environmental conditions (RECs) were identified within the tract (SWCA Environmental Consultants, 2017).

The proposed mitigation plan will have a benefit to chemical processes within the area. Additional wetlands and restored stream systems will biogeochemically treat and filter flood waters and overland flow before entering Luce Bayou and the East Fork of the San Jacinto River. From an iHGM perspective the following variables are used in the chemical (Removal and Sequestration of Elements and Compounds) function of a wetland:

- Vdur: The % of the WAA that is flooded and/or ponded due to the hydrology (i.e. flooding overbank flow) of the adjacent waterway
- Vfreq: The frequency that the WAA is flooded and/or ponded by nearby waterway
- Vtopo: The roughness associated with the WAA
- Vcwd: Coarse Woody Debris within the WAA
- **Vwood:** Percentage of the WAA that is covered by woody vegetation
- Vdetritus: The amount of the detritus on the WAA (A horizon has to have a value of 4 or less)
- **Vredox:** The amount of the WAA that exhibits redox features an indication of the chemical exchange
- **Vsorpt:** The absorptive properties of the soils in the WAA

In either wetland establishment or enhancement, these variables will be increased, increasing the chemical functions of wetlands within the bank and watershed. Restored stream reaches, and associated wetland features will provide additional benefits to chemical processes due to improved filtration provided by oxbow wetland areas and restored stream fine and coarse woody debris, reduced stream flow velocity provided by stream sinuosity, and restored natural stream sediment transport.

7.5 BIOLOGICAL CHARACTERISTICS

Vegetation

The site is predominately a mixed pine/hardwood stand (Figure 3). Based on historical and recent aerial photographs (Appendix A – Exhibits 10-15), the site appears to have been in a similar state since the 1930's and likely before. Although the historical conditions appeared to have a much heavier component of hardwood and could be best characterized as hardwood/pine. The site has experienced some selective timber harvesting but no clear-cutting and no conversion to loblolly pine plantations. As reported in the Block 1 and Block 2 wetland delineations within the site included loblolly pine (Pinus taeda), sweetgum (Liquidambar



dominant vegetation within uplands *Figure 3. Representative view of upland mixed pine/hardwood found within the tract.*

styraciflua), white oak (Quercus alba), water oak (Quercus nigra), southern magnolia (Magnolia grandiflora), blackgum (Nyssa sylvatica), American holly (Ilex opaca), Carolina laurelcherry (Prunus caroliniana) yaupon (Ilex vomitoria), American beautyberry (Callicarpa americana), American hophornbeam (Carpinus Americana), eastern hop-hornbeam (Ostrya virginiana), Indian wood-oats (Chasmanthium latifolium), deer-tongue rosette grass (Dichanthelium clandestinum), dog-fennel (Eupatorium capillifolium), laurel-leaf greenbrier (Smilax laurifolia), fringed greenbrier (Similax bona-nox), muscadine (Vitis rotundifolia), saw-tooth blackberry (Rubus argutus), evening trumpetflower (Gelsemium sempervirens), and trumpet creeper (Campsis radicans).



Figure 4. Representative view of small wetland area near East Fork San Jacinto River.

Dominant vegetation observed within wetland areas (Figure 4) included laurel oak (Quercus laurifolia), willow oak (Quercus phellos), water oak (Quercus nigra), bottom-land post oak (Quercus similis), blackgum (Nyssa sylvatica), sweetgum (Liquidambar styraciflua), loblolly pine (Pinus taeda), Chinese tallow (Triadica sebifera), red maple (Acer rubrum), yaupon (*Ilex vomitoria*), common buttonbush (Cephalanthus occidentalis), maidencane (Panicum hemitomon), coastal plain yelloweyed grass (Xyris ambigua), southern waxy sedge (Carex glaucescens), Louisiana sedge (Carex louisianica), dwarf palmetto (Sabal minor), long-leaf

wood-oats (*Chasmanthium sessiliflorum*), giant cane (*Arundinaria gigantea*), Cherokee sedge (*Carex cherokeensis*), silver plume grass (*Saccharum alopecuroides*), trumpet creeper (*Campsis radicans*), muscadine (*Vitis rotundifolia*), and longleaf greenbriar (*Smilax laurifolia*).

Threatened and Endangered Species

Federally listed threatened or endangered species listed in the USFWS' Information for Planning and Consultation (IPaC) include the West Indian manatee (*Trichechus manatus*), least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), red-cockaded woodpecker (*Picoides borealis*), and Texas prairie dawn-flower (*Hymenoxys texana*) (USFWS, 2018a).

The West Indian manatee is a marine mammal. Critical habitat has been designated for this species, but the project is located outside critical habitat and no effects to this species are anticipated because of the proposed mitigation bank. "Manatees have large, seal-shaped bodies with paired flippers and a round, paddle-shaped tail. They are typically grey in color (color can range from black to light brown) and occasionally spotted with barnacles or colored by patches of green or red algae" (USFWS, 2018b)

LHMB does not contain nesting or foraging habitat and therefore no effects to the red-cockaded woodpecker are anticipated. The red-cockaded woodpecker nests in old-growth pine forest generally maintained by frequent, low-intensity burns to limit hardwood encroachment and to maintain an open "savannah" like habitat. Suitable foraging habitat can be younger than nesting habitat; however little to no mid-story is still required to provide an abundance of native bunchgrass and forb groundcover (USFWS, 2003).

The interior least tern, piping plover and red knot are shore birds known to winter along the Texas Gulf Coast. The site may provide stopover habitat during migration for these species, but due to the distance

from the coast and other habitat factors, would not provide nesting or breeding habitat for these species. As a result, the Bank will not have an effect on these species.

The Texas prairie dawn-flower "is a member of the aster family (Asteraceae). It is a small, single-stemmed or branching annual reaching up to 10 centimeters (3.9 inches) tall. The basal leaves are 4 to 5 millimeters (0.16-0.20 inches) broad with entire to toothed margins: the upper stem leaves are linear with entire margins. The flower heads are 4 to 6 millimeters (0.16-9.24 inches) tall, yellowish, with phyllaries partially indurate and keeled, in two series which are basally united. Flowering usually occurs in late March to early April" (USFWS, 1986). "The known sites of Hymenoxys texana are in Harris and Fort Bend Counties to the west of Houston. This region falls within the Gulf Prairies and Marshes Vegetation Area of Gould" (Young & Brown, 1989). The project site is located in the South Central Plains Level III Ecoregion in northeast Harris and northwest Liberty Counties; outside the known range of Hymenoxys texana. As a result, the Bank will not have an effect on these species.

In addition, the threatened and endangered species list provided by Texas Parks and Wildlife Department (TPWD) (Table 4) and the Texas Natural Diversity Database (TXNDD) was reviewed. The TXNDD Element Occurrence Record (see Appendix D) did not identify any listed threatened or endangered species within a 1-mile perimeter of the proposed Bank. Species identified within the same USGS Quads as the bank site (Splendora, Plum Grove, Moonshine Hill and Huffman Quads) included the Rafinesque's big-eared bat (*Corynorhinus rafinesquii* – State listed as Threatened) and bald eagle (*Haliaeetus leucocephalus* – Federally delisted and state listed as threatened).

A Rafinesque's big-eared bat roost was identified in an abandoned concrete house in the Lake Houston Wilderness Park approximately 2-miles south of the Bank. The last observation date for this site was in 1999. "Rafinesque's Big-eared Bats roost in cave entrances, hollow trees, abandoned buildings and under bridges in the forests of southeastern United States" (TPWD, 2018). No abandoned structures are present within the bank and large, hollow trees will be left undisturbed where possible. No effects to this species are anticipated as a result of the proposed Bank.

A bald eagle nest was identified on Lake Houston approximately 8-miles south of the Bank. The last observation of bald eagles at this location was in 2000 and the nest fell in 2001. No effects to this species are anticipated as a result of the proposed Bank.

The Bank will not result in any negative impacts to state or federally-listed threatened and endangered species. The Bank, as proposed, will provide a beneficial wildlife corridor, important herpetofauna/amphibian habitat, and critical resting and "stop over" habitat for neotropical migrant song birds. This beneficial wildlife corridor and habitat is further complimented and enhanced by the wildlife habitat associated with the nearby or proximate Sam Houston National Forest, the Lake Houston Wilderness Park, USFWS's Trinity River Wildlife Refuge, the Houston Conroe Mitigation Bank, and the Tarkington Bayou Mitigation Bank. Reducing sediment runoff from the Bank site will improve quality for the San Jacinto, Luce Bayou, and Lake Houston systems, benefitting aquatic organisms such as fish and mussels.

			Federal	State
Taxon	Scientific Name	Common Name	Status	Status
Amphibians	Anaxyrus houstonensis	Houston toad	LE	E
Birds	Buteo albicaudatus	White-tailed Hawk		Т
Birds	Calidris canutus rufa	Red Knot	LT	
Birds	Charadrius melodus	Piping Plover	LT	Т
Birds	Elanoides forficatus	Swallow-tailed Kite		Т
Birds	Falco peregrinus	Peregrine Falcon	DL	Т
Birds	Falco peregrinus anatum	American Peregrine Falcon	DL	Т
Birds	Falco peregrinus tundrius	Arctic Peregrine Falcon	DL	
Birds	Grus americana	Whooping Crane	LE	E
Birds	Haliaeetus leucocephalus	Bald Eagle	DL	Т
Birds	Laterallus jamaicensis	Black Rail	NL	
Birds	Mycteria americana	Wood Stork		Т
Birds	Pelecanus occidentalis	Brown Pelican	DL	
Birds	Peucaea aestivalis	Bachman's Sparrow		Т
Birds	Picoides borealis	Red-cockaded Woodpecker	LE	E
Birds	Plegadis chihi	White-faced Ibis		Т
Fishes	Erimyzon oblongus	Creek chubsucker		Т
Fishes	Polyodon spathula	Paddlefish		Т
Fishes	Pristis pectinata	Smalltooth sawfish	LE	Е
Mammals	Canis rufus	Red wolf	LE	Е
Mammals	Corynorhinus rafinesquii	Rafinesque's big-eared bat		Т
Mammals	Ursus americanus	Black bear		Т
Mammals	Ursus americanus luteolus	Louisiana black bear	DL	Т
Mollusks	Fusconaia askewi	Texas pigtoe		Т
Mollusks	Fusconaia lananensis	Triangle pigtoe		Т
Mollusks	Lampsilis satura	Sandbank pocketbook		Т
Mollusks	Pleurobema riddellii	Louisiana pigtoe		Т
Mollusks	Potamilus amphichaenus	Texas heelsplitter		Т
Plants	Hymenoxys texana	Texas prairie dawn	LE	E
Reptiles	Caretta caretta	Loggerhead sea turtle	LT	Т
Reptiles	Cemophora coccinea copei	Northern scarlet snake		Т
Reptiles	Chelonia mydas	Green sea turtle	LT	Т
Reptiles	Crotalus horridus	Timber rattlesnake		Т
Reptiles	Dermochelys coriacea	Leatherback sea turtle	LE	Е
Reptiles	Lepidochelys kempii	Kemp's Ridley sea turtle	LE	E
Reptiles	Macrochelys temminckii	Alligator snapping turtle		Т
Reptiles	Phrynosoma cornutum	Texas horned lizard		Т

Table 9. TPWD Threatened and Endangered Species List for Harris and Liberty Counties.

7.6 CULTURAL RESOURCES

SWCA Environmental Consultants performed a cultural resources survey across the entire mitigation bank site. This report is provided in Appendix E. The investigation included a cultural resources background

literature and records review, as well as an intensive pedestrian survey supplemented with shovel testing of the project area to systematically identify, record, delineate, and, if possible, determine the significance of any cultural resources located within the proposed project area of potential effect (APE). The APE is defined as any direct and/or indirect effect to historic properties listed or considered eligible for listing in the National Register of Historic Places (NRHP). The direct APE is limited to areas of potential ground disturbance which could be physically altered. The APE considered for indirect effects is generally the geographic area from which any project activity has the potential to visually diminish or alter the setting of a NRHP-listed or NRHP-eligible property (36 CFR 800.16[d]). No NRHP listed or eligible properties are recorded in the vicinity of the project and any visual impacts will be minor and temporary.

During the investigation between June and August 2019, SWCA did not identify any cultural resources within the project area. SWCA excavated a total of 264 shovel tests within the proposed project area, all of which were negative for cultural materials. In accordance with 33 CFR 325 (Appendix C) and Section 106 of the NHPA (36 CFR 800.4), SWCA has made a reasonable and good faith effort to identify historic properties within the project area. Based on the results of this investigation, SWCA recommends a finding of NO HISTORIC PROPERTIES AFFECTED (per 36 CFR 800.4[d][1]) in the project area, up to a depth of 1-m below surface.

8 TECHNICAL FEASIBILITY

There are no technical hinderances associated with the proposed restoration plan. Engineering 303, Dave Rosgen, and CS Britton have reviewed the site for design and constructability and have deemed the project suitable for stream restoration. Engineering 303, Dave Rosgen, and CS Britton have designed and constructed streams in similar, severely entrenched systems and did not identify any constructability issues. The current, recommend design plan for the severely entrenched streams is to implement a series of "oxbow plugs" strategically placed within the current stream and construct a new channel at a higher/original elevation. As a technical note, any "oxbow" wetlands that are classified as open water will not be included for credit generation. This will provide additional floodplain access and will provide additional wetland and aquatic habitat within the plugged channels, which will essentially become oxbows of the new channel.

Engineering 303's recommended design approach will be to abandon most of the existing streams and build new streams (Priority 1) at the original and proper level of the valley floors. This approach has many advantages.

- Priority 1 stream restoration provides greater connection to the floodplain and construction is less expensive and intrusive, as there is less earth moving required to reconnect the streams to the floodplain.
- Priority 1 stream restoration will raise and restore the ground water elevation, which will increase productivity of the adjacent wetlands, flats, and woodlands. Including some wetlands that currently have a greatly reduced connection to groundwater due to the adjacent entrenched streams.
- Priority 1 stream restoration will greatly reduce the sediment load in the streams on-site and downstream waterbodies such as Lake Houston. Currently the streams are eroding approximately

4,000 – 6,000 tons of sediment per year in the East Fork of the San Jacinto River, Luce Bayou and ultimately Lake Houston.

- The creation of off-line oxbow wetlands and ponds will provide a more diverse habitat for the ecosystem.
- The oxbows will provide ground water recharge and will increase base flow downstream during drought conditions.
- The oxbows will provide flood storage during extreme flooding by increasing flood storage capacity within the floodplain. This additional storage will also reduce flows and will release the stormwater runoff back to the floodplain and streams over an extended period. This region is littered with natural oxbow wetlands, backwater basins, oxbow lakes, and relic channels; this is typical of E5 streams in coastal plains.
- The oxbows will create a treatment train to reduce pollutants and the total suspended solids.

Restoration of the unnamed tributaries in the western drainage basin, which drains to the East Fork of the San Jacinto River will involve three different approaches.

- 1. The intermittent streams will be relocated and raised/restored to their historical floodplain. The old channels will be converted to oxbow wetlands creating a more diverse habitat for the ecosystem. This will also help raise and restore the water table back to its original levels. These streams will be designed as Rosgen type C or E streams with a low width-depth ratio. The C streams will be properly sized to accommodate the transition from a C stream to an E stream as the vegetation matures.
- 2. The transition zone that will connect the upland terrace to the East Fork of the San Jacinto floodplain will require the design of Rosgen type B or C streams with step pools and/or riffle pool complexes.
- 3. Finally, the restoration of the streams within the floodplain will require the design of highly sinuous Rosgen type C/E streams with low width-depth ratios. These streams will be raised back up to the original floodplain. E303 will create small depressions and oxbows to provide additional storage within the floodplain. The residential subdivision to the south drains onto the Banks site, so E303 proposes converting the toe ditch to a detention / water quality feature and will relocate the stream to the north. This feature will be designed as a wetland feature, if the soil characteristics meet the proper criteria.

The restoration of Camp Branch and its tributaries will be similar in nature to the tributaries of the East Fork of the San Jacinto River. The West Fork of Camp Branch will be resized correctly to account for the addition of water from the historical drainage ditch along the northern property boundary. Due to the severe entrenchment, the Camp Branch system (West Fork, East Fork, Main Stem, and associated tributaries) require Priority 1 restoration and will incorporate multiple oxbow and wetland features into the design.

Tributaries to Luce Bayou proposed for restoration will incorporate a combined approach of Priority 1, 2, and 4 restoration. Due to severe entrenchment, the upper reaches require Priority 1 restoration and will incorporate multiple oxbow and wetland features into the design. As the streams approach Luce Bayou and associated floodplain wetlands, more Priority 2 and/or Priority 4 restoration will be utilized. This will allow for a stable, restored stream system, while minimizing impacts to floodplain and wetland associated with Luce Bayou.

Wetland establishment will be accomplished through a combination of restoring the streams to their original flood plain elevation, construction of low-level berms and/or excavation to re-establish and enhance riverine hydrology in areas that currently exhibit hydric soils and hydrophytic vegetation but lack sufficient hydrology indicators. Due to the presence of hydric soils and hydrophytic vegetation, the landscape position of the established wetlands (broad flat / historic floodplain) and other on-site evidence such as bald cypress deadfall indicating a historically wetter hydrologic regime, the Sponsor and certified engineers believe that wetland establishment can be achieved through enhancing or re-establishing riverine hydrology. The wetlands will be sized and validated by preforming a water budget for the proposed site.

Best Management Practices (BMPs) will be employed during all construction activities associated with implementation of the mitigation plan. These BMPs will reduce impacts to local vegetation and reduce sediment runoff among other benefits. BMPs that will be employed include silt fencing, temporary and permanent seeding, mulch / straw installation, brush filter dams, off-line construction, and a variety of other techniques as determined during the design stage and by project personnel during construction.

9 LONG-TERM MANAGEMENT

The Sponsor will be responsible for the long-term management of the Bank, unless a third-party entity is established and given the authority to maintain the Bank in perpetuity through approval by the Interagency Review Team (IRT). Prior to the final credit release and in accordance with the timelines established in the final MBI, the Sponsor will establish a non-wasting endowment for supporting the long-term maintenance plan. Any expenditures must be related to the maintenance of the bank and must be approved by the USACE.

The primary long-term strategy of the Bank is self-sustainability with relatively low maintenance. This management strategy is directly linked to the development stage of the mitigation banking process, particularly in the design and establishment of the Bank. Native planting plans and increased natural flood attenuation will provide these ecological benefits with minimal routine maintenance or attention after establishment. However, if the Bank is underperforming and is not meeting the proposed performance standards, the Sponsor will provide additional management designs to address the ecological benefit. These methodologies may include prescribed burn management, riparian buffer vegetative management, or easement enforcement actions. Many of these strategies, however, will be tailored to specific disturbances to achieve optimal results. As such, Adaptive Management Plans will be derived at the time of disturbance based upon data collected at the time, and work plans will be submitted to the IRT for commentary and guidance before implementation.

10 WATER RIGHTS

The Bank Sponsor owns 100% of the groundwater rights and surface water rights subordinate to any State ownership and/or prior appropriated water rights on the property. The water rights within the State of Texas are complex as they recognize both riparian rights and prior appropriation rights. Texas Water Code, however, does provide the rights to provide in-stream flow for environmental protection (Texas Water Code, 2007) (Senate Bill No. 3, 2007). The Bank is proposing no restorative actions which will affect

the in-stream flow rights of citizens or water users downstream of the Bank. The Texas Commission on Environmental Quality (TCEQ) does reference the State's climatic conditions and states the regulations do not guarantee any user the rights to water if the waters are unavailable due to inadequate rainfall and spring flows.

11 MINERAL RIGHTS

The Sponsor does not own the mineral resources, such as oil and natural gas, which may be situated beneath the Bank. In the State of Texas, surface owners cannot control a mineral owner's access to subsurface minerals. Based on decades of historical evidence, it is unlikely that any drilling will occur within the Bank in the near future. The same family has owned the minerals since 1947 (SS McClendon), have not accessed the minerals since 1947 to our knowledge, and there are no active leases of the minerals within the bank. See the Mineral Ownership Report provided in Appendix B. Surface impacts to the bank could be avoided by utilization of slant and/or horizontal drilling technologies. With these technologies, combined with the narrow corridor attributes of the mitigation bank, drilling pads can be strategically placed in uplands outside of the bank and minerals such as oil and natural gas can still be extracted from under the Bank. If necessary/required, drilling locations and access of adequate size and number will be identified/established within the Bank boundary and not included in the credit generation calculations. Further, these locations will be located in non-wetland areas such as upland buffers.

The exploration for, and production and transportation of, subsurface mineral resources beneath the Bank is acceptable provided: ground disturbing activities and surface alterations are minimized to the maximum extent practicable; activities are conducted in a manner that minimizes adverse environmental impacts; impacted areas are restored to pre-existing conditions as soon as practicable; reasonable and appropriate compensatory mitigation is achieved; and the entity conducting the activities complies with all applicable regulatory requirements, including Section 404 of the Clean Water Act (CWA). The number of credits in the Bank may be reduced depending on the extent and location of adverse impacts associated with mineral extraction activities. The appropriate compensatory action will be subject to approval by the USACE.

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APPENDIX A - EXHIBITS


































APPENDIX B – SURVEY AND TITLE RECORDS













Limited Title Mineral Ownership Report

Project Name: Lake Houston

County: Harris & Liberty

State: Texas

Client: Endeavor Real Estate Group

Tract acreage amount: 3,683.1 acres

Survey Name, Sec. No. & Abs. No.: Mary Magruder Survey, Abstract 530, in Harris County & Abstract 311, in Liberty County

Tract 1: 3,625 acres of land, more or less, being all of the Mary Magruder Survey, Less and Except 200.0 acres off the Northwest corner of said Abstract in Harris and Liberty Counties, Texas, the 3625 acres described in Mineral Deed dated August 7, 1963, between S.S. McClendon, Jr, as Grantor, and Sidney S. McClendon, III, Trustee, as Grantee, recorded under File# D714952, Deed Records of Harris County, Texas, also known as, 3,683.1 acres further described by metes & bounds description in First American Title Insurance Company's Commitment for Title Insurance, effective January 28, 2020, GF No. 202000183 (see Exhibit "A" attached).

Source Deed Reference: File No. D71452, Deed Records, Harris County, Texas.

Mineral Owner(s)	Frac	tional Interest	Net Acres
1. S.S. McClendon Family, LLC		1.0	3,683.1 acres
	TOTAL	1.0	3.683.1 acres

Title run through (beg. & end dates): 1/1/1900 – March 5, 2020

Surface Owner: LH Ranch, Ltd

Oil & Gas Lease Information: No current oil & gas lease found filed of record.

Liens/Deed of Trust: Not included in the scope of research.

Location Plats: See attached Exhibit "A"

Comments & Footnotes: None

Landman's name: Randall Brooks

Date: March 6, 2020

FRAZIER OIL PROPERTIES, L.L.C.



EXHIBIT "A"

LIMITED TITLE RUNSHEET Endeavor Real Estate Group - 3,625 Acres, Mary Magruder Survey, A-530 and A-311 Harris and Liberty Counties, Texas

-	Comments	Conveys ARTI being an undivided 1/3rd interest in all property held jointly with Grantees in Liberty Co. TX	Conveys ARTI being an undivided 1/4th interest in 3856 acres being the entire Mary Magruder Survey	Conveys 200 acres off the NW corner of the Mary Magruder Survey. NMR	Conveys ARTI being an undivided 1/3rd interest in all property held jointly with Grantees in Liberty Co. TX	Conveys ARTI inherited under the will of J.H.B. House Estate	Conveys ARTI in 3856 acres being the entire Mary Magruder Survey, Less & Except 200 acres off the NW corner sold to G.R. Scott ref(55/607) Harris Co. TX.	Conveys 3656 acres in I/lary Magruder Survey. RESERVE: 97/98ths of OGM and 100% of the executive rights.	Conveys ARTI in 3625 acres in Mary Magruder Survey being the same land conveyed in (762/253)	Conveys an undivided 1/64th interest as royalty on 1728 acres being out of the Western portion of the Mary Magruder Survey. Perpetual 1/64th NPRI.	Died 3/28/1938 in Travis Co. TX. Devises rest and residue of estate to Mona House Tucker & Janet House Auchincloss as Executors & Trustees of estate.	Conveys 3625 acres in Mary Magruder Survey being the entire survey Less and Except 200 acres sold to G.R. Scott, ref(117/370). RESERVE: 3/64th perpetual royalty interest & executive rights for period of 15 years and as long as producing.	Conveys undivided 1/20 interest owned by Grantors being 1/20th of 3/64th Royalty reserved in 259/404.	Conveys undivided royalty interest of 1/64th in and to 3625 acres in Mary Magruder Survey.	Conveys 3625 acres in Mary Magruder Survey being the entire survey Less and Except 200 acres sold to G.R. Scott, ref(117/370). Ref(259/404) NMR.	Conveys 3625 acres in Mary Magruder Survey, ref(309/553). RESERVE: all OGM.	Conveys al OGM in and under 3625 acres in Mary Magruder Survey, ref(322/523).	Conveys al OGM in and under Tract 9- 3625 acres in Mary Magruder Survey, ref#D714952).
	County Recorded	Liberty	Harris	Harris	Liberty	Liberty	Liberty Harris	Harris	Harris Liberty	Harris	Harris	Liberty	Liberty Harris	Harris	Liberty	Harris Liberty	Harris	Harris Liberty
	Type Record	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	OPR
	Vol./Pg. or File No.	P/429	97/630	117/370	5/520	18/286	13/182 175/293	762/253	882/81 116/293	973/732	1162/592	259/404	259/608A 3047/492	1302/207	309/553	2010/486 322/523	D714952	#2013-0017739 #2013-000413
	Filing Date	5/18/1896	5/5/1897	1/2/1900	5/12/1903	10/3/1906	6/30/1905	7/11/1928	7/13/1931	4/8/1935	4/16/1940	5/12/1943	6/25/1943	10/8/1943	11/20/1948	12/6/1949	10/15/1972	1/14/2013
	Instrument Date	4/17/1896	5/4/1897	1/2/1900	4/16/1503	4/26/1905	5/17/1505	3/29/1928	7/13/1931	3/27/1935	6/1/1936	5/5/1943	6/9/1943	10/8/1943	12/5/1947	11/9/1949	8/7/1963	12/31/2012
	Type Document	MD	ДM	Deed	QCD	QCD	СМ	WE/VL	MD	Mineral Deed	CC Probate	ДM	Royalty Deed	Mineral Deed	ШM	MD	Mineral Deed	MIneral and Royalty Deed of Gift and Trust Distribution
	Grantee	J.H.B. House & T.W. House	J.H.B. House & T.W. House	George R. Scott	J.H.B. House & T.W. House	T.W. House	E.M. House	Herman Hale	E.M. House	Deane Gill	Public	Hahl Development Company	Edward M. House II	Carroll A. Lewis et al	S.S. McClendon, Jr	Minor Bradshaw et al	Sidney S. McClendon, III, Trustee	S.S. McClendon Family, LLC,
	Grantor	E.M. House	B.W. Camp Executor of C.S. House Estate, Mary E. House & Katherine Camp, sole surviving heirs of C.S. House	J.H.B. House & T.W. House	E.M. House	E.M. House	T.W. House, Individually & Executor of J.H.B. House estate.	E.M. House	Herman Hale	E.M. House	Estate of E.M. House	Janet House Auchincloss & Mona House Tucker, Trustees & Executors of Edward M. House & Loulie Hunter House, both deceased and individually	Janet House Auchincloss & Mona House Tucker, Trustees & Executors of Edward M. House & Loulie Hunter House, toth deceased and individually	Hahl Development Company	Hahl Development Company	S.S. McClendon, Jr.	S.S. McClendon, Jr.	Caryl W. McClendon, Successor Trustee of the S.S. McClendon, Jr. Trust et al
	Doc. No.	~	7	ę	7	5	9	7	80	თ	C1	7	5	13	14	15	15	17

Frazier Oil Properties, LLC March 6, 2020 APPENDIX C – BASELINE DELINEATIONS AND FUNCTIONAL ASSESSMENTS



January 13, 2020

Kevin Mannie Regulatory Project Manager USACE Galveston District 2000 Fort Point Road Galveston, TX 77553-1229 Kevin.S.Mannie@usace.army.mil

Reference: Addendum 1 - Lake Houston Mitigation Bank (SWG-2019-00077) Delineation and Functional Assessment

Dear Mr. Mannie,

On behalf of the bank sponsor, LH Ranch, Ltd., we are pleased to submit Addendum 1 to the delineation and functional assessment reports for the Lake Houston Mitigation Bank (SWG-2019-00077). The proposed ~950-acre (Ac.) mitigation bank was split into "blocks" for purposes of verifying the delineation and functional assessment. The Block 1 (251 Ac.) Delineation and Functional Assessment was submitted on January 18, 2019. Block 2 is the remaining 708.3 Ac. within the proposed mitigation bank and was submitted for verification on July 2, 2019. During and after our verification site visit covering both Block 1 and Block 2 on November 11 and 12, 2019, you made requests to provide unique identification to discrete areas making up components of one overall wetland assessment area (WAA). For example, in certain circumstances one WAA is comprised of multiple, non-contiguous wetland areas that are of the same habitat. Each non-contiguous wetland area was given a unique identifier but remained part of the original overall WAA. See below in Table 1 and Table 2 for updated Wetland and WAA identifiers for Block 1 and Block 2 respectively. Updated delineation and functional assessment maps are also attached.

Additionally, a minor discrepancy in the acreages was discovered when processing the individual WAA data for Block 2. The overall WAA acreages and associated iHGM functional capacity units for WAA 8 and WAA 9 was updated and provided in Table 3.

Please feel free to contact me at NBoitnott@ENDEAVOR-RE.com or 903-245-0592 or Bill Goodrum at BGoodrum@ENDEAVOR-RE.com or 936-366-0800 to discuss this matter. We appreciate your time and efforts on this project.

Sincerely

Neil Boitnot

Neil Boitnott Project Manager Endeavor Real Estate Group, L.P.

CC:

Bill Goodrum, Chris Ellis, Brad Davis and Megan Wanek- Endeavor Real Estate Group, L.P.

	1		General WAA		Specific WAA		
Wetland Type	Wetland	General WAA	Acreage	Specific WAA	Acreage	X Coordinate	Y Coordinate
			Block	< 1			
Forested	Wetland 1	WAA 1	4.69	WAA 1	4.69	30.130466	-95.069304
Forested	Wetland 2a-2	WAA 2a	2.32	WAA 2a-2	2.32	30.125725	-95.061417
Forested	Wetland 2a-1	WAA 2a	0.49	WAA 2a-1	0.49	30.126832	-95.060295
Scrub/Shrub	Wetland 2b-1	WAA 2b	1.49	WAA 2b-1	1.49	30.126251	-95.060581
Forested	Wetland 3	WAA 3a	1.10	WAA 3a	1.10	30.124983	-95.065597
Forested	Wetland 3	WAA 3b	0.70	WAA 3b	0.70	30.124860	-95.066045
Forested	Wetland 4	WAA 4	0.12	WAA 4	0.12	30.122231	-95.063033

Tahle 1	Block 1 u	ndated	wetland	and	$M/\Delta\Delta$	identi	fiers
TUDIE 1.	DIUCKIU	puuleu	wellullu	unu	WAA	iueniij	iers.

			General WAA		Specific WAA		
Wetland Type	Wetland	General WAA	Acreage	Specific WAA	Acreage	X Coordinate	Y Coordinate
			Bloc	k 2			
Forested	Wetland 5			WAA 5a-1	1.53	30.121653	-95.130716
Forested	Wetland 5			WAA 5a-2	8.55	30.118547	-95.131172
Forested	Wetland 5			WAA 5a-3	2.30	30.119264	-95.129339
Forested	Wetland 5			WAA 5a-4	0.39	30.120651	-95.127890
Forested	Wetland 5	W/A A 50	28.85	WAA 5a-5	0.99	30.119826	-95.123021
Forested	Wetland 5	WAA Ja	36.65	WAA 5a-6	0.70	30.117116	-95.133756
Forested	Wetland 5			WAA 5a-7	6.15	30.117348	-95.129751
Forested	Wetland 5			WAA 5a-8	5.64	30.118087	-95.126850
Forested	Wetland 5			WAA 5a-9	6.47	30.114667	-95.136359
Forested	Wetland 5			WAA 5a-10	6.11	30.114702	-95.132752
Forested	Wetland 5			WAA 5b-1	8.29	30.122085	-95.129704
Forested	Wetland 5			WAA 5b-2	1.46	30.122596	-95.127355
Forested	Wetland 5	WAA 5b	13.59	WAA 5b-3	2.16	30.119456	-95.128311
Forested	Wetland 5	_		WAA 5b-4	1.20	30.118613	-95.130129
Forested	Wetland 5	_		WAA 5b-5	0.48	30.114748	-95.132341
Forested	Wetland 5		17.00	WAA 5c-1	7.75	30.122396	-95.126279
Forested	Wetland 5	WAA 5C	17.20	WAA 5c-2	9.46	30.119550	-95.124789
Forested	Wetland 6	WAA 6	35.66	WAA 6	35.66	30.119187	-95.116431
Forested	Wetland 7	WAA 7	7.00	WAA 7	7.00	30.114614	-95.112666
Forested	Wetland 8			WAA 8a-1	0.47	30.131557	-95.044901
Forested	Wetland 8	_		WAA 8a-2	16.30	30.128798	-95.047154
Forested	Wetland 8	_		WAA 8a-3	0.97	30.130063	-95.045369
Forested	Wetland 8			WAA 8a-4	0.56	30.130038	-95.045097
Forested	Wetland 8	WAA 8a	76.73	WAA 8a-5	0.23	30.128282	-95.045302
Forested	Wetland 8	_		WAA 8a-6	0.18	30.126530	-95.047569
Forested	Wetland 8	—		WAA 8a-7	4.07	30.126184	-95.046757
Forested	Wetland 8	_		WAA 8a-8	32.32	30.121613	-95.056099
Forested	Wetland 8	_		WAA 8a-9	21.64	30.121636	-95.053341
Forested	Wetland 8			WAA 8b-1	2.18	30.129785	-95.045141
Forested	Wetland 8			WAA 8b-2	0.44	30.127864	-95.045477
Forested	Wetland 8			WAA 8b-3	0.24	30.127550	-95.044796
Forested	Wetland 8			WAA 8b-4	0.27	30.126381	-95.046666
Forested	Wetland 8			WAA 8b-5	0.39	30.125853	-95.048802
Forested	Wetland 8			WAA 8b-6	0.23	30.125532	-95.048284
Forested	Wetland 8			WAA 8b-7	0.92	30.124658	-95.052400
Forested	Wetland 8			WAA 8b-8	0.04	30.124449	-95.049158
Forested	Wetland 8	WAA 8b	5.77	WAA 8b-9	0.04	30.123403	-95.053704
Forested	Wetland 8	-		WAA 8b-10	0.14	30.122955	-95.054344
Forested	Wetland 8	-		WAA 8b-11	0.26	30.122200	-95.054982
Forested	Wetland 8			WAA 8b-12	0.23	30.121314	-95.054695
Forested	Wetland 8	-		WAA 8b-13	0.10	30.119782	-95.055360
Forested	Wetland 8	_		WAA 8b-14	0.05	30.119683	-95.056453
Forested	Wetland 8	-		WAA 8b-15	0.18	30.119314	-95.057505
Forested	Wetland 8	-		WAA 8b-16	0.02	30,119025	-95.056101
Forested	Wetland 8	-		WAA 8b-17	0.05	30,118662	-95,057288
Forested	Wetland 9	WAA 9	1.19	WAA 9	1.19	30,128751	-95.054485
Forested	Wetland 10	WAA 10	0.13	WAA 10	0.13	30,121948	-95.046824
			0.10		0.15	30.121J-0	55.0 4 0024

Table 2. Block 2 updated wetland and WAA identifiers.

WAA	WAA 5a	WAA 5b	WAA 5c	WAA 6	WAA 7	WAA 8a	WAA 8b	WAA 9	WAA 10
HGM Plots	09, 10, 11, 12, 13, 14, 020, and 023	08, 021, 024, 025, and 026	022, 027, and 029	15, 16, 17, 18, and 19	028	030, 031, 033, 034, 036, 039, 041, 042, 043, and 044	032, 035, and 040	037	038
Landform	Floodplain	Floodplain	Depressions in Floodplain	Headwater Depression	Headwater Depression	Floodplain	Depressions & Sloughs in Floodplain	Headwater Flat	Depression
HGM Class	Forested	Forested	Forested	Forested	Fores ted	Forested	Forested	Forested	Forested
Vdur	0.75	1.00	1.00	1.00	0.75	0.75	1.00	1.00	0.50
Vfreq	0.75	1.00	1.00	1.00	0.75	1.00	1.00	1.00	0.50
Vtopo	0.70	0.70	0.40	0.40	0.40	0.70	0.40	0.70	0.40
Vcwd	0.50	0.50	0.50	1.00	0.50	0.50	0.30	1.00	0.50
Vwood	0.50	1.00	1.00	0.50	0.50	1.00	1.00	0.50	1.00
Vtree	0.50	0.80	0.50	0.80	0.80	0.80	0.80	0.30	0.80
Vrich	0.40	1.00	0.80	0.60	0.40	0.80	0.60	0.40	0.40
Vbasal	0.40	0.80	0.60	0.40	0.40	0.80	1.00	0.40	0.80
Vdensity	1.00	0.60	0.60	1.00	1.00	1.00	1.00	1.00	0.60
Vmid	0.50	0.75	0.75	0.25	0.50	0.75	0.75	0.25	0.75
Vherb	0.30	1.00	1.00	0.30	0.30	0.50	0.50	0.30	1.00
Vdetritus	0.50	1.00	1.00	0.50	0.50	1.00	1.00	0.50	1.00
Vredox	0.10	0.10	1.00	0.10	0.10	1.00	1.00	0.10	1.00
Vsorpt	0.50	0.50	0.50	0.50	0.50	1.00	0.50	0.50	1.00
Vconnect	0.75	0.75	0.75	1.00	0.50	0.75	0.75	0.50	0.50
MSQST	0.65	0.86	0.80	0.80	0.59	0.80	0.75	0.86	0.56
MPAC	0.54	0.77	0.67	0.73	0.55	0.73	0.68	0.53	0.63
RSEC	0.59	0.85	0.89	0.70	0.57	0.90	0.88	0.72	0.73
WAA Acreage	38.85	13.59	17.20	35.66	7.00	76.73	5.77	1.19	0.13
TSDSW Units	25.32	11.63	13.69	28.38	4.14	61.15	4.35	1.02	0.07
MPAC Units	21.04	10.47	11.54	26.00	3.85	55.95	3.92	0.63	0.08
RSEC Units	22.79	11.59	15.37	24.96	3.97	68.80	5.08	0.86	0.10

Table 3. Updated Block 2 iHGM summary.

BLOCK 1 EXHIBITS



Document Path: E:\Dropbox (Lake Houston)\Lake Houston Team Folder\Nitigation\Data\GIS\WXD\UD\Report Maps\Block 1\7-9 - JD Maps - New.mxd LHMB Delineation and Functional Assessment - Addendum 1 (SWG-2019-00077)

Page 6 of 13





Page 8 of 13



Page 9 of 13

BLOCK 2 EXHIBITS



LHMB Delineation and Functional Assessment - Addendum 1 (SWG-2019-00077)



LHMB Delineation and Functional Assessment - Addendum 1 (SWG-2019-00077)

Page 12 of 13


1/17/2019

Lake Houston Mitigation Bank

Waters of the U.S. Delineation and Functional Assessment– Block 1



TABLE OF CONTENTS

1	Intro	oduction	1
2	Site	overview	2
	2.1	General Site Overview	2
	2.2	Site Geology	2
	2.3	Site Soils	2
	2.4	Site Elevation and topography	3
	2.5	Site Hydrology	3
	2.6	Site Vegetation	4
3	Met	hods	4
	3.1	Wetland Delineation Methods	5
	3.2	Stream and Open Water Delineation Methods	5
	3.3	Wetland Functional Assessment (iGHM) Methods	6
	3.4	Stream Functional Assessment Methods	7
4	Resu	ults: Determination/Delineation of Waters of the U.S., Including Wetlands	7
	4.1	Delineation Results – Wetlands	9
	4.1.:	1 Wetland Delineation Results – Soils1	2
	4.1.2	2 Wetland Delineation Results – Vegetation1	2
	4.1.3	3 Wetland Delineation Results - Hydrology1	4
	4.2	Delineation Results - Streams1	5
5	Resu	ults: Functional Assessment of Wetlands and Streams1	7
	5.1	Wetland iHGM Analysis Results1	7
	5.2	Stream Functional Assessment Results2	0
6	Refe	erences	7

LIST OF FIGURES

Figure 1.	Portion of Cam	p Branch System	ndrv during sumr	mer (July 2018)	

LIST OF TABLES

Table 1. Sponsor and Sponsor's Agent contact information.	1
Table 2. Mapped soil types within the Block 1 Delineation Area.	3
Table 3. Precipitation data from Houston Intercontinental Airport	9
Table 4. Summary of Delineated Wetlands	10
Table 5. Summary of Recorded Delineation Data Points	11
Table 6. Summary of streams identified within the Block 1 Delineation Area.	15
Table 7. Summary of Wetland iHGM Analysis.	17
Table 8. Results of stream functional assessment	21

LIST OF APPENDICES

Appendix A – Exhibits

Exhibit 1 – Project Location Map
Exhibit 2 – Tract Overview Map
Exhibit 3 – Geology Map
Exhibit 4 – Soils Map
Exhibit 5 – Topographic Map
Exhibit 6 – LiDAR Map
Exhibit 7a – Delineation Map – 2018 Aerial North
Exhibit 7b – Delineation Map – 2018 Aerial South
Exhibit 8a – Delineation Map – 1996 Aerial North
Exhibit 8b – Delineation Map – 1996 Aerial South
Exhibit 9a – Delineation Map – LiDAR North
Exhibit 9a – Delineation Map – LiDAR South
Exhibit 10a – Functional Assessment Map – 2018 Aerial North
Exhibit 10b – Functional Assessment Map – 2018 Aerial South

- Appendix B GPS Documentation
- Appendix C Wetland Delineation Data Forms and Photos
- Appendix D Wetland iHGM Data Sheets
- Appendix E Stream Data Sheets
- Appendix F Previous Jurisdictional Determination Documentation

EXECUTIVE SUMMARY

Endeavor Real Estate Group, LP employees Neil Boitnott and Bill Goodrum performed a determination and delineation of potential waters of the U.S., including wetlands, on an approximate 251-acre delineation block (Block 1) for purposes of establishing a mitigation bank. The primary purpose of this investigation is to identify and delineate all potential waters of the U.S., including wetlands, occurring within the 251-acre delineation area. Further, the 251-acre delineation area is intended to be a portion of the approximate 900-acre Lake Houston Mitigation Bank (LHMB). A draft prospectus for the LHMB was submitted to the USACE Galveston District in October 2018 and is awaiting a USACE project number.

Based on our findings, there are 14.75 acres of potential waters of the U.S., including wetlands, located within the Block 1 Delineation Area. This consists of 10.90 acres of wetland (9.41 acres of forested wetland, and 1.49 acres of scrub/shrub wetland), and 21,809 linear feet (Lf.) of streams (3.85 Ac.) (19,385 Lf. (3.70 acres) of intermittent streams and 2,451 Lf. (0.16 acres) of ephemeral streams.

1 INTRODUCTION

Endeavor Real Estate Group, LP (Endeavor) employees Neil Boitnott and Bill Goodrum performed a determination and delineation of potential waters of the U.S., including wetlands, on an approximate 251acre (Ac.) delineation block (Block 1) for purposes of establishing a mitigation bank referred to Lake Houston Mitigation Bank (LHMB). At the request of USACE personnel, the proposed mitigation bank has been split into "Blocks" for purposes of verifying the delineation. This is the first of three blocks that will cover the proposed LHMB. The primary purpose of this investigation is to identify and delineate all potential waters of the U.S., including wetlands, occurring within the 251 Ac. delineation block (Block 1).

LH Ranch, Ltd. (LHR or Sponsor) proposes to establish the Lake Houston Mitigation Bank (LHMB or Bank) in Harris and Liberty Counties, Texas. Endeavor is managing the proposed Bank on behalf of LH Ranch, Ltd. LHMB is anticipated to provide both wetland and stream compensatory mitigation credits with the U.S. Army Corps of Engineers (USACE) Galveston District (SWG). The proposed Bank is situated within a 3,683.5 Acre (Ac.) parent tract located on either side of FM 2100 (Huffman-Cleveland Road) and approximately 3.7 miles north of Lake Houston. The western half of the parent tract is bound by the East Fork San Jacinto River, directly adjacent to the Lake Houston Wilderness Park and is within Harris County. The eastern portion of the property contains nearly a mile of Luce Bayou and is within Liberty County. The approximate center point of the property is located at 30.12340, -95.09000. Reference Appendix A - Exhibits 1 and 2 for general location and tract overview maps. The contact information for the Sponsor and primary agent are shown in Table 1.

Sponsor	Sponsor's Agent
Bill Goodrum	Neil Boitnott, PWS
LH Ranch, Ltd.	Endeavor Real Estate Group, L.P.
500 West 5th Street, Suite 700	500 West 5th Street, Suite 700
Austin, TX 78701	Austin, TX 78701
BGoodrum@ENDEAVOR-RE.com	NBoitnott@ENDEAVOR-RE.com
936-366-0800 (cell)	903-245-0592 (cell)

Table 1.	Sponsor and	Sponsor's	Agent contact	information.
		-	-	

2 SITE OVERVIEW

2.1 GENERAL SITE OVERVIEW

The parent tract encompasses approximately 3,683.5 Ac. located on either side of FM 2100 (Huffman-Cleveland Road) and approximately 3.7 miles north of Lake Houston. The western half of the parent tract is bound by the East Fork San Jacinto River, directly adjacent to the Lake Houston Wilderness Park and is within Harris County. The eastern portion of the property contains nearly a mile of Luce Bayou and is within Liberty County. The approximate center point of the property is located at 30.12340, -95.09000. The majority of the parent tract remains undeveloped and is currently managed for timber production. Approximately five percent of the parent tract is non-forested including natural herbaceous depressions, unimproved roads, and pipeline rights-of-way. Furthermore, the entire parent tract is located within the East Fork San Jacinto watershed (Hydrologic Unit Code 12040103). The Block 1 Delineation Area is located in the eastern third of the parent tract, where a pipeline right-of-way serves as the eastern boundary of the delineation block.

2.2 SITE GEOLOGY

According to the Geologic Atlas of Texas map (Beaumont sheet), the central portion of the parent tract, including much of the Block 1 Delineation Area, lies in an outcrop area of the Lissie Formation along a north-south trending ridge dividing the East Fork San Jacinto River and Luce Bayou (Exhibit 3). The western and eastern portions of the Parent Tract are within the Beaumont Formation. It should be noted that although portions of the Block 1 Delineation Area lie within the Lissie Formation it does not lie within the MLRA boundary for the A16 indicator (MLRA 150A) therefore, the Coastal Prairie Redox (A16) hydric soil indicator was not used even for areas occurring within the Lissie Formation.

2.3 SITE SOILS

In general, the site can be described as Mima Mound complex (Nature Serve classification) consisting of a mosaic of terrace/mound/inter-mound/flats landscape. Traversing this Mima Mound complex are perennial, intermittent, and ephemeral streams and their associated flood terrace soil types. In general, the inter-mound and flats are hydric or poorly drained, while the mounds and stream terrace areas are moderate to well drained loams and fine sandy loam soil types.

The NRCS national soil survey GIS data and NRCS soil survey for Liberty County characterizes and describes the mapped soils present within the site (NRCS, 1996) (USDA, NRCS, 2016). Reference Appendix A – Exhibit 4 for a soils map and Table 2 for a summary of mapped soil types. The Wetland Results section of this report as well as the Wetland Determination Data Forms describe in detail the soils on the project site but the following general soil types are shown in the NRCS soil surveys for the site: Atasco fine sandy loam, 2 to 5 percent slope; Bissonnet loam, 0 to 1 percent slopes; Buna very fine sandy loam, 3 to 8 percent slopes; Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded; Lelavale silt loam, 0 to 1 percent slopes; ponded; Splendora fine sandy loam, 0 to 2 percent slopes; Waller-Tarkington Complex 0 to 1 percent slopes; and Westcott-Plumgrove complex, 0 to 1 percent slopes.

Map Unit Symbol	Map Unit Name	Hydric Rating	Hydric Percent	Hydric Landform	Drainage Classification
AtaC	Atasco fine sandy loam, 2 to 5 percent slopes	Non- Hydric	0%	NA	Moderately well drained
BisA	Bissonnet loam, 0 to 1 percent slopes	Hydric	90%	Flats	Poorly drained
BunD	Buna very fine sandy loam, 3 to 8 percent slopes	Non- Hydric	0%	NA	Well drained
HatA	Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded	Partially Hydric	35%	Floodplains	Well drained (Hatliff), poorly drained (Pluck and Kian)
LelA	Lelavale silt loam, 0 to 1 percent slopes, ponded	Hydric	100%	Depressions	Very poorly drained
SplB	Splendora fine sandy loam, 0 to 2 percent slopes	Partially Hydric	7%	Flats	Moderately well to somewhat poorly drained
WatA	Waller-Tarkington complex, 0 to 1 percent slopes	Partially Hydric	65%	Flats	Poorly drained (Waller), moderately well drained (Tarkington)
WetA	Westcott-Plumgrove complex, 0 to 1 percent slopes	Partially Hydric	10%	Flats	Moderately well drained (Wescott), somewhat poorly drained (Plumgrove)

Table 2. Mapped soil types within the Block 1 Delineation Area.

2.4 SITE ELEVATION AND TOPOGRAPHY

The entire site is generally flat (slopes of 0-1%) except in areas of the severely entrenched stream systems such as Camp Branch and tributaries. Elevations of approximately 50 ft. above mean sea level (MSL) occur along the western edge of the property near the East Fork of the San Jacinto River. This area of the property is within the floodplain with the 100-year elevation extending to approximately 65 ft. in elevation and the 500-year extending to an elevation of approximately 70 ft. Moving east, once leaving the floodplain of the San Jacinto, the elevation rises to 80 - 100 ft near Farm to Market (FM) Road 2100. The elevation remains consistently between 80 - 90 ft. throughout the central portion of the property before dropping to 60 - 70 ft. when nearing the severely entrenched Camp Branch system. Camp Branch flows into Luce Bayou near the southern property boundary. The elevations with the Luce Bayou system area in the 50-60 ft. range. The area around Luce Bayou and lower Camp Branch are listed as floodplain with the 100-year elevation extending to approximately 75 ft. and the 500-year elevation extending to approximately 80 ft. Reference Appendix A – Exhibit 5 for a USGS topography map and Exhibit 6 for a Light Detecting and Ranging (LiDAR) map.

2.5 SITE HYDROLOGY

The site is divided into two main drainage basins. The western one third of the property drains to the East Fork of the San Jacinto River which flows south along the western property line and drains into Lake Houston, approximately 3 miles to the south. The eastern two thirds of the property drain to the southeast into Luce Bayou. There are three sub basins within this drainage basin. One drains to Key Gully located in the center of the property on the county line between Harris and Liberty Counties (not within proposed LHMB). The second drains to Camp Branch. Both sub-basins drain to Luce Bayou which flows southwest through the eastern corner of the property and flows into Lake Houston approximately 6 miles downstream. The historic drainage patterns and watersheds have been altered by a drainage ditch along the northern portion of the property. It appears this ditch is diverting a large portion of the historic watershed away from Key Gully into the West Fork of Camp Branch.

2.6 SITE VEGETATION

As mentioned in the soils overview section Nature Serve classifies the site as Mima Mound complex. This mound/inter-mound complex interspersed with forested and herbaceous depressions is traversed with perennial, intermittent, and ephemeral streams and their associated flood terrace plant communities. In general, the inter-mound, flats, and depressions are poorly drained dominated by wetland vegetation, many times obligate hydrophytic plant communities. The mounds and terraces are higher in elevation with moderate to well drained soils supporting mesic but usually non-wetland plant communities. Luce Bayou and it's floodplain can be characterized as southern bottomland hardwood forest typical of the Gulf Coast Plains in this geographic area. The Wetland Results (Section 4.1) section of this report and the attached Wetland Determination Data Forms (Appendix C) describe in detail the vegetation on the project site, but the following provides a general description of the vegetation on-site.

Typical vegetation found in the lower elevations (depressions and flats) are: laurel oak (*Quercus laurifolia*), willow oak (*Quercus phellos*), water oak (Quercus nigra), bottom-land post oak (*Quercus similis*), blackgum (*Nyssa sylvatica*), sweetgum (*Liquidambar styraciflua*), loblolly pine (*Pinus taeda*), red maple (*Acer rubrum*), yaupon (*Ilex vomitoria*), common buttonbush (*Cephalanthus occidentalis*), maidencane (*Panicum hemitomon*), coastal plain yelloweyed grass (*Xyris ambigua*), sedges (*Carex spp.*), Dwarf palmetto (*Sabal minor*), giant cane (*Arundinaria gigantea*), trumpet creeper (*Campsis radicans*), muscadine (*Vitis rotundifolia*), and longleaf greenbriar (*Smilax laurelfolia*).

Typical vegetation in the higher elevation (mounds and terraces) are: white Oak (*Quercus alba*), swamp chestnut oak (*Quercus michauxii*), green ash (*Fraxinus pennsylvanica*), eastern hophornbeam (*Ostrya virginia*), southern red oak (*Quercus falcata*), american elm (*Ulmus Americana*), and southern sugar maple (*Acer floridanum*), gulf sebastian-bush (*Ditrysinia fruticose*), indianwood-oats (*Chasmanthium latifolium*), and laurel-leaf greenbrier (*Smilax laurifolia*).

3 METHODS

Endeavor employees Bill Goodrum and Neil Boitnott conducted a determination, delineation, and functional assessment of Waters of the U.S., including wetlands (WOUS) in November and December of 2018. Recorded data points, wetland boundaries, and stream channels were mapped using a Trimble GeoXH series global positioning system (GPS) unit capable of sub-meter accuracy, and then digitized using ArcGIS version 10.6.1. GPS points were recorded in accordance with the Galveston GPS SOP as documented in Appendix B (USACE Galveston, 2016).

Characteristics for WOUS, including wetlands, as defined by 33 Code of Federal Regulations (CFR) § 328 (33 CFR Part 328, 1986), were evaluated for ephemeral, intermittent, and perennial streams, navigable and non-navigable waterways, deep-water habitats, wetlands, and other special aquatic sites. Prior to the field visit, aerial photographs, NWI maps and 7.5 minute USGS topographical quadrangle maps were reviewed to identify potentially jurisdictional features. Additionally, new light detecting and ranging data (LiDAR) and current aerial photography was collected for the site. This sub-foot resolution elevation data has an accuracy of less than 0.1 ft (Halis, 2018). During the field surveys, data points were established, and vegetation, hydrology, and soil characteristics were recorded.

3.1 WETLAND DELINEATION METHODS

The determination and delineation was performed in accordance with the US Army Corps of Engineers 1987 Wetlands Delineation Manual (USACE, 1987), and subsequent Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0) (USACE, 2010). It should be noted that although portions of the Block 1 Delineation Area lie within the Lissie Formation it does not lie within the MLRA boundary for the A16 indicator (MLRA 150A) therefore, the Coastal Prairie Redox (A16) hydric soil indicator was not used even for areas occurring within the Lissie Formation. In addition, prior to starting field efforts we met with Kenny Jaynes and John Davidson (SWG Compliance) to discuss data collection methods and approach.

WETLAND DELINEATION METHODS: HYDROLOGY

The presence of hydrology indicators was assessed within the plot and surrounding area visually, and with other sources such as aerial photography. The presence of wetland hydrology was confirmed if at minimum one primary, or two secondary wetland hydrology indicators were observed.

WETLAND DELINEATION METHODS: VEGETATION

The vegetative community was evaluated within a 30 ft radius at each established plot. Vegetative species were recorded by strata and the percent absolute cover was estimated for individual species in each stratum. The wetland indicator status and nomenclature for each species was determined using the US Army Corps of Engineers North American Digital Flora: National Wetlands Plant List (USACE, 2016). Plant dominance was determined using the "50/20" rule and the presence or absence of a hydrophytic vegetative community was made.

WETLAND DELINEATION METHODS: SOILS

The NRCS national soil survey GIS data and NRCS soil surveys for Liberty County was referenced to characterize and describe the mapped soils present within the site (NRCS, 1996) (USDA, NRCS, 2016). The soil profiles at each observation point/plot were examined to a depth of at least 12 inches below ground surface for identifying soil color, redox features, texture, structure, and other hydric soil indicators. Munsell Soil Color Charts (Munsell Color, 2009) were used to determine soil colors, and texture was determined by standard feel analysis as described in Journal of Agronomic Education (Thien, 1979). A hydric soil determination was made by the presence of at least one hydric soil indicator.

3.2 STREAM AND OPEN WATER DELINEATION METHODS

Prior to the field visit, Endeavor personnel used aerial photographs, ArcGIS, and desktop investigations to approximately identify stream lengths, possible stream channels, and watershed drainage areas. Stream

channels were identified within Block 1 in the field using the ordinary high water mark (OHWM) heuristic as described in the December 2005 USACE Regulatory Guidance Letter: Ordinary High Water Mark Identification (USACE, 2005).

Stream channels and their OHWMs were determined by locating two or more of the following:

-Natural line impressed on the bank -Shelving -Soil character changes -Presence of leaf litter/debris -Sediment sorting -Wracking -Deposition -Changes in plant community -Bed and banks -Wracking -Destruction of terrestrial vegetation -Vegetation matted/bent/absent -Scour -Leaf litter disturbed or washed away -Observed flow events

Above and beyond the requirement of determining the existence of a channel with an OHWM, the flow regime of the channel needed to be assessed. An evaluation was made using the characteristic definitions and hydrologic features described in the *Identification Methods for the Origins of Intermittent and Perennial Streams* (NCDWQ, 2010) and *Applied River Morphology* (Rosgen D. , 1996). Stream flow regimes are listed below.

- Perennial a channel containing flowing water year-round during normal conditions. Perennial stream beds are located at an elevation below the average groundwater table elevation, and therefore usually exhibit hydrological, biological, and physical characteristics of the continuous conveyance of water.
- Intermittent a well-defined channel that conveys water only part of the year, usually during the wettest season when the groundwater table is highest and supplemental stormwater runoff is frequent. These channels usually lack strong biological habitat characteristics, however, because of periods during the year when the channel is dry.
- Ephemeral these channels flow in direct response to precipitation runoff and are at a significantly higher elevation than the groundwater table. Because of the temporal stochasticity of individual rain events, flow is not present in the channel consistently enough to have strong channel forming capability, thus hydrological and physical characteristics are less pronounced and biological habitat is usually nonexistent.

3.3 WETLAND FUNCTIONAL ASSESSMENT (IGHM) METHODS

The Riverine Forested and Riverine Herbaceous/Shrub Interim Hydrogeomorphic Method (iHGM) provided by the USACE Galveston District (USACE Galveston, 2008a), (USACE Galveston, 2008b), as derived from (Ainslie, et al., 1999), was used to evaluate the ecological quality and function of the wetlands on site. During the field surveys, data plots were established along field transects; vegetation, hydrology, and soil characteristics were recorded. These plots were chosen by best professional judgment to ensure all encountered habitats were adequately described. When a unique wetland habitat was identified, it was referred to as a Wetland Assessment Area (WAA), and the iHGM data taken from plots within the WAA serve to quantify characteristics of the WAA. Should a potentially unique wetland

assemblage not be intersected by a transect line, a plot was established off transect to ensure the habitat was represented in the final data compilation.

The riverine iHGM used by the USACE Galveston District was developed for riverine systems in alluvial valleys. The model uses the terms duration and frequency in the context of out-banking events from adjacent waterways leading to flooding and ponding. For portions of LHMB within flats and depressions outside the floodplain, the source of hydrology was likely to be more precipitation driven than flood driven. As a result, during the field assessment, HGM plots within flats and depressions were scored without regard to the source of flooding/ponding rather than modifying the mathematical model used to calculate the overall score. This was done using a previously permitted mitigation bank as precedence (Tarkington Bayou Mitigation Bank – SWG-2015-00169) and by referencing other HGM models in the area that have evaluated flats and depressions. The HGM developed for use in East Texas did not develop a model for flats or unconnected depressions, but stated "plant community and composition are very similar to the more frequently wetlands on similar sites" and therefore the riverine models could be used if other assessments are not available (Williams, Miller, McNamee, & Kilmas, 2010).

3.4 STREAM FUNCTIONAL ASSESSMENT METHODS

The Level 1 Stream Condition Assessment was used for all streams within the Block 1 delineation area (USACE Galveston, 2013). Block 1 did not have any perennial streams or intermittent streams with perennial pools. Per the Level 1 Assessment instructions, each stream was subdivided into approximately 350 linear feet (Lf) transects (stream reaches). Each of these transects were separated by a gap of approximately 200 Lf. Segment and gap lengths were periodically adjusted to account for varying stream lengths and to adequately describe stream segments. For BEHI an assessment was made within each transect (stream reach) of at least one stream bank, with an emphasis on identifying the bank most likely susceptible to erosion. Measured variables are used to determine an erosion risk rating category, and these categories are Very Low, Low, Moderate, High, Very High, and Extreme.

4 RESULTS: DETERMINATION/DELINEATION OF WATERS OF THE U.S., INCLUDING WETLANDS

As a background note, previous wetland delineations were performed on the entire 3,700-acre site and verified by SWG in 2001 and 2002 and reverified in 2006 and 2007 (Appendix F). This information is outdated, but still pertinent since the wetland hydrology and hydric soils criteria were still very similar to what's currently being utilized under the regional supplement. These wetland delineations identified approximately 6.9 acres of wetland within the entire proposed 900-Ac. Bank. Identified wetlands were only within the western block of the proposed bank. Limited wetland resources were identified within the eastern portion of the proposed bank and the Block 1 Delineation Area.

Field activities associated with this delineation of potential waters of the U.S., including wetlands, were performed between November 13th and December 4th, 2018. During the study, twenty-three (23) observation points/wetland delineation data plots were established along five (5) linear transects. The five (5) transects were laid out perpendicular to the hydrologic flow across the project site. The observation points/plots were established along transect lines in each vegetative community encountered

and on either side of the wetland boundaries and were flagged and GPSed. The locations of observations points/plots, transects, and wetland boundaries are depicted on Exhibits 7-9 (Appendix A). Documentation of all GPS points recorded during the field investigation with associated accuracy statistics, can be found in Appendix B. All GPS points were recorded with the same unit (Trimble Geo XH) capable of sub-foot accuracy. Field data was post-processed after data collection to reduce error and increase accuracy. Wetland determination data forms and associated photographs are in Appendix C.

Field conditions were excellent during the survey period with soil saturation and ponding easily visible, which aided in identifying and verifying wetland boundaries. This fact was critical in determining jurisdiction in the areas exhibiting/meeting hydric soil criteria but lacking hydrology indicators, even during high rainfall conditions. It is also noteworthy that the survey period spanned more than a two (2) week period and was conducted during the "growing season" of the project site geographic area. Two additional methods were used to enhance the transect/plot methodology to ensure wetland identification: 1) during the process of walking all streams in the project area any adjacent or headwater areas exhibiting wetland characteristics were thoroughly investigated to determine jurisdiction, and 2) the recent Lidar flight and aerial photography was scrutinized carefully in an effort to identify potential wetland areas that would not be intercepted by a transect or stream assessment investigations.

Precipitation data from Houston Intercontinental Airport, located in Harris County approximately 17 miles southwest of the project site is shown in Table 3. As seen, September, October, and December were wetter than average, with September and December exceeding the 30% threshold (i.e. less than 30% chance monthly rainfall will be greater than the amount listed). These wet conditions were conducive to wetland identification and delineation due to presence of soil saturation and/or inundation within wetland areas.

WETS Station: HO	USTON INTER	CONTINE	NTAL	ΑΡ <i>,</i> ΤΧ									
STATS TABLE - tota	al precipitatio	on (inches	5)										
Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
2018	3.06	5.73	2.97	1.9	3.83	6.64	6.04	0.85	8.6	7.02	1.76	7.62	56.02
Below 30% Chance	e Precip Less	Than Thre	shold	l									
Above 30% Chanc	e Precip Mor	e Than Thi	reshol	d									
	Statisti	cs from 10	998-20	18									
	Jialisti	3	0% ch	ance	30% cl	nance							
Month	Avg Prec	ip pre	cip le	ss than	precip	more							
Jan	3.3		2.1	2	3.9	98							
Feb	2.82		1.5	4	3.4	14							
Mar	3.44		2.1	8	4.1	16							
Apr	3.58		1.6	5	4.3	37							
May	4.95		1.4	1	5.8	33							
Jun	5.96		2.3		7.2	21							
Jul	4.47		2.2	4	5.4	46							
Aug	5.22		1.6	9	6.2	23							
Sep	4.64		2.6	1	5.6	65							
Oct	5.96		1.9	3	7.1	12							
Nov	3.98		2.0	7	4.8	36							
Dec	3.85		2.7	9	4.5	54							
Annual:	52.17		43.7	77	58.	67							
			_										
GROWING SEASO	N DATES												
Data years used.	32 ueg = 21	. r.											
Flobability S2 F of Higher													
20 percent * 2/5 to 12/15, 200 udys													
* Percent chance	12/3 to $12/15$												
occurring betwee	n the Beginni	ing and											
Ending dates	in the beginn												
occurring between the Beginning and Ending dates.													

Table 3. Precipitation data from Houston Intercontinental Airport.

4.1 DELINEATION RESULTS – WETLANDS

The wetland portion of the jurisdictional determination/delineation revealed a total of 10.90 Ac. of wetlands (refer to Table 3 below), made up of 9.41 Ac. of forested wetlands, and 1.49 Ac. of scrub/shrub wetlands. Photographs and wetland delineation data forms representing each wetland area and type are included in Appendix C and summarized in Table 4. It should be noted that the wetland areas that were delineated and their associated acreages did not include the small acreage of upland mounds contained within each wetland. The upland mounds/acreage was removed from the overall wetland polygon using a combination of the recent Lidar flight elevation data with accuracy of less than 0.1 feet (Halis, 2018), the associated aerial photography, and data points collected using a survey grade GPS unit as required in the Galveston GPS SOP. For a more detailed description of the Lidar flight and GPS unit refer to the Methods Section (Section 3) of this report.

Wetland Name	Wetland Type	Acreag	ge
Wetland 1	Forested	4.69	
Watland 2	Forested	2.80	1 20
wettand z	Scrub/Shrub	1.49	4.29
Wetland 3	Forested	1.80	
Wetland 4	Forested	0.12	
TOTAL	Forested	9.41	
TOTAL	Scrub/Shrub	1.49	
GRAND TOTA	10.90)	

LHMB Wetland Data Sheet Summary - LHMB Block 1											
Sampling Transect Sampling Date On/Near Pt./Plot		Sampling Pt./Plot	Hydrophytic Vegetation Present (Y/N)	Hydric Soils Present (Y/N)	Wetland Hydrology Present (Y/N)	Sampled Area Within Wetland (Y/N)	Landform	LAT	LONG		
11/13/2018	1	DP01	Y	N	Y	N	Terrace	30.130552	-95.072122		
11/13/2018	1	DP02	Y	N	У	N	Mound	30.130472	-95.070093		
11/13/2018	1	DP03	Y	Y	Y	Y	Depression	30.130443	-95.069933		
11/13/2018	1	DP04	Y	N	Y	N	Mound	30.130446	-95.069865		
11/13/2018	1	DP05	Y	Y	Y	Y	Depression	30.130506	-95.068607		
11/14/2018	1	D P06	Y	N	N	N	Hillslope	30.130625	-95.06848		
11/14/2018	1	DP07	Y	Y	N	N	Flat	30.130492	-95.065517		
11/14/2018	?	DP08	Y	N	N	N	Terrace	30.127756	-95.063081		
11/14/2018	2	DP09	Y	Y	N	N	Flat	30.127699	-95.066296		
11/14/2018	2	DP10	Y	N	N	N N		30.127619	-95.069272		
11/15/2018	3	DP11	Y	N	Y	N	Terrace	30.125063	-95.069457		
11/15/2018	3	DP12	Y	Y	N	N	Flat	30.125023	-95.067143		
11/15/2018	3	DP13	Y	Y	Y	Y	Depression	30.125027	-95.065729		
11/15/2018	3	DP14	Y	Y	N	N	Flat	30.125094	-95.06635		
11/15/2018	3	DP15	Y	N	N	N	Terrace	30.125000	-95.064874		
11/26/2018	4	DP16	Y	Y	N	N	Flat	30.122290	-95.065677		
11/26/2018	4	DP17	Y	Y	Y	Y	Depression	30.122255	-95.063054		
11/27/2018	4	DP18	Y	N	N	N	Hillslope	30.122269	-95.062696		
11/27/2018	5	DP19	Y	N	N	N	Terrace	30.119569	-95.063115		
12/4/2018	3	DP20	Y	Y	Y	Y	Depression	30.125602	-95.062340		
12/4/2018	3	DP21	Y	N	N	N	Mound	30.125538	-95.062448		
12/4/2018	3	DP22	Y	Y	Y	Y	Depression	30.126138	-95.060954		
12/4/2018	3	DP23	Y	N	N	N	Mound	30.126035	-95.061140		
	TOTAL		23	11	10	6					
Perc	ent & numl (all located	ber of plots w in Depressio	vetland ns)	26%	6 of 23	Non-wetland mo and hills	unds, terraces, lopes	52%	12 of 23		
All Flats had Hydric soils but lacked hydrology			22%	5 of 23							

Table 5. Summary of Recorded Delineation Data Points

4.1.1 Wetland Delineation Results – Soils

The survey consisted of a total of the twenty-three (23) observation points/plots along five (5) transects with 26% (6 of 23) of the plots meeting all three (3) wetland criteria (Data Points 3, 5, 13, 17, 20, 22). Forty-eight percent (11 of 23) of the plots were characterized as hydric soils and exhibited depleted soil matrix and were found in the depression and flat landforms. The remaining fifty-two percent (12 of 23) plots were characterized as non-hydric. Two noteworthy findings were as follows: 1) the soil profiles for data points 2, 4, 16, 17, and 20 resembled soil types/units different than what is reflected in the NRCS soil survey maps (refer to Wetland Determination Data Forms), and 2) all the flat landform data points met the hydric soil criteria but lacked wetland hydrology. A summary of the wetland data sheets for each plot is included in Table 4.

The landforms represented in the Block 1 wetland delineation include flats, depressions, mounds, terraces, and hillslopes. The flats (22%) exhibited hydric soils but lacked wetland hydrology to be considered wetland. The dominant soil types found in the depressions (Data Points 3, 5, 13, 17, 20, 22) and flats (Data Points 2, 4, 10, 21, 23) were the following: Lelavale silt loam, 0 to 1 percent slopes, ponded; and the Waller portion of the Waller-Tarkington complex, 0 to 1 percent slopes. Data Point 16 was characterized as a flat and recorded in an area mapped as Atasco fine sandy loam, 2 to 5 percent slopes, but appeared to match the nearby Pluck soil series (fine sandy loam/sandy clay loam and poorly drained) component of the Hatliff-Pluck-Kian complex, 0 to 1 percent slopes, frequently flooded map unit. The non-hydric uplands (Data Points 1, 3, 6-9, 12, 14-16, 18, 19) occurred in the mounds, terraces, and hillslopes. The dominant soil types found in the non-jurisdictional mounds, terraces, and hillslopes (52%) were the following: Tarkington portion (fine sandy loam and well drained) of the Waller-Tarkington complex, 0 to 1 percent slopes; Wescott portion (moderately well drained) of the Westcott-Plumgrove complex, 0 to 1 percent slopes; moderately well drained; and Atasco fine sandy loam, 2 to 5 percent slopes. Data Point 19 was recoded in an area mapped as Bissonnet loam, 0 to 1 percent slopes (poorly drained and hydric), but the soils appeared to match the nearby Atasco soil series (moderately well drained and non-hydric.

4.1.2 Wetland Delineation Results – Vegetation

A dominance of hydrophytic vegetation was determined to be present at all 23 observation points. However, only six (6) of these observation points met all three wetland criteria and were determined to be located within areas of wetlands. Vegetative communities were consistent within similar landforms. As noted previously, five (5) major landforms were identified within the project site: terraces, mounds, hillslopes, flats, and depressions. The following paragraphs provide a description of the vegetative communities occurring within each landform.

Terraces, Mounds, and Hillslopes

COMMON TO ALL TERRACES, MOUNDS, AND HILLSLOPES:

The upland terrace, mound, and hillslope landforms (DPs 1, 2, 4, 6, 8, 10, 11, 15, 18, 19, 21, 23) can be characterized by the following species that were found in either all or two of the three landforms/stratum. The **tree stratum** included the following: loblolly pine (*Pinus taeda*), sweetgum (*Liquidambar styraciflua*), white oak (*Quercus alba*), water oak (*Quercus nigra*), southern magnolia (*Magnolia grandiflora*), blackgum (*Nyssa sylvatica*), and American holly (*Ilex opaca*). The **sapling/shrub** stratum included: yaupon (*Ilex vomitoria*), American holly (*Ilex opaca*), American beautyberry (*Callicarpa americana*), and American

hophornbeam (*Carpinus Americana*). The **herbaceous stratum** included: yaupon (*Ilex vomitoria*), indian wood-oats (*Chasmanthium latifolium*), American beautyberry (*Callicarpa americana*), and American holly (*Ilex opaca*). The **woody vine stratum** included: laurel-leaf greenbrier (*Smilax laurifolia*), muscadine (*Vitis rotundifolia*), and trumpet creeper (*Campsis radicans*).

TERRACES:

The terrace landform is represented by Data Points 1, 8, 11, 15, and 19. Terraces described throughout the project site are generally convex, depositional areas adjacent to streams. Species found in the terrace landform <u>but not found</u> in the mound or hillslope landforms: **Tree stratum** - green Ash (*Fraxinus pennsylvanica*), eastern hophornbeam (*Ostrya virginia*), Chinese tallow tree (*Triadica sebifera*), southern red oak (*Quercus falcata*), winged Elm (Ulmus allata), American elm (*Ulmus Americana*), red maple (*Acer rubrum*), and southern sugar maple (*Acer floridanum*). **Sapling/shrub stratum**: winged Elm (*Ulmus allata*), southern arrow-wood (*Viburnum dentatum*), and gulf sebastian-bush (*Ditrysinia fruticose*). **Herbaceous stratum**: gulf sebastian-bush (*Ditrysinia fruticose*), cherokee sedge (*Carex cherokeensis*), indianwood-oats (*Chasmanthium latifolium*), and rosette grass (*Dichanthelium spp.*). **Woody vine stratum**: laurel-leaf greenbrier (*Smilax laurifolia*), American buckwheat vine (*Brunnichia ovata*), and Alabama supplejack (*Berchemia scandens*).

MOUNDS:

Mounds encountered along the transects were easily identified due to vegetative patterns and difference of elevation. The mound landform is represented by Data Points 2, 4, 10, 21, and 23 and ranged from 0.5 to 3.0 feet in height above the adjacent landscape. Species found in the mound landform <u>but not found</u> in the terrace or hillslope landforms: **Tree stratum** – cherry-bark oak (*Quercus pagoda*) and laurel oak (*Quercus laurifolia*). **Sapling/shrub stratum** – laurel oak (*Quercus laurifolia*), virginia sweetspire (*Itea virginica*), tree sparkle-berry (*Vaccinium arboretum*), and white oak (*Quercus alba*). **Herbaceous stratum**: dwarf palmetto (*Sabal minor*), tree sparkle-berry (*Vaccinium arboretum*), dog-fennel (*Eupatorium capillifolium*), nut grass (*Cyperus esculentus*), and horsebrier (*Smilax rotundifolia*). **Woody vine stratum** – N/A.

HILLSLOPES:

The hillslope landform is represented by Data Points 6 and 18. Species found in the hillslope landform <u>but</u> <u>not found</u> in the terrace or mound landforms: **Tree stratum** – swamp chestnut oak (*Quercus michauxii*). **Sapling/shrub** stratum – blackgum (*Nyssa sylvatica*) and American hornbeam (*Carpinus caroliniana*). **Herbaceous stratum** - N/A. **Woody vine stratum** - N/A.

Flats (Non-Wetland - Lacking required hydrology)

FLATS:

The flat landform is represented by Data Points 7, 9, 12, 14, and 16. Flat communities are low-lying areas generally less than one percent slope and are represented by water oak (*Quercus nigra*), sweetgum (*Liquidambar styraciflua*), loblolly pine (*Pinus taeda*), yaupon (Ilex vomitoria), red maple (*Acer rubrum*), American hornbeam (*Carpinus caroliniana*), Chinese tallow (*Triadica sebifera*), gulf sebastian-bush (*Ditrysinia fruticosa*), southern arrowwood (*Viburnum dentatum*), American beautyberry (*Callicarpa americana*), green ash (*Fraxinus pennsylvanica*), dwarf palmetto (*Sabal minor*), sedges (*Carex spp.*), trumpet creeper (*Campsis radicans*), sawtooth blackberry (*Rubus argutus*), and muscadine (*Vitis rotundifolia*). Many of the above listed species were represented in more than one stratum.

Depressions (Wetlands)

DEPRESSIONS:

The depression landform is represented by Data Points 3, 5, 13, 17, 20, and 22. Depressions within the project site are low-lying, concave, wetland areas. During periodic field visits, these lower areas were ponded and/or saturated. According to aerial photography dating back to 1938, these wetland areas are naturally forested or herbaceous depressions that retain water for extended periods of time during the year. Except for common buttonbush (*Cephalanthus occidentalis*) present in sapling/shrub strata, the **Tree and Sapling/shrub strata** are dominated by similar species and are represented by laurel oak (*Quercus laurifolia*), willow oak (*Quercus phellos*), water oak (Quercus nigra), bottom-land post oak (*Quercus similis*), blackgum (*Nyssa sylvatica*), sweetgum (*Liquidambar styraciflua*), loblolly pine (*Pinus taeda*), Chinese tallow (*Triadica sebifera*), red maple (*Acer rubrum*), yaupon (*Ilex vomitoria*), and common buttonbush (*Cephalanthus occidentalis*). **The herbaceous and woody vine strata** are represented by maidencane (*Panicum hemitomon*), coastal plain yelloweyed grass (*Xyris ambigua*), waxy sedge (*Carex glaucescens*), Louisiana sedge (*Carex louisianica*), dwarf palmetto (*Sabal minor*), long-leaf wood-oats (*Chasmanthium sessiliflorum*), giant cane (*Arundinaria gigantea*), southern waxy sedge (*Carex cherokeensis*), silver plume grass (*Saccharum alopecuroides*), trumpet creeper (*Campsis radicans*), muscadine (*Vitis rotundifolia*), and longleaf greenbriar (*Smilax laurifolia*).

4.1.3 Wetland Delineation Results - Hydrology

Each observation point was evaluated for the presence of wetland hydrology indicators. Wetland hydrology was confirmed by the presence of one or more primary indicators, or two or more secondary indicators. Of the twenty-three (23) observation points/plots established across the project site, ten (10) met the criteria for wetland hydrology (DPs 1-5, 11, 13, 17, 20, 22). As previously noted, only six (6) of these observation points also demonstrated a dominance of hydrophytic vegetation and hydric soils.

DEPRESSIONS:

The primary hydrology indicators found in the depressions included Surface Water (A1), High Water Table (A2), Saturation (A3), Sediment Deposits (B2), and Water Stained Leaves (B9). The only data point exhibited secondary hydrology indicators was data point thirteen (13), where Crayfish Burrows (C8) were observed. Data Points 3, 5, and 13 exhibited four (4) of the above primary indicators, while data points 20 and 22 exhibited three (3) of the primary hydrology indicators. Lastly, two (2) of the primary indicators were recorded for Data Point 17.

FLATS:

None of the five (5) flat landforms (Data Points 7, 9, 12, 14, 16) exhibited primary or secondary wetland hydrology indicators. All flat landforms did meet the hydric soils and hydrophytic vegetation criteria.

TERRACES, MOUNDS, AND HILLSLOPES:

With a few excepts the terrace, mound, and hillslope landforms (Data Points 1, 2, 4, 6, 8, 10, 11, 14, 15, 18, 19, 21, 23) lacked wetland hydrology. The exceptions are Drift Deposits (B3) in Data Points 1 and 11 as well as Saturation (A3) in Data Points 2 and 4. Although wetland hydrology indicators were recorded as observed at the time of the field work it is likely that these are false positives for hydrology due to the significant rainfall and flood events occurring for the site (both recent and over the last several months). This particularly impacted the terraces and floodplains associated with Luce Bayou and its tributaries.

4.2 DELINEATION RESULTS - STREAMS

During the field investigation, and associated GIS analysis utilizing aerial imagery and LiDAR, 21,809 Lf. of streams (3.85 Ac.) were identified within the Block 1 Delineation Area (Table 6). These streams consisted of 19,358 Lf. (3.70 Ac.) of intermittent streams and 2,451 Lf. (0.16 Ac.) of ephemeral streams. All streams identified had a defined OHWM with bed and banks. Although described in more detail within the Stream Functional Assessment Results (Section 5.2) stream data sheets with photos can be referenced in Appendix E.

			OHWM	OHWM	
Name	Stream Type	Length	Width	Depth	Acreage
Camp Branch Main Stem	Intermittent	1,215	13.5	2.4	0.38
CB Trib 1	Intermittent	1,165	6.3	1.4	0.17
CB Trib 1-a	Ephemeral	83	3.0	1.0	0.01
CB-a	Ephemeral	161	2.8	1.8	0.01
CB-b	Ephemeral	383	2.5	0.7	0.02
Camp Branch West Fork	Intermittent	7,551	9.6	1.4	1.67
CBW Trib 1	Intermittent	284	4.0	0.5	0.03
CBW Trib 2	Intermittent	1,223	3.6	0.4	0.10
CBW Trib 2-a	Ephemeral	361	3.0	0.5	0.02
CBW Trib 2-b	Ephemeral	245	2.5	0.3	0.01
CBW Trib 3	Intermittent	851	3.5	0.8	0.07
CBW Trib 4	Intermittent	501	2.5	0.5	0.03
CBW-a	Ephemeral	299	2.8	0.5	0.02
CBW-b	Ephemeral	161	2.8	0.5	0.01
CBW-c	Ephemeral	359	2.8	0.3	0.02
CBW-d	Ephemeral	245	3.0	0.5	0.02
Camp Branch East Fork	Intermittent	5,624	9.1	1.4	1.18
CBE Trib 1	Intermittent	195	3.3	1.0	0.01
CBE Trib 2	Intermittent	421	5.0	0.5	0.05
CBE Trib 2-1	Intermittent	115	2.5	0.4	0.01
CBE Trib 3	Intermittent	212	3.2	0.3	0.02
CBE-a	Ephemeral	99	2.8	0.4	0.01
CBE-b	Ephemeral	55	3.0	0.5	0.004
TOTAL	Intermittent	19,358			3.70
TOTAL	Ephemeral	2,451			0.16
GRAND TO	TAL	21,809			3.85

Table 6.	Summary	of streams	identified	within the	Block 1	Delineation A	Area.
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CAMP BRANCH MAIN STEM, CAMP BRANCH WEST FORK, AND CAMP BRANCH EAST FORK

Camp Branch Main Stem, West Fork, and East Fork make up the main intermittent streams within the Block 1 Delineation Area. Camp Branch Main Stem, below confluence of East and West forks, is a relatively short reach (total of 1,215 Lf.) with an average OHWM width of 13.5 ft. and depth of 2.4 ft. Camp Branch

West Fork spans 7,551 Lf. from the confluence with East Fork north to the Block 1 Delineation Boundary and has an average OHWM width of 9.6 ft. and depth of 1.4 ft. Camp Branch East Fork spans 5,624 Lf. from the confluence of Camp Branch West Fork north the Block 1 Delineation Boundary and has an average OHWM width of 9.1 ft. and depth of 1.4 ft. These streams were flowing at the time of investigation and did appear to receive seasonal groundwater influence. However, these streams were observed dry during portions of the summer, even though the area experience a wetter than average summer (see Table 2 and Figure 1).



Figure 1. Portion of Camp Branch System dry during summer (July 2018).

SECONDARY INTERMITTENT TRIBUTARIES

During the field investigation and GIS analysis, nine (9) secondary intermittent tributaries were identified (CB Trib 1, CBW Trib 1, CBW Trib 2, CBW Trib 3, CBW Trib 4, CBE Trib 1, CBE Trib 2, CBE Trib 2-1, CBE Trib 3. These streams were generally shorter and smaller than the main channels of Camp Branch Main Stem, West Fork, and East Fork. In total, these stream represent 4,968 Lf. with individual stream lengths ranging from 115 Lf. to 1,223 Lf. OHWM widths ranged from 2.5 ft. to 6.3 ft. with depths of 0.3 ft to 1.4 ft. These streams were not flowing at the time of field investigation but did exhibit signs of seasonal groundwater influence and substantial channel forming processes. Field indicators for intermittent classification included substantial channel sinuosity, sediment sorting (e.g. gravel in riffles), riffle/pool complexes, presence of headcuts, and reduced soil conditions within the channel.

EPHEMERAL STREAMS

During the field investigation and GIS analysis, eleven (11) ephemeral streams were identified (CB Trib 1a, CB-a, CB-b, CBW Trib 2-a, CBW Trib 2-b, CBW-a, CBW-b, CBW-c, CBW-d, CBE-a, CBE-b). These streams totaled 2,451 Lf. (0.16 Ac), with individual stream lengths ranging from 55 to 383 Lf. OWHM widths ranged from 2.5 to 3.0 ft, with depths of 0.3 to 1.8 ft. These streams did exhibit a defined OHWM with bed and banks. Although a defined channel was present, channel forming processes were less evident than within intermittent streams. The streams were not flowing at the time of investigation and did not appear to have flowed recently, sinuosity was less, sediment sorting was less evident, soil reduction within the channel was lacking or less apparent, and riffle/pool complexes were lacking or ill-defined.

5 RESULTS: FUNCTIONAL ASSESSMENT OF WETLANDS AND STREAMS

5.1 WETLAND IHGM ANALYSIS RESULTS

During the field investigation, six (6) individual WAAs totaling 10.90 Ac. were identified within the Block 1 delineation boundary. Refer to Table 7 below for a summary of iHGM data collected, and Appendix D for field data sheets. WAAs 2a and 2b are within Wetland 2, and WAAs 3a and 3b are Wetland 3.

WAA	WAA 1	WAA 2a	WAA 2b	WAA 3a	WAA 3b	WAA 4
HGM Plot	HGM01 & 02 Combined	HGM06	HGM07	HGM03	HGM04	HGM05
Landform	Depression	Depression	Depression	Depression	Depression	Depression
HGM Class	Forested	Forested	Non-Forested	Forested	Forested	Forested
Vdur	1.00	0.75	1.00	1.00	1.00	0.75
Vfreq	1.00	0.75	1.00	1.00	1.00	0.75
Vtopo	0.40	0.40	0.40	0.40	0.40	0.40
Vcwd	0.50	0.50		0.30	1.00	0.30
Vwood	0.50	0.75	0.50	0.75	0.25	1.00
Vtree	1.00	0.50		0.80	0.30	0.80
Vrich	0.40	0.40		0.60	0.40	0.60
Vbasal	0.40	1.00		0.80	0.40	0.40
Vdensity	1.00	0.60		1.00	0.40	1.00
Vmid	0.50	0.75	0.75	0.50	0.50	0.75
Vherb	0.30	1.00	0.75	0.50	0.30	1.00
Vdetritus	1.00	1.00	1.00	1.00	0.50	1.00
Vredox	1.00	1.00	1.00	1.00	1.00	0.10
Vsorpt	0.50	0.50	0.50	0.50	0.50	0.50
Vconnect	1.00	1.00	1.00	1.00	1.00	1.00
TSDSW	0.68	0.64	0.76	0.70	0.74	0.65
MPAC	0.67	0.68	0.83	0.68	0.58	0.71
RSEC	0.76	0.73	0.79	0.81	0.69	0.72
WAA Acreage	4.69	2.80	1.49	1.10	0.70	0.12
TSDSW Units	3.20	1.80	1.13	0.76	0.52	0.08
MPAC Units	3.13	1.90	1.24	0.75	0.41	0.09
RSEC Units	3.56	2.03	1.18	0.89	0.49	0.09

Table 7.	Summary	of Wetland	iHGM Analysis.
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WAA1

WAA 1 makes up the entirety of Wetland 1 (4.69 Ac.) and consists of a hardwood dominated wetland depression situated 700 ft. east of Camp Branch West Fork. The area had undergone some recent silviculture operations which reduced the tree coverage within the WAA. Due to the size of the WAA, two iHGM plots were taken (HGM01 and HGM02). The data presented is an average of these plots, which were very similar. Willow oak (Quercus phellos) was the most dominant species at an average of 130 trees / Ac. and an average basal area of 40 sq. ft. / Ac. Other minor inclusions in the tree layer included blackgum (Nyssa sylvatica), red maple (Acer rubrum), loblolly pine (Pinus taeda), and sweetgum (Liquidambar styraciflua). The area appeared to be inundated for significant portions of the year, so it was scored optimal for variables associated with hydrology (Vdur and Vfreq). As a depression, the WAA was relatively flat except for inclusions of pimple/mima mounds, resulting in a suboptimal Vtopo score. The recent silviculture activities appeared to have reduced the tree coverage by approximately 50%, which reduced variables such at Vwood, Vrich, Vbasal, and Vmid. The thinning of trees likely resulted in a dense herbaceous layer, which is suboptimal according to the forested iHGM protocols. The WAA exhibited a defined O soil horizon as well as substantial redoximorphic features, resulting in optimal Vdetrius and Vredox variables. The soils within this WAA, as well as within majority of the Block 1 delineation area are fine sandy loams, or similar texture, which result in a 0.5 Vsorpt score. Lastly, the WAA is surrounded by forested habitat which results in an optimal Vconnect score.

WAA 2A

WAA 2a consists of a 2.80 Ac. portion of Wetland 2 that is comprised of a predominately pine dominated depressional wetland. The remaining portion of Wetland 2 (WAA 2b) is scrub-shrub wetland and will be described below. One HGM data point (HGM06) was recorded within the WAA due to its small size and homogeneity. Loblolly pine (*Pinus taeda*) was the most dominant tree species at 300 trees / Ac. and a basal area of 90 sq. ft. / Ac. Other minor tree species included Chinese tallow (*Triadica sebifera*), water oak (*Quercus nigra*), and red maple (*Acer rubrum*) for a total of 370 trees / Ac. and a basal area of 110 sq. ft. / Ac. The WAA was saturated, with some areas of shallow inundation, but did not appear to be ponded for more than 7 consecutive days, resulting in a Vdur score of 0.75. The WAA also appeared to pond 3 to 4 out of every 5 years (0.75 Vfreq score). As a depression, the WAA was relatively flat except for inclusions of pimple/mima mounds, resulting in a suboptimal Vtopo score. Vcwd was also sub-optimal, likely due to the relatively young age of the well-stocked stand. Due to the overwhelming dominance of loblolly pine (*Pinus taeda*), variables such as Vtree, Vrich, Vdensity, and Vmid were suboptimal. Remaining variables were optimal, except for Vsorpt which is a result of the natural soil conditions.

WAA 2B

WAA 2b consists of 1.49 acres of shrub/scrub wetland situated in the western portion of Wetland 2. The area appeared to be inundated for significant portions of the year, so it was scored optimal for variables associated with hydrology (Vdur and Vfreq). As a depression, the WAA was relatively flat except for inclusions of pimple/mima mounds, resulting in a suboptimal Vtopo score. Although classified as scrub/shrub, the WAA did contain approximately 20% tree coverage, resulting in an overall woody species coverage of approximately 80% (Vwood score of 0.75). Shrub and herbaceous coverage were both approximately 60% across the WAA resulting in Vmid and Vherb scores of 0.75. Remaining variables were optimal, except for Vsorpt which is a result of the natural soil conditions.

WAA 3A

WAA 3a consisted of a 1.10 Ac. portion of Wetland 3 that was a mixed pine/hardwood wetland depression. WAA 3b, which will be further described below, consisted of the remaining portion of Wetland 3 which had been recently disturbed by silviculture activities. HGM03 was the only data point recorded within this WAA due to the small size and homogeneity of this WAA. Loblolly pine (Pinus taeda) was the most dominant tree species within this WAA (100 trees / Ac. and a basal area of 50 sq. ft. / Ac.), but substantial components of willow oak (Quercus phellos) and bottomland post oak (Quercus similis) were also present for a total of 200 trees per acre and a basal area of 90 sq. ft. / acre. The area appeared to be inundated for significant portions of the year, so it was scored optimal for variables associated with hydrology (Vdur and Vfreq). As a depression, the WAA was relatively flat except for inclusions of pimple/mima mounds, resulting in a suboptimal Vtopo score. The amount of coarse woody debris (Vcwd) was low, likely due to the young age of the stand. Variables such as Vwood, Vtree, Vrich, and Vbasal, were not optimal due to the dominance of loblolly pine (Pinus taeda) with only two other species, as well as the young age of the stand. Vdensity was optimal, although the stand contained many young individuals, which allowed more sunlight to penetrate the canopy, resulting in a suboptimal Vherb score (0.5). The WAA exhibited a defined O soil horizon as well as substantial redoximorphic features, resulting in optimal Vdetrius and Vredox variables. The soils within this WAA, as well as within majority of the Block 1 delineation area are fine sandy loams, or similar texture, which result in a 0.5 Vsorpt score. Lastly, the WAA is surrounded by forested habitat which results in an optimal Vconnect score.

WAA 3B

WAA 3b (0.70 Ac.) is a portion of Wetland 3 that had been recently thinned. HGM04 was the only data point recorded within this WAA due to the small size and homogeneity of this WAA. The WAA exhibited approximately 20 trees / Ac., split between willow oak (*Quercus phellos*), and loblolly pile (*Pinus taeda*), with a basal area of approximately 10 sq. ft. / Ac. The area appeared to be inundated for significant portions of the year, so it was scored optimal for variables associated with hydrology (Vdur and Vfreq). As a depression, the WAA was relatively flat except for inclusions of pimple/mima mounds, resulting in a suboptimal Vtopo score. The amount of coarse woody debris (Vcwd) was optimal due to logging debris. All variables associated with the vegetative community of the WAA (Vwood, Vtree, Vrich, Vbasal, Vdensity, Vmod, and Vherb) were suboptimal due to silvicultural activities. The area also exhibited a disturbed O and/or A soil horizon, reducing the Vdetritus score to 0.5; however substantial redoximorphic features were present resulting in optimal Vredox. Lastly, the WAA is surrounded by forested habitat, although some has been thinned, which results in an optimal Vconnect score.

WAA4

WAA 4 comprises the entirety of Wetland 4, which is a small hardwood dominated wetland depression. HGM05 was the only data point recorded within this WAA due to the small size and homogeneity of this WAA. This WAA exhibited approximately 240 trees / Ac., half of which were Chinese tallow (*Triadica sebifera*). Remaining species, listed in order of dominance, included sweetgum (*Liquidambar styraciflua*), American hornbeam (*Carpinus caroliniana*), water oak (*Quercus nigra*), swamp chestnut oak (*Quercus michauxii*), white oak (*Quercus alba*), and cherrybark oak (*Quercus pagoda*). The area had a basal area of approximately 50 sq. ft. / Ac., split between Chinese tallow (*Triadica sebifera*), water oak (*Quercus nigra*), and white oak (*Quercus nigra*). Although many individual Chinese tallow (*Triadica sebifera*) were present, most were small, resulting in a low basal area. The WAA was saturated, with some areas of shallow inundation, but did not appear to be ponded for more than 7 consecutive days, resulting in a Vdur score

of 0.75. The WAA also appeared to pond 3 to 4 out of every 5 years (0.75 Vfreq score). As a depression, the WAA was relatively flat except for inclusions of pimple/mima mounds, resulting in a suboptimal Vtopo score. Vcwd was also sub-optimal, likely due to the relatively young age of the stand. Variables such as Vrich and Vbasal were low due to the low diversity of the stand (many individuals did not comprise 5% of the stand), and the dominance of small Chinese tallow which resulted in a low basal area. Remaining variables were optimal or near optimal except for Vredox. The soils only exhibited approximately 5% redoximorphic features, whereas this variable requires 20% for an optimal score.

5.2 STREAM FUNCTIONAL ASSESSMENT RESULTS

The results of the stream functional assessment can be seen in Table 8 below and Appendix E. The Galveston Level I SOP as well as a BEHI assessment were performed on all stream exhibiting a defined OHWM during the field investigation. A total of forty-six (46) stream transects were evaluated. Some general trends that were observed included a Severe Channel Condition in many of the main channels (Camp Branch Main Stem, Camp Branch West Fork, and Camp Branch East Fork), due to substantial downcutting resulting from anthropogenic impacts (i.e. drainage ditch that re-routed over 2 sq. mi. of watershed into Camp Branch West Fork). All streams had intact riparian buffers, although they were classified as Suboptimal due to lack of wetlands and some silviculture thinning in areas. None of the stream channels in the Block 1 delineation area have been assessed by TCEQ for water quality, resulting in a Severe Aquatic Use score. All main channels (Camp Branch Main Stem, Camp Branch West Fork, and Camp Branch Main Stem, Camp Branch West Fork, and camp Branch East Fork) also exhibited a Severe Channel Alteration metric due downcutting as a result of anthropogenic impacts. Most streams also exhibited a Very High or Extreme BEHI value due to the degree of entrenchment, lack of vegetative cover on the banks, and sandy nature of the stream banks.

Table 8. Results of stream functional assessment.

Stream Name	Stream Type	Transect	Channel Condition	Rip Right Bank Score	arian Buffer _{Left Bank} T Score	rotal Buffer Score	Aquatic Use	Channel Alteration	RCI	BEHI
Camp Branch	Intermittent	CB T1	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
Camp Branch	Intermittent	CB T2	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
CB Trib 1	Intermittent	CB Trib 1 T1	2.00	4.50	4.50	4.50	1.00	2.00	2.38	Extreme
CB Trib 1	Intermittent	CB Trib 1 T2	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
CB Trib 1-a	Ephemeral	CB Trib 1-a T1	3.00	4.50	4.50	4.50	1.00	3.00	2.88	Very High
CB-a	Ephemeral	CB-a T1	4.00	4.50	4.50	4.50	1.00	4.00	3.38	Very High
CB-b	Ephemeral	CB-b T1	4.00	4.50	4.50	4.50	1.00	5.00	3.63	High
Camp Branch East	Intermittent	CBE T1	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Very High
Camp Branch East	Intermittent	CBE T2	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
Camp Branch East	Intermittent	CBE T3	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
Camp Branch East	Intermittent	CBE T4	2.00	4.50	4.50	4.50	1.00	1.00	2.13	Very High
Camp Branch East	Intermittent	CBE T5	2.00	4.25	4.50	4.38	1.00	1.00	2.09	Very High
Camp Branch East	Intermittent	CBE T6	2.00	4.25	4.25	4.25	1.00	1.00	2.06	Very High
Camp Branch East	Intermittent	CBE T7	1.00	4.25	4.25	4.25	1.00	1.00	1.81	Extreme
Camp Branch East	Intermittent	CBE T8	1.00	4.25	4.25	4.25	1.00	1.00	1.81	Extreme
Camp Branch East	Intermittent	CBE T9	1.00	4.25	4.25	4.25	1.00	1.00	1.81	Extreme
CBE Trib 1	Intermittent	CBE Trib 1 T1	3.00	4.50	4.50	4.50	1.00	3.00	2.88	Very High
CBE Trib 2	Intermittent	CBE Trib 2 T1	3.00	4.25	4.25	4.25	1.00	3.00	2.81	High
CBE Trib 2-1	Intermittent	CBE Trib 2-1 T1	4.00	4.50	4.50	4.50	1.00	4.00	3.38	High
CBE Trib 3	Intermittent	CBE Trib 3 T1	4.00	4.50	4.50	4.50	1.00	4.00	3.38	High
CBE-a	Ephemeral	CBE-a T1	3.00	4.00	4.00	4.00	1.00	4.00	3.00	High
CBE-b	Ephemeral	CBE-b T1	3.00	4.00	4.00	4.00	1.00	4.00	3.00	Very High

Table 8 Continued. Results of stream functional assessment.

	Riparian Buffer									
Stroom Nomo	Stroom Tuno	Transact					Aquatic	Channel	PCI	реш
Stream Name	Stream Type	Iransect	Channel	Right Bank	Left Bank	Total Buffer	Use	Alteration	KCI	DEILI
			Condition	Score	Score	Score				
Camp Branch West	Intermittent	CBW T1	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
Camp Branch West	Intermittent	CBW T2	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
Camp Branch West	Intermittent	CBW T3	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
Camp Branch West	Intermittent	CBW T4	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
Camp Branch West	Intermittent	CBW T5	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
Camp Branch West	Intermittent	CBW T6	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Very High
Camp Branch West	Intermittent	CBW T7	1.00	4.50	4.45	4.48	1.00	1.00	1.87	Extreme
Camp Branch West	Intermittent	CBW T8	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Very High
Camp Branch West	Intermittent	CBW T9	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
Camp Branch West	Intermittent	CBW T10	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
Camp Branch West	Intermittent	CBW T11	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Extreme
Camp Branch West	Intermittent	CBW T12	1.00	4.50	4.50	4.50	1.00	1.00	1.88	Very High
CBW Trib 1	Intermittent	CBW Trib 1 T1	1.00	4.25	4.25	4.25	1.00	1.00	1.81	Extreme
CBW Trib 2	Intermittent	CBW Trib 2 T1	3.00	4.50	4.50	4.50	1.00	3.00	2.88	Extreme
CBW Trib 2	Intermittent	CBW Trib 2 T2	2.00	4.50	4.50	4.50	1.00	2.00	2.38	Extreme
CBW Trib 2-a	Ephemeral	CBW Trib 2-a T	2.00	4.50	4.50	4.50	1.00	2.00	2.38	Extreme
CBW Trib 2-b	Ephemeral	CBW Trib 2-b T	5.00	4.50	4.50	4.50	1.00	5.00	3.88	High
CBW Trib 3	Intermittent	CBW Trib 3 T1	3.00	4.50	4.50	4.50	1.00	3.00	2.88	Extreme
CBW Trib 3	Intermittent	CBW Trib 3 T2	2.00	4.50	4.50	4.50	1.00	2.00	2.38	Extreme
CBW Trib 4	Intermittent	CBW Trib 4 T1	2.00	4.05	4.25	4.15	1.00	3.00	2.54	Very High
CBW-a	Ephemeral	CBW-a T1	4.00	4.30	4.50	4.40	1.00	5.00	3.60	High
CBW-b	Ephemeral	CBW-b T1	3.00	4.50	4.30	4.40	1.00	5.00	3.35	Very High
CBW-c	Ephemeral	CBW-c T1	5.00	4.25	4.25	4.25	1.00	5.00	3.81	High
CBW-d	Ephemeral	CBW-d T1	4.00	4.50	4.50	4.50	1.00	4.00	3.38	High

CAMP BRANCH MAIN STEM

The main channel of Camp Branch (below confluence of East and West forks) is a relatively short reach (total of 1,215 Lf.) where two (2) stream transects (reaches) were evaluated. Camp Branch Main Stem has a watershed size of 4.67 sg. mi. at the confluence of east and west forks. The channel exhibited a typical "F" or "G" Rosgen channel type, which are severely entrenched and highly unstable. Typical topof-bank height was 7-8 ft. whereas the Bankfull height was approximately 3 ft. It should be noted the OWHM height was less than the Bankfull height in some cases since Bankfull indicators are difficult (if not impossible) to determine for active forming F and G channels, thus the "visible" ordinary high-water mark was used in the field determination. It is evident the previous Bankfull, before the drainage ditch diverted 2 sq. mi. watershed into Camp Branch West Fork, is still showing physical signs of an OHWM. As a result, the Bankfull height was adjusted (higher in all cases) based on the Harris County Regional Curve (AMEC Geomatrix, Inc., 2009). The Channel Condition was Severe due to substantial downcutting resulting from anthropogenic impacts (i.e. drainage ditch that re-routed over 2 sq. mi. of watershed into Camp Branch West Fork). The riparian buffer was an intact, native mixed pine/hardwood forested community with over 60% cover, but no wetlands were present, so it was scored Suboptimal (4.5). This channel has not been assessed by TCEQ for water quality, resulting in a Severe Aquatic Use score. This channel also exhibited a Severe Channel Alteration metric due to downcutting as a result of anthropogenic impacts. The BEHI for Camp Branch Main Stem was Extreme due to the degree of entrenchment, lack of vegetative cover on the banks, and sandy nature of the stream banks.

CB TRIB. 1

Camp Branch (CB) Trib. 1 is a 1,165 Lf. intermittent tributary to Camp Branch near the southwestern extent of the Block 1 delineation area. This channel was severely entrenched, especially in the upstream most portion (See CB Trib. 1 T2). Bank heights were 8 ft. in the uppermost transect (T2) and 4 ft in the lower (T1), whereas Bankfull heights 1.2 and 1.5 ft. respectively. A woods road and culvert abruptly stopped a deep (8-10 ft.) head-cut near the southern extent of this stream. The Channel Condition was Severe due to substantial downcutting resulting from anthropogenic impacts (i.e. drainage ditch that re-routed over 2 sq. mi. of watershed into Camp Branch West Fork). As Camp Branch West Fork and Main Stem downcut due to the anthropogenic increase in watershed area, associated tributaries also down-cut to match the confluence elevation. The riparian buffer was an intact, native mixed pine/hardwood forested community with over 60% cover, but no wetlands were present, so it was scored Suboptimal (4.5). This channel has not been assessed by TCEQ for water quality, resulting in a Severe Aquatic Use score. This channel also exhibited a Poor (T1) or Severe (T2) channel alteration metric due downcutting as a result of anthropogenic impacts. The BEHI for CB Trib. 1 was Extreme due to the degree of entrenchment, lack of vegetative cover on the banks, and sandy nature of the stream banks.

CB TRIB. 1A, CB-A, AND CB-B

CB Trib. 1-a, CB-a, and CB-b are ephemeral tributaries of CB Trib. 1 and Camp Branch Main Stem. These channels were slightly to moderately entrenched (Channel Condition of 3-4) due to downcutting of the entire Camp Branch system. Bank heights ranged from 1-5 ft. and Bankfull/OHWM heights ranged from 0.5 - 1.0 ft. The riparian buffer was an intact, native mixed pine/hardwood forested community with over 60% cover, but no wetlands were present, so it was scored Suboptimal (4.5). These channels have not been assessed by TCEQ for water quality, resulting in a Severe Aquatic Use score. These channels also exhibited Marginal to Optimal Channel Alteration metrics (score of 3-5) due to downcutting as a result of anthropogenic impacts, but not as severe as within the main channels. BEHI scores for these streams

ranged from High to Very High as a result of lack of vegetative cover on the banks, and sandy nature of the stream banks.

CAMP BRANCH EAST FORK

Camp Branch East Fork spans 5,624 Lf. from the confluence of Camp Branch West Fork north the Block 1 Delineation Boundary. Nine (9) stream transects were evaluated within this stream. Camp Branch East Fork has a watershed size of 0.46 sq. mi. at the northern extent of the delineation boundary, and 0.68 sq. mi. at the confluence with Camp Branch West Fork. The channel exhibited a typical "F" or "G" Rosgen channel type, which are severely entrenched and highly unstable. Typical top-of-bank height was 3-7 ft. whereas the average Bankfull/OWHM height was 1.2 ft. The Channel Condition was severe due to substantial downcutting resulting from anthropogenic impacts (i.e. drainage ditch that re-routed over 2 sq. mi. of watershed into Camp Branch West Fork). As Camp Branch West Fork and Main Stem down-cut due to the anthropogenic increase in watershed area, associated tributaries also down-cut to match the confluence elevation. The riparian buffer on Transects 1-4 was an intact, native mixed pine/hardwood forested community with over 60% cover, but no wetlands were present, so it was scored Suboptimal (4.5). The riparian buffer on Transects 5-9 consisted of an approximately 50/50 split of native mixed pine/hardwood forested community with over 60% cover (score of 4.5) and a similar community type that had recently undergone a silviculture thinning operation which reduced the cover to between 30-60% (Score of 4). This channel has not been assessed by TCEQ for water quality, resulting in a Severe Aquatic Use score. This channel also exhibited a Severe Channel Alteration metric due downcutting as a result of anthropogenic impacts. The BEHI for Camp Branch East Fork ranged from Very High to Extreme due to the degree of entrenchment, lack of vegetative cover on the banks, and sandy nature of the stream banks.

CBE TRIB. 1, 2, 2-1 AND 3

CBE Trib. 1, 2, 2-1, and 3 are all ultimately tributaries of Camp Branch East Fork, with CBE Trib. 2-1 being an intermittent tributary of CBE Trib. 2. These streams were relatively short, with the longest being CBE Trib. 2 at 421 Lf. Bank heights ranged from 2.5-4 ft. and Bankfull/OHWM heights ranged from 0.4 - 1.0 ft. These channels were slightly to moderately entrenched (Channel Condition of 3-4) due to downcutting of the entire Camp Branch system. CBE Trib. 1 CBE Trib 2-1 had an intact native pine/hardwood stand for the entirety of the buffer (score of 4.5). CBE Trib 2 and 3 had a mix of native mixed pine/hardwood forested community with over 60% cover (score of 4.5) and a similar community type that had recently undergone a silviculture thinning operation which reduced the cover to between 30-60% (Score of 4). These channels have not been assessed by TCEQ for water quality, resulting in a Severe Aquatic Use score. These channels also exhibited Marginal to Suboptimal channel alteration metrics (score of 3-4) due to downcutting as a result of anthropogenic impacts, but not as severe as within the main channels. BEHI scores for these streams ranged from high to very high as a result of lack of vegetative cover on the banks, and sandy nature of the stream banks.

CBE-A & CBE-B

CBE-a and CBE-b are ephemeral tributaries of Camp Branch East Fork. These channels were slightly to moderately entrenched (Channel Condition of 3-4) due to downcutting of the entire Camp Branch system. Bank heights ranged from 1-5 ft. and Bankfull/OHWM heights ranged from 0.5 - 1.0 ft. The riparian buffer was an intact, native mixed pine/hardwood forested community with over 60% cover, but no wetlands were present, so it was scored Suboptimal (4.5). These channels have not been assessed by TCEQ for water quality, resulting in a Severe Aquatic Use score. These channels also exhibited Marginal to Optimal Channel Alteration metrics (score of 3-5) due to downcutting as a result of anthropogenic impacts, but

not as severe as within the main channels. BEHI scores for these streams ranged from high to very high as a result of lack of vegetative cover on the banks, and sandy nature of the stream banks.

CAMP BRANCH WEST FORK

Camp Branch West Fork spans 7,551 Lf. from the confluence with East Fork north to the Block 1 Delineation Boundary. Twelve (12) transects (stream reaches) were evaluated on Camp Branch West. The watershed size at the northern delineation boundary is 3.35 sq. mi.; this includes 2.15 sq. mi. that was diverted into Camp Branch through a drainage ditch constructed in the 1960's based on historical aerial photographs. The channel exhibited a typical "F" or "G" Rosgen channel type, which are severely entrenched and highly unstable. Top-of-bank height was 4.5-7 ft. whereas the Bankfull height was approximately 2.5-3 ft. It should be noted the OWHM height was less than the Bankfull height in some cases since Bankfull indicators are difficult (if not impossible) to determine for active forming F and G channels, thus the "visible" ordinary high water mark was used in the field determination. It is evident that indicators of the previous Bankfull, before the drainage ditch diverted 2 sq. mi. watershed into Camp Branch West Fork, are still showing physical signs of an OHWM. As a result, the Bankfull height was adjusted (higher in all cases) based on the Harris County Regional Curve (AMEC Geomatrix, Inc., 2009). The Channel Condition was Severe due to substantial downcutting resulting from anthropogenic impacts (i.e. drainage ditch that re-routed over 2 sq. mi. of watershed). The riparian buffer was an intact, native mixed pine/hardwood forested community with over 60% cover, but no wetlands were present, so it was scored Suboptimal (4.5). This channel has not been assessed by TCEQ for water quality, resulting in a Severe Aquatic Use score. This channel also exhibited a Severe Channel Alteration metric due downcutting as a result of anthropogenic impacts. The BEHI for Camp Branch West Fork was Very High to Extreme due to the degree of entrenchment, lack of vegetative cover on the banks, and sandy nature of the stream banks.

CBW TRIB. 1, 2, 3, & 4

CBW Trib. 1, 2, 3, and 4 are intermittent tributaries of Camp Branch West Fork. These streams varied in length from 1,223 Lf. (CBW Trib 2) to 284 Lf. (CBW Trib 1). Bank heights ranged from 3-4 ft. and Bankfull/OHWM heights ranged from 0.3 – 1.0 ft. These channels were moderately to severely entrenched (Channel Condition of 1-3) due to downcutting of the entire Camp Branch system. CBW Trib 1 especially showed signs of recent head cutting and instability. CBW Tribs 2, 3, and 4 had an intact native pine/hardwood stand for the entirety of the buffer (score of 4.5). CBW Trib 1 had a mix of native mixed pine/hardwood forested community with over 60% cover (score of 4.5) and a similar community type that had recently undergone a silviculture thinning operation which reduced the cover to between 30-60% (Score of 4). These channels have not been assessed by TCEQ for water quality, resulting in a Severe Aquatic Use score. These channels also exhibited Severe to Marginal Channel Alteration metrics (score of 1-3) due to downcutting as a result of anthropogenic impacts. BEHI scores for these streams ranged from Very High to Extreme as a result of the degree of entrenchment, lack of vegetative cover on the banks, and sandy nature of the stream banks.

CBW TRIB 2-A

CBW Trib. 2-a is a 284 Lf. ephemeral tributary of CBW Trib. 2. This channel was severely entrenched (bank height of 3 ft. but Bankfull height of 0.5 ft.), but with its small watershed and ephemeral flow regime, active erosion was not as prevalent to warrant a severe (1.00) Channel Condition score (Channel Condition was scored a 2.00). This channel had an intact native pine/hardwood stand for the entirety of the buffer (score of 4.5). This channel has not been assessed by TCEQ for water quality, resulting in a Severe Aquatic

Use score. This channel also exhibited a Severe Channel Alteration metric due downcutting as a result of anthropogenic impacts. The BEHI was Extreme due to the degree of entrenchment, lack of vegetative cover on the banks, and sandy nature of the stream banks.

CBW TRIB 2-B, CWB-A, CBW-B, CBW-C, CBW-D

CBW Trib. 2-b is an ephemeral tributary of CBW Trib. 2, and CBW-a, CBW-b, CBW-c, and CBW-d are ephemeral tributaries of Camp Branch West Fork. These channels were slightly entrenched to not entrenched (Channel Condition of 3-5). Bank heights ranged from 2.5-3 ft. and Bankfull/OHWM heights ranged from 0.25 – 0.5 ft. The riparian buffers had a mix of native mixed pine/hardwood forested community with over 60% cover (score of 4.5) and a similar community type that had recently undergone a silviculture thinning operation which reduced the cover to between 30-60% (Score of 4). These channels have not been assessed by TCEQ for water quality, resulting in a Severe Aquatic Use score. These channels also exhibited Suboptimal to Optimal Channel Alteration metrics (score of 4-5) due to some impacts from downcutting as a result of anthropogenic influences, but not as severe as within the main channels. BEHI scores for these streams ranged from High to Very High as a result of lack of vegetative cover on the banks, and sandy nature of the stream banks.

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APPENDIX A - EXHIBITS




























APPENDIX B – GPS POINT DOCUMENTATION



























Document Path: E:/Dropbox (Lake Houston)/Lake Houston Team Folder/Mitigation/Data/GIS/MXD/JD/Report Maps/GPS Maps.mxd







Document Path: E:\Dropbox (Lake Houston)\Lake Houston Team Folder\Mitigation\Data\GI\$\MXD\JD\Report Maps\GPS Maps mxd






























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Point ID	Point Type	×	۲	NUM SATS	PDOP	НООР	GPS DATE	GPS TIME (LTC) Comments
Non-JD 1	Non-JD Feature	30.129738	-95.072376	10	1.6300	1.0100	12/4/2018	8:18:23 PM Gully with no ohwm
Non-JD 2	Non-JD Feature	30.127887	-95.070643	14	1.5400	0.7574	11/14/2018	8:30:16 PM Secondary channel with no ohwm
Non-JD 3	Non-JD Feature	30.127388	-95.070920	11	1.3300	0.8300	12/4/2018	6:50:19 PM Secondary channel with no ohwm
Non-JD 4	Non-JD Feature	30.126806	-95.070579	11	1.2900	0.8100	12/4/2018	6:46:16 PM Secondary channel with no ohwm
Non-JD 5	Non-JD Feature	30.124989	-95.069455	10	2.2000	1.1300	12/4/2018	10:45:50 PM Gully with no ohwm
Non-JD 6	Non-JD Feature	30.124874	-95.069299	10	1.8000	1.1300	12/4/2018	10:46:49 PM Gully with no ohwm
Non-JD 7	Non-JD Feature	30.124748	-95.069214	12	1.5450	0.9111	11/15/2018	3:14:36 PM Secondary channel with no ohwm
Non-JD 8	Non-JD Feature	30.125110	-95.068855	9	2.6700	1.4300	12/5/2018	1:34:51 PM Gully with no ohwm
Non-JD 9	Non-JD Feature	30.125035	-95.068656	7	2.6800	1.2100	12/5/2018	1:35:54 PM Gully with no ohwm
Non-JD 10	Non-JD Feature	30.124898	-95.068375	10	1.4800	0.9400	12/4/2018	11:08:24 PM Gully with no ohwm
Non-JD 11	Non-JD Feature	30.123805	-95.069197	8	1.8600	0066.0	12/5/2018	1:50:51 PM Gully with no ohwm
Non-JD 12	Non-JD Feature	30.123427	-95.069131	10	1.5700	0.8700	12/5/2018	1:54:04 PM Gully with no ohwm
Non-JD 13	Non-JD Feature	30.123383	-95.069390	10	1.4900	0.8600	12/5/2018	2:03:50 PM Gully with no ohwm
Non-JD 14	Non-JD Feature	30.123499	-95.069486	10	1.4800	0.8600	12/5/2018	2:04:44 PM Gully with no ohwm
Non-JD 15	Non-JD Feature	30.124221	-95.067313	10	1.5300	0.9800	12/5/2018	2:49:09 PM Gully with no ohwm
Non-JD 16	Non-JD Feature	30.121533	-95.068003	8	1.8400	1.0600	12/5/2018	4:18:00 PM Gully with no ohwm
Non-JD 17	Non-JD Feature	30.121184	-95.068236	10	1.4600	0.8100	12/5/2018	4:21:33 PM Gully with no ohwm
Non-JD 18	Non-JD Feature	30.122813	-95.065810	10	2.1700	1.1400	12/5/2018	5:52:58 PM Gully with no ohwm
Non-JD 19	Non-JD Feature	30.122265	-95.065515	11	1.4500	0.8800	12/5/2018	6:41:41 PM Gully with no ohwm
Non-JD 20	Non-JD Feature	30.122020	-95.065137	10	1.5400	0.9100	12/5/2018	6:39:15 PM Gully with no ohwm
Non-JD 21	Non-JD Feature	30.121695	-95.064222	13	1.4942	0.7316	11/27/2018	6:46:53 PM Secondary channel with no ohwm
Non-JD 22	Non-JD Feature	30.121788	-95.063714	12	1.8976	0.9602	11/27/2018	9:22:41 PM Gully with no ohwm
Non-JD 23	Non-JD Feature	30.121455	-95.063523	14	2.0151	0.7921	11/27/2018	6:58:39 PM Gully with no ohwm
Non-JD 24	Non-JD Feature	30.121623	-95.063299	13	1.7337	0.8604	11/27/2018	9:21:21 PM Gully with no ohwm
Non-JD 25	Non-JD Feature	30.121251	-95.063508	15	1.5963	0.7179	11/27/2018	6:59:48 PM Gully with no ohwm
Non-JD 26	Non-JD Feature	30.121507	-95.063058	13	1.6034	0.8207	11/27/2018	9:20:07 PM Gully with no ohwm
Non-JD 27	Non-JD Feature	30.121565	-95.063018	13	1.6000	0.8200	11/27/2018	9:18:45 PM Gully with no ohwm
Non-JD 28	Non-JD Feature	30.121126	-95.062406	12	1.5677	0.8806	11/27/2018	9:16:14 PM Gully with no ohwm
Non-JD 29	Non-JD Feature	30.120841	-95.062633	12	2.5934	0.9365	11/27/2018	7:22:06 PM Gully with no ohwm
Non-JD 30	Non-JD Feature	30.120895	-95.062452	12	2.5780	0.9353	11/27/2018	7:23:12 PM Gully with no ohwm
Non-JD 31	Non-JD Feature	30.121102	-95.062216	12	1.6582	0.8633	11/27/2018	9:14:35 PM Gully with no ohwm
Non-JD 32	Non-JD Feature	30.121052	-95.061738	11	1.7121	1.0494	11/27/2018	9:01:49 PM Secondary channel with no ohwm
Non-JD 33	Non-JD Feature	30.132114	-95.063535	14	1.6433	0.7586	11/28/2018	6:57:38 PM Gully with no ohwm
Non-JD 34	Non-JD Feature	30.131877	-95.063224	13	1.5931	0.8137	11/28/2018	6:32:17 PM Gully with no ohwm
Non-JD 35	Non-JD Feature	30.131744	-95.063555	13	1.7681	0.8272	11/28/2018	6:27:57 PM Gully with no ohwm
Non-JD 37	Non-JD Feature	30.131594	-95.063605	12	1.5387	0.7815	11/28/2018	7:37:50 PM Gully with no ohwm
Non-JD 38	Non-JD Feature	30.131391	-95.063714	14	1.4586	0.7797	11/28/2018	7:38:53 PM Gully with no ohwm

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Point ID	Point Type	×	۲	NUM	PDOP	НДОР	GPS DATE	GPS TIME //ITC/ Comments
Non-JD 39	Non-JD Feature	30.131214	-95.063701	14	1.6774	0.8460	11/28/2018	6:22:15 PM Gully with no ohwm
Non-JD 40	Non-JD Feature	30.130836	-95.063389	11	1.9582	0.9236	11/28/2018	7:47:05 PM Gully with no ohwm
Non-JD 41	Non-JD Feature	30.130367	-95.063496	13	1.4486	0.7713	11/28/2018	7:50:41 PM Gully with no ohwm
Non-JD 42	Non-JD Feature	30.130163	-95.063351	11	2.1135	1.1077	11/28/2018	5:35:15 PM Gully with no ohwm
Non-JD 43	Non-JD Feature	30.130165	-95.063495	13	1.6648	0.8247	11/28/2018	5:36:34 PM Gully with no ohwm
Non-JD 44	Non-JD Feature	30.129786	-95.063636	12	1.5087	0.8206	11/28/2018	7:54:09 PM Gully with no ohwm
Non-JD 45	Non-JD Feature	30.129571	-95.063646	13	2.1406	0.9840	11/28/2018	5:31:07 PM Gully with no ohwm
Non-JD 46	Non-JD Feature	30.129362	-95.063633	11	2.1510	0.9865	11/28/2018	5:28:19 PM Gully with no ohwm
Non-JD 47	Non-JD Feature	30.128534	-95.063174	13	1.9387	0.9725	11/28/2018	5:02:11 PM Secondary channel with no ohwm
Non-JD 48	Non-JD Feature	30.127741	-95.063367	16	1.2786	0.6824	11/28/2018	9:19:07 PM Gully with no ohwm
Non-JD 49	Non-JD Feature	30.128188	-95.063689	16	1.2031	0.6658	11/28/2018	8:56:06 PM Gully with no ohwm
Non-JD 50	Non-JD Feature	30.126581	-95.063429	13	1.5171	0.7682	11/28/2018	4:08:27 PM Gully with no ohwm
Non-JD 51	Non-JD Feature	30.125649	-95.063031	12	1.7933	0.9777	11/28/2018	2:29:30 PM Gully with no ohwm
Non-JD 52	Non-JD Feature	30.125037	-95.063689	6	3.8093	1.5332	11/15/2018	6:56:54 PM Gully with no ohwm
Non-JD 53	Non-JD Feature	30.124875	-95.063267	11	2.1186	0.8875	11/15/2018	7:01:14 PM Gully with no ohwm
S1	Stream Reference	30.129549	-95.071252	10	1.7400	1.0800	12/4/2018	7:53:08 PM Head of CBW-d
S2	Stream Reference	30.125334	-95.071050	12	1.6779	0.9422	11/15/2018	2:30:25 PM Head of CBW Trib 4
S3	Stream Reference	30.124605	-95.070257	14	1.5035	0.7607	11/15/2018	2:17:29 PM Head of CBW-c
S4	Stream Reference	30.123282	-95.069762	10	1.5200	0.8600	12/5/2018	2:00:41 PM Head of CBW Trib 3
S5	Stream Reference	30.124549	-95.067324	10	1.8300	1.2000	12/5/2018	2:51:49 PM Head of CBW-b
S6	Stream Reference	30.121272	-95.068396	10	1.5200	0.8400	12/5/2018	4:23:12 PM Head of CBW Trib 2
S7	Stream Reference	30.121247	-95.067743	10	1.9600	0.9800	12/5/2018	4:00:14 PM Head of CBW Trib 2-b
S8	Stream Reference	30.121240	-95.067155	ø	2.3400	1.1900	12/5/2018	4:43:47 PM Head of CBW Trib 2-a at two gullies
S9	Stream Reference	30.123537	-95.065769	6	2.3200	1.2400	12/5/2018	5:22:50 PM Head of CBW Trib 1 at headcut
S10	Stream Reference	30.123119	-95.065226	8	2.1300	1.1800	12/5/2018	5:58:39 PM Head of CBW-a
S11	Stream Reference	30.120803	-95.063669	12	2.0153	0.9046	11/27/2018	7:04:05 PM Head of CB-b
S12	Stream Reference	30.121378	-95.061920	13	1.5006	0.8550	11/27/2018	9:03:37 PM Head of CB-a
S13	Stream Reference	30.119808	-95.062892	11	2.2092	0.9183	11/27/2018	7:52:48 PM Head of CB Trib 1-a
S14	Stream Reference	30.118557	-95.063010	12	1.5996	0.8302	11/27/2018	8:06:34 PM Head of CB Trib 1 at road
S15	Stream Reference	30.132414	-95.063498	16	1.2548	0.6374	11/28/2018	7:10:36 PM CBE-b continues. Point at edge of delineation boundary.
S16	Stream Reference	30.132330	-95.063671	16	1.2364	0.6413	11/28/2018	7:14:35 PM Head of CBE-a
S17	Stream Reference	30.129231	-95.062712	14	1.4465	0.7845	11/28/2018	9:35:49 PM Head of CBE Trib 3
S18	Stream Reference	30.127847	-95.063297	16	1.3690	0.7145	11/28/2018	9:17:00 PM Head of CBE Trib 2-1
S19	Stream Reference	30.128106	-95.063953	17	1.1661	0.6695	11/28/2018	8:54:05 PM Head of CBE Trib 2
S20	Stream Reference	30.125703	-95.062446	10	2.1653	1.1535	11/28/2018	2:40:38 PM Head of CBE Trib 1 T1

GPS TIME (UTC)	5:52:55 PM	6:17:34 PM	7:36:37 PM	8:18:52 PM	7:54:05 PM	9:08:38 PM	7:07:59 PM	9:33:09 PM	9:53:56 PM	10:06:14 PM	1:57:39 PM	4:30:53 PM	4:53:12 PM	5:19:11 PM	6:00:12 PM	6:47:44 PM	3:17:44 PM	9:01:10 PM	9:09:45 PM	9:29:33 PM	7:26:52 PM	7:22:21 PM	6:20:16 PM	5:46:36 PM	3:29:59 PM	3:02:47 PM	10:56:08 PM	10:29:40 PM	6:36:06 PM	7:05:06 PM	7:37:28 PM	8:30:50 PM	8:47:19 PM	9:12:30 PM	2:09:55 PM	5:38:47 PM	2:29:43 PM
GPS DATE	11/27/2018	11/27/2018	11/27/2018	11/27/2018	11/27/2018	11/27/2018	11/27/2018	11/27/2018	11/27/2018	11/27/2018	11/28/2018	11/28/2018	11/28/2018	11/28/2018	11/28/2018	11/28/2018	11/28/2018	11/28/2018	11/28/2018	11/28/2018	11/28/2018	11/28/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/5/2018	12/5/2018	12/5/2018
НДОР	0.9472	0.6964	1.0116	0.8188	0.9420	0.8155	0.8028	0.8289	0.7650	0.7466	0.9899	0.7672	0.8545	1.0212	0.9093	0.7191	1.3776	0.6685	0.6936	0.7249	0.6747	0.7547	0.9600	1.1200	1.0400	1.1400	0.9300	0.9200	0.8700	0.8000	1.1500	0.7800	0.8500	0.8400	0.8500	1.0500	1.0500
PDOP	2.1244	1.5554	3.0511	1.5501	2.2772	1.5621	1.5665	1.6104	1.5461	1.4179	1.9233	1.5126	1.6735	2.2349	1.9860	1.4597	2.3944	1.2121	1.1681	1.3396	1.2959	1.3436	1.7000	1.8000	2.2500	2.0800	1.5300	1.7200	1.4600	1.2800	1.8400	1.3800	1.6900	1.7600	1.4400	1.8100	1.6500
NUM SATS	12	15	6	13	10	13	12	13	14	14	13	13	13	10	14	14	6	16	17	15	15	13	10	6	8	8	10	10	12	11	8	12	11	10	10	10	6
٨	-95.062259	-95.063400	-95.062669	-95.062922	-95.062855	-95.061948	-95.063186	-95.063993	-95.063693	-95.063510	-95.063374	-95.063431	-95.063091	-95.063432	-95.063337	-95.063330	-95.062706	-95.063492	-95.063274	-95.062814	-95.063541	-95.063491	-95.064712	-95.065906	-95.066685	-95.067323	-95.068149	-95.069600	-95.070301	-95.070763	-95.071301	-95.071929	-95.072256	-95.072701	-95.069466	-95.065874	-95.068289
х	30.121036	30.121538	30.120148	30.118628	30.119870	30.121159	30.121176	30.122836	30.123554	30.124720	30.125335	30.127177	30.128372	30.129192	30.130710	30.131820	30.125832	30.127620	30.127725	30.128946	30.132184	30.132390	30.122011	30.122870	30.123118	30.124033	30.124717	30.125155	30.126673	30.127741	30.128530	30.129425	30.130435	30.131693	30.123405	30.123293	30.124102
Point Type	Stream Transect																																				
Point ID	CB T1	CB T2	CB Trib 1 T1	CB Trib 1 T2	CB Trib 1-a T1	CB-a T1	CB-b T1	CBE T1	CBE T2	CBE T3	CBE T4	CBE T5	CBE T6	CBE T7	CBE T8	CBE T9	CBE Trib 1 T1	CBE Trib 2 T1	CBE Trib 2-1 T1	CBE Trib 3 T1	CBE-a T1	CBE-b T1	CBW T1	CBW T2	CBW T3	CBW T4	CBW T5	CBW T6	CBW T7	CBW T8	CBW T9	CBW T10	CBW T11	CBW T12	CBW Trib 1 T1	CBW Trib 1 T1	CBW Trib 1 T2

Page 3 of 6

Lake Houston Mitigaiton Ban Block 1 Delineation GPS Poin	¥	S
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Point ID	Point Type	×	۲	NUM SATS	PDOP	НООР	GPS DATE	GPS TIME (LITC) Comments
CBW Trib 2 T1	Stream Transect	30.121675	-95.067776	6	1.8000	0.9300	12/5/2018	4:29:53 PM
CBW Trib 2 T1	Stream Transect	30.122724	-95.066952	6	1.9500	1.0200	12/5/2018	5:01:31 PM
CBW Trib 2-a T1	Stream Transect	30.121666	-95.067077	8	1.8200	0.9800	12/5/2018	4:47:46 PM
CBW Trib 2-b T1	Stream Transect	30.121527	-95.067653	6	2.7200	1.1800	12/5/2018	4:04:37 PM
CBW Trib 4 T1	Stream Transect	30.125250	-95.070094	10	1.7900	0.9100	12/4/2018	10:19:40 PM
CBW-a T1	Stream Transect	30.122571	-95.065271	8	2.2500	1.1600	12/5/2018	6:07:45 PM
CBW-b T1	Stream Transect	30.124366	-95.067448	6	1.9600	1.2100	12/5/2018	2:54:03 PM
CBW-c T1	Stream Transect	30.124745	-95.070053	10	1.6400	0.9300	12/4/2018	10:40:26 PM
CBW-d T1	Stream Transect	30.129428	-95.071683	10	1.6400	0.9400	12/4/2018	8:01:12 PM
WB1	Wetland Boundary	30.130527	-95.069996	14	1.2990	0.7415	11/13/2018	4:27:50 PM
WB2	Wetland Boundary	30.130515	-95.069903	13	1.8580	0.8541	11/13/2018	8:40:11 PM Mound in Wetland 1
WB3	Wetland Boundary	30.130445	-95.069908	14	1.5388	0.7805	11/13/2018	8:40:55 PM Mound in Wetland 1
WB4	Wetland Boundary	30.130413	-95.069868	11	2.4599	0.9454	11/13/2018	8:41:56 PM Mound in Wetland 1
WB5	Wetland Boundary	30.130445	-95.069786	17	1.1773	0.6074	11/13/2018	8:57:01 PM Mound in Wetland 1
WB6	Wetland Boundary	30.130491	-95.069820	17	1.1872	0.6263	11/13/2018	8:58:00 PM Mound in Wetland 1
WB7	Wetland Boundary	30.130408	-95.068533	15	1.4221	0.7048	11/13/2018	10:43:05 PM Wetland 1
WB8	Wetland Boundary	30.131401	-95.069620	10	2.0685	1.1586	11/13/2018	10:45:52 PM Wetland 1
WB9	Wetland Boundary	30.131284	-95.069938	12	1.9563	0.9165	11/13/2018	10:46:08 PM Wetland 1
WB10	Wetland Boundary	30.130034	-95.069942	13	1.4681	0.7615	11/13/2018	5:58:59 PM Wetland 1
WB11	Wetland Boundary	30.129562	-95.069291	12	1.5390	0.8546	11/13/2018	6:04:57 PM Wetland 1
WB12	Wetland Boundary	30.129256	-95.069051	13	1.6725	0.7904	11/13/2018	6:07:22 PM Wetland 1
WB13	Wetland Boundary	30.125064	-95.066277	14	1.8006	1.0010	11/15/2018	5:35:42 PM Wetland 3
WB14	Wetland Boundary	30.124855	-95.066287	13	1.6017	0.8128	11/15/2018	5:57:02 PM Wetland 3
WB15	Wetland Boundary	30.124584	-95.065808	12	2.1502	1.0423	11/15/2018	6:04:43 PM Wetland 3
WB15	Wetland Boundary	30.124571	-95.065698	12	1.8445	0.9627	11/15/2018	6:05:23 PM Wetland 3
WB17	Wetland Boundary	30.124995	-95.065090	10	2.5189	1.1960	11/15/2018	6:11:25 PM Wetland 3
WB18	Wetland Boundary	30.125404	-95.065502	13	1.3867	0.7962	11/15/2018	4:18:48 PM Wetland 3
WB19	Wetland Boundary	30.125262	-95.066273	10	1.9768	1.0195	11/15/2018	5:55:37 PM Wetland 3
WB20	Wetland Boundary	30.125181	-95.066308	8	1.8537	0.8695	11/15/2018	5:53:44 PM Wetland 3
WB21	Wetland Boundary	30.125143	-95.066181	13	1.6399	0.8491	11/15/2018	5:52:25 PM Wetland 3
WB22	Wetland Boundary	30.125081	-95.066176	12	1.7105	0.9692	11/15/2018	5:51:32 PM Wetland 3
WB23	Wetland Boundary	30.125052	-95.065872	12	1.6063	0.8312	11/15/2018	5:03:01 PM Mound in Wetland 3
WB24	Wetland Boundary	30.125003	-95.065841	11	1.6497	0.8257	11/15/2018	5:03:50 PM Mound in Wetland 3
WB25	Wetland Boundary	30.125081	-95.065832	12	1.5296	0.8237	11/15/2018	5:02:02 PM Mound in Wetland 3
WB26	Wetland Boundary	30.125048	-95.065799	12	1.5994	0.8325	11/15/2018	5:01:08 PM Mound in Wetland 3
WB27	Wetland Boundary	30.122308	-95.063145	11	1.9837	1.0112	11/26/2018	11:14:31 PM Wetland 4
WB28	Wetland Boundary	30.122337	-95.063123	12	1.7600	0.9772	11/26/2018	11:15:10 PM Wetland 4

																																			Mound in Wetland 1	
GPS TIME	(UTC) CUITINETICS	11:15:46 PM Wetland 4	11:16:23 PM Wetland 4	11:10:52 PM Wetland 4	11:11:48 PM Wetland 4	11:12:20 PM Wetland 4	11:13:02 PM Wetland 4	11:13:49 PM Wetland 4	2:29:43 PM Wetland 2	2:30:15 PM Wetland 2	2:30:50 PM Wetland 2	2:31:44 PM Wetland 2	2:32:34 PM Wetland 2	2:33:35 PM Wetland 2	2:34:58 PM Wetland 2	2:36:32 PM Wetland 2	2:38:36 PM Wetland 2	2:39:25 PM Wetland 2	2:40:26 PM Wetland 2	2:41:08 PM Wetland 2	2:42:03 PM Wetland 2	2:43:29 PM Wetland 2	2:45:07 PM Wetland 2	2:45:50 PM Wetland 2	2:47:33 PM Wetland 2	2:48:32 PM Wetland 2	2:49:17 PM Wetland 2	3:02:30 PM Wetland 2	3:05:52 PM Wetland 2	3:58:40 PM Wetland 2	3:14:52 PM Wetland 2	3:15:36 PM Non-Wetland	4:30:36 PM Non-Wetland	5:09:18 PM Wetland 1	8:59:25 PM Non-Wetland	10-/8-10 DM Watland 1
		11/26/2018	11/26/2018	11/26/2018	11/26/2018	11/26/2018	11/26/2018	11/26/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/29/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/12/2018
	JOUL	1.1001	0.8666	0.9372	0.9792	0.9776	1.1759	0.9783	1.4752	1.2748	1.4824	1.4858	1.3180	1.2869	0.8954	1.1477	0.9879	0.8929	0.8385	0.8827	0.8412	0.8434	1.0284	1.0316	0.8496	0.8512	0.8525	0.8415	0.8356	0.8993	0.8093	0.9936	0.7851	0.8154	0.6494	0 8118
	LUUL	1.8354	1.5630	1.5637	1.8241	1.8187	2.4195	1.7605	2.6493	2.1797	2.6448	2.6424	2.2815	2.1648	1.5322	2.1744	1.5897	1.5250	1.4862	1.5750	1.4838	1.4816	1.7766	1.7763	1.4748	1.4729	1.4714	1.3613	1.3455	1.8398	1.2835	2.0654	1.3646	1.6549	1.1533	1 1950
NUM	SATS	12	12	11	11	12	11	12	6	10	6	6	6	10	13	11	11	12	13	12	13	13	12	12	13	13	13	13	13	11	13	10	13	12	16	14
>	-	-95.063044	-95.062943	-95.062953	-95.062978	-95.062958	-95.063040	-95.063104	-95.062453	-95.062495	-95.062441	-95.062304	-95.062193	-95.062156	-95.061968	-95.061769	-95.061699	-95.061556	-95.061453	-95.061355	-95.061335	-95.061202	-95.060981	-95.060872	-95.060652	-95.060466	-95.060350	-95.060114	-95.060738	-95.061001	-95.061463	-95.072138	-95.070094	-95.069933	-95.069865	-95 068607
>	<	30.122359	30.122370	30.122238	30.122146	30.122090	30.122060	30.122154	30.125659	30.125582	30.125594	30.125493	30.125403	30.125222	30.125331	30.125485	30.125619	30.125619	30.125496	30.125566	30.125393	30.125542	30.125407	30.125329	30.125568	30.125729	30.125729	30.127152	30.126650	30.126129	30.126123	30.130548	30.130471	30.130442	30.130446	30 130505
Doint Tuno	FUILT LYPE	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Boundary	Wetland Data Point	Wetland Data Point	Wetland Data Point	Wetland Data Point	Wetland Data Point						
Cint ID		VB29	NB30	VB31	VB32	VB33	VB34	VB35	VB36	VB37	VB38	VB39	VB40	VB41	VB42	VB43	VB44	VB45	VB46	VB47	VB48	VB49	VB50	VB51	VB52	VB53	VB54	VB55	VB56	VB57	VB58	DP01	2002	DP03)P04	DDG

Page 5 of 6

PDOF Wetland Data Point 30.130561 -55.068472 0 0.0000 11/13/2018 Phone. No accuracy statistics. PDOF Wetland Data Point 30.130561 -55.065515 0 0.0000 11/13/2018 Phone. No accuracy statistics. PDOF Wetland Data Point 30.130491 -55.065515 0 0.0000 11/13/2018 Phone. No accuracy statistics. PDOF Wetland Data Point 30.127756 -55.065316 1 0.0000 11/13/2018 Phone. No accuracy statistics. PDOF Wetland Data Point 30.127564 -55.065316 1 2.1213 0.6174 11/14/2018 7.29:14 PM Non-Wetland. PD10 Wetland Data Point 30.127503 -55.065316 1 3.4332 0.9149 11/14/2018 7.29:14 PM Non-Wetland. PD11 Wetland Data Point 30.125693 5.506573 1 1.44/2018 5.3:33:11/14/2018 5.9:0078 9.0:066 PD11 Wetland Data Point 30.125693 5.5:05573 1 1.4/12/2018 5.7:3:1 PM Non-Wetland. P	Point ID	Point Type	×	٨	NUM SATS	PDOP	НДОР	GPS DATE	GPS TIME (UTC)
DP06 Wetland Data Point 301305d1 -55.068472 0 0.0000 11/13/2013 Phone. Non-Wetland. Point soniable. DP07 Wetland Data Point 30.130491 -55.063515 0 0.0000 11/13/2013 soniable. Non-Wetland. Point recorded Works DP07 Wetland Data Point 30.127754 -55.063081 0 0.0000 11/13/2013 soniable. DP08 Wetland Data Point 30.127724 -55.063081 0 0.0000 11/13/2018 soniable. DP09 Wetland Data Point 30.127724 -55.063081 1 12/13/2018 s-3-3-14 M Non-Wetland. Point recorded Works DP13 Wetland Data Point 30.125064 55.06370 13 14/3 11/13/2018 2-3-3-14 M Non-Wetland. Point recorded Works DP13 Wetland Data Point 30.125064 55.065708 13 14/3 11/15/2018 2-3-3-14 M Non-Wetland Point recorded Works DP13 Wetland Data Point 30.125094 55.065508 13 15/12/2018									Non-Wetland. Point recorded with
Point Point <th< td=""><td>DP06</td><td>Wetland Data Point</td><td>30.130561</td><td>-95.068472</td><td>0</td><td>0.0000</td><td>0.0000</td><td>11/13/2018</td><td>phone. No accuracy statistics</td></th<>	DP06	Wetland Data Point	30.130561	-95.068472	0	0.0000	0.0000	11/13/2018	phone. No accuracy statistics
Drow Wetland Data Point 30.130491 95.065515 0 00000 11/13/2018 Phone. No accuracy statistics PDB Wetland Data Point 30.127756 95.065315 1 0 00000 11/13/2018 Phone. No accuracy statistics PDB Wetland Data Point 30.127756 95.065301 1 12.111 Work Non-Wetland Data Point 30.127061 Statistics available. Non-Wetland Phone. No accuracy statistics PP10 Wetland Data Point 30.127061 55.069372 16.513 0.5124 11/14/2018 7.29:14 PM Non-Wetland Point available. DP10 Wetland Data Point 30.125063 55.069372 16.414 0.87321 11/15/2018 8.23:37 PM Non-Wetland Point 30.125061 55.06578 11 16.474 11/15/2018 3.53:27 PM Non-Wetland Point 30.122699 55.06578 11 11/15/2018 3.53:27 PM Non-Wetland Point 30.12269 55.06578 11 15.62018 11/15/2018 2.53:5 PM Non-Wetland Point 30.12559 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>available.</td></td<>									available.
DP07 Wetland Data Point 30.130491 -5.065515 0 0.0000 0.1000 11/13/2018 phone. No excuracy statististististististististic DP08 Wetland Data Point 30.12775 -5.063081 0 0.0000 0.11/13/2018 available. DP10 Wetland Data Point 30.12772 -5.063051 1 1.11/14/2018 7.291.4 PM Non-Wetland DP10 Wetland Data Point 30.12772 -5.063457 13 1.4382 0.8423 11/14/2018 7.291.4 PM Non-Wetland DP11 Wetland Data Point 30.12504 -55.066351 1 1.4382 0.8423 11/15/2018 3.53.13 PM Non-Wetland DP13 Wetland Data Point 30.125043 -55.06578 11 1.6474 0.817 11/15/2018 5.37.37 PM Non-Wetland DP12 Wetland Data Point 30.125043 50.06557 11 1.6674 0.11/15/2018 5.37.37 PM Non-Wetland DP14 Wetland Data Point 30.122504 50.06578 11 1.6674 0.11/15/2018 5.37.37 PM Non-Wetland <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Non-Wetland. Point recorded with</td>									Non-Wetland. Point recorded with
Neural Data Point 30.127756 -95.063081 0 0.0000 11/13/2018 Non-Wetland, Point recorded wetland, Point recorded wetland DP09 Wetland Data Point 30.127751 -95.063316 17 1.2113 0.6124 11/14/2018 7:29:14 PM Non-Wetland DP10 Wetland Data Point 30.127031 -95.063375 16 1.3619 0.6754 11/14/2018 7:29:14 PM Non-Wetland DP11 Wetland Data Point 30.125003 -95.06372 16 1.3619 0.6754 11/15/2018 2:36:19 PM Non-Wetland DP11 Wetland Data Point 30.125094 -95.066373 13 1.4832 0.8440 11/15/2018 2:36:19 PM Non-Wetland DP13 Wetland Data Point 30.125094 -95.066307 13 1.6474 0.8171 1.1/15/2018 2:35:10 PM Non-Wetland DP13 Wetland Data Point 30.125094 -95.066307 13 1.6474 0.8171 1.7672018 2:5:5:10 PM Wetland DP14 Wetland Data Point 30.125094 -95.065307 13 1.6871 0.176	DP07	Wetland Data Point	30.130491	-95.065515	0	0.0000	0.0000	11/13/2018	phone. No accuracy statistics
PDB Wethand Data Point 30.127756 95.063081 0 0.0000 11/13/2018 Phone. No accuracy statistics available. DP100 Wethand Data Point 30.127751 5.065316 17 12113 0.6124 11/14/2018 7.29:14 PM Non-Wethand Data Point 30.127618 35.0651712 13.13 0.6124 11/14/2018 3.23:11 PM Non-Wethand Phone. No accuracy statistics DP11 Wethand Data Point 30.127033 95.065712 11 1.432 0.31 1.11/15/2018 3.43:13 PM Non-Wethand DP12 Wethand Data Point 30.127039 95.065678 11 1.4382 0.313 8.5:05PM Non-Wethand DP12 Wethand Data Point 30.122039 95.065678 11 1.4832 0.313 8.2:35PM Non-Wethand DP12 Wethand Data Point 30.122039 95.065678 11 1.6832 1.1/15/2018 3:3:3:3:4PM Non-Wethand DP12 Wethand Data Point 30.122039 95.065673 13 1.6832 0.11/15/2018 3:3:3:3:4PM Non-Wethand DP12 Wethand Data Point<									Non-Wetland. Point recorded with
Anallable Anallable PD09 Wetland Data Point 30.127618 55.065316 17 1.213 0.6124 11/14/2018 7.29:14 M Non-Wetland DP11 Wetland Data Point 30.127618 55.065316 1 1.4121 20.35:31 M Non-Wetland DP11 Wetland Data Point 30.12503 -55.065172 1 1.433 0.3141/2018 7.29:14 M Non-Wetland DP12 Wetland Data Point 30.12503 -55.06573 13 1.433 0.3151 2.60:33 1 1.41/2018 8.23:53 PM Non-Wetland DP13 Wetland Data Point 30.12503 -55.06573 11 1.683 0.3157 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.50:07 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0<	DP08	Wetland Data Point	30.127756	-95.063081	0	0.0000	0.0000	11/13/2018	phone. No accuracy statistics
PD09 Wetland Data Point 30.127721 95.066316 17 12.113 0.6124 11/14/2018 7.29:14 PM Non-Wetland PP10 Wetland Data Point 30.125648 -95.06372 16 1.3619 0.6754 11/14/2018 8:47:31 PM Non-Wetland PP11 Wetland Data Point 30.12503 -95.067142 14 1.3825 0.3157 8:47:01 11/15/2018 8:47:31 PM Non-Wetland PP13 Wetland Data Point 30.12509 -50.6530 12 1.6810 0.8995 11/15/2018 8:45:50 PM Non-Wetland PP14 Wetland Data Point 30.12209 -50.6530 12 1.6810 0.8955 11/15/2018 5:37:37 PM Non-Wetland PP13 Wetland Data Point 30.12259 -50.65303 13 1.6874 0.11/15/2018 5:37:37 PM Non-Wetland PP13 Wetland Data Point 30.122569 -50.65303 13 1.5828 0.3431 11/15/2018 3:57:37 PM Non-Wetland PP13 Wetland Data Point 30.122569 -50.656371 1 1.8331									available.
DP10 Wetland Data Point 30.127618 95.069372 16 13619 0.6754 11/14/2018 8.42:31 PM Non-Wetland DP11 Wetland Data Point 30.12503 95.06372 13 14382 0.9323 11/15/2018 8.42:31 PM Non-Wetland DP13 Wetland Data Point 30.125034 95.066350 12 1.5557 0.8321 11/15/2018 8.42:31 PM Non-Wetland DP13 Wetland Data Point 30.125094 95.066350 12 1.6810 0.8995 11/15/2018 5.37:37 PM Non-Wetland DP15 Wetland Data Point 30.122299 95.066353 13 1.6810 0.8345 11/15/2018 5.37:37 PM Non-Wetland DP17 Wetland Data Point 30.122269 95.065578 13 1.6823 0.9345 10.72/2018 95.37.37 PM Non-Wetland DP17 Wetland Data Point 30.122269 95.06557 12 1.8372 10.433 11/27/2018 3.57.37 PM Non-Wetland DP17 Wetland Data Point 30.122536 95.065637 12 1.8562 11	DP09	Wetland Data Point	30.127721	-95.066316	17	1.2113	0.6124	11/14/2018	7:29:14 PM Non-Wetland
PP11 Wetland Data Point 30.12506 -55.069457 12 1.557 0.8321 11/15/2018 2:36:35 PM Non-Wetland PP12 Wetland Data Point 30.12503 -55.067342 14 1.4382 0.31551 2:36:35 PM Non-Wetland PP13 Wetland Data Point 30.12503 -55.06738 13 1.6474 0.8171 11/15/2018 5:37:37 PM Non-Wetland PP15 Wetland Data Point 30.122290 -55.065678 11 1.6982 0.9168 11/15/2018 6:32:32 PM Non-Wetland PP16 Wetland Data Point 30.122290 -55.065678 11 1.6982 0.9168 11/15/2018 6:37:37 PM Non-Wetland PP16 Wetland Data Point 30.122529 -55.06303 13 1.5882 0.9168 11/26/2018 9:35:47 PM Non-Wetland PP17 Wetland Data Point 30.125536 -55.06247 12 1.835 11/27/2018 5:37:37 PM Non-Wetland PP17 Wetland Data Point 30.125536 -55.062447 12 1.8921 1.1/29/2018 3:37:47 PM Non-Wetla	DP10	Wetland Data Point	30.127618	-95.069272	16	1.3619	0.6754	11/14/2018	8:42:31 PM Non-Wetland
DP12 Wetland Data Point 30.125023 95.0657142 14 14382 0.9158 11/15/2018 3:36:19 PM Non-Wetland DP13 Wetland Data Point 30.125030 -95.066573 13 14832 0.8440 11/15/2018 5:37:37 PM Non-Wetland DP14 Wetland Data Point 30.122090 -95.066578 13 1.6810 0.8995 11/15/2018 5:37:37 PM Non-Wetland DP15 Wetland Data Point 30.122090 -95.065657 13 1.6812 0.815 11/15/2018 5:37:37 PM Non-Wetland DP17 Wetland Data Point 30.122269 -95.065657 12 1.6810 0.81345 11/15/2018 5:37:37 PM Non-Wetland DP17 Wetland Data Point 30.122269 -95.0653112 12 1.8620 11/12/2018 3:57:47 PM Non-Wetland DP20 Wetland Data Point 30.122603 -95.065147 12 1.8891 1.0291218 3:57:47 PM Non-Wetland DP21 Wetland Data Point 30.125602 -95.065147 12 1.8891 1.1/29/2018 3:57:47 PM	DP11	Wetland Data Point	30.125064	-95.069457	12	1.5557	0.8321	11/15/2018	2:40:35 PM Non-Wetland
PP13 Wetland Data Point 30.125030 95.065728 13 1.4832 0.8440 11/15/2018 4:25:50 PM Wetland 3 DP14 Wetland Data Point 30.125094 -95.065478 13 1.6474 0.8171 11/15/2018 5:37:37 PM Non-Wetland DP15 Wetland Data Point 30.122299 -95.065678 13 1.6474 0.8171 11/15/2018 5:37:37 PM Non-Wetland DP17 Wetland Data Point 30.122299 -95.065678 13 1.6875 0.91631 11/15/2018 5:37:37 PM Non-Wetland DP17 Wetland Data Point 30.122529 -95.06312 12 1.8836 1.0433 11/26/2018 5:37:37 PM Non-Wetland DP20 Wetland Data Point 30.125562 -95.06314 12 1.8836 1.0433 11/27/2018 5:37:62 PM Non-Wetland DP20 Wetland Data Point 30.125562 -95.06234 12 1.8836 1.1/27/2018 5:37:62 PM Non-Wetland DP21 Wetland Data Point 30.125562 -95.062341 12 1.8891 1.1/27/2018	DP12	Wetland Data Point	30.125023	-95.067142	14	1.4382	0.9158	11/15/2018	3:36:19 PM Non-Wetland
DP14 Wetland Data Point 30.125094 95.066350 12 1.6810 0.8995 11/15/2018 5.37.37 PM Non-Wetland DP15 Wetland Data Point 30.124999 95.064374 13 1.6474 0.8171 11/15/2018 5.37.37 PM Non-Wetland DP16 Wetland Data Point 30.12299 95.065033 13 1.5828 0.8345 11/26/2018 9:55.20 PM Non-Wetland DP17 Wetland Data Point 30.122569 95.065037 12 1.8353 1.0493 11/22/2018 3:55.32 PM Non-Wetland DP10 Wetland Data Point 30.122569 95.062340 12 1.833 1.227/2018 3:55.02 PM Non-Wetland DP20 Wetland Data Point 30.125602 95.062340 12 1.8891 1.0291018 3:57.47 PM Non-Wetland DP21 Wetland Data Point 30.126035 95.062340 16 1.129/2018 3:57.47 PM Non-Wetland DP22 Wetland Data Point 30.126036 95.06524112 1 1.8921 0.9104 11/29/2018 3:57.47 PM Non-Wetland <t< td=""><td>DP13</td><td>Wetland Data Point</td><td>30.125030</td><td>-95.065728</td><td>13</td><td>1.4832</td><td>0.8440</td><td>11/15/2018</td><td>4:25:50 PM Wetland 3</td></t<>	DP13	Wetland Data Point	30.125030	-95.065728	13	1.4832	0.8440	11/15/2018	4:25:50 PM Wetland 3
PP15 Wetland Data Point 30.12499 95.064874 13 1.6474 0.8171 11/15/2018 6:2:3:5 PM Non-Wetland PP16 Wetland Data Point 30.12299 95.06578 11 1.6982 0.9168 11/25/2018 9:5:5:20 PM Non-Wetland DP17 Wetland Data Point 30.12259 95.06578 11 1.8536 1.0493 1.1/25/2018 9:5:20 PM Non-Wetland DP18 Wetland Data Point 30.119572 95.065340 12 1.8536 1.0493 1.1/27/2018 3:5:0.2 PM Non-Wetland DP20 Wetland Data Point 30.119572 95.065340 12 1.8891 1.02661 1.1/29/2018 3:5:7.4 PM Non-Wetland DP21 Wetland Data Point 30.126505 95.065141 12 1.8891 1.1/29/2018 3:5:7.4 PM Non-Wetland DP22 Wetland Data Point 30.126505 95.065141 1 1.8922 0.9104 11/29/2018 3:5:7.4 PM Non-Wetland DP22 Wetland Data Point 30.126036 95.065141 1 1.8921 11/29/2018	DP14	Wetland Data Point	30.125094	-95.066350	12	1.6810	0.8995	11/15/2018	5:37:37 PM Non-Wetland
PP16 Wetland Data Point 30.122290 95.065678 11 1.6982 0.9168 11/26/2018 9:55:20 PM Non-Wetland DP17 Wetland Data Point 30.12224 95.06503 13 1.5828 0.8345 11/26/2018 9:5:20 PM Non-Wetland DP18 Wetland Data Point 30.122269 95.06507 12 1.8536 1.0493 11/27/2018 2:5:0:24 PM Non-Wetland DP19 Wetland Data Point 30.113572 95.06514 12 1.8891 10/27/2018 3:5:0:24 PM Non-Wetland DP20 Wetland Data Point 30.112572 95.065244 12 1.8892 0.8562 11/27/2018 3:5:7:27 PM Wetland 2 DP21 Wetland Data Point 30.126536 95.06514 11 1.8922 0.9104 11/23/2018 3:5:7:27 PM Wetland 2 DP22 Wetland Data Point 30.126536 95.065524 16 1.172/2018 3:5:7:27 PM Wetland 2 DP22 Wetland HGM Point 30.136505 95.065522 16 1.173/2018 3:5:7:27 PM Wetland 2 DP24	DP15	Wetland Data Point	30.124999	-95.064874	13	1.6474	0.8171	11/15/2018	6:23:25 PM Non-Wetland
DF17 Wetland Data Point 30.12254 95.063053 13 1.5828 0.8345 11/26/2018 10:34:13 PM Wetland 4 DP18 Wetland Data Point 30.122269 95.06307 12 1.8536 1.0493 11/27/2018 2:02:24 PM Non-Wetland DP19 Wetland Data Point 30.13552 -95.063112 12 1.9404 1.0666 11/27/2018 2:00.22 PM Non-Wetland DP20 Wetland Data Point 30.135502 -95.063340 12 1.8891 1.029/2018 3:55:02 PM Non-Wetland 2 DP21 Wetland Data Point 30.125602 -95.063340 12 1.8891 1.029/2018 3:55:52 PM Wetland 2 DP22 Wetland Data Point 30.126036 95.066124 16 1.172/2018 3:57:47 PM Non-Wetland 2 DP23 Wetland Data Point 30.125036 95.06614 16 1.129/2018 3:57:52 PM Wetland 2 DP23 Wetland HGM Point 30.125030 1650524 16 1.173/2018 3:57:47 PM	DP16	Wetland Data Point	30.122290	-95.065678	11	1.6982	0.9168	11/26/2018	9:55:20 PM Non-Wetland
PP18 Wetland Data Point 30.122269 -95.062697 12 1.8536 1.0433 11/27/2018 2:20:24 PM Non-Wetland PP19 Wetland Data Point 30.119572 -95.063112 12 1.9404 1.0666 11/27/2018 3:50:02 PM Non-Wetland DP20 Wetland Data Point 30.119572 -95.063140 12 1.5880 0.8562 11/27/2018 3:55:44 PM Wetland 2 DP21 Wetland Data Point 30.125536 -95.06034 11 1.8922 0.9104 11/29/2018 3:57:52 PM Wetland 2 DP22 Wetland Data Point 30.126036 -95.066924 16 1.3721 0.24/2018 3:57:52 PM Wetland 2 DP23 Wetland Data Point 30.126036 -95.066924 16 1.3721 0.1242018 3:57:52 PM Wetland 2 DF33 Wetland HGM Point 30.124890 -95.066924 16 1.3721 0.1242018 3:57:52 PM Wetland 2 DF4M01 Wetland HGM Point 30.130490 -95.066924 16 1.3721 0.1742018 3:16:18 PM Non-Wetland	DP17	Wetland Data Point	30.122254	-95.063053	13	1.5828	0.8345	11/26/2018	10:34:13 PM Wetland 4
PP19 Wetland Data Point 30.119572 -95.063112 12 1.9404 1.0666 11/27/2018 3:50:02 PM Non-Wetland DP20 Wetland Data Point 30.125602 -95.062340 12 1.5880 0.8562 11/29/2018 3:55:44 PM Wetland 2 DP21 Wetland Data Point 30.125502 -95.060544 12 1.8891 1.0294 11/29/2018 3:35:44 PM Wetland 2 DP22 Wetland Data Point 30.125536 -95.06054 11 1.8922 0.9104 11/29/2018 3:37:47 PM Non-Wetland 2 DP23 Wetland Data Point 30.126138 -95.060544 16 1.3721 0.5752 PM Wetland 2 DP23 Wetland HGM Point 30.130490 -95.0655712 11 1.8922 0.174/2018 3:16:18 PM Non-Wetland 2 HGM01 Wetland HGM Point 30.126302 -95.0655712 11 1.3721018 10:31:4.7 PM HGM02 Wetland HGM Point 30.124899 -95.0653012 1 1.173/2018 10:31:4.7 PM HGM03 Wetland HGM Point 30.125332	DP18	Wetland Data Point	30.122269	-95.062697	12	1.8536	1.0493	11/27/2018	2:20:24 PM Non-Wetland
DP20 Wetland Data Point 30.125602 95.062340 12 1.5880 0.8562 11/29/2018 3:35:44 PM Wetland 2 DP21 Wetland Data Point 30.125536 95.062447 12 1.8891 1.0294 11/29/2018 3:37:47 PM Non-Wetland 2 DP22 Wetland Data Point 30.125136 95.06954 11 1.8922 0.9104 11/29/2018 3:57:52 PM Wetland 2 DP23 Wetland Data Point 30.126036 95.06954 16 1.3721 0.507018 3:57:52 PM Wetland 2 HGM01 Wetland HGM Point 30.130505 95.0659624 16 1.3721 0.5742018 1:2/47018 1:6:31:47 PM HGM02 Wetland HGM Point 30.130400 95.065902 16 1.3711 0.745018 1:2/37018 1:3:3:47 PM HGM02 Wetland HGM Point 30.125032 95.0655712 11 1.8176 1:1/13/2018 1:0:31:47 PM HGM03 Wetland HGM Point 30.125032 95.0655712 11 1.8176 1:1/13/2018 1:0:31:47 PM	DP19	Wetland Data Point	30.119572	-95.063112	12	1.9404	1.0666	11/27/2018	3:50:02 PM Non-Wetland
Image: Decision content 30.12536 -95.06247 12 1.8891 1.0294 11/29/2018 3:37:47 PM Non-Wetland DP22 Wetland Data Point 30.126138 -95.060954 11 1.8922 0.9104 11/29/2018 3:37:47 PM Non-Wetland 2 DP23 Wetland Data Point 30.126036 -95.060140 9 1.6500 0.9200 12/4/2018 3:57:52 PM Wetland 2 HGM01 Wetland HGM Point 30.130505 -95.069624 16 1.3721 0.6754 11/13/2018 1:6:18 PM Non-Wetland HGM02 Wetland HGM Point 30.130490 -95.0665712 11 1.8176 1.713/2018 1:3:1:47 PM PM HGM03 Wetland HGM Point 30.125032 -95.065712 11 1.8176 1.713/2018 1:3:1:47 PM PM HGM04 Wetland HGM Point 30.124899 -95.065712 11 1.8176 1.713/2018 5:05.07 PM PM recorded with phone. No HGM04 Wetland HGM Point 30.124899 -95.065212 11 1.8176 11/15/2018 5:05.	DP20	Wetland Data Point	30.125602	-95.062340	12	1.5880	0.8562	11/29/2018	3:35:44 PM Wetland 2
DP22 Wetland Data Point 30.126138 -95.060954 11 1.8922 0.9104 11/29/2018 3:57:52 PM Wetland 2 DP23 Wetland Data Point 30.126036 -95.061140 9 1.6500 0.9200 12/4/2018 3:16:18 PM Non-Wetland HGM01 Wetland HGM Point 30.130505 -95.069624 16 1.3721 0.6754 11/13/2018 10:31:47 PM HGM02 Wetland HGM Point 30.130490 -95.068902 16 1.3721 0.6754 11/13/2018 10:31:47 PM HGM03 Wetland HGM Point 30.125032 -95.068902 16 1.3770 11/13/2018 10:31:47 PM HGM03 Wetland HGM Point 30.125032 -95.065712 11 1.8176 11/15/2018 5:05:07 PM HGM04 Wetland HGM Point 30.122832 -95.065212 11 1.8176 5:05:07 PM Point recorded with Phone. No HGM04 Wetland HGM Point 30.122832 -95.065214 11 2.05018 5:05:07 PM Point recorded with Phone. No HGM05 <td>DP21</td> <td>Wetland Data Point</td> <td>30.125536</td> <td>-95.062447</td> <td>12</td> <td>1.8891</td> <td>1.0294</td> <td>11/29/2018</td> <td>3:37:47 PM Non-Wetland</td>	DP21	Wetland Data Point	30.125536	-95.062447	12	1.8891	1.0294	11/29/2018	3:37:47 PM Non-Wetland
PP23 Wetland Data Point 30.126036 -95.061140 9 1.6500 0.9200 12/4/2018 3:16:18 PM Non-Wetland HGM01 Wetland HGM Point 30.130505 -95.069624 16 1.3721 0.6754 1/13/2018 10:28:48 PM HGM02 Wetland HGM Point 30.130490 -95.068902 16 1.4511 0.7458 1/1/13/2018 10:31:47 PM HGM03 Wetland HGM Point 30.125032 -95.065712 11 1.8176 1.2760 1/15/2018 5:05:07 PM HGM04 Wetland HGM Point 30.124899 -95.065312 11 1.8176 1.1/15/2018 5:05:07 PM HGM05 Wetland HGM Point 30.12232 -95.065304 11 1.27601 1.1/15/2018 5:05:07 PM HGM05 Wetland HGM Point 30.12232 -95.066304 1 1 2:043 2:04:12 PM HGM05 Wetland HGM Point 30.125860 -95.061809 7 2:0700 1/1/15/2018 2:16:34 PM HGM05 Wetland HGM Point 30.125860 <td>DP22</td> <td>Wetland Data Point</td> <td>30.126138</td> <td>-95.060954</td> <td>11</td> <td>1.8922</td> <td>0.9104</td> <td>11/29/2018</td> <td>3:57:52 PM Wetland 2</td>	DP22	Wetland Data Point	30.126138	-95.060954	11	1.8922	0.9104	11/29/2018	3:57:52 PM Wetland 2
HGM01 Wetland HGM Point 30.130505 -95.069624 16 1.3721 0.6754 11/13/2018 10:28:48 PM HGM02 Wetland HGM Point 30.130490 -95.068902 16 1.4511 0.7458 11/13/2018 10:31:47 PM HGM03 Wetland HGM Point 30.125032 -95.065712 11 1.8176 1.2760 11/15/2018 5:05:07 PM HGM04 Wetland HGM Point 30.124899 -95.065712 11 1.8176 1.2760 11/15/2018 5:05:07 PM HGM04 Wetland HGM Point 30.124899 -95.065219 0 0.0000 11/15/2018 5:05:07 PM HGM05 Wetland HGM Point 30.122822 -95.065304 11 2.0100 11/15/2018 2:04:20 PM HGM05 Wetland HGM Point 30.122860 -95.061809 7 2.0700 11/15/2018 2:16:34 PM HGM06 Wetland HGM Point 30.125860 -95.061809 7 2.0700 11/12/2018 2:04:20 PM HGM07 Wetland HGM Point 30.125860	DP23	Wetland Data Point	30.126036	-95.061140	6	1.6500	0.9200	12/4/2018	3:16:18 PM Non-Wetland
HGM02 Wetland HGM Point 30.130490 -95.068902 16 1.4511 0.7458 11/13/2018 10:31:47 PM HGM03 Wetland HGM Point 30.125032 -95.065712 11 1.8176 1.2760 11/15/2018 5:05:07 PM HGM04 Wetland HGM Point 30.124899 -95.066219 0 0.0000 11/15/2018 5:05:07 PM HGM05 Wetland HGM Point 30.122232 -95.066219 0 0.0000 11/15/2018 Point recorded with phone. No HGM05 Wetland HGM Point 30.122232 -95.063044 11 2.0543 1.0498 11/27/2018 2:16:34 PM HGM06 Wetland HGM Point 30.125860 -95.061809 7 2.0700 1.1900 12/4/2018 2:04:20 PM HGM07 Wetland HGM Point 30.125938 -95.060853 6 2.9800 1.3100 12/4/2018 3:34:53 PM	HGM01	Wetland HGM Point	30.130505	-95.069624	16	1.3721	0.6754	11/13/2018	10:28:48 PM
HGM03 Wetland HGM Point 30.125032 -95.065712 11 1.8176 1.12/2018 5:05:07 PM HGM04 Wetland HGM Point 30.124899 -95.066219 0 0.0000 11/15/2018 Foint recorded with phone. No accuracy statistics available. HGM05 Wetland HGM Point 30.122322 -95.0663044 11 2.0543 1.0498 11/27/2018 2:16:34 PM HGM06 Wetland HGM Point 30.125860 -95.061809 7 2.0700 1.1900 12/4/2018 2:04:20 PM HGM07 Wetland HGM Point 30.125938 -95.060853 6 2.9800 1.3100 12/4/2018 3:34:53 PM	HGM02	Wetland HGM Point	30.130490	-95.068902	16	1.4511	0.7458	11/13/2018	10:31:47 PM
HGM04 Wetland HGM Point 30.124899 -95.066219 0 0.0000 0.1/15/2018 Point recorded with phone. No HGM05 Wetland HGM Point 30.12232 -95.063044 11 2.0543 1.0498 11/27/2018 2.16:34 PM HGM06 Wetland HGM Point 30.125860 -95.061809 7 2.0700 1.1900 12/4/2018 2:16:34 PM HGM07 Wetland HGM Point 30.125938 -95.060853 6 2.9800 1.3100 12/4/2018 2:04:20 PM	HGM03	Wetland HGM Point	30.125032	-95.065712	11	1.8176	1.2760	11/15/2018	5:05:07 PM
HGM05 Wetland HGM Point 30.122232 -95.063044 11 2.0543 1.0498 11/27/2018 2:16:34 PM HGM06 Wetland HGM Point 30.125860 -95.061809 7 2.0700 1.1900 12/4/2018 2:04:20 PM HGM07 Wetland HGM Point 30.125938 -95.060853 6 2:9800 1.3100 12/4/2018 3:34:53 PM	HGM04	Wetland HGM Point	30.124899	-95.066219	0	0.0000	0.0000	11/15/2018	Point recorded with phone. No accuracy statistics available.
HGM06 Wetland HGM Point 30.125860 -95.061809 7 2.0700 1.1900 12/4/2018 2:04:20 PM HGM07 Wetland HGM Point 30.125938 -95.060853 6 2.9800 1.3100 12/4/2018 3:34:53 PM	HGM05	Wetland HGM Point	30.122232	-95.063044	11	2.0543	1.0498	11/27/2018	2:16:34 PM
HGM07 Wetland HGM Point 30.125938 -95.060853 6 2.9800 1.3100 12/4/2018 3:34:53 PM	HGM06	Wetland HGM Point	30.125860	-95.061809	7	2.0700	1.1900	12/4/2018	2:04:20 PM
	HGM07	Wetland HGM Point	30.125938	-95.060853	9	2.9800	1.3100	12/4/2018	3:34:53 PM

APPENDIX C – WETLAND DELINEATION DATA FORMS AND PHOTOS

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

Project/Site:	Lake Houston Mitigation E	Bank	City/County:	Liberty Coun	ity	Sampling Date:	11/13/2018
Applicant/Owner:		LH Ranch, Ltd.		State	e: TX	Sampling Point:	DP01
Investigator(s):	Goodrum/Boitnott		Section, Township	, Range:		NA	
Landform (hillslope, terrace, e	etc): Teri	ace	Local relief (conca	ve, convex, none):	Conve	x Slope	(%): 0-1
Subregion (LRR or MLRA):	LRR-T	Lat:	30,130552	Long:	-95.07212	2 Datun	n: NAD 83
Soil Map Unit Name:	Waller-Tarl	kington complex, 0 t	o 1 percent slopes		NWI classificati	on: Pl	FO1A
Are climatic / hydrologic cond	itions on the site typical for	or this time of year?	Yes X	No (lf no, e	xplain in Remarl	<s.)< td=""><td></td></s.)<>	
Are Vegetation , So	il , or Hydrology	significant	y disturbed?	Are "Normal Circu	mstances" pres	ent? Yes >	K No
Are Vegetation , So	il , or Hydrology	naturally p	roblematic?	(If needed, explair	n any answers ir	Remarks.)	
SUMMARY OF FINDIN	GS - Attach site ma	p showing san	npling point loc	ations, transects	s, important	features, etc.	
Hydrophytic Vegetation Pre	sent? Yes	<u>X No</u>		,	· •	•	
Hydric Soil Present?	Yes	No X	Is the S	ampled Area			
Wetland Hydrology Presen	t? Yes	X No		a Wetland?	Yes	No X	
		<u></u>					-
Remarks:							
Mixed hardwo	od stand adjacent to Carr	p Branch West. Hyd	dric soils not present	Site is not a wetland			
	itors:	all that ann hi			Cocceden (India	atona (minimana af t	
Primary Indicators (minimu	m of one required: check	all that apply)	- (D40)		Secondary Indic	ators (minimum of t	wo required)
Surface vvaler (AT)		Aquatic Faun			Sunace So	II Cracks (B6)	
High Water Table (A2)			S (B15) (LKK U)		Sparsely Ve	egetated Concave a	Surface (B8)
Saturation (A3)		Hydrogen Su	mde Odor (C1)		Drainage P	atterns (B10)	
Water Marks (B1)			zospheres along Liv	ing Roots (C3)		Lines (B16)	
Sediment Deposits (B	2)	Presence of	Reduced Iron (C4)		Dry-Seasor	n Water Table (C2)	
X Drift Deposits (B3)		Recent Iron F	Reduction in Tilled S	oils (C6)	Crayfish Bu	irrows (C8)	
Algal Mat or Crust (B4	•)	Thin Muck St	urface (C7)		Saturation	Visible on Aerial Ima	agery (C9)
Iron Deposits (B5)		Other (Explai	n in Remarks)		Geomorphi	c Position (D2)	
Inundation Visible on A	Aerial Imagery (B7)				Shallow Aq	uitard (D3)	
Water-Stained Leaves	, (B9)				FAC-Neutra	al Test (D5)	
					Sphagnum	moss (D8) (LRR T,	, U)
Field Observations:							
Surface Water Present?	Yes No	X Depth (inch	es).				
Water Table Present?	Yes No	X Depth (inch	es):	-			
Saturation Present?	Yes No	X Depth (inch	es):	– Wetland Hydro	logy Present?	Yes X	No
(includes capillary fringe)				-			
Describe Recorded Data (s	tream gauge, monitoring	well, aerial photos, p	previous inspection),	if available:			
Demontori							
Remarks: Flashv hvdrol	ogy from occasional outba	nking from Camp B	ranch West. Stream	is severely entrenche	d. which reduce	s outbanking event	s. One primary
hydrology indi	cator observed. Wetland	hydrology present.		,	,		

VEGETATION (Four Strata) - Use scientific names of plants.

VEGETATION (Four Strata) - Use scientific names	s of plant	s.		Sampling Point:DP01
	-			Dominance Test worksheet:
	Absolute	Dominant	Indicator	Number of Dominant Species
Tree Stratum (Plot size: 30')	% Cover	Species?	Status	That Are OBL. FACW. or FAC: 6 (A)
1. Liquidambar stvraciflua / Sweetgum	20	Yes	FAC	(*)
2. Ostrva virginiana / Eastern hop-hornbeam	30	Yes	FACU	Total Number of Dominant
3. Quercus nigra / Water oak	10	No	FAC	Species Across All Strata: 8 (B)
4 Triadica sebifera / Chinese tallowtree	3	No	FAC	
5				Percent of Dominant Species
6				That Are OBL_EACW or EAC: 75 (A/B)
7				
8				Prevalence Index worksheet:
0	63	= Total Cov		Total % Cover of: Multiply by:
50% of total cover: 31	20%	_ = Total Cov	- 12	OBL species 0 $x 1 = 0$
Sono on total cover. <u>51</u>	20 %		. 15	FACW species $0 \times 2 = 0$
Saping/Sillub Stratum (Flot size)	50	Vaa	FAC	FAC species 9 $\times 3 = 27$
	<u> </u>	Yes	FAC	$\frac{1}{1} = \frac{1}{1}$
2. <i>Ilex opaca / American holly</i>	5	<u> </u>	FAC	$\frac{1}{100} \frac{1}{100} \frac{1}$
3. Callicarpa americana / American beauty-berry	10	No	FACU	$\begin{array}{c} \text{Oll L species} \\ \text{Column Totals:} \\ 13 \\ (\Lambda) \\ 43 \\ (P) \\ \end{array}$
4. Ostrya virginiana / Eastern hop-hornbeam	5	No	FACU	$\begin{array}{c} \text{Column rotals.} \\ $
5				Drevelopes lades = D(A = 2.0077)
6				Prevalence index = $B/A = 3.3077$
7				Hydrophytic Vegetation Indicators:
8				1 - Rapid Test for Hydrophytic Vegetation
	70	= Total Cov	er	X = 2 - Dominance Test is >50%
50% of total cover: 35	20%	of total cover:	14	$\frac{1}{3}$ - Prevalence Index <3 011
Herb Stratum (Plot size: <u>30'</u>)				data in Remarks or on a separate sheet)
1. Chasmanthium sessiliflorum / Long-leaf wood-oats	10	Yes	FAC	Problematic Hydronbytic Vegetation ¹ (Explain)
2. Callicarpa americana / American beauty-berry	5	Yes	FACU	
3. Ilex vomitoria / Yaupon	10	Yes	FAC	Indicators of hydric soil and wotland hydrology must
4				he present unless disturbed or problematic
5				be present, unless disturbed of problematic.
6.				Definitions of Four Vegetation Strata:
7.				
8.				Tree – Woody plants, excluding vines 3 in (7.6 cm) or
9.				more in diameter at breast height (DBH) regardless of
10.		-		height
11.				hoight.
12.		-		Sapling/Shrub – Woody plants, excluding vines, less
	25	= Total Cov	er	than 3 in DBH and groater than 3 28 ft (1 m) tall
50% of total cover: 12	20%	- of total cover:	5	
Woody Vine Stratum (Plot size: 30')				Harb All berbasseus (non weedy) plants, regardless
1 Smilax rotundifolia / Horsebrier	5	Yes	FAC	nerb – All herbaceous (hon-woody) plants, regardless
2 Vitis rotundifolia / Muscadine	5	Yes	FAC	of size, and woody plants less than 3.26 it tall.
3				
0				Woody vine – All woody vines greater than 3.28 ft in
۲ 5	·			height.
J	10			Hydrophytic
E00/ of total action E	200/	Total COV	וס . ח	Vegetation
	20%	or total cover:	. <u> </u>	Present? Ves V No
Remarks (if observed, list morphological adaptions below).				

Hardwood stand adjacent to Camp Branch West. Hydrophytic vegetation is dominant.

SO	L
----	---

(:		0/	Calar (maint)	0/ True 1	1 + +2	Terreture	Deveerlee
(incries)			Color (moist)	% Type	LOC		Remarks
0-8	10/YR 4/4	<u> </u>				Fine sandy loa	
8-12	10YR 6/4	100		·			
ype: C=Cor	ncentration, D=Depletio	on, RM=Reduc	ed Matrix, MS=Masl	ked Sand Grains.		² Location: Pl	_=Pore Lining, M=Matrix.
ydric Soil I	ndicators: (Applicabl	e to all LRRs,	unless otherwise r	noted.)		Indicators for Pr	oblematic Hydric Soils ³ :
Histosol	(A1)		Polyvalue I	Below Surface (S8) (LF	RR S, T, U) 1 cm Muck (/	A9) (LRR O)
Histic Ep	oipedon (A2)		Thin Dark	Surface (S9) (LRR S, T	; U)	2 cm Muck (A10) (LRR S)
Black Hi	stic (A3)		Loamy Mu	cky Mineral (F1) (LRR)	D)	Reduced Ver	rtic (F18) (outside MLRA 150A,E
Hydroge	en Sulfide (A4)		Loamy Gle	yed Matrix (F2)		Piedmont Flo	oodplain Soils (F19) (LRR P, S, T)
Stratified	d Layers (A5)		Depleted N	latrix (F3)		Anomalous E	Bright Loamy Soi l s (F20)
 Organic	Bodies (A6) (LRR P, T	r, U)	Redox Dar	k Surface (F6)		(MLRA 153E	3)
5 cm Mu	icky Mineral (A7) (LRF	R P. T. U)	Depleted D	ark Surface (F7)		Red Parent I	Material (TF2)
 Muck Pr	esence (A8) (LRR U)		Redox Dep	pressions (F8)		Verv Shallow	/ Dark Surface (TF12)
	ick (A9) (LRR P. T)		Marl (F10)	(LRR U)		Other (Expla	in in Remarks)
_ Depleter	d Below Dark Surface (A11)	Depleted C	Chric (E11) (MI RA 151)		,
- Thick Da	ark Surface (A12)		Iron-Manga	anese Masses (F12) (I F	, 2R O. P. T) ³ Indicators of h	hydropphobic vegetation and
- Coast Pi	rairie Redox (A16) (M	I RA 150A)	Limbric Su	face (F13) (I RR P T I	n N	wetland hv	drology must be present
Sandy M	Aucky Mineral (S1) (LF		Delta Ochr	ic (F17) (MI RA 151)	-,	unless dist	urbed or problematic
_ Sandy G	Heved Matrix (S4)	(((0,0)	Beduced V	ertic (F18) (MI RΔ 150	A 150B)		
_ Sandy E	Pedax (S5)		Riedmont F	Eloodolain Soils (E19) (Л, 1000) ЛІ ПА 1/0	(A)	
_ Strippod	Matrix (S6)			Bright Loomy Soils (F2)		(~) \ 149A 152C 152D)	
_ Surpped	rfaaa (S7) /I PP P S	T 10	Anomalous	B Dhyfit Loainy Solis (F2		A 149A, 103C, 103D)	
	Trace (37) (LKK F, 3,	1, 0)				1	
estrictive L	ayer (if present):						
Туре:							
Depth (in	ches):					Hydric Soil Present	? Yes <u>No X</u>

WETLAND DETERMINATION DATA FORM - Atlantic and Gulf Coastal Plain Region

Project/Site:	Lake Houston Mitigation Bank	City/County:	Liberty Cou	nty	Sampling Date:	11/13/2018
Applicant/Owner:	LH Ranch,	Ltd.	State: T>		TX Sampling Point: DP02	
Investigator(s):	Goodrum/Boitnott	Section, Towns	Section, Township, Range:		NA	
Landform (hillslope, terrace,	etc): Mound	Local relief (co	ncave, convex, none):	Concav	e Slope (%	o): 0-1
Subregion (LRR or MLRA):	LRR-T	Lat: 30.1304	72 Long:	-95.07009	3 Datum:	NAD 83
Soil Map Unit Name:	Lelavale silt loam, 0 to 2	1 percent slopes, ponde	ed	NWI classification	on: Non-We	etland
Are climatic / hydrologic cond	litions on the site typical for this time of	year? Yes X	No (lf no, e	explain in Remark	s.)	
Are Vegetation X , So	il , or Hydrology sigr	nificantly disturbed?	Are "Normal Circ	umstances" prese	ent? Yes X	No
Are Vegetation , So	il , or Hydrology nati	urally problematic?	(If needed, explai	in any answers in	Remarks.)	
SUMMARY OF FINDIN	GS - Attach site map showing	a sampling point	locations. transect	s. important	features. etc.	
	sent? Yes Y No	<u>5 </u>	·····, ·····			
Hydrio Soil Procent?			he Sampled Area			
Wetland Hydrology Brooon	t2 Yee No	<u>^</u> 15 U	ne Sampleu Area	Vaa	No. X	
wettand Hydrology Preser	t? fes No _	wit		tes		
Remarks: Upland mixed wetland.	I pine/hardwood habitat adjacent to the	western extent of a de	pressional wetland (Wetl	and 1). Hydric soi	ls not present. Site is ı	not a
HYDROLOGY						
Wetland Hydrology Indic Primary Indicators (minimu) Surface Water (A1) High Water Table (A2 X Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Water-Stained Leaves	ators: <u>m of one required: check all that apply</u>) Aquati Marl D — Hydrog 2) 2) 4) 4) 4) 4) 4) 4) 4) 4) 4) 4	c Fauna (B13) Deposits (B15) (LRR U gen Sulfide Odor (C1) ed Rhizospheres along nce of Reduced Iron (C ti Iron Reduction in Tille fuck Surface (C7) (Explain in Remarks)) 4) ed Soils (C6)	Secondary Indica Surface Soi Drainage Pa Moss Trim L Dry-Season Crayfish Bu Saturation N Geomorphic Shallow Aqu FAC-Neutra Sphagnum	ttors (minimum of two I Cracks (B6) getated Concave Surf atterns (B10) .ines (B16) Water Table (C2) rrows (C8) /isible on Aerial Image : Position (D2) uitard (D3) I Test (D5) moss (D8) (LRR T, U)	required) face (B8) ery (C9)
Field Observations: Surface Water Present? Water Table Present? Saturation Present? (includes capillary fringe)	Yes <u>No X</u> Dept Yes <u>No X</u> Dept Yes X No Dept	h (inches): h (inches): h (inches): 0	Wetland Hydro	ology Present?	Yes X N	No
Describe Recorded Data (stream gauge, monitoring well, aerial ph	notos, previous inspecti	on), if available:			
Remarks: Soils saturate	d to surface due to recent rains and inf	luence from adjacent w	etland. Wetland hydrolog	gy present.		

VEGETATION (Four Strata) - Use scientific names of plants

VEGETATION (Four Strata) - Use scientific names	s of plant	s.			Samp	ling Poin	t: <u>D</u>	P02
				Dominance Test w	orksheet:			
	Absolute	Dominant	Indicator	Number of Domina	nt Species			
Tree Stratum (Plot size: 30')	% Cover	Species?	Status	That Are OBL, FAC	W, or FAC:		9	(A)
1. Pinus taeda / Loblolly pine	30	Yes	FAC					_ ` /
2. Quercus nigra / Water oak	15	Yes	FAC	Total Number of Do	minant			
3. Liguidambar styraciflua / Sweetgum	10	No	FAC	Species Across All	Strata:		11	(B)
4. Quercus pagoda / Cherry-bark oak	10	No	FACW					_ ` '
5. <i>Quercus alba /</i> White oak	5	No	FACU	Percent of Dominar	nt Species			
6.	-			That Are OBL, FAC	W, or FAC:		82	(A/B)
7.				, 	, 			. ,
8.				Prevalence Index	worksheet:			
	70	= Total Cov	rer	Total % Cover	of:	Mu	tiply by:	
50% of total cover: 35	20%	- of total cover:	: 14	OBL species	0	x 1 =	0	
Sapling/Shrub Stratum (Plot size: 30')				FACW species	2	x 2 =	4	
1. Ilex vomitoria / Yaupon	10	Yes	FAC	FAC species	11	x 3 =	33	
2. Ostrya virginiana / Eastern hop-hornbeam	5	Yes	FACU	FACU species	4	x 4 =	16	
3. <i>Quercus nigra / Water oak</i>	5	Yes	FAC	UPL species	0	x 5 =	0	
4. Magnolia grandiflora / Southern magnolia	2	No	FAC	Column Totals:	17	(A)	53	(B)
5. Callicarpa americana / American beauty-berry	2	No	FACU					
6. <i>Quercus alba /</i> White oak	5	Yes	FACU	Prevalence Ir	idex = B/A =	;	3.1176	
7.						•		
8.				Hydropnytic veger	ation Indica	itors:	-4:	
	29	= Total Cov	rer		Tractice 5 500	rtic veget	ation	
50% of total cover:14	20%	of total cover:	: 6		lest is >50%	'0 1		
Herb Stratum (Plot size: 30')				3 - Prevalence		noroto ob	a a tì	
1. Sabal minor / Dwarf palmetto	40	Yes	FACW	Dreblemetie L	(s or on a sep	parate sn	eet) (Evalaia)	
2. Chasmanthium sessiliflorum / Long-leaf wood-oats	10	Yes	FAC		/drophytic ve	getation	(Explain)	
3. Quercus nigra / Water oak	2	Yes	FAC	1 Indiactors of hydric	a a il and wat			
4. Ilex vomitoria / Yaupon	5	Yes	FAC	he present unless	disturbed or u	anu nyu	tio	ot
5				be present, unless		JIUDiema	uc.	
6				Definitions of Fou	r Vegetation	Strata:		
7								
8				Tree - Woody plant	ts, excluding	vines, 3 i	n. (7.6 cm)) or
9				more in diameter at	breast heigh	nt (DBH),	regardless	of
10				height.	-		-	
11				-				
12				Sapling/Shrub – W	/oody plants,	excludin	g vines, les	ss
	57	_ = Total Cov	rer	than 3 in. DBH and	greater than	3.28 ft (1	m) tall.	
50% of total cover: 28	20%	of total cover	: <u>11</u>					
Woody Vine Stratum (Plot size: <u>30'</u>)				Herb – All herbace	ous (non-woc	ody) plant	s, regardle	ess
1. Vitis rotundifolia var. rotundifolia / Muscadine	5	Yes	FAC	of size, and woody	plants less th	nan 3.28 f	t tall.	
2. Smilax rotundifolia / Horsebrier	2	No	FAC					
3				Woody vine – All w	/oody vines ç	greater th	an 3.28 ft i	n
4				height.				
5								
	7	= Total Cov	rer	Hydrophytic				
50% of total cover: <u>3</u>	20%	of total cover	: <u>1</u>	Vegetation				
				Present?	Yes X	<u>No</u>		
Remarks (if observed, list morphological adaptions below).				1				

Mixed pine/hardwood stand. Hydrophytic vegetation is dominant.

OIL								Sam	npling Point:	DP0	2
Profile Desc	ription: (Describe to tl	ne depth ne	eded to document the	e indicator	or confirm	n the abse	ence of indicators.)				
Depth	Matrix		Redox	Features			-				
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture		Remarks		
0-6	10YR 4/4	100					Fine sandy loa				
6-12	10YR 6/3	95	10YR 6/8	5		M	Fine sandy loa				
¹ Type: C=Co	ncentration, D=Depletio	n, RM=Redu	ced Matrix, MS=Maske	ed Sand Gr	ains.		²Location:	PL=Pore	Lining, M=Matr	ix.	
Hydric Soil I Histosol Histic Ep Black Hi Hydroge Stratified Organic 5 cm Mu Muck Pr 1 cm Mu Depleter Thick Da Coast P Sandy M Sandy G Sandy F Stripped Dark Su	ndicators: (Applicable (A1) bipedon (A2) istic (A3) en Sulfide (A4) d Layers (A5) Bodies (A6) (LRR P, T, ucky Mineral (A7) (LRR resence (A8) (LRR U) uck (A9) (LRR P, T) d Below Dark Surface (/ ark Surface (A12) rairie Redox (A16) (ML Aucky Mineral (S1) (LR Bleyed Matrix (S4) Redox (S5) I Matrix (S6) rface (S7) (LRR P, S,	u) P, T, U) A11) RA 150A) R O, S) T, U)	a, unless otherwise no Polyvalue B Thin Dark S Loamy Much Loamy Gley Depleted Ma Redox Dark Depleted Da Redox Depr Marl (F10) Depleted Oa Iron-Mangar Umbric Surf Delta Ochric Reduced Ve Piedmont Fl Anomalous	oted.) elow Surfac urface (S9) ky Mineral (red Matrix (F3) Surface (F1 ark Surface ressions (F8 (LRR U) Chric (F11) (nese Masse face (F13) (c (F17) (ML ertic (F18) (loodplain Sc Bright Loan	ce (S8) (LF (LRR S, 1 F1) (LRR F2) 6) (F7) 3) (MLRA 151 (LRR P, T, .RA 151) (MLRA 150 oils (F19) (I ny Soils (F2	RR S, T, U F, U) O) RR O, P, T U) DA, 150B) MLRA 148 20) (MLR/	Indicators for 1 cm Mucl 2 cm Mucl Reduced V Piedmont Anomalou (MLRA 15 Red Parer Very Shall Other (Exp) ³ Indicators of wetland unless d DA) A 149A, 153C, 153D)	Problema (A9) (L (A10) (L /ertic (F18 Floodplain s Bright Lo 3B) It Material ow Dark S plain in Re of hydropp hydrology sturbed or	tic Hydric Soil RR O) RR S) (outside ML a Soils (F19) (L barry Soils (F20 (TF2) Surface (TF12) marks) hobic vegetatic must be presen r problematic.	Is ³ : RA 150A RR P, S, D) on and nt.	,В) Т)
Type: Depth (in	ches):						Hydric Soil Prese	nt?``	Yes	No <u>×</u>	
Remarks:	No hydric soil indicators	s present. Sc	ils appear to match the	e Tarkingtor	n soi l s serie	es (modera	ately well drained and i	10n-hydric	:).		



DP 03 Vegetation. Wetland depression (Wetland 1) near Camp Branch West. Predominantly hardwood stand with pine on mounds



DP 03 soils. Depleted matrix and redox depressions indicators present



DP 04 vegetation. Upland pine dominated mound within depressional wetland (Wetland 1).



DP 04 soils. No hydric soil indicators observed.



DP 05 vegetation facing south. Eastern extent of hardwood dominated depressional wetland (Wetland 1).



DP 05 soils. Depleted matrix and redox depressions indicators present.





DP 06 vegetation facing north. Mixed hardwood/pine on ridge east of depressional wetland (Wetland 1)



DP 06 Soils. No hydric soil indicators present.



DP 07 vegetation facing north. Recently thinned mixed hardwood non-wetland flat.



DP 07 Soils. Depleted matrix present. Area is nonwetland due to lack of wetland hydrology indicators.



DP 08 vegetation facing west. Mixed hardwood/pine adjacent to Camp Branch East Fork.



DP 08 soils. No hydric soil indicators present.





DP 09 vegetation facing north. Recently thinned mixed hardwood non-wetland flat.



DP 09 soils. Depleted matrix present. Area is non-wetland due to lack of wetland hydrology indicators.



DP 10 vegetation facing south. Mixed hardwood/pine mound within non-wetland flat



DP 10 soils. No hydric soil indicators observed.



DP11 vegetation facing north. Hardwood stand adjacent to Camp Branch West Fork.



DP11 soils. No hydric soil indicators observed.





DP 12 vegetation facing east. Recently thinned mixed hardwood non-wetland flat.



DP 12 soils. Depleted matrix present. Area is nonwetland due to lack of wetland hydrology indicators.



DP 13 vegetation facing east. Mixed hardwood/pine wetland depression (Wetland 3)



DP 13 soils. Depleted matrix present.



DP 14 vegetation facing north. Recently thinned nonwetland area on west side of wetland depression (Wetland 3).



DP 14 soils. Depleted matrix present. Area is non-wetland due to lack of wetland hydrology indicators.





DP 15 vegetation facing west. Upland hardwood stand located east of depressional wetland (Wetland 3)



DP 15 soils. No hydric soil indicators present.



DP 16 vegetation facing south. Mixed pine/hardwood stand adjacent to Camp Branch West.



DP 16 soils. Depleted matrix present. Area nonwetland due to lack of wetland hydrology indicators.



DP17 vegetation facing south. Small hardwood dominated wetland depression (Wetland 4).



DP17 soils. Depleted matrix present.





DP18 vegetation facing east. Upland hardwood stand adjacent to small wetland depression.



DP18 soils. No hydric soils indicators present.



DP19 vegetation facing north. Upland hardwood stand adjacent to Camp Branch



DP19 soils. No hydric soil indicators present.



DP20 vegetation facing southeast. Hardwoood dominated wetland depression (Wetland 2).



DP20 soils. Depleted matrix present.





DP21 vegetation facing south. Pine dominated upland mound adjacent to Wetland 2.



DP21 soils. No hydric soil indicators present.



DP22 vegetation facing east. Plot located in scrub/shrub portion of depressional wetland (Wetland 2).



DP22 soils. Depleted matrix and redox depressions present.



DP23 vegetation facing south. Mixed pine/hardwood upland mound adjacent to Wetland 2.



DP23 soils. No hydric soil indicators present.



APPENDIX D-IHGM DATA SHEETS

Forested iHGM				
Project	Lake Houston MB Wetland			
ID	30753			
Survey Date	11/13/2018			
User	Neil Boitnott			
Plot	HGM01			
WAA	WAA 1			
Location	30.130500,-95.069651			
Photos				



HGM 01

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Quercus laurifolia /</i> Laurel oak
Tree Count	15

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Acer rubrum /</i> Red maple
Tree Count	1

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Nyssa sylvatica</i> / Blackgum
Tree Count	1

Ba	Basal Area - 10-Factor Prism					
	Basal Area Species	<i>Quercus laurifolia /</i> Laurel oak				
	Basal Area Species Count	6				
Vo	lur:	1.00: In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days				
Vf	req	1.00: Floods or pond annually 5 out of 5 years (floodway)				



Vtopo	0.40: Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/ or other topographic features
Vcwd	0.50: From 3 -7 pieces of cwd greater than 3" diameter along 100' transect
Vcwd Count	3
Vwood	0.50: 34 to 66% of the WAA is covered with woody vegetation
Vtree	1.00: At least 60% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 5% of the stand.
Vrich	0.40: One-two tree species present
Vbasal	0.60: The average basal area of the WAA is between 60-80 square ft/acre
Vdensity	1.00: The WAA averages a tree density of 100-250 trees/acre
Vmid	0.50: Midstory coverage of the WAA is between 11-30%
Vherb	0.30: Herbaceous cover in the WAA is less than 5% or greater than 50%
Vdetritus	1.00: Greater than 85% of the area possesses an O or A horizon
Vredox	1.00: Redox at least 20% within the top 4 inches of the soil surface.
Vsorpt	0.50: WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non- montmorillonitic clays
Vconnect	1.00: Wetland plus four habitats and/or surrounded by forested

Forested iHGM				
Project	Lake Houston MB Wetland			
ID	30752			
Survey Date	11/13/2018			
User	Neil Boitnott			
Plot	HGM02			
WAA	WAA 1			
Location	30.130525,-95.069004			

Photos



HGM 02 facing south

Tr	ee Count - 1/10th Acre	e Plot			
	Tree Count Species	<i>Quercus laurifolia /</i> Laurel oak			
	Tree Count	11			
Tr	ee Count - 1/10th Acre	e Plot			
	Tree Count Species	<i>Liquidambar styraciflua /</i> Sweetgum			
	Tree Count	1			
Tree Count - 1/10th Acre Plot					
	Tree Count Species	Pinus taeda / Loblolly pine			
	Tree Count	1			
_	-				

Basal Area - 10-Factor Prism

Basal Area Species *Quercus laurifolia /* Laurel oak



Basal Area - 10-Factor Prism

Basal Area Species	Liquidambar styraciflua / Sweetgum
Basal Area Species Count	1
Vdur:	1.00: In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days
Vfreq	1.00: Floods or pond annually 5 out of 5 years (floodway)
Vtopo	0.40: Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/ or other topographic features
Vcwd	0.50: From 3 -7 pieces of cwd greater than 3" diameter along 100' transect
Vcwd Count	3
Vwood	0.50: 34 to 66% of the WAA is covered with woody vegetation
Vtree	1.00: At least 60% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 5% of the stand.
Vrich	0.40: One-two tree species present
Vbasal	0.40: The average basal area of the WAA is less than 60 square ft /acre
Vdensity	1.00: The WAA averages a tree density of 100-250 trees/acre
Vmid	0.50: Midstory coverage of the WAA is between 11-30%
Vherb	0.30: Herbaceous cover in the WAA is less than 5% or greater than 50%
Vdetritus	1.00: Greater than 85% of the area possesses an O or A horizon
Vredox	1.00: Redox at least 20% within the top 4 inches of the soil surface.
Vsorpt	0.50: WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non- montmorillonitic clays
Vconnect	1.00: Wetland plus four habitats and/or surrounded by forested



Forested iHGM		
Project	Lake Houston MB Wetland	
ID	32720	
Survey Date	12/04/2018	
User	Neil Boitnott	
Plot	HGM06	
WAA	WAA 2a	
Location	30.125836,-95.061747	
Photos		



HGM06 facing north

Tree Count - 1/10th Acre Plot

Tree Count 30	Tree Count Species	<i>Pinus taeda /</i> Loblolly pine
	Tree Count	30

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Quercus nigra /</i> Water oak
Tree Count	4

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Acer rubrum /</i> Red maple
Tree Count	1

Tree Count - 1/10th Acre Plot

Tree Count Species	Triadica sebifera / Chinese tallowtree
Tree Count	2

Basal Area - 10-Factor Prism

Basal Area Species Pinus taeda / Loblolly pine



Basal Area - 10-Factor Prism

Basal Area Species	<i>Quercus nigra /</i> Water oak
Basal Area Species Count	1

Basal Area - 10-Factor Prism				
	Basal Area Species	Acer rubrum / Red maple		
	Basal Area Species Count	1		
Vd	ur:	0.75: In an average year at 80% of the WAA either floods and/or ponds for at least 7 consecutive days		
Vfr	eq	0.75: Floods or ponds 3 or 4 out of 5 years (elevation data reveals in floodway and mapped w/n 100 yr floodplain)		
Vto	ро	0.40: Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/ or other topographic features		
٧c١	vd	0.50: From 3 -7 pieces of cwd greater than 3" diameter along 100' transect		
۷c۱	vd Count	3		
Vw	ood	0.75: 67 to 90 % of the WAA is covered with woody vegetation		
Vtr	ee	0.50: More than 20% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 15% of the stand.		
Vri	ch	0.40: One-two tree species present		
Vb	asal	1.00: The average basal area of the WAA is greater than 100 square ft/acre		
Vd	ensity	0.60: The WAA averages a tree density of 250-500 trees/acre OR 50-100 trees/acre		
Vm	iid	0.75: Midstory coverage of the WAA is between 31-50 %		
Vh	erb	1.00: Herbaceous cover in the WAA averages between 5-30%		
Vd	etritus	1.00: Greater than 85% of the area possesses an O or A horizon		
Vre	edox	1.00: Redox at least 20% within the top 4 inches of the soil surface.		
Vso	orpt	0.50: WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non- montmorillonitic clays		
Vcd	onnect	1.00: Wetland plus four habitats and/or surrounded by forested		


Herbaceous/Shrub iHGM	
Project	Lake Houston MB Wetland
ID	32719
Survey Date	12/04/2018
User	Neil Boitnott
Plot	HGM07
WAA	WAA 2b
Location	30.125961,-95.060743
Photos	



HGM07 facing south

Tr	ree Count - 1/10th Ac	re Plot		
	Tree Count Species			
	Tree Count	0		
B	asal Area - 10-Eactor	Drism		
Do		FIISIII		
	Basal Area Species			
	Basal Area Species Count	0		
Vo	dur:		1.00: In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days	
Vf	req		1.00: Floods or pond annually 5 out of 5 years (floodway)	
Vt	оро		0.40: Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and or other topographic features	/
Vo	cwd		NA on Herbacous/Shrub iHGM	
Vo	cwd Count			
V١	wood		0.75: 67 to 90 % of the WAA is covered with woody vegetation	
Vt	ree		NA on Herbacous/Shrub iHGM	
Vr	rich		NA on Herbacous/Shrub iHGM	
V	pasal		NA on Herbacous/Shrub iHGM	
Vo	density		NA on Herbacous/Shrub iHGM	



Vmid	0.75: Midstory coverage of the WAA is between 50-75 %
Vherb	0.75: Herbaceous cover in the WAA averages between 50-75%
Vdetritus	1.00: Greater than 85% of the area possesses an O or A horizon
Vredox	1.00: Redox at least 20% within the top 4 inches of the soil surface.
Vsorpt	0.50: WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non- montmorillonitic clays
Vconnect	1.00: Wetland plus four habitats and/or surrounded by forested

Forested iHGM	
Project	Lake Houston MB Wetland
ID	31016
Survey Date	11/15/2018
User	Neil Boitnott
Plot	HGM03
WAA	WAA 3a
Location	30.124819,-95.065864
Photos	



HGM03 facing east

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Quercus phellos /</i> Willow oak
Tree Count	5

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Pinus taeda /</i> Loblolly pine
Tree Count	10

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Quercus similis /</i> Bottom-land post oak
Tree Count	5

Basal Area - 10-Factor Prism

Basal Area Species	<i>Quercus phellos /</i> Willow oak
Basal Area Species Count	2

Basal Area - 10-Factor Prism



Basal Area Species 5			
Count			

Basal Area - 10-Factor	Prism
Basal Area Species	<i>Quercus similis /</i> Bottom-land post oak
Basal Area Species Count	2
Vdur:	1.00: In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days
Vfreq	1.00: Floods or pond annually 5 out of 5 years (floodway)
Vtopo	0.40: Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/ or other topographic features
Vcwd	0.30: Less than 3 pieces of cwd greater than 3" diameter along 100' transect
Vcwd Count	2
Vwood	0.75: 67 to 90 % of the WAA is covered with woody vegetation
Vtree	0.80: At least 40% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 10% of the stand.
Vrich	0.60: Three tree species present
Vbasal	0.80: The average basal area of the WAA is between 80-100 square ft/acre
Vdensity	1.00: The WAA averages a tree density of 100-250 trees/acre
Vmid	0.50: Midstory coverage of the WAA is between 11-30%
Vherb	0.50: Herbaceous cover in the WAA averages between 31-50%
Vdetritus	1.00: Greater than 85% of the area possesses an O or A horizon
Vredox	1.00: Redox at least 20% within the top 4 inches of the soil surface.
Vsorpt	0.50: WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non- montmorillonitic clays
Vconnect	1.00: Wetland plus four habitats and/or surrounded by forested



Forested iHGM	
Project	Lake Houston MB Wetland
ID	31021
Survey Date	11/15/2018
User	Neil Boitnott
Plot	HGM04
WAA	WAA 3b
Location	30.124873,-95.066205
Photos	



HGM 04 facing south

Tree Count - 1/10th Acre Plot

Tree Count Species	Quercus phellos / Willow oak
Tree Count	1

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Pinus taeda /</i> Loblolly pine
Tree Count	1

Basal Area - 10-Factor Prism

	Basal Area Species	<i>Quercus phellos /</i> Willow oak
	Basal Area Species Count	1
Vc	ur:	1.00: In an average year at 80% of the WAA either floods and/or ponds for at least 14 consecutive days
Vf	req	1.00: Floods or pond annually 5 out of 5 years (floodway)
Vt	оро	0.40: Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/ or other topographic features
Vc	wd	1.00: More than 7 pieces of cwd greater than 3" diameter along 100' transect
Vc	wd Count	12
Vv	vood	0.25: 11 to 33% of the WAA is covered with woody vegetation



Vtree	0.30: Less than 20% of the stand is oak, hickory, cypress, maple and/or elm.
Vrich	0.40: One-two tree species present
Vbasal	0.40: The average basal area of the WAA is less than 60 square ft /acre
Vdensity	0.40: The WAA averages less than 49 trees/acre or greater than 500 trees/acre
Vmid	0.50: Midstory coverage of the WAA is between 11-30%
Vherb	0.30: Herbaceous cover in the WAA is less than 5% or greater than 50%
Vdetritus	0.50: From 11-84% of the area possesses an O or A horizon
Vredox	1.00: Redox at least 20% within the top 4 inches of the soil surface.
Vsorpt	0.50: WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non- montmorillonitic clays
Vconnect	1.00: Wetland plus four habitats and/or surrounded by forested



Forested iHGM	
Project	Lake Houston MB Wetland
ID	31942
Survey Date	11/27/2018
User	Neil Boitnott
Plot	HGM05
WAA	WAA 4
Location	30.122271,-95.063100
Photos	



HGM05 facing southeast

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Triadica sebifera /</i> Chinese tallowtree
Tree Count	12

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Quercus nigra /</i> Water oak
Tree Count	2

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Liquidambar styraciflua /</i> Sweetgum
Tree Count	4

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Quercus michauxii /</i> Swamp chestnut oak
Tree Count	1

Tree Count - 1/10th Acre Plot

Tree Count Species *Quercus alba /* White oak



	Tree Count	1
Tr	ee Count - 1/10th Acre	e Plot
	Tree Count Species	<i>Carpinus caroliniana /</i> American hornbeam
	Tree Count	3

Tree Count - 1/10th Acre Plot

Tree Count Species	<i>Quercus pagoda /</i> Cherry-bark oak
Tree Count	1

Basal Area - 10-Factor Prism

Basal Area Species	<i>Triadica sebifera /</i> Chinese tallowtree
Basal Area Species Count	2

Basal Area - 10-Factor Prism

Basal Area Species	<i>Quercus nigra /</i> Water oak
Basal Area Species Count	2

Basal Area - 10-Factor Prism

	Basal Area Species	<i>Quercus alba /</i> White oak
	Basal Area Species Count	1
Vdı	ur:	0.75: In an average year at 80% of the WAA either floods and/or ponds for at least 7 consecutive days
Vfr	eq	0.75: Floods or ponds 3 or 4 out of 5 years (elevation data reveals in floodway and mapped w/n 100 yr floodplain)
Vtc	ро	0.40: Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/ or other topographic features
Vcv	vd	0.30: Less than 3 pieces of cwd greater than 3" diameter along 100' transect
Vcv	vd Count	2
Vw	ood	1.00: Greater than 90% of the WAA is covered with woody vegetation
Vtr	ee	0.80: At least 40% of the stand is oak, hickory, cypress, maple and/or elm. Black willow, cottonwood, tallow and sycamore do not represent more than 10% of the stand.
Vri	ch	0.60: Three tree species present
Vba	asal	0.40: The average basal area of the WAA is less than 60 square ft /acre
Vde	ensity	1.00: The WAA averages a tree density of 100-250 trees/acre
Vm	id	0.75: Midstory coverage of the WAA is between 31-50 %
Vhe	erb	1.00: Herbaceous cover in the WAA averages between 5-30%
Vde	etritus	1.00: Greater than 85% of the area possesses an O or A horizon
Vre	edox	0.10: Redox features less than 20%
Vso	orpt	0.50: WAA is dominated by loamy (silt loams, very fine sandy loams, loam) or non- montmorillonitic clays





APPENDIX E – STREAM DATA SHEETS

SWG Level 1 Stream SOP

Project	Lake Houston MB Stream		
ID	31770		
Survey Date	11/25/2018		
User	Neil Boitnott		
Evaluator(s)	Boitnott / Goodrum		
Stream Name	Camp Branch	OHWM Width	12.5'
Stream Type	Intermittent	OWHM Depth	2.0
Transect	CB T1		
Location	30.120971,-95.062085		

Photos



CB T1 upstream



CB T1 left bank



CB T1 downstream



CB T1 right bank



Channel Condition	1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20%
	or less.

Riparian Buffer Right Bank				
Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.			
Percent of Buffer	100			

Riparian Buffer Left Bank

Buffer Score		4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.		
	Percent of Buffer	100		
Aq	uatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.		
Ch	annel Alteration	1.00: Between 90-100% of the Transect is impacted.		

RCI - 1.88

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	7
Bankfull Height	3
Root Depth	2
Root Density	20
Bank Angle	80
Surface Protection (%)	10
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	31769			
Survey Date	11/27/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch	OHWM Width	15.0	
Stream Type	Intermittent	OWHM Depth	3.0'	
Transect	CB T2			
Location	30.121537, - 95.063460			



CB T2 upstream



CB T2 downstream



CB T2 left bank



CB T2 right bank



Channe	Condition
011011110	Contaiteron

1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.	
Percent of Buffer	100	
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.	
Channel Alteration	1.00: Between 90-100% of the Transect is impacted.	

RCI - 1.88

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	8
Bankfull Height	3
Root Depth	2
Root Density	30
Bank Angle	85
Surface Protection (%)	10
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	31977			
Survey Date	11/27/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CB Trib 1	OHWM Width	5.5'	
Stream Type	Intermittent	OWHM Depth	1.2'	
Transect	CB Trib 1 T1			
Location	30.120184,-95.062674			



CB Trib 1 T1 Upstream



CB Trib 1 T1 Downstream



CB Trib 1 T1 Left bank



CB Trib 1 T1 Right bank



Channel Condition

2.00: Channel is over-widened or incised with vertically or laterally unstable banks. Erosional scars 60-80% of the Transect, vegetative cover or natural rock is limited to 20-40%.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
A	quatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Cl	hannel Alteration	2.00: Between 60-90% of the Transect is impacted.

RCI - 2.38

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	4
Bankfull Height	1.5
Root Depth	4
Root Density	10
Bank Angle	80
Surface Protection (%)	30
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	31976			
Survey Date	11/27/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CB Trib 1	OHWM Width	5.5	
Stream Type	Intermittent	OWHM Depth	1.2'	
Transect	CB Trib 1 T2			
Location	30.11873195.062901			



CB Trib 1 T2 upstream



CB Trib 1 T2 downstream



CB Trib 1 T2 Left bank



CB Trib 1 T2 Right bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
species 30-60% with wetlands. No maintenance or grazing activities.	
Percent of Buffer	100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.	
	Percent of Buffer	100	
Ac	quatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.	
Cł	nannel Alteration	1.00: Between 90-100% of the Transect is impacted.	

RCI - 1.88

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	8
Bankfull Height	1.2
Root Depth	8
Root Density	10
Bank Angle	85
Surface Protection (%)	5
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	31975			
Survey Date	11/27/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CB Trib 1 - a	OHWM Width	3.0'	
Stream Type	Ephemeral	OWHM Depth	1.0'	
Transect	CB Trib 1 - a T1			
Location	30.119864,-95.062896			



CB Trib 1-a T1 upstream



CB Trib 1-a T1 downstream



CB Trib 1-a T1 Left bank



CB Trib 1-a T1 Right bank



Channel Condition

3.00: Channel is incised or has had its course widened. Erosional scars 40-60%, vegetative cover or natural rock only found on 40-60%.

Riparian Buffer Right Bank			
E	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.	
P	ercent of Buffer	100	

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffe	r 100
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alteration	3.00: Between 30-60% of the Transect is impacted.

RCI - 2.88

BEHI Rating	Very High
Bank	Left Bank
Study Bank Height	5
Bankfull Height	1
Root Depth	5
Root Density	10
Bank Angle	80
Surface Protection (%)	20
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	31974			
Survey Date	11/27/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CB-a	OHWM Width	2.75'	
Stream Type	Ephemeral	OWHM Depth	1.75'	
Transect	CB-a T1			
Location	30.121411,-95.061910			



CB-a T1 upstream



CB-a T1 downstream



CB-a T1 Left bank



CB-a T1 Right bank



Riparian Buffer Right B	ank
Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
100
1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
4.00: Less than 30% of the Transect is impacted.

RCI - 3.38

BEHI Rating	High
Bank	Left Bank
Study Bank Height	3
Bankfull Height	1
Root Depth	3
Root Density	20
Bank Angle	90
Surface Protection (%)	20
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	31973			
Survey Date	11/27/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CB-b	OHWM Width	2.5'	
Stream Type	Ephemeral	OWHM Depth	0.7'	
Transect	CB-b T1			
Location	30.121244,-95.063304			



CB-b T1 upstream



CB-b T1 downstream



CB-b T1 left bank



CB-b T1 right bank



Channel Condition

Riparian Buffer Right Bank			
Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.		
Percent of Buffer	100		

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
Aq	uatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Ch	annel Alteration	5.00: Channelization, dredging, alteration or hardening absent.

RCI - 3.63

BEHI Rating	High
Bank	Right Bank
Study Bank Height	1
Bankfull Height	.5
Root Depth	1
Root Density	50
Bank Angle	40
Surface Protection (%)	60
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	31948			
Survey Date	11/27/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch East	OHWM Width	7.0'	
Stream Type	Intermittent	OWHM Depth	2.0'	
Transect	CBE T1			
Location	30.122852,-95.064008			



CBE T1 upstream



CBE T1 downstream



CBE T1 left bank



CBE T1 Right Bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bank Buffer Score 4.50: Native woody species greater than 60% with NO wetlands present OR native woody

	species 30-60% with wetlands. No maintenance or gra	zing activities.	
Percent of Buffer	100		

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
Ac	luatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Ch	annel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.88

BEHI Rating	Very High
Bank	Right Bank
Study Bank Height	3.5
Bankfull Height	2
Root Depth	1.5
Root Density	20
Bank Angle	70
Surface Protection (%)	20
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	31971			
Survey Date	11/27/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch East	OHWM Width	9.0'	
Stream Type	Intermittent	OWHM Depth	1.75'	
Transect	CBE T2			
Location	30.123601,-95.063685			



CBE T2 upstream



CBE T2 downstream



CBE T2 Left bank



CBE T2 Right bank



Channel Condition	1.00: Channel is deeply incised or excavated with vertical or lateral instability in the
	stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20%
	or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody	
	species 30-60% with wetlands. No maintenance or grazing activities.	
Percent of Buffer	100	

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.88

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	6
Bankfull Height	1.75
Root Depth	2
Root Density	20
Bank Angle	85
Surface Protection (%)	20
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	31972			
Survey Date	11/27/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch East	OHWM Width	10.0	
Stream Type	Intermittent	OWHM Depth	1.5'	
Transect	CBE T3			
Location	30.124717,-95.063619			



CBE T3 Upstream



CBE T3 downstream



CBE T3 Left bank



CBE T3 Right Bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bank

Buffer Score 4.50: Native woody species greater than 60% with NO wetlands present OR native	
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.88

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	6
Bankfull Height	1.5
Root Depth	2
Root Density	40
Bank Angle	75
Surface Protection (%)	30
Bank Material	Sand



SWG Level 1 Stream SOP			
Project	Lake Houston MB Stream		
ID	32278		
Survey Date	11/28/2018		
User	Neil Boitnott		
Evaluator(s)	Boitnott / Goodrum		
Stream Name	Camp Branch East	OHWM Width	9.0
Stream Type	Intermittent	OWHM Depth	1.75'
Transect	CBE T4		
Location	30.125375,-95.063484		



CBE T4 upstream



CBE T4 downstream



CBE T4 Left bank



CBE T4 right bank



Ch	nannel Condition	2.00: Channel is over-widened or incised with vertically or laterally unstable banks. Erosional scars 60-80% of the Transect, vegetative cover or natural rock is limited to 20-40%.
Ri	parian Buffer Right Ba	nk
	6	
	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
		species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
Ri	parian Buffer Left Ban	k
	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100

Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 2.13

BEHI Rating	Very High
Bank	Left Bank
Study Bank Height	4.5
Bankfull Height	1.75
Root Depth	2
Root Density	40
Bank Angle	85
Surface Protection (%)	45
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32285			
Survey Date	11/28/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch East	OHWM Width	10.0'	
Stream Type	Intermittent	OWHM Depth	1.0'	
Transect	CBE T5			
Location	30.127139, - 95.063497			



CBE T5 Upstream



CBE T5 Downstream



CBE T5 Left Bank



CBE T5 right bank



Channel Condition	2.00: Channel is over-widened or incised with vertically or laterally unstable banks. Erosional scars 60-80% of the Transect, vegetative cover or natural rock is limited to 20-40%.
Riparian Buffer Right B	Bank
Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50
Riparian Buffer Right B	lank
Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
Percent of Buffer	50
Riparian Buffer Left Ba	nk
Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50
Riparian Buffer Left Ba	nk
Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
Percent of Buffer	50
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alteration	1.00: Between 90-100% of the Transect is impacted.
RCI - 2.09	

BEHI Rating	Very High
Bank	Right Bank
Study Bank Height	3.5
Bankfull Height	1
Root Depth	1.5
Root Density	30
Bank Angle	75
Surface Protection (%)	40
Bank Material	Sand

SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32283			
Survey Date	11/28/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch East	OHWM Width	10.0'	
Stream Type	Intermittent	OWHM Depth	1.0'	
Transect	CBE T6			
Location	30.128359,-95.063121			



CBE T6 Upstream



CBE T6 Downstream



CBE T6 Left bank



CBE T6 Right bank



Channel Condition		2.00: Channel is over-widened or incised with vertically or laterally unstable banks. Erosional scars 60-80% of the Transect, vegetative cover or natural rock is limited to 20-40%.
Rip	oarian Buffer Right Bai	nk
	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
		species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	50

Riparian Buffer Right Bank

Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

	Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
	Percent of Buffer	50
Aq	uatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Ch	annel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 2.06

BEHI Rating	Very High
Bank	Right Bank
Study Bank Height	4.75
Bankfull Height	1
Root Depth	2
Root Density	30
Bank Angle	80
Surface Protection (%)	40
Bank Material	Sand


SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32281			
Survey Date	11/28/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch East	OHWM Width	9.5'	
Stream Type	Intermittent	OWHM Depth	1.0'	
Transect	CBE T7			
Location	30.129188, - 95.063426			



CBE T7 Upstream



CBE T7 Downstream



CBE T7 Left bank



CBE T7 Right Bank



Channel Condition	1.00: Channel is deeply incised or excavated with vertical or lateral instability in the
	stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20%
	or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

	Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
	Percent of Buffer	50
Ac	quatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
C٢	nannel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.81

BEHI Rating	Extreme
Bank	Right Bank
Study Bank Height	3
Bankfull Height	1
Root Depth	1
Root Density	20
Bank Angle	85
Surface Protection (%)	20
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32279			
Survey Date	11/28/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch East	OHWM Width	7.5'	
Stream Type	Intermittent	OWHM Depth	1.4'	
Transect	CBE T8			
Location	30,130675,-95,063361			



CBE T8 Upstream



CBE T8 Downstream



CBE T8 Left bank



CBE T8 Right bank



Channel Condition	1.00: Channel is deeply incised or excavated with vertical or lateral instability in the
	stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20%
	or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Right Bank

Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

Buffer Score4.00: Native woody species between 30-60% with NO wetlands. No mainter grazing activities.		4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
	Percent of Buffer	50
Ad	quatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Cł	nannel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.81

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	5
Bankfull Height	1.4
Root Depth	1.5
Root Density	20
Bank Angle	80
Surface Protection (%)	30
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32280			
Survey Date	11/28/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch East	OHWM Width	10.6'	
Stream Type	Intermittent	OWHM Depth	1.25'	
Transect	CBE T9			
Location	30.131780, - 95.063333			



CBE T9 Upstream



CBE T9 Downstream



CBE T9 Left bank



CBE T9 Right bank



Channel Condition	1.00: Channel is deeply incised or excavated with vertical or lateral instability in the
	stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20%
	or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Right Bank

Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

	Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
	Percent of Buffer	50
Aq	uatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Ch	annel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.81

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	7
Bankfull Height	1.25
Root Depth	2
Root Density	20
Bank Angle	90
Surface Protection (%)	20
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32277			
Survey Date	11/28/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CBE Trib 1	OHWM Width	3.3'	
Stream Type	Intermittent	OWHM Depth	1.0'	
Transect	CBE Trib 1 T1			
Location	30.125885, - 95.062713			



CBE Trib 1 T1 upstream



CBE Trib 1 T1 downstream



CBE Trib 1 T1 Right bank



CBE Trib 1 T1 left bank



Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alteration	3.00: Between 30-60% of the Transect is impacted.

RCI - 2.88

BEHI Rating	Very High
Bank	Right Bank
Study Bank Height	4
Bankfull Height	1
Root Depth	2
Root Density	40
Bank Angle	80
Surface Protection (%)	30
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32286			
Survey Date	11/28/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch East Trib 2	OHWM Width	5.0'	
Stream Type	Intermittent	OWHM Depth	0.5'	
Transect	CBE Trib 2 T1			
Location	30.127634,-95.063468			



CBE Trib 2 T1 Upstream



CBE Trib 2 T1 Downstream



CBE Trib 2 T1 Left Bank



CBE Trib 2 T1 Right Bank



Channel Condition	3.00: Channel is incised or has had its course widened. Erosional scars 40-60%, vege	etative
	cover or natural rock only found on 40-60%.	

Riparian Buffer Right	Bank	
Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.	
Percent of Buffer	50	
Riparian Buffer Right Bank		
Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.	
Percent of Buffer	50	
Riparian Buffer Left B	ank	
Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.	
Percent of Buffer	50	
Riparian Buffer Left B	lank	
Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.	
Percent of Buffer	50	
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.	
Channel Alteration	3.00: Between 30-60% of the Transect is impacted.	

RCI - 2.81

BEHI Rating	High
Bank	Right Bank
Study Bank Height	4
Bankfull Height	.5
Root Depth	4
Root Density	40
Bank Angle	60
Surface Protection (%)	40
Bank Material	Sand

SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32282			
Survey Date	11/28/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CBE Trib 2-1	OHWM Width	2.5'	
Stream Type	Intermittent	OWHM Depth	0.4'	
Transect	CBE Trib 2-1 T1			
Location	30.127752,-95.063248			



CBE Trib 2-1 T1 Upstream



CBE Trib 2-1 T1 Downstream



CBE Trib 2-1 T1 Left bank



CBE Trib 2-1 T1 Right Bank



Channel Condition

Ri	parian Buffer Right Bar	nk
	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
Ac	quatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Cł	nannel Alteration	4.00: Less than 30% of the Transect is impacted.

RCI - 3.38

BEHI Rating	High
Bank	Left Bank
Study Bank Height	2.5
Bankfull Height	.4
Root Depth	2
Root Density	50
Bank Angle	80
Surface Protection (%)	50
Bank Material	Sand



SWG Level 1 Stream SOP			
Project	Lake Houston MB Stream		
ID	32287		
Survey Date	11/28/2018		
User	Neil Boitnott		
Evaluator(s)	Boitnott / Goodrum		
Stream Name	Camp Branch East Trib 3	OHWM Width	3.2'
Stream Type	Intermittent	OWHM Depth	0.3'
Transect	CBE Trib 3 T1		
Location	30.128986,-95.062847		



CBE Trib 3 T1 Upstream



CBE Trib 3 T1 Downstream



CBE Trib 3 T1 Left bank



CBE Trib 3 T1 Right bank



Channel Condition

Ri	parian Buffer Right Bai	nk
	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
Ac	uatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Cł	annel Alteration	4.00: Less than 30% of the Transect is impacted.

RCI - 3.38

BEHI Rating	High
Bank	Left Bank
Study Bank Height	4
Bankfull Height	.4
Root Depth	4
Root Density	40
Bank Angle	75
Surface Protection (%)	30
Bank Material	Sand



SWG Level 1 Stream SOP					
Project	Lake Houston MB Stream				
ID	32276				
Survey Date	11/28/2018				
User	Neil Boitnott				
Evaluator(s)	Boitnott / Goodrum				
Stream Name	CBE-a	OHWM Width	2.75'		
Stream Type	Ephemeral	OWHM Depth	0.4'		
Transect	CBE-a T1				
Location	30.132247,-95.063592				



CBE-a T1 Upstream



CBE-a T1 Downstream



CBE-a T1 Left bank



CBE-a T1 Right bank



3.00: Channel is incised or has had its course widened. Erosional scars 40-60%, vegetative cover or natural rock only found on 40-60%.

Riparian Buffer Right Bank

Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
Percent of Buffer	100
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alteration	4.00: Less than 30% of the Transect is impacted.

RCI - 3.00

BEHI Rating	High
Bank	Left Bank
Study Bank Height	4
Bankfull Height	.4
Root Depth	4
Root Density	40
Bank Angle	70
Surface Protection (%)	40
Bank Material	Sand

SWG Level 1 Stream SOP					
Project	Lake Houston MB Stream				
ID	32284				
Survey Date	11/28/2018				
User	Neil Boitnott				
Evaluator(s)	Boitnott / Goodrum				
Stream Name	CBE-b	OHWM Width	3.0'		
Stream Type	Ephemeral	OWHM Depth	0.5'		
Transect	CBE-b T1				
Location	30.132388, - 95.063556				



CBE-b T1 Upstream



CBE-b T1 Downstream



CBE-b T1 Left bank



CBE-b T1 Right bank



Channe	l Condi	ition

3.00: Channel is incised or has had its course widened. Erosional scars 40-60%, vegetative cover or natural rock only found on 40-60%.

Riparian Buffer Right Bank			
Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.		
Percent of Buffer	100		

Riparian	Buffer	Left Bank
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	Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
A	quatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Cl	nannel Alteration	4.00: Less than 30% of the Transect is impacted.

RCI - 3.00

BEHI Rating	Very High
Bank	Left Bank
Study Bank Height	4
Bankfull Height	.5
Root Depth	1.5
Root Density	30
Bank Angle	60
Surface Protection (%)	30
Bank Material	Sand

SWG Level 1 Stream SOP					
Project	Lake Houston MB Stream				
ID	32894				
Survey Date	12/05/2018				
User	Neil Boitnott				
Evaluator(s)	Boitnott / Goodrum				
Stream Name	Camp Branch West	OHWM Width	8.75'		
Stream Type	Intermittent	OWHM Depth	1.75'		
Transect	CBW T1				
Location	30.122065,-95.064730				



CBW T1 Upstream



CBW T1 Downstream



CBW T1 Left bank



CBW T1 Right Bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.	
	Percent of Buffer	100	
Ac	quatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.	
Cł	nannel Alteration	1.00: Between 90-100% of the Transect is impacted.	

RCI - 1.88

BEHI Rating	Extreme
Bank	Right Bank
Study Bank Height	5.3
Bankfull Height	3
Root Depth	2
Root Density	30
Bank Angle	70
Surface Protection (%)	10
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	33106			
Survey Date	12/05/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch West	OHWM Width	7.3'	
Stream Type	Intermittent	OWHM Depth	1.2'	
Transect	CBW T2			
Location	30.122837, - 95.065864			



CBW T2 Upstream



CBW T2 Downstream



CBW T2 Left Bank



CBW T2 Right Bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Buffer Right Bank Buffer Score 4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities. Percent of Buffer 100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
Aq	uatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Ch	annel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.88

BEHI Rating	Extreme
Bank	Right Bank
Study Bank Height	5
Bankfull Height	3
Root Depth	2
Root Density	40
Bank Angle	90
Surface Protection (%)	10
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32892			
Survey Date	12/05/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch West	OHWM Width	10.0'	
Stream Type	Intermittent	OWHM Depth	1.5'	
Transect	CBW T3			
Location	30.123097,-95.066680			



CBW T3 Upstream



CBW T3 Downstream



CBW T3 Left bank



CBW T3 Right bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Rip	Riparian Buffer Right Bank		
	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody	
		species 30-60% with wetlands. No maintenance or grazing activities.	
	Percent of Buffer	100	

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
Aq	uatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Ch	annel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.88

BEHI Rating	Extreme
Bank	Right Bank
Study Bank Height	5
Bankfull Height	3
Root Depth	1.5
Root Density	30
Bank Angle	85
Surface Protection (%)	10
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	33115			
Survey Date	12/05/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch West	OHWM Width	8.5'	
Stream Type	Intermittent	OWHM Depth	1.1'	
Transect	CBW T4			
Location	30.124075,-95.067273			



CBW T4 Upstream



CBW T4 Downstream



CBW T4 Left Bank



CBW T4 Right Bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
Aq	uatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Ch	annel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.88

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	6
Bankfull Height	3
Root Depth	1
Root Density	20
Bank Angle	80
Surface Protection (%)	30
Bank Material	Sand



SWG Level 1 Stream SOP			
Project	Lake Houston MB Stream		
ID	32747		
Survey Date	12/04/2018		
User	Neil Boitnott		
Evaluator(s)	Boitnott / Goodrum		
Stream Name	Camp Branch West	OHWM Width	11.8'
Stream Type	Intermittent	OWHM Depth	1.3'
Transect	CBW T5		
Location	30.124694,-95.068232		



CBW T5 Upstream



CBW T5 Downstream



CBW T5 Left Bank



CBW T5 Right bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.		
	Percent of Buffer	100		
Ac	luatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.		
Cł	annel Alteration	1.00: Between 90-100% of the Transect is impacted.		

RCI - 1.88

BEHI Rating	Extreme
Bank	Right Bank
Study Bank Height	5
Bankfull Height	2.5
Root Depth	1
Root Density	20
Bank Angle	110
Surface Protection (%)	20
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32737			
Survey Date	12/04/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch West	OHWM Width	8.8'	
Stream Type	Intermittent	OWHM Depth	1.75'	
Transect	CBW T6			
Location	30.125198, - 95.069545			



CBW T6 Upstream



CBW T6 Downstream



CBW T6 Left bank



CBW T6 Right bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bank			
Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody		
	species 30-60% with wetlands. No maintenance or grazing activities.		
Percent of Buffer	100		

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer 100		100
Ac	quatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Ch	nannel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.88

BEHI Rating	Very High
Bank	Left Bank
Study Bank Height	6
Bankfull Height	2.5
Root Depth	2
Root Density	40
Bank Angle	70
Surface Protection (%)	30
Bank Material	Sand



SWG Level 1 Stream SOP			
Project	Lake Houston MB Stream		
ID	33113		
Survey Date	12/04/2018		
User	Neil Boitnott		
Evaluator(s)	Boitnott / Goodrum		
Stream Name	Camp Branch West	OHWM Width	7.0'
Stream Type	Intermittent	OWHM Depth	1.5'
Transect	CBW T7		
Location	30.126698, -95.070307		



CBW T7 Upstream



CBW T7 Downstream



CBW T7 Left Bank



CBW T7 Right Bank



Channel Condition	1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20%
	or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.87

BEHI Rating	Extreme
Bank	Right Bank
Study Bank Height	7
Bankfull Height	3
Root Depth	2
Root Density	30
Bank Angle	80
Surface Protection (%)	10
Bank Material	Sand



SWG Level 1 Stream SOP					
Project	Lake Houston MB Stream				
ID	32710				
Survey Date	12/04/2018				
User	Neil Boitnott				
Evaluator(s)	Boitnott / Goodrum				
Stream Name	Camp Branch West	OHWM Width	9.5'		
Stream Type	Intermittent	OWHM Depth	0.8'		
Transect	CBW T8				
Location	30.127839, - 95.070806				



CBW T8 Upstream



CBW T8 Downstream



CBW T8 Left Bank



CBW Right Bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bank

Buffer Score 4.50: Native woody species greater than 60% with NO wetlands present OR native w	
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

Buffer Score4.50: Native woody species greater than 60% with NO wespecies 30-60% with wetlands. No maintenance or grazir		4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
Aq	uatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Ch	annel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.88

BEHI Rating	Very High
Bank	Left Bank
Study Bank Height	5
Bankfull Height	2.5
Root Depth	2
Root Density	50
Bank Angle	80
Surface Protection (%)	30
Bank Material	Sand

SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32739			
Survey Date	12/04/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch West	OHWM Width	12.2'	
Stream Type	Intermittent	OWHM Depth	1.5'	
Transect	CBW T9			
Location	30.128522,-95.071386			



CBW T9 Upstream



CBW T9 Downstream



CBW T9 Left Bank



CBW T9 Right Bank



Channel Con	dition
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1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Buffer Score 4.50: Native woody species greater than 60% with NO wetlands present OR native woody r species 30-60% with wetlands. No maintenance or grazing activities. Percent of Buffer 100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
Aq	luatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Ch	annel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.88

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	5
Bankfull Height	2.5
Root Depth	2
Root Density	30
Bank Angle	100
Surface Protection (%)	25
Bank Material	Sand


SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32743			
Survey Date	12/04/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch West	OHWM Width	9.4'	
Stream Type	Intermittent	OWHM Depth	1.5'	
Transect	CBW T10			
Location	30.129453,-95.071872			



CBW T10 Upstream



CBW T10 Downstream



CBW T10 Left Bank



CBW T10 Right bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
A	quatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Cl	nannel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.88

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	5
Bankfull Height	3
Root Depth	1
Root Density	30
Bank Angle	110
Surface Protection (%)	20
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32751			
Survey Date	12/04/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch West	OHWM Width	11.1'	
Stream Type	Intermittent	OWHM Depth	1.1	
Transect	CBW T11			
Location	30.130454,-95.072217			



CBW T11 Upstream



CBW T11 Downstream



CBW T11 Left bank



CBW T11 Right Bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bark Buffer Score 4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities. Percent of Buffer 100

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.88

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	4.75
Bankfull Height	2.5
Root Depth	1.5
Root Density	20
Bank Angle	85
Surface Protection (%)	15
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32745			
Survey Date	12/04/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	Camp Branch West	OHWM Width	11.5'	
Stream Type	Intermittent	OWHM Depth	1.0'	
Transect	CBW T12			
Location	30.131692, - 95.072659			



CBW T12 Upstream



CBW T12 Downstream



CBW T12 Right Bank



CBW T12 Left Bank



Channel Condition

1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

Buffer Sco	ore 4.5 sp	0: Native woody species greater than 60% with NO wetlands present OR native woody ecies 30-60% with wetlands. No maintenance or grazing activities.
Percent o	f Buffer 10	0
Aquatic Use		1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alt	eration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.88

BEHI Rating	Very High
Bank	Right Bank
Study Bank Height	4.5
Bankfull Height	2.5
Root Depth	1.5
Root Density	30
Bank Angle	80
Surface Protection (%)	20
Bank Materia	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32918			
Survey Date	12/05/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CBW Trib 1	OHWM Width	4.0'	
Stream Type	Intermittent	OWHM Depth	0.5'	
Transect	CBW Trib 1 T1			
Location	30.12329595.065922			



CBW Trib 1 Upstream



CBW Trib 1 Downstream



CBW Trib 1 Left Bank



CBW Trib 1 Right Bank



Channel Condition 1.00: Channel is deeply incised or excavated with vertical or lateral instability in the stream bank. Erosion is 80-100% and vegetative surface protection or natural rock is 20% or less.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native wo	
	species 30-60% with wetlands. No maintenance or grazing activities.	
Percent of Buffer	50	

Riparian Buffer Right Bank

Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
Percent of Buffer	50
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alteration	1.00: Between 90-100% of the Transect is impacted.

RCI - 1.81

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	4
Bankfull Height	.5
Root Depth	1
Root Density	20
Bank Angle	90
Surface Protection (%)	10
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	33111			
Survey Date	12/05/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CBW Trib 2	OHWM Width	3.2'	
Stream Type	Intermittent	OWHM Depth	0.3'	
Transect	CBW Trib 2 T1			
Location	30.121630,-95.067827			



CBW Trib 2 T1 Upstream



CBW Trib 2 T1 Downstream



CBW Trib 2 T1 Left bank



CBW Trib 2 T1 Right bank



Channe	Condition
channe	contantion

3.00: Channel is incised or has had its course widened. Erosional scars 40-60%, vegetative cover or natural rock only found on 40-60%.

Riparian Buffer Right Bank				
Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.			
Percent of Buffer	100			

Riparian Buffer Left Bank

Buffer Score4.50: Native woody species greater than 60% with species 30-60% with wetlands. No maintenance of Percent of Buffer100		4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
		100
Ac	uatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Cŀ	annel Alteration	3.00: Between 30-60% of the Transect is impacted.

RCI - 2.88

BEHI Rating	Extreme
Bank	Right Bank
Study Bank Height	3.5
Bankfull Height	.3
Root Depth	1
Root Density	30
Bank Angle	100
Surface Protection (%)	10
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	33107			
Survey Date	12/05/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CBW Trib 2	OHWM Width	4.0'	
Stream Type	Intermittent	OWHM Depth	0.5'	
Transect	CBW Trib 2 T2			
Location	30.122724, - 95.066940			



CBW Trib 2 T2 Upstream



CBW Trib 2 T2 Downstream



CBW Trib 2 T2 Left bank



CBW Trib 2 T2 Right bank



Channel Condition	2.00: Channel is over-widened or incised with vertically or laterally unstable banks. Erosional scars 60-80% of the Transect, vegetative cover or natural rock is limited to
	20-40%.

Riparian Buffer Right Bank

Buffer Score4.50: Native woody species greater than 60% with NO wetlands present OR national	
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
Ac	uatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Cŀ	annel Alteration	2.00: Between 60-90% of the Transect is impacted.

RCI - 2.38

BEHI Rating	Extreme
Bank	Right Bank
Study Bank Height	3.5
Bankfull Height	.5
Root Depth	2
Root Density	40
Bank Angle	90
Surface Protection (%)	25
Bank Material	Sand



SWG Level 1 Stream SOP			
Project	Lake Houston MB Stream		
ID	32924		
Survey Date	12/05/2018		
User	Neil Boitnott		
Evaluator(s)	Boitnott / Goodrum		
Stream Name	CBW Trib 2-a	OHWM Width	3.0'
Stream Type	Ephemeral	OWHM Depth	0.5'
Transect	CBW Trib 2-a T1		
Location	30.121649,-95.067068		



CBW Trib 2-a T1 Upstream



CBW Trib 2-a T1 Downstream



CBW Trib 2-a T1 Left Bank



CBW Trib 2-a T1 Right Bank



Channel Condition2.00: Channel is over-widened or incised with vertically or laterally unstable banks.
Erosional scars 60-80% of the Transect, vegetative cover or natural rock is limited to
20-40%.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody
	species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alteration	2.00: Between 60-90% of the Transect is impacted.

RCI - 3.38

BEHI Rating	Extreme
Bank	Right Bank
Study Bank Height	3.5
Bankfull Height	.5
Root Depth	1.5
Root Density	30
Bank Angle	90
Surface Protection (%)	10
Bank Material	Sand



SWG Level 1 Stream SOP			
Project	Lake Houston MB Stream		
ID	32922		
Survey Date	12/05/2018		
User	Neil Boitnott		
Evaluator(s)	Boitnott / Goodrum		
Stream Name	CBW Trib 2-b	OHWM Width	2.5'
Stream Type	Ephemeral	OWHM Depth	0.25'
Transect	CBW Trib 2-b T1		
Location	30.121533,-95.067642		



CBW Trib 2-b T1 Upstream



CBW Trib 2-b T1 Downstream



CBW Trib 2-b T1 Left bank



CBW Trib 2-b T1 Right bank



Channel Condition 5.00: Channel shows very little incision or widening and little or no evidence of erosion or unprotected banks.

Buffer Right Bank Buffer Score 4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities. Percent of Buffer 100

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100
Aquatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channel Alteration	5.00: Channelization, dredging, alteration or hardening absent.

RCI - 3.88

BEHI Rating	High
Bank	Left Bank
Study Bank Height	2.5
Bankfull Height	.25
Root Depth	2.5
Root Density	50
Bank Angle	50
Surface Protection (%)	40
Bank Material	Sand



SWG Level 1 Stream SOP			
Project	Lake Houston MB Stream		
ID	32921		
Survey Date	12/05/2018		
User	Neil Boitnott		
Evaluator(s)	Boitnott / Goodrum		
Stream Name	CBW Trib 3	OHWM Width	3.5'
Stream Type	Intermittent	OWHM Depth	0.75'
Transect	CBW Trib 3 T1		
Location	30.123437,-95.069454		



CBW Trib 3 T1 Upstream



CBW Trib 3 T1 Downstream



CBW Trib 3 T1 Left bank



CBW Trib 3 T1 Right Bank



Channel Condition

3.00: Channel is incised or has had its course widened. Erosional scars 40-60%, vegetative cover or natural rock only found on 40-60%.

Ri	parian Buffer Right Ba	ink
	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.	
	Percent of Buffer	100	
Ac	quatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.	
Cł	nannel Alteration	3.00: Between 30-60% of the Transect is impacted.	
		5.00. Between 50-00% of the transect is impacted.	

RCI - 2.88

BEHI Rating	Extreme
Bank	Left Bank
Study Bank Height	3
Bankfull Height	1
Root Depth	1
Root Density	30
Bank Angle	100
Surface Protection (%)	10
Bank Material	Sand

SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32896			
Survey Date	12/05/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CBW Trib 3	OHWM Width	3.5'	
Stream Type	Intermittent	OWHM Depth	0.75'	
Transect	CBW Trib 3 T2			
Location	30.124066,-95.068250			



CBW Trib 3 T2 Upstream



CBW Trib 3 T2 Downstream



CBW Trib 3 T2 Left bank



CBW Trib 3 T2 Right Bank



Channel Condition

2.00: Channel is over-widened or incised with vertically or laterally unstable banks. Erosional scars 60-80% of the Transect, vegetative cover or natural rock is limited to 20-40%.

Riparian Buffer Right Bank			
Buffer Score 4.5	0: Native woody species greater than 60% with NO wetlands present OR native woody		
spe	cies 30-60% with wetlands. No maintenance or grazing activities.		
Percent of Buffer 100)		

Riparian Buffer Left Bank

Buffe	er Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Perce	ent of Buffer	100
Aquatic	Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Channe	el Alteration	2.00: Between 60-90% of the Transect is impacted.

RCI - 2.38

BEHI Rating	Extreme
Bank	Right Bank
Study Bank Height	3
Bankfull Height	.75
Root Depth	1
Root Density	30
Bank Angle	80
Surface Protection (%)	20
Bank Material	Sand



SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	32741			
Survey Date	12/04/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CBW Trib 4	OHWM Width	2.5'	
Stream Type	Intermittent	OWHM Depth	0.5'	
Transect	CBW Trib 4 T1			
Location	30.125255,-95.070123			



CBW Trib 4 T1 Upstream



CBW Trib 4 T1 Downstream



CBW Trib 4 T1 Left bank



CBW Trib 4 T1 Right bank



Channel	Condition

2.00: Channel is over-widened or incised with vertically or laterally unstable banks. Erosional scars 60-80% of the Transect, vegetative cover or natural rock is limited to 20-40%.

Riparian Buffer Right Bank

Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or
	grazing activities.
Percent of Buffer	90

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	10

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

	Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
	Percent of Buffer	50
Ac	quatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
C٢	nannel Alteration	3.00: Between 30-60% of the Transect is impacted.

RCI - 2.54

BEHI Rating	Very High
Bank	Right Bank
Study Bank Height	3.75
Bankfull Height	.5
Root Depth	2
Root Density	30
Bank Angle	70
Surface Protection (%)	20
Bank Material	Sand



SWG Level 1 Stream SOP				
Droject	Lake Houston MD Stream			
Project	Lake houston wid stream			
ID	33117			
Survey Date	12/05/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CBW-a	OHWM Width	2.8'	
Stream Type	Ephemeral	OWHM Depth	0.5'	
Transect	CBW-a T1			
Location	30.122538,-95.065473			



CBW-a T1 Upstream



CBW-a T1 Downstream



CBW-a T1 Left bank





Channel Condition	4.00: Channel is slightly incised and contains a few areas of active erosion.
Riparian Buffer Right I	Bank
Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	60
Riparian Buffer Right	Bank
Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.

Percent of Buffer	40

Riparian Buffer Left Bank

Buf	ffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Per	rcent of Buffer	100
Aquat	ic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Chanr	nel Alteration	5.00: Channelization, dredging, alteration or hardening absent.

RCI - 3.60

BEHI Rating	High
Bank	Right Bank
Study Bank Height	1.5
Bankfull Height	.5
Root Depth	1.5
Root Density	50
Bank Angle	80
Surface Protection (%)	30
Bank Material	Sand

SWG Level 1 Stream SOP				
Project	Lake Houston MB Stream			
ID	33109			
Survey Date	12/05/2018			
User	Neil Boitnott			
Evaluator(s)	Boitnott / Goodrum			
Stream Name	CBW-b	OHWM Width	2.8'	
Stream Type	Ephemeral	OWHM Depth	0.5'	
Transect	CBW-b T1			
Location	30.124399,-95.067474			



CBW-b T1 Upstream



CBW-b T1 Downstream



CBW-b T1 Left Bank



CBW-b T1 Right bank



3.00: Channel is incised or has had its course widened. Erosional scars 40-60%, vegetative cover or natural rock only found on 40-60%.

Riparian Buffer Right Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.	
	Percent of Buffer	100	
Ac	luatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.	
Ch	annel Alteration	5.00: Channelization, dredging, alteration or hardening absent.	

RCI - 3.35

BEHI Rating	Very High
Bank	Right Bank
Study Bank Height	2.5
Bankfull Height	.5
Root Depth	.5
Root Density	30
Bank Angle	60
Surface Protection (%)	20
Bank Material	Sand



SWG Level 1 Stream SOP			
Project	Lake Houston MB Stream		
ID	32711		
Survey Date	12/04/2018		
User	Neil Boitnott		
Evaluator(s)	Boitnott / Goodrum		
Stream Name	CBW-c	OHWM Width	2.75'
Stream Type	Ephemeral	OWHM Depth	0.3'
Transect	CBW-c T1		
Location	30.124785,-95.070080		



CBW-c T1 Upstream



CBW-c T1 Downstream



CBW-c T1 Left bank



CBW-c T1 Right Bank



Channel Condition	5.00: Channel shows very little incision or widening and little or no evidence of erosion or
	unprotected banks.

Riparian Buffer Right Bank	
Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Right Bank

Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
Percent of Buffer	50

Riparian Buffer Left Bank

	Buffer Score	4.00: Native woody species between 30-60% with NO wetlands. No maintenance or grazing activities.
	Percent of Buffer	50
Aq	luatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Ch	annel Alteration	5.00: Channelization, dredging, alteration or hardening absent.

RCI - 3.81

BEHI Rating	High
Bank	Left Bank
Study Bank Height	1.75
Bankfull Height	.3
Root Depth	1.75
Root Density	40
Bank Angle	60
Surface Protection (%)	30
Bank Material	Sand



SWG Level 1 Stream SOP			
Project	Lake Houston MB Stream		
ID	32916		
Survey Date	12/04/2018		
User	Neil Boitnott		
Evaluator(s)	Boitnott / Goodrum		
Stream Name	CBW-d	OHWM Width	3.0'
Stream Type	Ephemeral	OWHM Depth	0.5'
Transect	CBW-d T1		
Location	30.129602,-95.071781		



CBW-d T1 Upstream



CBW-d T1 Downstream



CBW-d T1 Left bank



CBW-d T1 Right Bank



Riparian Buffer Right Bank		
	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100

Riparian Buffer Left Bank

	Buffer Score	4.50: Native woody species greater than 60% with NO wetlands present OR native woody species 30-60% with wetlands. No maintenance or grazing activities.
	Percent of Buffer	100
Ac	luatic Use	1.00: Aquatic Life Score of Minimal. Unassessed Intermittent and Ephemeral Streams.
Ch	annel Alteration	4.00: Less than 30% of the Transect is impacted.

RCI - 3.38

BEHI Rating	High
Bank	Left Bank
Study Bank Height	2
Bankfull Height	.5
Root Depth	2
Root Density	30
Bank Angle	60
Surface Protection (%)	40
Bank Material	Sand







Page 45 of 767



Page 46 of 767

Block 2 Delineation and Functional Assessment



Page 47 of 767

Block 2 Delineation and Functional Assessment



Block 2 Delineation and Functional Assessment

SWG-2019-00077

Page 48 of 767




Page 50 of 767





Page 52 of 767



Page 53 of 767



Block 2 Delineation and Functional Assessment

Page 54 of 767







Page 57 of 767







Block 2 Delineation and Functional Assessment

Page 60 of 767



Page 61 of 767







Block 2 Delineation and Functional Assessment



Block 2 Delineation and Functional Assessment

Page 65 of 767



Block 2 Delineation and Functional Assessment

APPENDIX B-GPS POINT DOCUMENTATION

า Bank	Points
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e Hoi	CK 2 D
Lak	Bloc

Point ID	Point Type	Latitude	Longitude	NUM	PDOP	НООР	GPS DATE	GPS TIME	Comments
Non-JD 1	Non-JD Feature	30.116436	-95.131925	15	1.2165	0.6794	2/20/2019	6:51:31 PM	Gully with no OHWM
Non-JD 2	Non-JD Feature	30.115113	-95.129329	13	1.5142	0.7948	2/20/2019	7:12:02 PM	Gully with no OHWM
Non-JD 3	Non-JD Feature	30.116063	-95.124861	17	1.2033	0.6684	2/20/2019	11:39:33 PM	Gully with no OHWM
Non-JD 4	Non-JD Feature	30.114678	-95.123533	15	1.3666	0.7666	2/20/2019	11:54:02 PM	Gully with no OHWM
Non-JD 5	Non-JD Feature	30.114813	-95.122776	11	2.0698	1.0986	2/21/2019	4:15:23 PM	Gully with no OHWM
Non-JD 6	Non-JD Feature	30.112844	-95.135457	14	1.4614	0.7604	2/20/2019	3:54:30 PM	Gully with no OHWM
Non-JD 7	Non-JD Feature	30.113511	-95.133681	13	1.6555	0.8983	2/20/2019	3:17:13 PM	Gully with no OHWM
Non-JD 8	Non-JD Feature	30.113987	-95.116085	15	1.3695	0.7254	3/26/2019	9:08:38 PM	Gully with no OHWM
Non-JD 9	Non-JD Feature	30.113360	-95.115428	14	1.3758	0.8345	3/26/2019	9:21:27 PM	Gully with no OHWM
Non-JD 10	Non-JD Feature	30.127642	-95.054827	13	1.8973	0.8346	2/19/2019	10:20:27 PM	Gully with no OHWM
Non-JD 11	Non-JD Feature	30.127765	-95.054779	11	2.4187	0.8822	2/19/2019	10:21:36 PM	Gully with no OHWM
Non-JD 12	Non-JD Feature	30.127004	-95.052817	15	1.4373	0.7196	2/19/2019	11:09:40 PM	Gully with no OHWM
Non-JD 13	Non-JD Feature	30.126791	-95.044996	12	1.8098	0.9271	2/28/2019	10:36:00 PM	Gully with no OHWM
Non-JD 14	Non-JD Feature	30.125717	-95.055421	8	2.4176	1.6422	2/19/2019	7:22:07 PM	Gully with no OHWM
Non-JD 15	Non-JD Feature	30.125191	-95.054140	13	1.6424	0.7139	2/19/2019	9:21:19 PM	Gully with no OHWM
Non-JD 16	Non-JD Feature	30.123765	-95.059508	13	1.6078	0.7835	2/18/2019	8:49:20 PM	Gully with no OHWM
Non-JD 17	Non-JD Feature	30.123515	-95.059332	11	2.7659	1.2055	2/18/2019	8:38:51 PM	Gully with no OHWM
Non-JD 18	Non-JD Feature	30.123720	-95.059250	11	3.1934	1.4106	2/18/2019	8:48:14 PM	Gully with no OHWM
Non-JD 19	Non-JD Feature	30.124161	-95.054879	14	1.6130	0.8248	2/19/2019	8:08:55 PM	Gully with no OHWM
Non-JD 20	Non-JD Feature	30.123743	-95.055035	12	1.8840	0.8970	2/19/2019	8:12:19 PM	Gully with no OHWM
Non-JD 21	Non-JD Feature	30.123579	-95.054904	11	1.8275	0.9434	2/19/2019	8:17:12 PM	Gully with no OHWM
Non-JD 22	Non-JD Feature	30.123583	-95.054647	11	1.7786	0.8499	2/19/2019	8:50:57 PM	Gully with no OHWM
Non-JD 23	Non-JD Feature	30.122374	-95.059948	13	1.6829	0.7676	2/18/2019	8:06:43 PM	Gully with no OHWM
Non-JD 24	Non-JD Feature	30.121932	-95.055618	11	2.2439	1.1574	2/27/2019	5:56:47 PM	Gully with no OHWM
Non-JD 25	Non-JD Feature	30.121721	-95.055647	11	2.1817	1.0651	2/27/2019	5:54:58 PM	Gully with no OHWM
Non-JD 26	Non-JD Feature	30.121446	-95.053982	13	1.5084	0.8587	2/28/2019	4:38:25 PM	Gully with no OHWM
Non-JD 27	Non-JD Feature	30.123035	-95.048891	11	1.8886	0.9592	2/28/2019	5:56:05 PM	Gully with no OHWM
Non-JD 28	Non-JD Feature	30.122902	-95.048791	11	1.7555	0.9439	2/28/2019	5:54:43 PM	Gully with no OHWM
Non-JD 29	Non-JD Feature	30.120959	-95.061033	13	1.7985	0.9167	2/18/2019	5:30:07 PM	Gully with no OHWM
Non-JD 30	Non-JD Feature	30.118909	-95.055245	12	1.7457	0.9835	2/28/2019	3:26:42 PM	Gully with no OHWM
S1	Stream Reference Point	30.118715	-95.132556	12	1.5799	0.8789	2/20/2019	6:11:46 PM	Head of EFSJ Trib 2-1 at wetland
S2	Stream Reference Point	30.118172	-95.131627	14	1.3625	0.7833	2/20/2019	6:24:33 PM	Head of EFSJ Trib 2-2 at wetland
S3	Stream Reference Point	30.115729	-95.119845	15	1.5933	0.7917	2/21/2019	4:38:46 PM	Head of EFSJ Trib 2-3
S4	Stream Reference Point	30.117132	-95.118714	13	1.6284	0.8540	2/21/2019	5:03:07 PM	Head of EFSJ Trib 2-5 at wetland
S5	Stream Reference Point	30.117695	-95.118412	15	1.3621	0.8022	2/21/2019	5:20:09 PM	Head of EFSJ Trib 2-5 at wetland
S6	Stream Reference Point	30.118150	-95.118539	14	1.4274	0.7797	2/21/2019	5:33:58 PM	Head of EFSJ Trib 2 at wetland

Point ID	Point Type	Latitude	Longitude	NUM SATS	PDOP	НДОР	GPS DATE	GPS TIME (UTC)	Comments
S7	Stream Reference Point	30.113434	-95.115349	16	1.2635	0.6981	3/26/2019	9:27:55 PM	Confluence of ESFJ Trib 2-4 and 2-4- 1. ESFJ Trib 2-4 continues to pipeline.
S8	Stream Reference Point	30.113541	-95.115088	16	1.3502	0.7576	3/26/2019	9:30:14 PM	Head of EFSJ Trib 2-4-1 at wetland
S9	Stream Reference Point	30.130841	-95.049509	14	1.7473	0.8371	2/19/2019	12:14:39 AM	Head of LB Trib 12
S10	Stream Reference Point	30.130677	-95.049646	13	1.7988	1.0515	2/19/2019	12:13:20 AM	Head of LB Trib 12-4
S11	Stream Reference Point	30.130095	-95.049790	14	1.7434	0.8418	2/19/2019	12:26:01 AM	Head of LB Trib 12-3
S12	Stream Reference Point	30.130317	-95.048985	6	4.3530	1.5402	2/18/2019	11:50:13 PM	Head of LB Trib 12-2
S13	Stream Reference Point	30.129916	-95.045384	15	1.4020	0.6914	3/1/2019	6:33:27 PM	Head of LB Trib 14
S14	Stream Reference Point	30.129193	-95.045248	13	1.7204	0.8934	3/1/2019	5:43:17 PM	LB Trib 14 flows into slough (portion of of Wetland 8) and heads un again at this point
S15	Stream Reference Point	30.128591	-95.055044	18	1.7638	0.7440	2/19/2019	10:34:42 PM	head of LB Trib 5-3-1 in wetland.
S16	Stream Reference Point	30.128679	-95.054334	15	1.3059	0.6937	2/19/2019	10:38:42 PM	Head of LB Trib 5-3 at wetland. Head of stream at wetland boundary.
S17	Stream Reference Doint	30 126586	-95 054744	13	21224	0 7676	2/19/2019	9.54.46 PM	Head of I B Trih 5-3-a
518 S18	Stream Reference Point	30.127406	-95.053426	14	1.5423	0.7713	2/19/2019	10:56:47 PM	Head of LB Trib 5-4
S19	Stream Reference Point	30.127481	-95.049074	12	2.3834	1.2152	2/28/2019	11:26:23 PM	Head of LB Trib 11
S20	Stream Reference Point	30.127323	-95.047902	15	1.3102	0.6815	2/18/2019	10:49:35 PM	Head of LB Trib 12-1
S21	Stream Reference Point	30.126755	-95.048373	12	1.9985	0.9307	2/28/2019	11:37:12 PM	Head of LB-b
S22	Stream Reference Point	30.124568	-95.059651	12	2.4805	1.1470	2/18/2019	8:57:58 PM	Head of CB Trib 2-a
S23	Stream Reference Point	30.124501	-95.059297	12	1.6213	0.8042	2/18/2019	8:53:30 PM	Head of CB Trib 2
S24	Stream Reference Point	30.124378	-95.055948	11	1.7444	0.8246	2/19/2019	7:57:17 PM	Head of LB Trib 5-1
S25	Stream Reference Point	30.125460	-95.055609	11	1.5870	0.8332	2/19/2019	7:26:22 PM	Head of LB Trib 5-2-1
S26	Stream Reference Point	30.125837	-95.055197	12	1.7567	0.8672	2/19/2019	7:14:39 PM	Head of LB Trib 5-2
S27	Stream Reference Point	30.123450	-95.055241	11	2.0743	0.9214	2/19/2019	8:20:44 PM	Head of LB Trib 5-a
S28	Stream Reference Point	30.123312	-95.055231	13	1.6474	0.7836	2/19/2019	8:29:30 PM	Head of LB Trib 5-b
S29	Stream Reference Point	30.121811	-95.056521	11	2.3654	1.0886	2/27/2019	5:41:24 PM	Head of LB-a
S30	Stream Reference Point	30.122588	-95.051204	10	2.7812	1.3144	2/28/2019	5:11:53 PM	Head of LB Trib 4
S31	Stream Reference Point	30.122588	-95.050892	12	1.9958	1.0390	2/28/2019	5:13:07 PM	Head of LB Trib 8
S32	Stream Reference Point	30.122287	-95.048906	12	1.5458	0.8344	2/28/2019	6:03:09 PM	Head of LB Trib 9
S33	Stream Reference Point	30.122553	-95.048728	12	1.5704	0.8329	2/28/2019	6:06:20 PM	Head of LB Trib 9-a
S34	Stream Reference Point	30.119075	-95.059981	14	1.4263	0.7737	2/18/2019	6:41:57 PM	Head of CB-c
S35	Stream Reference Point	30.119802	-95.059612	6	1.9147	0.9698	2/18/2019	7:00:04 PM	head of CB-e

itigation Bank	ion GPS Points
Lake Houston M	3lock 2 Delineati

Point ID	Point Type	Latitude	Longitude	NUM SATS	PDOP	НООН	GPS DATE	GPS TIME (UTC)	Comments
S36	Stream Reference Point	30.119860	-95.057546	12	1.8763	0.9971	2/27/2019	4:10:07 PM	Head of LB Trib 2-a. Stream starts as ephemeral but transitions to intermittent (LB Trib 2)
S37	Stream Reference Point	30.119007	-95.056189	14	1.5734	0.9044	2/28/2019	3:23:36 PM	Head of LB Trib 1 at backwater slough (portion of Wetland 8).
S38	Stream Reference Point	30.118850	-95.055010	12	1.6517	0.8818	2/28/2019	3:28:08 PM	Head of LB Trib 3-1
S39	Stream Reference Point	30.119979	-95.054467	13	1.4583	0.7829	2/28/2019	3:58:47 PM	Head of LB Trib 3-b
S40	Stream Reference Point	30.120149	-95.054292	15	1.4671	0.7487	2/28/2019	3:57:31 PM	Head of LB Trib 3-a
S41	Stream Reference Point	30.120290	-95.054116	13	1.6731	0.8645	2/28/2019	4:20:42 PM	Head of LB Trib 4-a
CB T3	Stream Transect	30.118990	-95.059384	13	1.6563	0.8673	2/18/2019	6:28:55 PM	
CB T4	Stream Transect	30.119671	-95.060146	12	1.6544	0.9051	2/18/2019	6:08:23 PM	
CB T5	Stream Transect	30.120480	-95.061023	12	1.8313	0.9712	2/18/2019	5:37:07 PM	
CB Trib 2 T1	Stream Transect	30.120849	-95.059698	12	2.1297	0.8996	2/18/2019	7:30:37 PM	
CB Trib 2 T2	Stream Transect	30.121877	-95.059717	13	1.7608	0.7588	2/18/2019	7:48:16 PM	
CB Trib 2 T3	Stream Transect	30.123233	-95.059487	13	1.8349	0.9428	2/18/2019	8:39:59 PM	
CB Trib 2 T4	Stream Transect	30.124328	-95.059235	13	1.6131	0.9414	2/18/2019	9:01:32 PM	
CB Trib 2-a T1	Stream Transect	30.124208	-95.059541	0	0.0000	0.0000	2/18/2019		GPS point recorded with phone. No accuracy statistics.
CB-c T1	Stream Transect	30.119087	-95.059881	12	1.9968	1.0598	2/18/2019	6:44:28 PM	
CB-d T1	Stream Transect	30.119026	-95.059870	14	1.4488	0.7918	2/18/2019	6:52:01 PM	
CB-e T1	Stream Transect	30.119780	-95.059558	12	1.5760	0.8231	2/18/2019	7:01:10 PM	
EFSJ Trib 1 T1	Stream Transect	30.113429	-95.136747	12	1.9795	1.2473	2/20/2019	4:17:27 PM	
EFSJ Trib 1 T2	Stream Transect	30.112927	-95.135737	14	1.5600	0.7625	2/20/2019	3:46:45 PM	
EFSJ Trib 1 T3	Stream Transect	30.113526	-95.133989	12	1.7042	0.8216	2/20/2019	3:36:30 PM	
EFSJ Trib 1-1 T1	Stream Transect	30.112939	-95.136162	14	1.5236	0.7448	2/20/2019	4:06:44 PM	
EFSJ Trib 1-2 T1	Stream Transect	30.113207	-95.133794	14	1.5559	0.8650	2/20/2019	3:25:13 PM	
EFSJ Trib 2 T1	Stream Transect	30.115029	-95.137437	12	1.8491	0.8545	2/20/2019	4:35:18 PM	
EFSJ Trib 2 T10	Stream Transect	30.115911	-95.128920	14	1.4470	0.7188	2/20/2019	7:19:11 PM	
EFSJ Trib 2 T11	Stream Transect	30.116967	-95.129011	16	1.5521	0.6774	2/20/2019	9:53:27 PM	
EFSJ Trib 2 T12	Stream Transect	30.117446	-95.127477	15	1.7577	0.7188	2/20/2019	10:07:33 PM	
EFSJ Trib 2 T13	Stream Transect	30.118566	-95.127239	17	1.5320	0.6908	2/20/2019	10:21:24 PM	
EFSJ Trib 2 T14	Stream Transect	30.119250	-95.125798	14	2.0041	0.8602	2/20/2019	10:50:54 PM	
EFSJ Trib 2 T15	Stream Transect	30.118129	-95.125173	16	1.4227	0.7712	2/20/2019	11:06:56 PM	
EFSJ Trib 2 T16	Stream Transect	30.117373	-95.124445	17	1.2243	0.6660	2/20/2019	11:29:48 PM	
EFSJ Trib 2 T17	Stream Transect	30.115660	-95.124599	14	1.3667	0.7793	2/20/2019	11:43:35 PM	
EFSJ Trib 2 T18	Stream Transect	30.114738	-95.123424	16	1.2773	0.7148	2/20/2019	11:54:59 PM	
EFSJ Trib 2 T19	Stream Transect	30.115060	-95.122277	16	1.3080	0.6739	2/21/2019	4:18:41 PM	
EFSJ Trib 2 T2	Stream Transect	30.115423	-95.136968	15	1.3933	0.7061	2/20/2019	4:49:59 PM	

Point ID	Point Type	Latitude	Longitude	MUM	PDOP	НООР	GPS DATE	GPS TIME	Comments
				SAIS	1000		010010010	(UIC)	
EFSJ Trib 2 T20	Stream Transect	30.115486	-95.121011	14	1.3087	0.7453	2/21/2019	4:28:32 PM	
EFSJ Trib 2 T21	Stream Transect	30.116170	-95.119856	15	1.5545	0.8143	2/21/2019	4:46:16 PM	
EFSJ Trib 2 T22	Stream Transect	30.117553	-95.118807	15	1.3167	0.7402	2/21/2019	5:13:24 PM	
EFSJ Trib 2 T3	Stream Transect	30.116209	-95.136135	10	2.1288	1.1154	2/20/2019	5:05:52 PM	
EFSJ Trib 2 T4	Stream Transect	30.117193	-95.135043	12	1.7053	0.9316	2/20/2019	5:32:41 PM	
EFSJ Trib 2 T5	Stream Transect	30.118058	-95.133472	13	1.6617	0.9472	2/20/2019	5:46:56 PM	
EFSJ Trib 2 T6	Stream Transect	30.117947	-95.132144	13	1.6458	0.9696	2/20/2019	6:34:07 PM	
EFSJ Trib 2 T7	Stream Transect	30.116627	-95.132180	14	1.5236	0.7890	2/20/2019	6:44:26 PM	
EFSJ Trib 2 T8	Stream Transect	30.115786	-95.131549	15	1.2614	0.6833	2/20/2019	6:54:42 PM	
EFSJ Trib 2 T9	Stream Transect	30.115261	-95.130281	14	1.4195	0.7151	2/20/2019	7:05:38 PM	
EFSJ Trib 2-1 T1	Stream Transect	30.118586	-95.132857	13	1.5635	0.8965	2/20/2019	6:14:20 PM	
EFSJ Trib 2-2 T1	Stream Transect	30.118214	-95.132169	15	1.4111	0.7510	2/20/2019	6:28:33 PM	
EFSJ Trib 2-3 T1	Stream Transect	30.115753	-95.120008	16	1.4329	0.7554	2/21/2019	4:43:35 PM	
EFSJ Trib 2-4 T1	Stream Transect	30.115714	-95.119077	15	1.4740	0.7843	3/26/2019	8:39:48 PM	
EFSJ Trib 2-4 T2	Stream Transect	30.115354	-95.118335	14	1.4721	0.7742	3/26/2019	8:47:16 PM	
EFSJ Trib 2-4 T3	Stream Transect	30.114178	-95.116376	13	1.7989	0.8873	3/26/2019	9:01:18 PM	
EFSJ Trib 2-4 T4	Stream Transect	30.113437	-95.115440	17	1.1958	0.6655	3/26/2019	9:22:42 PM	
EFSJ Trib 2-4-1 T1	Stream Transect	30.113555	-95.115182	16	1.2620	0.7021	3/26/2019	9:32:06 PM	
EFSJ Trib 2-5 T1	Stream Transect	30.117099	-95.118882	15	1.3688	0.7799	2/21/2019	5:04:18 PM	
EFSJ Trib 2-6 T1	Stream Transect	30.117722	-95.118563	13	1.4414	0.8129	2/21/2019	5:27:06 PM	
LB T1	Stream Transect	30.118964	-95.057621	14	1.3671	0.7784	2/27/2019	4:45:46 PM	
LB T2	Stream Transect	30.119255	-95.056614	11	2.3822	1.1634	2/27/2019	4:53:58 PM	
LB T3	Stream Transect	30.120312	-95.056285	11	1.9265	0.9965	2/27/2019	5:14:59 PM	
LB T4	Stream Transect	30.121178	-95.055586	12	2.4013	1.4249	2/27/2019	5:29:19 PM	
LB T5	Stream Transect	30.122065	-95.055121	12	1.8600	0.9272	2/27/2019	6:01:56 PM	
LB T6	Stream Transect	30.120486	-95.054515	12	1.7891	0.9012	2/28/2019	4:13:22 PM	
LB T7	Stream Transect	30.121168	-95.055148	12	1.6813	0.9414	2/27/2019	6:17:48 PM	
LB T8	Stream Transect	30.122530	-95.054517	10	2.1539	1.0916	2/27/2019	6:52:20 PM	
LB T9	Stream Transect	30.122833	-95.053637	11	1.9695	0.9748	2/27/2019	7:01:38 PM	
LB T10	Stream Transect	30.124076	-95.053382	13	1.9142	0.8544	2/27/2019	7:21:31 PM	
LB T11	Stream Transect	30.124013	-95.052484	13	1.6017	0.7924	2/28/2019	8:17:10 PM	
LB T12	Stream Transect	30.124680	-95.050584	10	1.9097	1.0300	2/28/2019	8:31:09 PM	
LB T13	Stream Transect	30.123781	-95.050010	14	1.7039	0.7729	2/28/2019	8:52:33 PM	
LB T14	Stream Transect	30.124452	-95.049837	16	1.4720	0.6729	2/28/2019	9:06:53 PM	
LB T15	Stream Transect	30.126501	-95.048610	14	1.6137	0.8819	3/1/2019	4:15:22 PM	
LB T16	Stream Transect	30.126216	-95.047916	12	1.8043	1.0134	3/1/2019	4:45:17 PM	
LB T17	Stream Transect	30.127081	-95.046174	13	1.8319	1.0458	3/1/2019	4:56:08 PM	
LB T18	Stream Transect	30.127621	-95.045229	12	1.6413	0.9810	3/1/2019	5:23:22 PM	
LB T19	Stream Transect	30.128623	-95.045040	11	1.9656	1.0617	3/1/2019	5:48:17 PM	

	_	_	_	_	_	_	_	_	_	_	_		_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_				_	_	_
Comments												GPS point recorded with phone. No accuracy statistics.																										
GPS TIME (UTC)	6:26:47 PM	3:12:53 PM	3:19:24 PM	6:20:21 PM	11:31:43 PM	11:00:17 PM	11:19:03 PM	11:36:17 PM	11:58:00 PM	10:51:47 PM	11:51:18 PM		10:38:20 PM	10:53:11 PM	6:38:02 PM	4:38:04 PM	4:22:33 PM	4:00:05 PM	4:12:22 PM	3:43:32 PM	3:33:23 PM	4:03:33 PM	4:00:06 PM	4:33:27 PM	4:41:47 PM	5:04:17 PM	4:23:37 PM	8:44:56 PM	8:55:26 PM	9:10:45 PM	9:27:40 PM	11:11:21 PM	8:07:13 PM	7:45:40 PM	7:36:39 PM	7:34:35 PM	9:44:30 PM	10:15:46 PM
GPS DATE	3/1/2019	2/28/2019	2/28/2019	2/28/2019	2/28/2019	2/18/2019	2/18/2019	2/18/2019	2/18/2019	2/18/2019	2/18/2019	2/18/2019	2/28/2019	2/28/2019	3/1/2019	2/19/2019	2/19/2019	2/27/2019	2/27/2019	2/28/2019	2/28/2019	2/28/2019	2/28/2019	2/28/2019	2/28/2019	2/28/2019	2/28/2019	2/19/2019	2/19/2019	2/19/2019	2/19/2019	2/19/2019	2/19/2019	2/19/2019	2/19/2019	2/19/2019	2/19/2019	2/19/2019
HDOP	0.6912	0.9600	0.8848	0.9492	1.0417	0.7771	0.7522	0.9455	1.1629	0.7432	1.1829	0.0000	0.8832	1.0373	0.8342	0.9092	0.8540	0.7395	0.7930	0.9165	0.9768	0.9217	0.7496	0.7729	0.7644	1.0472	0.7717	1.0775	0.6746	0.9020	0.8754	0.8886	0.7948	0.7157	0.7152	0.8158	0.7796	0.8030
PDOP	1.3713	2.1838	1.8070	2.0042	1.9451	1.6050	1.4295	1.6617	2.9452	1.5596	2.8872	0.0000	1.7474	1.9723	1.7859	1.9649	1.7828	1.3706	1.5490	1.7113	2.1991	2.1535	1.4361	1.4310	1.4337	2.0096	1.5312	2.1337	1.3642	1.7236	1.8972	1.8019	1.5755	1.5468	1.5703	1.7652	2.1815	1.9199
NUM SATS	15	12	12	11	12	13	15	12	13	14	11	0	13	13	13	13	13	15	14	12	12	14	14	13	14	12	14	11	15	13	11	14	13	14	14	14	13	12
Longitude	-95.044542	-95.057174	-95.056375	-95.048972	-95.049366	-95.047281	-95.047247	-95.048323	-95.049240	-95.047527	-95.048920	-95.049700	-95.044662	-95.045066	-95.045216	-95.045224	-95.045742	-95.058300	-95.057894	-95.055408	-95.055466	-95.054554	-95.054474	-95.054201	-95.053655	-95.052178	-95.054140	-95.054667	-95.054695	-95.054066	-95.053437	-95.052633	-95.055300	-95.054915	-95.055290	-95.055394	-95.053918	-95.054815
Latitude	30.129718	30.118546	30.118962	30.124185	30.127032	30.127359	30.128516	30.129362	30.130054	30.127383	30.130258	30.130065	30.126792	30.125834	30.129100	30.131308	30.131992	30.118929	30.119625	30.120095	30.119164	30.120165	30.120028	30.121013	30.121611	30.122526	30.120435	30.123468	30.124296	30.125021	30.125703	30.127085	30.124221	30.124576	30.125302	30.125195	30.126270	30.127447
Point Type	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect	Stream Transect											
Point ID	LB T20	LB Trib 1 T1	LB Trib 1 T2	LB Trib 10 T1	LB Trib 11 T1	LB Trib 12 T1	LB Trib 12 T2	LB Trib 12 T3	LB Trib 12 T4	LB Trib 12-1 T1	LB Trib 12-2 T1	LB Trib 12-3 T1	LB Trib 13 T1	LB Trib 13 T2	LB Trib 14 T1	LB Trib 15 T1	LB Trib 15 T2	LB Trib 2 T1	LB Trib 2-a T1	LB Trib 3 T1	LB Trib 3-1 T1	LB Trib 3-a T1	LB Trib 3-b T1	LB Trib 4 T1	LB Trib 4 T2	LB Trib 4 T3	LB Trib 4-a T1	LB Trib 5 T1	LB Trib 5 T2	LB Trib 5 T3	LB Trib 5 T4	LB Trib 5 T5	LB Trib 5-1 T1	LB Trib 5-2 T1	LB Trib 5-2 T2	LB Trib 5-2-1 T1	LB Trib 5-3 T1	LB Trib 5-3 T2

Point ID	Point Type	Latitude	Longitude	MUM	PDOP	НООР	GPS DATE	GPS TIME	Comments
	: 1			SAIS				(UIC)	
LB Trib 5-3-1 T1	Stream Transect	30.128327	-95.054661	18	1.1827	0.6054	2/19/2019	10:45:18 PM	
LB Trib 5-3-a T1	Stream Transect	30.126525	-95.054310	15	1.8646	0.7572	2/19/2019	9:58:06 PM	
LB Trib 5-4 T1	Stream Transect	30.126951	-95.053137	17	1.3820	0.6610	2/19/2019	11:01:40 PM	
LB Trib 5-a T1	Stream Transect	30.123378	-95.055055	13	1.8960	0.9229	2/19/2019	8:27:47 PM	
LB Trib 6 T1	Stream Transect	30.123845	-95.051096	11	2.2826	1.1824	2/28/2019	5:34:15 PM	
LB Trib 7 T1	Stream Transect	30.125140	-95.050202	10	2.6023	1.3292	2/28/2019	7:41:12 PM	
LB Trib 8 T1	Stream Transect	30.123076	-95.050368	12	1.7609	0.9363	2/28/2019	5:22:22 PM	
LB Trib 9 T1	Stream Transect	30.123347	-95.049802	13	1.9554	1.0525	2/28/2019	5:47:40 PM	
LB Trib 9 T2	Stream Transect	30.123043	-95.049052	6	7.5881	5.0543	2/28/2019	5:57:03 PM	
LB Trib 9-a T1	Stream Transect	30.122648	-95.048720	6	2.4707	1.2357	2/28/2019	6:08:06 PM	
LB-a T1	Stream Transect	30.121532	-95.056108	6	2.3711	1.1081	2/27/2019	5:47:19 PM	
LB-b T1	Stream Transect	30.126560	-95.048371	13	1.7994	0.8664	2/28/2019	11:39:17 PM	
WB1	Wetland Boundary Point	30.122782	-95.130689	14	1.4798	0.7651	3/26/2019	2:09:44 PM	Wetland 5
WB2	Wetland Boundary Point	30.122667	-95.130664	13	1.8548	0.9126	3/26/2019	2:10:47 PM	Wetland 5
WB3	Wetland Boundary Point	30.122807	-95.130234	14	1.3478	0.7769	3/26/2019	2:58:00 PM	Wetland 5
WB4	Wetland Boundary Point	30.122734	-95.130250	15	1.3217	0.7407	3/26/2019	2:56:37 PM	Wetland 5
WB5	Wetland Boundary Point	30.122797	-95.129188	14	1.4034	0.7801	3/26/2019	3:06:59 PM	Wetland 5
WB6	Wetland Boundary Point	30.122711	-95.129112	13	1.7866	0.9187	3/26/2019	3:04:38 PM	Wetland 5
WB7	Wetland Boundary Point	30.122624	-95.129107	13	1.7900	0.9215	3/26/2019	3:05:50 PM	Wetland 5
WB8	Wetland Boundary Point	30.122756	-95.128699	14	1.5912	0.8988	3/26/2019	4:00:49 PM	Wetland 5
WB9	Wetland Boundary Point	30.122711	-95.128680	13	1.4497	0.8138	3/26/2019	4:01:57 PM	Wetland 5
									Wetland boundary. Upland to
WB10	Wetland Boundary Point	30.123266	-95.128800	14	1.4729	0.7525	3/26/2019	5:53:40 PM	north. Narrow wetland drain
									connects two wetlands
WB11	Wetland Boundary Point	30.122776	-95.127784	15	1.3018	0.7315	3/26/2019	4:22:04 PM	Wetland 5
WB12	Wetland Boundary Point	30.122703	-95.127835	14	1.3111	0.7762	3/26/2019	4:20:04 PM	Wetland 5
WB13	Wetland Boundary Point	30.122481	-95.127850	15	1.2599	0.6896	3/26/2019	4:26:14 PM	Wetland 5
WB14	Wetland Boundary Point	30.123543	-95.127035	13	1.4621	0.7484	3/26/2019	6:01:38 PM	Wetland 5
WB15	Wetland Boundary Point	30.122656	-95.126321	14	1.5124	0.7214	3/26/2019	6:10:24 PM	Wetland 5
WB16	Wetland Boundary Point	30.120096	-95.131044	11	1.7560	0.9801	3/25/2019	4:27:54 PM	Wetland 5
WB17	Wetland Boundary Point	30.120031	-95.131096	14	1.4483	0.7633	3/25/2019	4:20:45 PM	Wetland 5
WB18	Wetland Boundary Point	30.119983	-95.131118	15	1.2930	0.7042	3/25/2019	4:28:56 PM	Wetland 5
WB19	Wetland Boundary Point	30.120046	-95.130271	16	1.3442	0.6594	3/25/2019	5:02:17 PM	Wetland 5
WB20	Wetland Boundary Point	30.120055	-95.130504	17	1.2762	0.6403	3/25/2019	5:00:37 PM	Wetland 5
WB21	Wetland Boundary Point	30.120013	-95.130614	16	1.3959	0.6902	3/25/2019	4:59:42 PM	Wetland 5
WB22	Wetland Boundary Point	30.119917	-95.130775	15	1.3502	0.6957	3/25/2019	4:57:22 PM	Wetland 5
WB23	Wetland Boundary Point	30.119832	-95.130821	16	1.3916	0.6897	3/25/2019	4:58:35 PM	Wetland 5
WB24	Wetland Boundary Point	30.120039	-95.128809	15	1.5288	0.7854	3/25/2019	6:25:21 PM	Wetland 5
WB25	Wetland Boundary Point	30.119969	-95.128806	14	1.3288	0.7303	3/25/2019	6:05:15 PM	Wetland 5

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Point ID	Point Type	Latitude	Longitude	NUM SATS	PDOP	НООР	GPS DATE	GPS TIME	Comments
WB26	Wetland Boundary Point	30.120395	-95.128711	17	1.2481	0.6027	3/25/2019	6:52:58 PM	Wetland 5
WB28	Wetland Boundary Point	30.120301	-95.128629	18	1.2096	0.5801	3/25/2019	6:52:03 PM	Wetland 5
WB29	Wetland Boundary Point	30.120119	-95.128603	15	1.4133	0.6747	3/25/2019	6:51:11 PM	Wetland 5
WB30	Wetland Boundary Point	30.119977	-95.128613	15	1.4655	0.7072	3/25/2019	6:49:58 PM	Wetland 5
WB31	Wetland Boundary Point	30.120020	-95.127915	16	1.3742	0.6395	3/25/2019	7:02:28 PM	Wetland 5
WB32	Wetland Boundary Point	30.119970	-95.127992	12	1.5567	0.7644	3/25/2019	7:01:46 PM	Wetland 5
WB33	Wetland Boundary Point	30.119953	-95.127539	11	2.3610	0.8795	3/25/2019	7:59:27 PM	Wetland 5
WB34	Wetland Boundary Point	30.119982	-95.126415	16	1.2596	0.7049	3/25/2019	9:44:13 PM	Wetland 5
WB35	Wetland Boundary Point	30.119913	-95.125981	13	1.7395	0.8489	3/25/2019	10:04:55 PM	Wetland 5
WB36	Wetland Boundary Point	30.120016	-95.125432	13	1.7333	0.8402	3/25/2019	10:17:46 PM	Wetland 5
WB37	Wetland Boundary Point	30.119954	-95.124848	14	1.3135	0.7357	3/25/2019	10:27:08 PM	Wetland 5
WB38	Wetland Boundary Point	30.119427	-95.125555	6	2.0895	1.2997	4/8/2019	11:41:13 PM	Wetland 5
WB39	Wetland Boundary Point	30.119649	-95.124842	13	1.5199	0.9510	4/8/2019	10:47:00 PM	Wetland 5
WB40	Wetland Boundary Point	30.119216	-95.124533	12	2.1681	1.1992	4/8/2019	10:17:49 PM	Wetland 5
WB41	Wetland Boundary Point	30.118793	-95.124357	15	1.4146	0.8284	4/8/2019	9:54:47 PM	East side of portion of Wetland 5. Wetland continues west
WB42	Wetland Boundary Point	30.118797	-95.125272	6	2.2601	1.5146	4/8/2019	11:37:10 PM	Wetland 5
WB43	Wetland Boundary Point	30.118827	-95.123746	10	3.3999	1.7330	4/8/2019	11:07:41 PM	Wetland 5
WB44	Wetland Boundary Point	30.120422	-95.123809	12	1.3913	0.8558	4/8/2019	10:55:40 PM	Wetland 5
WB45	Wetland Boundary Point	30.119980	-95.123064	13	1.3969	0.9232	3/25/2019	11:52:56 PM	Wetland 5
WB46	Wetland Boundary Point	30.120030	-95.122895	12	2.0646	1.1122	3/25/2019	11:14:43 PM	Wetland 5
WB47	Wetland Boundary Point	30.119094	-95.122770	13	1.4623	0.8293	4/8/2019	11:21:20 PM	Wetland 5
WB48	Wetland Boundary Point	30.116895	-95.134700	14	1.6399	0.8346	3/24/2019	10:21:14 PM	Wetland 5. Head of wetland swale. Wetland to east.
WB49	Wetland Boundary Point	30.117131	-95.134161	14	1.6114	0.8330	3/24/2019	10:24:23 PM	Wetland 5. North side of wetland swale.
WB50	Wetland Boundary Point	30.116977	-95.134185	14	1.6212	0.8336	3/24/2019	10:23:08 PM	Wetland 5. South Side of Wetland Swale
WB51	Wetland Boundary Point	30.117238	-95.133505	13	1.6646	0.8563	3/24/2019	10:27:29 PM	Wetland 5. North side of wetland swale.
WB52	Wetland Boundary Point	30.117114	-95.133561	14	1.5689	0.8302	3/24/2019	10:28:27 PM	Wetland 5. South side of wetland swale.
WB53	Wetland Boundary Point	30.117248	-95.133246	14	1.5159	0.9208	3/24/2019	10:36:39 PM	Wetland 5. North side of wetland swale.
WB54	Wetland Boundary Point	30.117094	-95.133217	16	1.3501	0.7574	3/24/2019	10:37:53 PM	Wetland 5. South side of wetland swale.
WB55	Wetland Boundary Point	30.117077	-95.132819	12	1.9138	0.9629	3/24/2019	10:39:35 PM	Wetland 5. Head of wetland swale. Wetland to west.

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Point ID	Point Type	Latitude	Longitude	NUM SATS	PDOP	НДОР	GPS DATE	GPS TIME (UTC)	Comments
WB57	Wetland Boundary Point	30.117400	-95.131846	15	1.2274	0.7015	3/24/2019	10:51:59 PM	Wetland 5. Upland to north, wetland swale to south.
WB58	Wetland Boundary Point	30.117351	-95.131858	13	1.3099	0.7659	3/24/2019	10:50:29 PM	Wetland swale to north that flows into larger portion of Wetland 5.
WB59	Wetland Boundary Point	30.117286	-95.131712	13	1.3455	0.7816	3/24/2019	10:49:24 PM	Wetland 5
WB60	Wetland Boundary Point	30.117234	-95.131645	14	1.3977	0.8255	3/24/2019	10:54:36 PM	Wetland 5
WB61	Wetland Boundary Point	30.117262	-95.130378	14	1.2581	0.6974	3/24/2019	11:06:04 PM	Wetland 5
WB62	Wetland Boundary Point	30.117230	-95.130473	14	1.3496	0.7381	3/24/2019	11:02:40 PM	Wetland 5
WB63	Wetland Boundary Point	30.117128	-95.130299	16	1.2635	0.7182	3/24/2019	11:07:25 PM	Wetland 5
W B64	Wetland Boundary Point	30.117277	-95.130025	15	1.2713	0.7106	3/24/2019	11:09:24 PM	Wetland boundary around small, upland knoll in portion of Wetland 5
									Wetland boundary around small,
WB65	Wetland Boundary Point	30.117292	-95.129837	15	1.2677	0.7132	3/24/2019	11:12:38 PM	upland knoll in portion of Wetland 5.
WB66	Wetland Boundary Point	30.117299	-95.129557	16	1.223	0.7005	3/24/2019	11:14:45 PM	Wetland 5
WB67	Wetland Boundary Point	30.117201	-95.129475	17	1.1512	0.6633	3/24/2019	11:15:53 PM	Wetland 5
WB68	Wetland Boundary Point	30.117449	-95.127422	16	1.2041	0.7102	3/24/2019	11:25:27 PM	Wetland 5
WB69	Wetland Boundary Point	30.117247	-95.127525	17	1.2605	0.7710	3/24/2019	11:24:20 PM	Wetland 5
WB70	Wetland Boundary Point	30.117106	-95.127451	15	1.5352	0.8993	3/24/2019	11:23:18 PM	Wetland 5
WB71	Wetland Boundary Point	30.117257	-95.126866	14	1.3578	0.8254	3/24/2019	11:30:31 PM	Wetland 5
WB72	Wetland Boundary Point	30.117304	-95.126863	15	1.1589	0.6843	3/24/2019	11:41:05 PM	Wetland 5
WB73	Wetland Boundary Point	30.117350	-95.126682	12	1.3425	0.8324	3/24/2019	11:37:08 PM	Wetland 5
WB74	Wetland Boundary Point	30.117472	-95.126618	13	1.3230	0.7691	3/24/2019	11:38:04 PM	Wetland 5
WB75	Wetland Boundary Point	30.116183	-95.130635	13	1.6262	0.8502	4/8/2019	9:30:07 PM	South side of portion of Wetland 5. Wetland continues north.
WB76	Wetland Boundary Point	30.114994	-95.136814	16	1.2705	0.7284	3/24/2019	9:58:21 PM	Wetland 5. Wetland to east.
WB77	Wetland Boundary Point	30.114904	-95.136886	14	1.4481	0.8692	3/24/2019	9:55:20 PM	Wetland 5. Wetland to east.
WB78	Wetland Boundary Point	30.114824	-95.136952	16	1.2732	0.7269	3/24/2019	9:56:59 PM	Wetland 5. Wetland to east.
WB79	Wetland Boundary Point	30.114880	-95.136222	16	1.2885	0.7118	3/24/2019	9:42:49 PM	Wetland 5. Wetland west, upland ridge to east.
WB80	Wetland Boundary Point	30.114875	-95.136009	17	1.1874	0.6733	3/24/2019	9:38:56 PM	Wetland 5. Upland ridge to west.
WB81	Wetland Boundary Point	30.114772	-95.135486	17	1.2144	0.6678	3/24/2019	9:28:11 PM	Wetland 5
WB82	Wetland Boundary Point	30.114804	-95.133352	16	1.3559	0.7328	3/24/2019	9:17:49 PM	Wetland 5
WB83	Wetland Boundary Point	30.115080	-95.132698	18	1.2158	0.6574	3/24/2019	9:06:46 PM	Wetland 5
WB84	Wetland Boundary Point	30.114843	-95.132851	12	2.0812	1.0843	3/24/2019	9:13:30 PM	Wetland 5

Point ID	Point Type	Latitude	Longitude	NUM SATS	PDOP	НООН	GPS DATE	GPS TIME (UTC)	Comments
WB85	Wetland Boundary Point	30.114768	-95.132821	0	0.0000	0.0000	3/24/2019	9:10:32 PM	Wetland bndy at tip of upland ridge within Wetland 5
WB86	Wetland Boundary Point	30.114995	-95.132522	18	1.1896	0.6543	3/24/2019	9:04:14 PM	Wetland 5
WB87	Wetland Boundary Point	30.114781	-95.132026	17	1.2773	0.6677	3/24/2019	9:00:01 PM	Wetland 5
WB88	Wetland Boundary Point	30.113772	-95.137034	13	1.7758	1.0278	4/8/2019	8:54:47 PM	South side of portion of Wetland 5. Wetland continues north.
WB89	Wetland Boundary Point	30.113613	-95.136545	14	1.7744	0.8272	4/8/2019	8:50:53 PM	South side of portion of Wetland 5. Wetland continues north.
WB90	Wetland Boundary Point	30.113401	-95.136133	15	1.5414	0.8491	4/8/2019	8:34:56 PM	Wetland boundary near head of wetland swale. Wetland continues north and west.
WB91	Wetland Boundary Point	30.113966	-95.136135	15	1.3456	0.7818	4/8/2019	8:29:59 PM	East side of portion of Wetland 5
WB92	Wetland Boundary Point	30.113434	-95.133579	15	1.5516	0.8687	4/8/2019	8:22:08 PM	Wetland 5 continues north to EFSJ Trib 1
WB93	Wetland Boundary Point	30.113307	-95.132718	12	1.9392	0.9867	4/8/2019	8:18:08 PM	Wetland 5
WB94	Wetland Boundary Point	30.117225	-95.118636	16	1.1660	0.6464	3/25/2019	1:18:22 PM	West side of Wetland 6.
WB95	Wetland Boundary Point	30.117078	-95.118139	17	1.2997	0.6674	3/25/2019	1:26:05 PM	Wetland boundary around small upland knoll within Wetland 6
WB96	Wetland Boundary Point	30.117152	-95.118126	19	1.0825	0.5976	3/25/2019	1:23:59 PM	Wetland boundary around small upland knoll within Wetland 6
WB97	Wetland Boundary Point	30.117226	-95.118010	17	1.2600	0.6630	3/25/2019	1:25:05 PM	Wetland boundary around small upland knoll within Wetland 6
WB98	Wetland Boundary Point	30.117223	-95.117837	17	1.2568	0.6459	3/25/2019	1:28:49 PM	Wetland boundary around small upland knoll within Wetland 6
WB99	Wetland Boundary Point	30.117159	-95.117815	16	1.4173	0.7474	3/25/2019	1:30:27 PM	Wetland boundary around small upland knoll within Wetland 6
WB100	Wetland Boundary Point	30.117098	-95.117806	14	1.7061	0.8404	3/25/2019	1:31:30 PM	Wetland boundary around small upland knoll within Wetland 6
WB101	Wetland Boundary Point	30.117185	-95.117671	16	1.4434	0.7164	3/25/2019	1:33:44 PM	Wetland boundary around small upland knoll within Wetland 6

Point ID	Point Type	Latitude	Longitude	NUM SATS	PDOP	НООН	GPS DATE	GPS TIME (UTC)	Comments
WB102	Wetland Boundary Point	30.117141	-95.117661	17	1.4000	0.7529	3/25/2019	1:34:40 PM	Wetland boundary around small upland knoll within Wetland 6
WB103	Wetland Boundary Point	30.117176	-95.117410	15	1.4145	0.7298	3/25/2019	1:39:43 PM	Wetland boundary around small upland knoll within Wetland 6
WB104	Wetland Boundary Point	30.117154	-95.117103	16	1.4132	0.6812	3/25/2019	1:47:08 PM	East side of Wetland 6
WB105	Wetland Boundary Point	30.117258	-95.116919	16	1.4442	0.7585	3/25/2019	1:44:37 PM	East side of Wetland 6
WB106	Wetland Boundary Point	30.118301	-95.117110	15	1.4527	0.7941	3/25/2019	1:55:24 PM	Wetland boundary at small upland knoll within Wetland 6
WB107	Wetland Boundary Point	30.119226	-95.117968	16	1.4272	0.7598	3/25/2019	2:00:55 PM	Wetland boundary on west side of Wetland 6
WB108	Wetland Boundary Point	30.119890	-95.117702	16	1.3303	0.6921	3/25/2019	2:08:31 PM	West side of Wetland 6
WB109	Wetland Boundary Point	30.119929	-95.117543	16	1.3038	0.6802	3/25/2019	2:09:30 PM	West side of Wetland 6
WB110	Wetland Boundary Point	30.119989	-95.117459	16	1.2978	0.6805	3/25/2019	2:10:24 PM	West side of Wetland 6
WB111	Wetland Boundary Point	30.120141	-95.115625	16	1.2667	0.6914	3/25/2019	2:31:42 PM	Wetland boundary around small upland knoll in Wetland 6
WB112	Wetland Boundary Point	30.119948	-95.115183	15	1.4312	0.7931	3/25/2019	2:36:35 PM	Wetland boundary around small upland knoll in Wetland 6
WB113	Wetland Boundary Point	30.119893	-95.115075	14	1.3262	0.7413	3/25/2019	2:39:11 PM	Wetland boundary around small upland knoll in Wetland 6
WB114	Wetland Boundary Point	30.119835	-95.114844	14	1.3079	0.7309	3/25/2019	2:41:12 PM	Wetland boundary around small upland knoll in Wetland 6
WB115	Wetland Boundary Point	30.119835	-95.114645	15	1.3897	0.7470	3/25/2019	2:44:37 PM	Wetland boundary around small upland knoll in Wetland 6
WB116	Wetland Boundary Point	30.119873	-95.113317	14	1.4528	0.7844	3/25/2019	2:58:39 PM	Wetland boundary. East side of Wetland 6
WB117	Wetland Boundary Point	30.121122	-95.116768	17	1.1577	0.6556	3/25/2019	2:24:19 PM	Wetland boundary around small upland knoll in Wetland 6
WB118	Wetland Boundary Point	30.121533	-95.117273	17	1.1356	0.6390	3/25/2019	2:26:28 PM	Wetland boundary at northwest portion of Wetland 6.
WB119	Wetland Boundary Point	30.114428	-95.114497	14	1.4092	0.7432	3/26/2019	10:45:32 PM	Wetland 7

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Point ID	Point Type	Latitude	Longitude	NUM SATS	PDOP	НДОР	GPS DATE	GPS TIME (UTC)	Comments
WB120	Wetland Boundary Point	30.114301	-95.113386	14	1.6745	0.8329	3/26/2019	9:53:48 PM	Wetland 7
									Wetland boundary at mound on
WB121	Wetland Boundary Point	30.114451	-95.113005	14	1.7570	0.9670	3/26/2019	10:09:42 PM	south side of Wetland 7. Wetland to north.
WB122	Wetland Boundary Point	30.130351	-95.047406	16	1.4449	0.6952	4/9/2019	7:03:21 PM	Wetland 8
WB123	Wetland Boundary Point	30.130342	-95.046593	12	1.6953	0.8177	4/9/2019	5:33:50 PM	Wetland 8
WB124	Wetland Boundary Point	30.130357	-95.045635	12	1.8842	0.8660	4/9/2019	5:19:59 PM	Wetland 8
WB125	Wetland Boundary Point	30.130353	-95.045171	12	1.6443	0.8224	4/9/2019	4:27:15 PM	Wetland 8
WB126	Wetland Boundary Point	30.130348	-95.044651	13	1.7144	0.8317	4/9/2019	3:57:30 PM	wetland bndy. transect ends in wetland
WB127	Wetland Boundary Point	30.128828	-95.054354	16	1.2690	0.6768	4/11/2019	5:28:56 PM	Wetland boundary at upland mound within Wetland 9.
WB127a	Wetland Boundary Point	30.128679	-95.054334	15	1.3059	0.6937	2/19/2019	10:38:42 PM	Wetland boundary at head of stream.
WB128	Wetland Boundary Point	30.127615	-95.048477	12	2.4731	1.1373	4/10/2019	2:08:56 PM	Wetland 8
WB129	Wetland Boundary Point	30.127620	-95.048018	10	2.4019	1.0548	4/9/2019	11:56:46 PM	Wetland 8
WB130	Wetland Boundary Point	30.127608	-95.047566	10	1.8755	1.0371	4/9/2019	11:49:57 PM	Wetland 8
WB131	Wetland Boundary Point	30.127549	-95.046792	10	2.1986	0.9979	4/9/2019	11:37:46 PM	Wetland swale to north. Wetland 8
WB132	Wetland Boundary Point	30.127676	-95.046663	10	2.4409	1.0096	4/9/2019	11:41:19 PM	North side of wetland swale. Wetland 8
WB133	Wetland Boundary Point	30.127602	-95.045822	11	1.7335	0.9186	4/9/2019	11:28:33 PM	Wetland to west. Wetland 8
				ç					West side of wetland swale /
WB134	Wetland Boundary Point	30.127575	-95.044939	12	1.4904	0.8500	4/9/2019	10:27:44 PM	outlet to cypress dominated depression
									Wetland boundary at south side of
WB135	Wetland Boundary Point	30.127513	-95.044775	10	1.7956	0.8801	4/9/2019	10:24:39 PM	Cypress dominated wetland depression.
WB136	Wetland Boundary Point	30.124437	-95.055061	11	2.6196	1.1743	4/11/2019	2:16:17 PM	Wetland to south. Wetland 8.
WB137	Wetland Boundary Point	30.124312	-95.054370	11	2.2038	1.0676	4/11/2019	2:22:06 PM	Wetland to west and south.
									Wetland 8.
WB138	Wetland Boundary Point	30.124900	-95.053026	13	1.9380	0.8138	4/10/2019	8:47:20 PM	Wetland 8
WB139	Wetland Boundary Point	30.124858	-95.051431	12	1.9666	0.8546	4/10/2019	7:04:55 PM	Wetland 8
WB140	Wetland Boundary Point	30.125081	-95.048075	11	2.2089	0.9246	4/10/2019	5:12:01 PM	Wetland 8
WB141	Wetland Boundary Point	30.122179	-95.056980	11	2.0756	1.2870	4/16/2019	10:40:12 PM	Wetland 8
WB142	Wetland Boundary Point	30.122133	-95.056532	11	2.0676	1.0938	4/16/2019	9:54:31 PM	Wetland 8
WB143	Wetland Boundary Point	30.122194	-95.055978	13	1.5270	0.8281	4/16/2019	9:24:56 PM	Wetland 8
WB144	Wetland Boundary Point	30.122188	-95.054795	13	2.2634	0.9964	4/16/2019	8:40:40 PM	Wetland 8
WB145	Wetland Boundary Point	30.122185	-95.053983	13	1.8878	0.9155	4/16/2019	8:10:27 PM	Wetland 8

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Point ID	Point Type	Latitude	Longitude	NUM SATS	PDOP	НООР	GPS DATE	GPS TIME (UTC)	Comments	
WB146	Wetland Boundary Point	30.122140	-95.053518	13	1.7052	0.9210	4/16/2019	7:36:26 PM	Wetland 8	
WB147	Wetland Boundary Point	30.122153	-95.052597	12	2.2147	0.8982	4/16/2019	6:48:00 PM	Wetland 8	
WB148	Wetland Boundary Point	30.122273	-95.051344	10	2.2794	1.1802	4/16/2019	6:09:07 PM	Wetland 8	
									Wetland boundary around	
WB149	Wetland Boundary Point	30.122131	-95.046808	12	2.1751	0.9936	4/16/2019	5:17:09 PM	Wetland 10 (small wetland	
WB150	Wetland Boundary Point	30.122062	-95.046742	10	2.9643	1.2398	4/16/2019	5:14:47 PM	Wetland 10	
WB151	Wetland Boundary Point	30.121993	-95.046718	12	2.0938	0.9648	4/16/2019	5:23:26 PM	Wetland 10	
WB152	Wetland Boundary Point	30.121849	-95.046764	12	2.1655	1.0053	4/16/2019	5:22:27 PM	Wetland 10	
WB153	Wetland Boundary Point	30.121765	-95.046859	11	2.2014	1.0168	4/16/2019	5:21:01 PM	Wetland 10	
WB154	Wetland Boundary Point	30.121812	-95.046924	6	2.8040	1.1465	4/16/2019	5:19:31 PM	Wetland 10	
WB155	Wetland Boundary Point	30.122019	-95.046894	12	2.0239	1.0062	4/16/2019	5:18:06 PM	Wetland 10	
WB156	Wetland Boundary Point	30.119433	-95.060385	14	1.4923	0.7987	4/17/2019	8:19:40 PM	Wetland 8	
WB157	Wetland Boundary Point	30.119394	-95.056518	15	1.6966	0.6752	4/17/2019	5:43:05 PM	Wetland 8	
WB158	Wetland Boundary Point	30.119431	-95.055375	8	2.7955	1.2759	4/17/2019	4:05:27 PM	Wetland 8	
DP 24	Wetland Data Point	30.114852	-95.123816	17	1.3130	0.6573	3/24/2019	8:50:47 PM		
DP 25	Wetland Data Point	30.114912	-95.132341	17	1.2279	0.6549	3/24/2019	9:02:16 PM		
DP 26	Wetland Data Point	30.114760	-95.131992	16	1.3632	0.7050	3/24/2019	8:59:00 PM		
DP 27	Wetland Data Point	30.115076	-95.132609	20	1.0831	0.5927	3/24/2019	9:05:48 PM		
DP 28	Wetland Data Point	30.114809	-95.133333	18	1.1989	0.6624	3/24/2019	9:16:48 PM		
DP 29	Wetland Data Point	30.114743	-95.133449	12	1.4000	0.8000	3/18/2019	9:55:13 PM		
DP 30	Wetland Data Point	30.114847	-95.135598	16	1.2903	0.7053	3/24/2019	9:36:20 PM		
DP 31	Wetland Data Point	30.114904	-95.136118	16	1.2855	0.7165	3/24/2019	9:47:05 PM		
DP 32	Wetland Data Point	30.114866	-95.136494	15	1.4535	0.8948	3/24/2019	9:44:46 PM		
DP 33	Wetland Data Point	30.114921	-95.136965	16	1.2797	0.7223	3/24/2019	9:52:29 PM		
DP 34	Wetland Data Point	30.114869	-95.137645	13	3.0246	1.3679	3/24/2019	10:02:24 PM		
DP 35	Wetland Data Point	30.117319	-95.136393	13	1.7125	0.8794	3/24/2019	10:15:55 PM		
DP 36	Wetland Data Point	30.117288	-95.133664	11	3.0364	1.9398	3/24/2019	10:26:26 PM		
DP 37	Wetland Data Point	30.117145	-95.133206	13	1.5933	0.8972	3/24/2019	10:29:57 PM		
DP 38	Wetland Data Point	30.117288	-95.131852	14	1.2849	0.7367	3/24/2019	10:48:28 PM		
DP 39	Wetland Data Point	30.117460	-95.131443	14	1.3598	0.7372	3/24/2019	10:57:27 PM		
DP 40	Wetland Data Point	30.117287	-95.129375	17	1.1513	0.6645	3/24/2019	11:17:33 PM		
DP 41	Wetland Data Point	30.117259	-95.127279	15	1.2081	0.7298	3/24/2019	11:26:53 PM		
DP 42	Wetland Data Point	30.117305	-95.126784	15	1.1948	0.6554	3/24/2019	11:39:36 PM		
DP 43	Wetland Data Point	30.117206	-95.124304	11	1.6541	0.8950	3/25/2019	12:09:15 AM		
DP 44	Wetland Data Point	30.117231	-95.118708	16	1.1647	0.6478	3/25/2019	1:15:01 PM		
DP 45	Wetland Data Point	30.117196	-95.118485	17	1.1864	0.6610	3/25/2019	1:16:09 PM		
DP 46	Wetland Data Point	30.117285	-95.117078	16	1.3940	0.7068	3/25/2019	1:42:21 PM		Т
DP 47	Wetland Data Point	30.117179	-95.116596	17	1.3608	0.6988	3/25/2019	1:49:11 PM		

Doint ID	Point Tyne	Latitude	Iongitude	MUM		НООР	GPS DATE	GPS TIME	Comments
		במווממכ	FUIBILITY	SATS	2	2		(UTC)	
DP 48	Wetland Data Point	30.119881	-95.113083	6	1.6200	0.8900	3/20/2019	7:14:50 PM	
DP 49	Wetland Data Point	30.119885	-95.113483	14	1.2694	0.7883	3/25/2019	2:48:14 PM	
DP 50	Wetland Data Point	30.119863	-95.117296	16	1.4310	0.7373	3/25/2019	2:15:28 PM	
DP 51	Wetland Data Point	30.119993	-95.117552	15	1.5778	0.7407	3/25/2019	2:04:05 PM	
DP 52	Wetland Data Point	30.120022	-95.131346	0	0.0000	0.0000	3/25/2019		GPS point recorded with phone. No accuracy statistics.
DP 53	Wetland Data Point	30.119928	-95.130862	15	1.2827	0.6879	3/25/2019	4:31:35 PM	
DP 54	Wetland Data Point	30.119924	-95.129028	6	3.4139	1.3418	3/25/2019	6:21:31 PM	
DP 55	Wetland Data Point	30.119983	-95.128705	16	1.3503	0.6705	3/25/2019	6:41:42 PM	
DP 56	Wetland Data Point	30.120026	-95.127757	15	1.4165	0.6637	3/25/2019	7:05:04 PM	
DP 57	Wetland Data Point	30.119924	-95.127376	0	0.0000	0.0000	3/25/2019		GPS point recorded with phone. No accuracy statistics.
DP 58	Wetland Data Point	30.119922	-95.126146	16	1.2580	0.7074	3/25/2019	9:47:15 PM	
DP 59	Wetland Data Point	30.119969	-95.122971	13	1.5850	0.9207	3/25/2019	11:48:50 PM	
DP 60	Wetland Data Point	30.119934	-95.123184	14	1.2121	0.7524	3/25/2019	11:54:16 PM	
DP 61	Wetland Data Point	30.122737	-95.130774	17	1.3524	0.6700	3/26/2019	2:06:58 PM	
DP 62	Wetland Data Point	30.122737	-95.130471	0	0.0000	0.0000	3/26/2019		GPS point recorded with phone. No accuracy statistics.
DP 63	Wetland Data Point	30.122700	-95.128953	15	1.4275	0.8006	3/26/2019	3:50:44 PM	
DP 64	Wetland Data Point	30.122751	-95.128663	13	1.3680	0.7952	3/26/2019	4:03:18 PM	
DP 65	Wetland Data Point	30.122700	-95.127383	13	1.6181	0.8722	3/26/2019	4:38:54 PM	
DP 66	Wetland Data Point	30.114457	-95.113478	15	1.4026	0.7980	3/26/2019	10:34:02 PM	
DP 68	Wetland Data Point	30.114456	-95.114569	13	1.5180	0.8094	3/26/2019	10:46:37 PM	
DP 69	Wetland Data Point	30.130243	-95.044943	11	1.8514	0.9935	4/9/2019	4:22:06 PM	
DP 70	Wetland Data Point	30.130373	-95.045422	13	1.8150	0.8496	4/9/2019	5:11:02 PM	
DP 71	Wetland Data Point	30.130328	-95.046388	10	2.5735	1.2130	4/9/2019	5:40:35 PM	
DP 72	Wetland Data Point	30.130387	-95.046978	13	1.5437	0.8439	4/9/2019	9:49:02 PM	
DP 73	Wetland Data Point	30.130327	-95.049215	14	1.3844	0.7500	4/9/2019	7:17:42 PM	
DP 74	Wetland Data Point	30.127544	-95.044510	13	1.5437	0.8439	4/9/2019	9:49:02 PM	
DP 75	Wetland Data Point	30.127516	-95.044830	11	2.2544	1.1974	4/9/2019	10:16:22 PM	
DP 76	Wetland Data Point	30.127589	-95.046333	10	2.3803	1.1564	4/9/2019	11:19:15 PM	
DP 77	Wetland Data Point	30.127614	-95.047343	13	1.5033	0.8297	4/10/2019	1:34:30 PM	
DP 78	Wetland Data Point	30.127582	-95.047721	15	1.2602	0.7319	4/10/2019	1:39:34 PM	
DP 79	Wetland Data Point	30.124859	-95.046212	11	2.2565	0.9617	4/10/2019	4:31:59 PM	
DP 80	Wetland Data Point	30.124866	-95.051562	11	1.9753	1.0668	4/10/2019	8:11:22 PM	
DP 81	Wetland Data Point	30.124886	-95.051328	12	2.0541	0.9017	4/10/2019	8:34:35 PM	
DP 82	Wetland Data Point	30.124963	-95.055423	12	1.9586	0.9508	4/11/2019	1:57:32 PM	
DP 83	Wetland Data Point	30.127679	-95.054577	12	1.6715	0.8232	4/11/2019	4:30:31 PM	
DP 84	Wetland Data Point	30.128903	-95.054248	17	1.2167	0.6336	4/11/2019	5:16:55 PM	

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Point ID	Point Type	Latitude	Longitude	NUM SATS	PDOP	НООН	GPS DATE	GPS TIME (UTC)	Comments
DP 85	Wetland Data Point	30.128811	-95.054435	16	1.2509	0.6403	4/11/2019	5:18:14 PM	
DP 86	Wetland Data Point	30.122225	-95.059741	12	2.0542	1.0600	4/16/2019	1:55:09 PM	
DP 87	Wetland Data Point	30.122102	-95.046751	12	2.2727	1.1464	4/16/2019	5:08:48 PM	
DP 88	Wetland Data Point	30.122109	-95.047045	13	1.7787	0.8582	4/16/2019	5:37:59 PM	
DP 89	Wetland Data Point	30.122052	-95.052169	15	1.5667	0.7752	4/16/2019	6:42:07 PM	
DP 90	Wetland Data Point	30.122180	-95.052719	13	1.6727	0.9917	4/16/2019	7:28:06 PM	
DP 91	Wetland Data Point	30.122161	-95.053655	13	1.7908	0.9275	4/16/2019	7:37:18 PM	
DP 92	Wetland Data Point	30.122168	-95.054729	13	1.8718	0.8987	4/16/2019	8:27:07 PM	
DP 93	Wetland Data Point	30.122259	-95.054988	0	0.0000	0.0000	4/16/2019		GPS point recorded with phone. No accuracy statistics.
DP 94	Wetland Data Point	30.122218	-95.056438	14	1.5239	0.8569	4/16/2019	9:32:37 PM	
DP 95	Wetland Data Point	30.122089	-95.056616	10	1.9384	1.1295	4/16/2019	10:33:38 PM	
DP 96	Wetland Data Point	30.119281	-95.044809	10	2.2135	1.0752	4/17/2019	2:50:47 PM	
DP 97	Wetland Data Point	30.119410	-95.052182	13	1.7621	0.8279	4/17/2019	3:22:47 PM	
DP 98	Wetland Data Point	30.119455	-95.055464	11	1.9131	0.9053	4/17/2019	4:49:57 PM	
DP 99	Wetland Data Point	30.119397	-95.056500	14	2.0928	0.7797	4/17/2019	5:43:52 PM	
DP 100	Wetland Data Point	30.119448	-95.057844	13	2.4301	0.8623	4/17/2019	6:40:35 PM	
DP 101	Wetland Data Point	30.119446	-95.060586	14	1.5079	0.8007	4/17/2019	8:15:04 PM	
DP 102	Wetland Data Point	30.119438	-95.060326	11	1.7392	0.9479	4/17/2019	8:48:09 PM	
HGM 08	Wetland HGM Point	30.114912	-95.132341	17	1.2279	0.6549	3/24/2019	9:02:16 PM	
HGM 09	Wetland HGM Point	30.114866	-95.133158	0	0.0000	0.0000	3/24/2019		GPS point recorded with phone. No accuracy statistics.
HGM 10	Wetland HGM Point	30.114847	-95.135598	16	1.2903	0.7053	3/24/2019	9:36:20 PM	
HGM 11	Wetland HGM Point	30.114866	-95.136494	15	1.4535	0.8948	3/24/2019	9:44:46 PM	
HGM 12	Wetland HGM Point	30.117145	-95.133206	13	1.5933	0.8972	3/24/2019	10:29:57 PM	
HGM 13	Wetland HGM Point	30.117460	-95.131443	14	1.3598	0.7372	3/24/2019	10:57:27 PM	
HGM 14	Wetland HGM Point	30.117259	-95.127279	15	1.2081	0.7298	3/24/2019	11:26:53 PM	
HGM 15	Wetland HGM Point	30.117196	-95.118485	17	1.1864	0.6610	3/25/2019	1:16:09 PM	
HGM 16	Wetland HGM Point	30.117285	-95.117078	16	1.3940	0.7068	3/25/2019	1:42:21 PM	
HGM 17	Wetland HGM Point	30.119919	-95.116403	16	1.1499	0.6563	3/25/2019	2:19:27 PM	
HGM 18	Wetland HGM Point	30.119863	-95.117296	16	1.4310	0.7373	3/25/2019	2:15:28 PM	
HGM 19	Wetland HGM Point	30.119885	-95.113482	13	1.7123	0.9363	3/25/2019	2:57:56 PM	
HGM 20	Wetland HGM Point	30.119928	-95.130862	15	1.2827	0.6879	3/25/2019	4:31:35 PM	
HGM 21	Wetland HGM Point	30.120026	-95.127757	15	1.4165	0.6637	3/25/2019	7:05:04 PM	
HGM 22	Wetland HGM Point	30.119922	-95.126146	16	1.2580	0.7074	3/25/2019	9:47:15 PM	
HGM 23	Wetland HGM Point	30.119969	-95.122971	13	1.5850	0.9207	3/25/2019	11:48:50 PM	
HGM 24	Wetland HGM Point	30.122737	-95.130471	0	0.0000	0.0000	3/26/2019		GPS point recorded with phone. No accuracy statistics.
HGM 25	Wetland HGM Point	30.122700	-95.128953	15	1.4275	0.8006	3/26/2019	3:50:44 PM	

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	Found Type	rautude	rongiude	SATS	ruor	TOUL		(UTC)	CONTINENTS
HGM 26	Wetland HGM Point	30.122700	-95.127383	13	1.6181	0.8722	3/26/2019	4:38:54 PM	
HGM 27	Wetland HGM Point	30.122769	-95.127093	14	1.6463	0.8759	3/26/2019	5:31:17 PM	
HGM 28	Wetland HGM Point	30.114457	-95.113478	15	1.4026	0.7980	3/26/2019	10:34:02 PM	
HGM 29	Wetland HGM Point	30.119332	-95.124839	13	1.3671	0.8006	4/8/2019	10:40:20 PM	
HGM 30	Wetland HGM Point	30.130373	-95.045422	13	1.8150	0.8496	4/9/2019	5:11:02 PM	
HGM 31	Wetland HGM Point	30.130387	-95.046978	0	0.0000	0.0000	4/9/2019		GPS point recorded with phone. No accuracy statistics.
HGM 32	Wetland HGM Point	30.127544	-95.044510	13	1.5437	0.8439	4/9/2019	9:49:02 PM	
HGM 33	Wetland HGM Point	30.127589	-95.046333	10	2.3803	1.1564	4/9/2019	11:19:15 PM	
HGM 34	Wetland HGM Point	30.127614	-95.047343	13	1.5033	0.8297	4/10/2019	1:34:30 PM	
HGM 35	Wetland HGM Point	30.124803	-95.052139	13	2.0412	0.8575	4/10/2019	7:20:45 PM	
HGM 37	Wetland HGM Point	30.128903	-95.054248	17	1.2167	0.6336	4/11/2019	5:16:55 PM	
HGM 36	Wetland HGM Point	30.124866	-95.051562	11	1.9753	1.0668	4/10/2019	8:11:22 PM	
HGM 38	Wetland HGM Point	30.122102	-95.046751	12	2.2727	1.1464	4/16/2019	5:08:48 PM	
HGM 39	Wetland HGM Point	30.122180	-95.052719	13	1.6727	0.9917	4/16/2019	7:28:06 PM	
HGM 40	Wetland HGM Point	30.122259	-95.054988	0	0.0000	0.0000	4/16/2019		GPS point recorded with phone. No accuracy statistics.
HGM 41	Wetland HGM Point	30.122089	-95.056616	10	1.9384	1.1295	4/16/2019	10:33:38 PM	
HGM 42	Wetland HGM Point	30.119455	-95.055464	11	1.9131	0.9053	4/17/2019	4:49:57 PM	
HGM 43	Wetland HGM Point	30.119448	-95.057844	13	2.4301	0.8623	4/17/2019	6:40:35 PM	
HGM 44	Wetland HGM Point	30.119438	-95.060326	11	1.7392	0.9479	4/17/2019	8:48:09 PM	





SWG-2019-00077



Block 2 Delineation and Functional Assessment














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Block 2 Delineation and Functional Assessment



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APPENDIX C – WETLAND DELINEATION DATA FORMS AND PHOTOS






































































RIAN J KINC







RIAN I KING





 Scale: 1"= 50' (22"x34 Prints)
 1"= 100' (11"x17" Prints)



Drawn: BJK Date: Sept-2019 Sheet PP-CB-2b Project Number 18-4431

NO. 117994





























