PERMITTEE-RESPONSIBLE MITIGATION PLAN
SWG-2016-00832
SHIP DOCK 5 PROJECT
HARRIS COUNTY, TEXAS

Prepared for:

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Acronyms and Abbreviations

CFR	Code of Federal Regulations
CWA	Clean Water Act
E2EM	estuarine intertidal emergent
FCI	functional capacity index
FCU	functional capacity unit(s)
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
HUC	hydrologic unit code
iHGM	hydrogeomorphic (interim) model
IPAC	Information, Planning and Conservation
LBC	LBC Houston, LP
LEI	Lloyd Engineering, Inc.
MOU	Memorandum of Understanding
NCSS	National Cooperative Soil Survey
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
PEM	palustrine emergent
PFO	palustrine forested
PFO1	palustrine forested broad-leaved deciduous (hardwood)
PRM	permittee-responsible mitigation
PSS1	palustrine scrub-shrub broad-leaved deciduous (hardwood)
Regional Supplement	Regional Supplement: Atlantic and Gulf Coastal Plain
SAL	State Antiquities Landmarks
SWG	Southwestern Galveston District
TARL	Texas Archeological Research Laboratory
THC	Texas Historical Commission
TXNDD	Texas Natural Diversity Database
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WOUS	waters of the United States

1.0 Introduction

This mitigation plan presents solutions to offset unavoidable impacts to wetlands at the request of LBC Houston, LP (LBC) for the proposed LBC Ship Dock 5 project, U.S. Army Corps of Engineers (USACE) Project No. SWG-2016-00832. The proposed Ship Dock 5 project area is an approximate 22.74-acre site consisting of approximately 7.74 acres of open-water, located within Harris County, Texas. The proposed Ship Dock 5 project area is positioned within the USACE Galveston District, and is located on the U.S. Geological Survey (USGS) League City, Texas, 7.5-minute series topographic quadrangle map (USGS, 1982a).

LBC is proposing to construct and operate an expansion of their existing facilities to include a new ship dock along the Bayport Ship Channel. The proposed project includes the construction and installation of a new bulkhead wall, ship dock, and fire boat dock. Additionally, the proposed project will require the dredging of approximately 450,000 cubic yards of material to a depth of -47 feet mean low tide (MLT) to safely maneuver vessels to the proposed ship dock. The proposed project will allow LBC to expand their current assets and continue to provide the intermodal transportation capabilities necessary to fulfill strategic corporate expansion initiatives and stability within a growing market. LBC has designed the proposed project to minimize or avoid both temporary and permanent impacts to the maximum extent practicable.

An exhaustive alternatives analysis and feasibility study was conducted to determine the best alternative that minimizes environmental impacts to the maximum extent practical, while fulfilling project needs. Four potential alternatives were evaluated (Alternative A, Alternative B, No Action/No Build Alternative, and the Preferred Alternative) based on vessel navigability, safety, impacts to waters of the United States (WOUS), and dredge volumes. The preferred alternative was selected as it presents the lowest potential for environmental impacts, constructability concerns, and hazard to project personnel while accomplishing the project purpose and need. The proposed project site best encompasses the critical elements necessary including an area adjacent to or in the proximity of the existing infrastructure, deep-water accessibility, and pipeline and road accessibility. Due to the desired location of the proposed project existing within a highly industrialized corridor, the alternatives considered would require the purchase and development of additional sites, thereby resulting in dispersed and increased impacts to WOUS and reducing operational efficiencies. The no action alternative was evaluated and determined not a valid alternative as it would not meet the purpose and need of the proposed project. Refer to Figure 2 in Appendix A for a depiction of the Alternatives analyzed.

Lloyd Engineering, Inc. (LEI) conducted a formal wetland delineation in accordance with USACE recommendations for sites larger than 5 acres in size within the entirety of the project area. All wetlands identified within the proposed project area are considered WOUS, as defined under Section 404 of the Clean Water Act (CWA). Unavoidable impacts to wetlands within the proposed project area will result in the permanent loss of 0.389 acre of palustrine emergent (PEM) wetlands, 3.014 acres of palustrine scrub-shrub broad leaved deciduous (PSS1) wetlands, 2.165 acres of palustrine forested broad leaved deciduous (PFO1) wetlands, and 0.138 acres of estuarine intertidal emergent (E2EM) wetlands. LBC proposes to mitigate for all permanent losses to WOUS as a result of the construction of the proposed project. Table 1 provides a summary of the wetland impacts requiring mitigation within the proposed project area.

Table 1
Summary of Wetland Impacts Within the Proposed LBC Ship Dock 5 Project Area

Field ID	Classification[1]	Permanent Impacts (acres)[2]	USACE Jurisdiction
WET 1	PFO1	0.069	Section 404
WET 2	PEM	0.389	Section 404
WET 3	PSS1	0.397	Section 404
WET 4	PFO1	1.777	Section 404
WET 5	PFO1	0.319	Section 404
WET 6	PSS1	2.126	Section 404
WET 7	PSS1	0.491	Section 404
WET 8	E2EM	0.138	Section 404/10
TOTALS	**PFO1 Wetland (3)**	**2.165**	
	PSS1 Wetland (3)	**3.014**	
	PEM Wetland (1)	**0.389**	
	E2EM Wetland (1)	**0.138**	

1 PFO1 = Palustrine forested broad-leaved deciduous
PSS1 = Palustrine scrub-shrub
PEM = Palustrine emergent
E2EM = Estuarine intertidal emergent
2 Acreages represent the total acreage to be impacted by the proposed project.

1.1 Available Mitigation Credits

The wetlands detailed in Table 1 contribute to the Clear Creek-Frontal Galveston Bay watershed (hydrologic unit code [HUC] 120402040100). Greens Bayou Wetlands Mitigation Bank is the only mitigation bank within the primary service area and this bank currently does not have any active credits available for compensatory mitigation. The proposed project is located within the secondary service area of the Gulf Coastal Plains Mitigation Bank and Mill Creek Mitigation Bank but do not currently have a sufficient number of functional capacity units (FCU) available to compensate for impacts associated with the proposed project. Due to the absence of an approved mitigation bank or in-lieu fee programs with the appropriate number and resource types of credits available at this time, this permittee-responsible mitigation (PRM) plan is proposed as the environmentally preferable mitigation alternative.

The following sections detail all actions proposed to compensate for the unavoidable impacts to WOUS, including wetlands, as a result of the proposed project in accordance with the 2008 Final Mitigation Rule (Title 33 Code of Federal Regulation [CFR] 333.2) (2008 Final Compensatory Mitigation Rule).

2.0 Goals and Objectives

The goal of the proposed PRM plan is to compensate for the functions of the PEM, PSS1, PFO1, and E2EM wetlands impacted as a result of the proposed project. The proposed PRM plan will compensate partially out-of -kind and offsite for all wetlands impacted as a result of the Ship Dock 5 project. The establishment of PFO (palustrine forested) and PEM wetlands, as proposed within this PRM plan, would result in the establishment of wetland functions and values within areas not currently realized, and ultimately improve the quality and quantity of aquatic resources within the Clear Creek-Frontal Galveston Bay watershed.

The overall goal of this mitigation project is to compensate for the lost physical, chemical, and biological functions of the wetlands within the Clear Creek-Frontal Galveston Bay watershed as a result of impacts associated with the Ship Dock 5 project. A large portion of the Clear Creek-Frontal Galveston Bay watershed has been impacted as a result of residential and industrial development, resulting in the isolation and fragmentation of associated wetland areas which further presents water quality challenges within the watershed. Wetlands provide flood attenuation and buffer against storm runoff and improve water quality by increasing water retention times and assimilating pollutants.

The proposed PRM plan is designed to specifically address and implement methods to aid in the establishment of the physical structure and conditions conducive for the establishment of wetlands known to naturally occur within this watershed. The proposed mitigation project will increase the duration of water retention and filtration thereby reducing the velocity of surface runoff. The establishment of a species-rich understory PEM wetlands will aid in improving habitat connectivity. Overall, the anticipated results of the proposed mitigation project will be to establish additional wetland area which contribute to the ecological functions and capacity of the Clear Creek-Frontal Galveston Bay watershed.

3.0 Site Selection

The evaluation process of potential mitigation sites that could be utilized for this PRM plan consisted of identifying a tract of land of suitable size within the Clear Creek-Frontal Galveston Bay watershed where minimally invasive site development activities would be required to establish the hydrologic conditions necessary to create wetland areas known to naturally occur within the watershed. LBC coordinated with the City of Morgan's Point regarding this mitigation project to explore the opportunity of implementing efforts on land currently under their ownership, as well as facilitate with the recreational development within.

As a result of this coordination, LBC proposes to implement this PRM plan on an approximate 52-acre site currently under the ownership of the City of Morgan's Point. The proposed mitigation site is located approximately 0.3-mile northeast of the intersection of East Main Street and Wilson Road, and intersects portions of the La Porte and Morgan's Point, Texas, 7.5-minute series topographic quadrangle maps (USGS, 1982b; USGS, 1993). The proposed mitigation site has been previously utilized for agricultural practices. In order to restore hydrological activity within the mitigation site, modifications to existing contours and elevations must occur to establish hydrologic conditions necessary for the development of wetland area. As such, it was necessary to identify a site with low potential for disturbances to cultural resources and/or other historic properties. The mitigation site currently exhibits low aquatic functional capabilities, but high functional lift potential with the restoration and protection efforts as proposed within this PRM plan.

The proposed mitigation site is located just south of Barbor's Cut, which consist of vast amounts of impervious surfaces. The proposed mitigation site will aid in the capture and retention of sheet-flow water from these impervious surfaces, and ultimately increase water quality within the watershed through filtration.

4.0 Site Protection Instrument

The City of Morgan's Point will serve as the Property Owner and LBC will be the Sponsor for the proposed mitigation project. The Sponsor will oversee the construction and the establishment of the mitigation project. The City of Morgan's Point will serve as the long-term manager and steward responsible for activities such as monitoring, invasive species control, prescribed burning, and boundary maintenance and protection. As a conservation area, the mitigation site will be protected by a perpetual conservation easement. Provided as Appendix B is a Memorandum of Understanding (MOU) entered in by the City of Morgan's Point and LBC which details the requirements and expectations for the implementation of the PRM plan and long-term management of the mitigation site.

5.0 Baseline Information

The following sections describe the general and specific ecological characteristic associated with the proposed mitigation site.

5.1 General Ecological Characteristics

The proposed mitigation site is located within the Northern Humid Gulf Coastal Prairies (34a) Level IV Ecoregion (Griffith, et al., 2007). This portion of Texas consist of low, flat plains and low-gradient rivers and

streams (some channelized) with sandy, silty, and clayey substrates. Drainage is generally poor and soils remain wet for portions of the year. This portion of Texas is considered humid, sub-tropical, with mild winters and hot summers. The area receives substantial rainfall throughout the year. Proximity to the Gulf of Mexico buffers the area from rapid climatic changes.

The Gulf Coast plain consists of sedimentary rocks deposited during the Pleistocene age approximately two million years ago. Deposits were comprised predominantly of deltaic and lagoonal clays and loams (Weindorf, 2008). The weight of recent deposits has resulted in a sloping of the landform toward the Gulf of Mexico. Soils are often mostly poorly to somewhat poorly drained Alfisols with silt loam or silty clay loam texture. Coastal marshes geology was derived from alluvial and marine sediment deposits during the Holocene age (Weindorf, 2008). Soils are very poorly drained Histosols and Entisols with muck or clay surface textures.

Historically, the Gulf Coastal Prairies were vast areas of tallgrass prairies broken only by gallery forest located along streams and bayous. Typical prairie communities were dominated by little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), brownseed paspalum (*Paspalum plicatulum*), and switchgrass (*Panicum virgatum*). Grasslands were maintained by deep clay soils and frequent fires that suppressed woody invasion (Daigle, et al., 2006). These lush grasslands supported bison (*Bison bison*) and red wolf (*Canis rufus*). The coastal marshes were unbroken expanses of herbaceous wetlands of varying salinity interspersed by rivers, lakes, bayous, and tidal channels. The majority of the Gulf Coastal prairie has been converted to agriculture, pasture, aquaculture, and urban land uses. The farming of rice and crawfish are especially suited to the deep clay soils of the region. Wetlands located both in the prairie and coastal marshes have been impacted by filling, altering of natural hydrologic regimes, and conversion to agriculture.

5.2 Mitigation Site Ecological Characteristics

The proposed mitigation site is located approximately 4 miles northeast of the project site and is similarly situated within the Northern Humid Gulf Coastal Prairies (34a) Level IV Ecoregion. Refer to Appendix A, Figure 1 for a depiction of the location of the proposed mitigation site.

LEI conducted formal wetland delineation in accordance with USACE recommendations for sites larger than 5 acres in size within the entirety of the proposed mitigation site for the purpose of documenting any potential WOUS located within the mitigation site. As a result of this investigation, potential WOUS, including wetlands were identified. Refer to Appendix C for the results of a formal wetland delineation conducted within proposed mitigation site.

5.2.1 Mitigation Site Topography

A topographic survey was completed within the project area during preliminary analysis and feasibility studies. The mitigation site exhibits a genital topographic gradient sloping from east to west. Refer to Appendix A, Figure 3 for a depiction of the topographic survey conducted within the mitigation site.

5.2.2 Mitigation Site Hydrology

The mitigation site is located within the Clear Creek-Frontal Galveston Bay watershed (HUC 120402040100) which consist of multiple large and small-scale waterbodies that drain surface-runoff into Galveston Bay. Based on a review of Federal Emergency Management Agency (FEMA) National Flood Insurance Rate Maps (FIRM), no portion of the proposed mitigation site is located within the 100-year floodplain. A small portion of the mitigation site located in the northwestern corner is located within the 500-year floodplain. Refer to Figure 3, in Appendix A for a depiction of the limits of the100-year and 500-year floodplain in relation to the mitigation site.

5.2.3 Mitigation Site Soils

Based on the mapped soil data for Harris County, Texas (U.S. Department of Agriculture [USDA] National Cooperative Soil Survey [NCSS], 2016), the mitigation site consist of four mapped soil units. Descriptions of the mapped soil types are provided below; the parenthetical abbreviation following the soil name corresponds to the soil unit symbols provided in Figure 4 in Appendix A.

Addicks-Urban land complex (Ak)– Addicks soils are very deep, poorly drained, moderately permeable, with slow surface runoff and internal drainage. These soils are on coastal prairies of Pleistocene Age. Based on the national hydric soils list (NRCS, 2015), these soils are considered hydric in Harris County, Texas.

Bernard clay loam, 0 to 1 percent slopes (Bd) – Bernard soils consist of very deep, somewhat poorly drained soils, with high runoff. These gently sloping to sloping soils formed in clayey fluviomarine deposits derived from igneous, metamorphic and sedimentary rock. Based on the national hydric soils list (NRCS, 2015), these soils are considered hydric in Harris County, Texas.

Lake Charles clay, 0 to 1 percent slopes (LcA) – Lake Charles soils consist of very deep, moderately well drained, very slowly permeable soils, with high runoff on 0 to 1 percent slopes. These gently sloping to sloping soils formed in clayey sediments and primarily exhibit slopes less than 1 percent. Based on the national hydric soils list (NRCS, 2015), these soils are not considered hydric in Harris County, Texas.

Beaumont clay, 0 to 1 percent slopes (BeaA) – Beaumont soils consist of very deep, poorly drained soils, with very slow permeability and negligible runoff. These nearly level soils formed in clayey sediments on the Beaumont Formation of the Pleistocene Age with slope ranges from 0 to 1 percent. Based on the national hydric soils list (NRCS, 2015), these soils are considered hydric in Harris County, Texas.

Refer to the wetland delineation report provided as Appendix C for detailed descriptions of observed soils within the mitigation site.

5.2.4 Historical Characteristics

Based on a review of historic aerials, the mitigation site had been utilized for agricultural practices since at least 1953. Since that time, the site has been actively maintained through practices such as mechanical brush control, livestock grazing, and land leveling. Prior to conversion, the site likely functioned as mosaic

coastal prairie with emergent wetlands exhibiting a large diversity of vegetation species. Characteristic native plants commonly observed within these communities are listed below.

- Bushy Bluestem (*Andropogon glomeratus*)
- Sideoats grama (*Bouteloua curtipendula*)
- Switchgrass (*Panicum virgatum*)
- Angle-stem beaksedge (*Rhynchospora caduca*)
- Early paspalum (*Paspalum praecox*)
- Rosy camphorweed (*Pluchea rosea*)
- Bedstraw St. Johns-wort (*Hypericum galioides*)
- Eastern gamagrass (*Tripsacum dactyloides*)

5.3 Threatened and Endangered Species

A records review of the Texas Natural Diversity Database (TXNDD), dated November 2, 2016 and the U.S. Fish and Wildlife Service (USFWS) Information, Planning and Conservation (IPAC) database (USFWS, 2016) was conducted to identify protected species, sensitive natural communities, and other features of concern known or suspected to occur within the mitigation site. Based on this review, no suitable habitat exists within the proposed mitigation site for federally listed threatened or endangered species. The implementation of the PRM plan within the proposed mitigation site will decrease habitat fragmentation and provide refuge for waterfowl and neotropical migrants during spring and fall migrations.

5.4 Cultural Resources

A records review was conducted at the Texas Archeological Research Laboratory (TARL) for the purpose of determining the presence of any previously recorded archeological sites known to occur within the mitigation site. Additionally, a search of the Texas Historical Commission's (THC) online Texas Historical Sites Atlas and the National Park Service's on-line National Register of Historic Places (NRHP) to identify any sites eligible to be listed on the NRHP, or as State Antiquities Landmarks (SALs), within the mitigation site. Based on this review, no archeological sites or sites eligible for listing were recorded within 0.1-mile radius of the proposed mitigation site.

6.0 Determination of Credits

The PRM plan, as proposed, will mitigate for unavoidable impacts to aquatic resources through the establishment of functions and services similar to those impacted as a result of the Ship Dock 5 project. To ensure no net loss to wetland functions, the USACE SWG interim hydrogeomorphic models (iHGM) were used to calculate compensation requirements. The iHGM assessment utilizes a suite of variables to uniquely quantify the functions a wetland performs within an ecosystem and determine mitigation requirements under the Compensatory Mitigation Rule (33 CFR 332). Each iHGM model consisted of a suite of quantifiable variables used to evaluate the functional capacity of a wetland. Based on the Cowardin, et al. (1979) wetland vegetation community classification system, either the Riverine Forested iHGM, Riverine Herbaceous/Shrub iHGM, or Tidal Fringe iHGM was utilized for analysis (USACE, 2010a; USACE, 2010b; USACE, 2010c). The fundamental unit for evaluating impacts within the iHGM is the functional capacity index (FCI).

The Riverine Forested iHGM and Riverine Herbacious/Shrub iHGM use sub-indices to determine FCI values for biological, physical, and chemical wetland functions. The Tidal Fringe iHGM uses sub-indices to determine FCI values for biological, physical, chemical, and botanical wetland functions. Sub-indices are quantified from 0.00 to 1.00 based on the conditions observed within each wetland. Once FCIs were computed for each wetland, the FCI value was multiplied by the size of the wetland, in acres, to establish the amount of functional capacity units (FCU) contained within each wetland. The total amount of FCUs contained within the project area was calculated by adding the respective FCUs measured for each wetland classification type. The total FCUs for each wetland classification type represents the compensatory mitigation requirements to replace the loss of the wetland functions as a result of impacts associated with the proposed project. Based on this analysis, LBC proposes to construct 10 acres of PEM wetlands and 5 acres of PFO wetlands within the approximate 52-acre mitigation site to fully compensate for the described wetland impacts. Refer to Appendix D for details related to the iHGM calculations and formulas used to determine the compensation credits to be constructed at the proposed PRM site.

Table 2
Summary of iHGM Results for Impacts
Within the Ship Dock 5 Project Area

Wetland Classification[1]	Acreage[2]	Physical FCU	Biological FCU	Chemical FCU	Botanical FCU
PFO1 Wetland	2.165	0.576	0.900	0.548	NA
PEM & PSS1 Wetland	3.403	1.254	2.083	1.083	NA
E2EM Wetland	0.138	0.070	0.069	0.076	0.069

1. PFO1 = Palustrine forested broad-leaved deciduous
   PSS1 = Palustrine scrub-shrub
   PEM = Palustrine emergent
   E2EM = Estuarine intertidal emergent
2. Acreages represent the total acreage to be impacted by the proposed project.

7.0 Mitigation Work Plan

The restoration of PEM and PFO wetlands within the mitigation site will be guided by a pragmatic application of good science and appreciation for existing site conditions and topography. The following sections detail the specific work plan activities, which together comprise a complete and synergistic approach to the site development.

7.1 Reference Site Investigations

Initial feasibility investigations were conducted at reference sites to analyze both the surface and sub-surface hydrologic activity within wetland areas located within the proximity of the proposed mitigation site. The wetland reference site investigated is located approximately 0.75 mile west of the mitigation site, and west of the intersection of Ballester Road and Vinsonia Street, in Morgan's Point, Texas. During this investigation elevation data was collected within wetland areas experiencing prolonged inundation and saturation. Soil profiles were analyzed within the wetland reference area to better understand the percolation of surface water as well as localized groundwater activity. In addition to the investigations conducted at this reference site, additional elevation data was collected at a nearby waterbody located approximately 0.23 mile west of the mitigation site. This information was collected to aid in the development of the proposed PRM plan and determine the site development activities necessary to establish sufficient hydrologic activity within the mitigation site for the establishment of wetlands. Refer to Figure 3 for a depiction of the elevation data collected within the mitigation site, reference site, and nearby waterbody.

7.2 Site Development Plan

The proposed site development plan would implement mitigation activities specific to the goals of ecological and hydrologic improvement envisioned for the associated habitat proposed to be established. The proposed techniques intend to utilize simple solutions to retain water, enhance hydrologic activity, and establish wetland functions within the mitigation site. This will be done utilizing low-impact and sustainable methodologies such as strategically located low profile earthen berms and excavation techniques. Once complete, the mitigation site is expected to exhibit prolonged saturation and periodic inundation, which will be conducive for the growth of planted and naturally occurring hydrophytic vegetation. As detailed in the following sections, five phases are proposed for the site development associated with this mitigation work plan. A conceptual design and layout of the proposed mitigation site is provided as Figure 5 in Appendix A.

7.2.1 Phase 1 – Site Development Preparation

Phase 1 of the site development plan includes preparation activities and abatement of existing invasive and noxious vegetation located within the mitigation site. During this phase, the Sponsor will reduce the presence of noxious and invasive vegetation species to eliminate their negative effects on existing communities, and to prevent their propagation to additional areas during future site development activities. An initial inspection will be conducted to determine the presence and abundance of all noxious and invasive species within the mitigation site to determine the necessary abatement measures to be implemented. The abatement measures may include herbicide control methods and/or mechanical control methods based on the characteristics of the species at the time of initial inspection. Herbicide control methods may include,

but are not limited to, broadcast application and single-stem application. Herbicide activities will be conducted by or under the supervision of a licensed herbicide applicator and every effort will be made to minimize herbicide effects on non-target flora and fauna. Mechanical control methods may also be utilized either independently or in combination with herbicide control methods.

Preparation activities includes the civil survey of the boundaries of the proposed mitigation site, PEM and PFO wetland establishment areas, access and maintenance roads, water retention ponds, and culverts. Additional details regarding these features are discussed further in the following sections. Additionally, an equipment and materials staging area will be established and constructed during this phase of the site development plan.

7.2.2 Phase 2 – Hydrology Enhancement

Phase 2 of the site development plan includes excavation activities, installation of culverts connecting the wetland establishment areas to the nearby waterbody, and construction of low profile earthen berms. The first course of action in implementing this phase is to modify the existing site contours and elevations to capture sheet-flow water from surrounding topography, enhance the retention of surface water, and increase shallow groundwater soil saturation. Such objectives will be achieved through surface contouring of upland/dry material within the mitigation site. Based on the elevational data collected within the mitigation site an estimated range of 150,083 to 200,000 cubic yards of dry/upland material will be required to be removed within the wetland establishment areas to fulfill the necessary hydrology objectives. As a result of the excavation, elevations within the wetland establishment areas are anticipated to range from 9 to 12 feet. The material to be removed within the wetland establishment areas will be placed entirely within uplands at a designated location adjacent to the mitigation site.

For the purposes of creating jurisdiction under Section 404 of the CWA within the wetland establishment areas, an artificial linear waterbody or culvert would be excavated/installed to create a nexus between the wetland establishment areas and the neighboring tributary. The installation of this feature would allow the wetland functions within the mitigation site to have more than an insubstantial or speculative effect on the chemical, physical, and/or biological integrity of traditionally navigable waters.

Low profile earthen berms would be installed in strategic locations as a hydrologic enhancement features to aid in the judicious handling of precipitation and retention of water within the wetland establishment areas. The location of these earthen berms will be such that sheet-flow water as a result of precipitation will be retained and slowly released to the neighboring tributary through the installed culvert.

7.2.3 Phase 3 – Planting Preparation

To restore the soil composition, disking will be completed to alleviate soil compaction as a result of surface contouring activities. Additionally, disking activities will also aid in increasing the organic matter by mixing any established vegetation in to the soils. Planting site preparation activities will be implemented to create the suitable growing conditions for the vegetation to be planted within the wetland establishment areas. Preparation of PFO and PEM wetland establishment areas will include double disking of soils the fall prior to planting efforts to prevent soil cracks along furrow rows during dry conditions (Allen et. al, 2001), as well

as the herbicide applications and prescribed burns to remove exotic and otherwise ruderal vegetation species that may have established following Phase 1 and Phase 2.

7.2.4 Phase 4 – Palustrine Forested Wetland Planting

The proposed species to be planted within the PFO wetland establishment area naturally occur within Harris County, Texas, or have an historic range and are commonly associated with riverine forested wetlands within the region. The exact quantities of each planted species will be determined based on their availability from nurseries. A combination of tree seedlings and 6 to 8 feet-tall trees will be utilized for initial planting efforts. Seedlings will be planted at a minimal density of at least 538 stems per acre on a 9 foot centers throughout the PFO wetland establishment area. Planting of seedlings will be completed using hand tools including dibble bars and sharpshooter shovels. The distribution of seedlings will be completed so that slow and fast growing mast species are intermixed to create a structural canopy diversity oftentimes utilized as habitat for neotropical migrants during spring and fall migrations.

Initial planting efforts will occur the second planting season (December through February) following site preparation. Subsequent planting activities will be completed, if necessary, to accommodate for low survival rates. Table 3 details the potential tree species to be planted as well as their corresponding wetland indicator status as determined using Lichvar et. al (2016). At the time of planting efforts if the desired species are not commercially available, species may be substituted following USACE approval. A 30-foot-wide buffer will be maintained around the PFO wetland establishment area for monitoring, maintenance, and management purposes.

Table 3
Proposed Species to be Planted within the PFO Wetland Establishment Area

Scientific Name	Common Name	Indicator Status
Fraxinus pennsylvanica	Green ash	FACW
Pinus taeda	Loblolly pine	FAC
Quercus laurifolia	Laurel oak	FACW
Quercus michauxii	Swamp chestnut oak	FAC
Quercus nigra	Water oak	FAC
Quercus phellos	Willow oak	FACW
Ulmus americana	American elm	FAC
Ulmus crassifolia	Cedar elm	FAC
Taxodium distichum	Bald cypress	OBL
Carya aquatica	Water hickory	OBL
Quercus texana	Texas red oak	FACW
Quercus nuttalli	Nuttall oak	OBL

7.2.5 Phase 5 – Palustrine Emergent Wetland Planting

The proposed vegetation to be planted within the PEM wetland establishment area will consist of species common to coastal prairie wetlands. Table 4 details the potential herbaceous species to be planted as well as their corresponding wetland indicator status as determined using Lichvar et. al (2016). Seeds will be purchased from commercial seed producers that specialize in coastal prairie seed in the Texas coastal prairie. The species listed in Table 4 as well as native coastal prairies seed mixes will be planted throughout

the entirety of the PEM wetland establishment area via mechanized seed drills and hand broadcasting methods. Initial planting efforts will occur the second planting season (December through February) following site preparation. Subsequent planting activities will be completed, if necessary, to accommodate for low survival rates. A 30-foot-wide maintenance path will traverse the PEM restoration wetland establishment area for monitoring, maintenance, and management purposes.

Table 4
Proposed Species to be Planted within the PEM Wetland Establishment Area

Scientific Name	Common Name	Indicator Status
Andropogon gerardii	Big bluestem	FAC
Andropogon glomeratus	Bushy bluestem	FACW
Panicum virgatum	Switchgrass	FAC
Eryngium yuccifolium	Rattlesnake master	FAC
Tripsacum dactyloides	Eastern gammagrass	FAC
Tridens strictus	Longspike tridens	FACW
Hymenocallis littoralis	Beach spiderlily	OBL
Setaria parviflora	Marsh bristlegrass	FACW
Rhynchospora latifolia	Sandswamp whitetop	FACW
Rhynchospora elliottii	Elliott's beak sedge	FACW
Rhynchospora corniculata	Short-bristle horned beak sedge	OBL
Pluchea rosea	Rosy camphorweed	FACW

8.0 Maintenance Plan

LBC will be responsible for all maintenance and management activities as long as needed to accomplish the predetermined performance standards. These activities may include:

- Additional planting of tree and/or herbaceous vegetation;
- Maintenance/repairs of earthen berms;
- Maintenance/repairs of permeable surface trails to allow for better access;
- Maintenance/repairs of fencing protecting wetland areas and/or the mitigation site;
- Maintenance/repairs of access roads necessary for maintenance and monitoring; and
- Control of invasive species within the established wetland areas.

If revisions or adaptations to this PRM plan is required, LBC will consult with a mitigation specialist and/or USACE. Should the natural establishment of vegetation within the mitigation site be unsuccessful, then potential contingencies, as outlined in Section 12.0 (Adaptive Management) of this plan, will be evaluated. Routine monitoring inspections will be conducted to determine the presence of any noxious and invasive species within the mitigation area and necessary abatement measures to be implemented. The abatement measures will be generally based on the characteristics of the species at the time of implementation. Herbicide control methods may include, but are not limited to, broadcast application and single-stem application. Herbicide activities will be conducted by or under the supervision of a licensed herbicide applicator and every effort will be made to minimize herbicide effects on non-target flora and fauna. Mechanical control methods may also be utilized either independently or in combination with herbicide

control methods. The mitigation site will be protected by fencing and or topographic features (i.e. streams or ponds) to prohibit vehicular and pedestrian traffic from traversing the established wetland areas.

9.0 Performance Standards

The performance standards detailed in the following sections shall be used to determine and measure the minimum level of success in reaching the goals and objectives of this PRM plan.

9.1 Palustrine Forested Wetlands

The restoration of PFO wetlands will be considered successful if annually, and at the end of 8 years from plating activities, the following conditions are met:

1. A survival rate of at least 56 percent (300 seedlings/trees per acre) for areas planted with bottomland hardwood species

2. Less than 5 percent relative cover of nuisance, invasive, noxious, and exotic species.

By year 8, the surviving seedlings/trees planted are anticipated to achieve 65 percent canopy coverage with less than 5 percent relative cover nuisance, invasive, noxious, and exotic species. If these requirements are not satisfied, then additional planting of pre-approved species will be required to accomplish the described requirements. In the situation that additional planting is required, the area will be monitored for one additional year to establish performance standards. This will be repeated until the PFO wetland establishment areas meet the required performance standards.

9.2 Palustrine Emergent Wetlands

The restoration of PEM wetlands will be considered successful if annually, and at the end of 5 years from plating activities, the following conditions are met:

1. 80 percent areal coverage throughout the designated PEM wetland establishment area

2. Less than 5 percent relative cover of nuisance, invasive, noxious, and exotic species.

If these requirements are not satisfied, then additional planting of pre-approved species will be required to accomplish the described requirements. In the situation that additional planting is required, the area will be monitored for one additional year to establish performance standards. This will be repeated until the PEM wetland establishment area meets the required performance standards.

10.0 Monitoring Requirements

LBC will monitor and report the progress toward meeting mitigation goals and objectives and performance standards. All monitoring and reporting requirements will be in accordance with USACE Regulatory Guidance Letter 08-03, Minimum Requirements for Compensatory Mitigation Project involving the Restoration, Establishment, and or Enhancement of Aquatic Resources.

10.1 Monitoring Schedule

Performance standards will be evaluated annually within the proposed wetland establishment areas. This will include the assessment of the establishment of wetland conditions (i.e. wetland hydrology, soils, and vegetation) via visual assessments at pre-determined locations within wetland establishment areas. Information gathered during these assessments will be used for comparative analysis with previous assessments as well as track the progress of the establishment of the wetland as it matures.

Monitoring will be conducted within PEM and PFO wetland establishment areas on an annual basis for years 1 through 5 following the completion of construction activities and site development. Additionally, monitoring will occur in years 6 through 8 for PFO wetland establishment area. Should additional planting be needed within either of the wetland establishment areas, annual monitoring will be conducted within that area until performance standards are met.

10.2 Reporting

The first reporting effort will consist of a "As-Built Monitoring Report" to be prepared and submitted to USACE within 3 months of the completion of all mitigation construction and planting efforts. This report will provide details related to the project, objectives, and construction activities completed and will include topographic and aerial-based figures, as-built drawings, and site photographs.

Monitoring reports will be prepared on an annual-basis for a period of 8 years. Annual monitoring reports will include descriptions of the proposed mitigation site, describe the results of the quantitative assessments of vegetation coverage, and discussions of the observed conditions in relation to the performance standards. Included within the annual monitoring reports will be project figures and site photographs documenting the conditions observed during the time of the annual assessment. In the situation that corrective actions are necessary to remediate conditions or deficiencies, those recommendations will be included within the results. Annual monitoring reports will be submitted to USACE by October 1st of each year.

10.3 Achievement of Performance Standards Report

A "Final Mitigation Monitoring Report" will be submitted to USACE within 30 days of the last monitoring event indicating the minimum performance standards have been achieved within the mitigation area. In the situation that performance standards are not met at scheduled times following the initial planting activities, the areas in need of rehabilitation will be improved upon utilizing the methods described in Section 8.0 and/or Section 12.0 of this PRM plan.

Conditions indicative of a potential problem within the mitigation site will be evaluated and detailed in the annual monitoring reports. Solutions and recommendations detailing remediating actions will be provided which may include, but not limited to, the installation of devices to prevent predation of planted vegetation, additional planting efforts, and modifications to site contours and elevations. Should these corrective actions be necessary during the monitoring and/or maintenance period, LBC will implement the appropriate mitigation actions to assure the predetermined performance standards are achieved. LBC is the responsible party for conducting the monitoring and report requirements as described. LBC may choose to sub-contract

an environmental consultant to conduct monitoring, analyze collected data, and prepare the monitoring reports to be submitted in accordance with this PRM plan.

11.0 Long-Term Management Plan

Once the mitigation site has achieved the minimum performance standards, long-term management will be necessary to ensure the sustainability, functionality, and longevity of the aquatic resources. In general, long-term management of the mitigation site would include monitoring natural progression and responding to occurrences that may be detrimental to the success of the site. Long-term management practices may include:

- Mechanical vegetation control of noxious or invasive species;
- Selective herbicide treatments;
- Use of prescribed burns to control woody encroachment;
- Planting of native vegetation; and
- Other resources management activities as deemed appropriate.

Management practices may be conducted within the mitigation site provided that the activity would enhance water quality, wildlife habitat, and other wetland functions. The City of Morgan's Point will be the responsible party for funding, coordinating, and implementing the long-term management and maintenance of the mitigation area. Provided within Appendix B is a Memorandum of Understanding (MOU) entered in by the City of Morgan's Point and LBC detailing the requirements and expectations for the implementation of the PRM plan and long-term management of the mitigation site.

11.1 Force Majeure

Nothing herein shall be construed to authorize proceedings against the mitigation sponsor for any damages to the mitigation site that is attributed to extreme natural catastrophes such as flood, drought, disease, regional pest infestation, climatic instability, etc., or human interference such as arson or civil disorder, etc. that the USACE determines beyond the reasonable control of the sponsor to prevent or mitigate. In the event of a force majeure event, the mitigation sponsor will notify the USACE and work with the USACE to resolve the damages caused by the event. However, if force majeure events do not preclude the mitigation sponsor from resuming mitigation operations without unreasonable expense, then it shall not be relieved of its obligations under this document.

11.2 Mineral Rights

Valuable mineral resources may exist under the land proposed for mitigation in this PRM plan; however, the sponsor, LBC, does not own any subsurface mineral rights for the property. Recognizing that surface landowners in the State of Texas cannot wholly control access to subsurface minerals, if a third party intends to explore for minerals within the proposed PRM project site, the third party will be requested to permit and compensate for any surface impacts to the PRM project and the relocation of the mitigation project under terms that will be outlined in the conservation easement.

11.3 Eminent Domain

In the event all or part of this property is taken by exercise of the power of Eminent Domain or acquired by purchase in lieu of condemnation, whether by public, corporate, or other authority, so as to terminate the conservation easement in whole or in part, the conservation easement sponsor is entitled to the fair market value of the property to recover the full value of the interests taken in order to replace lost wetland mitigation credits with in-kind mitigation credits.

12.0 Adaptive Management Plan

Adaptive management provides a critical instrument for continuous evaluation and modifications to mitigation efforts, as needed, to satisfy the required compensatory mitigation for impacts to WOUS, including wetlands as a result of the proposed LBC Ship Dock 5 project. LBC is responsible for implementing adaptive management to achieve mitigation success.

Should an adaptive management strategy be required to address unforeseen changes in site conditions or other components of the of the mitigation project, LBC must notify USACE of any significant modifications proposed to this PRM plan. If the mitigation site cannot be constructed as proposed within the approved PRM plan, or if performance standards are not met as anticipated, LBC must notify USACE and receive approval prior to any modifications to the approved PRM plan. Performance standards may be revised in accordance with adaptive management to remediate deficiencies within the mitigation site.

13.0 Financial Assurances

The mitigation sponsor and long term management sponsor shall ensure that sufficient financial resources are available to ensure all actions contained in this PRM plan including site development, long-term maintenance, monitoring, and any remedial actions necessary to achieve the predetermined performance standards. LBC and the City of Morgan's Point understand the risk and level of uncertainty associated with mitigation projects. Due to this uncertainty, LBC and the City of Morgan's Point propose the following financial assurances plan as detailed in the following sections.

The proposed financial assurance instruments detailed in the following sections have been prepared following the guidance of USACE Regulatory Guidance Letter 05-1, Guidance on the Use of Financial Assurances, and Suggested Language for Special Conditions for Department of the Army Permits Requiring Performance Bonds.

13.1 Construction Security Instrument

The permittee shall furnish to the USACE a Construction Security in the amount of 100 percent of a contract to restore wetlands on the permittee's property. The Construction Security shall be in the form of a letter of credit or a performance bond. The permittee shall ensure that the full amount of the Construction Security shall remain in effect throughout the performance of construction and planting activities to create, restore, or enhance wetlands on the permittee's property.

The letter of credit or performance bond shall be submitted to and approved by the holding agency before they satisfy any financial assurance requirement. Any letter of credit or performance bond shall be issued for a period of at least one year, and shall provide that the expiration date will be automatically extended for at least one year on each successive expiration date unless, at least 120 days before the current expiration date, the permittee and the holder have received notice from the issuing institution of its decision not to extend the expiration date, as evidenced by the return receipts. The letter of credit or performance bond shall provide that any unused portion shall be available for 120 days after the date the permittee and the holder have received such notice, as shown on the signed return receipts. If the issuer fails to extend the expiration date of any letter of credit or performance bond, the permittee shall provide the holder with replacement security in the form of a letter of credit, performance bond, or cashier's check, as determined by the holder, within 60 days after receiving notice of the issuer's failure to extend. If the permittee does not provide such replacement security on or before the expiration of the 60-day period, then the holder shall have the right to immediately draw upon the letter of credit or performance bond for which the replacement security was required.

The permittee will take out a letter of credit or performance bond to complete the site development, construction, and planting phase of the project. The tasks required to complete this phase of the project includes background studies and planning (geotechnical survey, wetland delineation and functional assessment, topographical surveys, civil design), construction, planting, security and fencing, and the establishment of the conservation easement and associated legal fees. The total cost of these construction activities is estimated to be $2,100,000.

13.2 Performance Security Instrument

Following the completion of the site development, construction, and planting phase, the permittee shall set up and fund a foundation that will provide the USACE with a performance security mechanism. In the event that the permittee does not fulfill its responsibilities as detailed in this plan, the USACE will have access to the foundation account to provide for the expected costs of maintenance and monitoring over the required 8-year period. If the required monitoring or maintenance is not conducted by the permittee as specified in Sections 8.0 and 10.0 of this plan, then the USACE shall request release of funds to a USACE agency or its designee from this foundation sufficient to cover the necessary monitoring or maintenance activities.

Over the first 8 years of the required maintenance and monitoring period, $50,000 shall be released annually by the foundation to the permittee on November 1st of each year following the submission of the previous year's monitoring report that documents that part or all of the restoration portion of the project satisfies the predetermined performance standards. Refer to Table 5 for an itemized list of task that will be required to complete the required 8-year maintenance and monitoring phase as well as the annual release of funds.

Table 5
Summary of the Allocated Performance Security Cost

Year	Annual Inspection	Maintenance/Invasive Species Control	Monitoring and Reporting	Security and Remedial Actions	Release Amount
2020	$5,000	$25,000	$10,000	$10,000	$50,000
2021	$5,000	$25,000	$10,000	$10,000	$50,000
2022	$5,000	$25,000	$10,000	$10,000	$50,000
2023	$5,000	$25,000	$10,000	$10,000	$50,000
2024	$5,000	$25,000	$10,000	$10,000	$50,000
2025	$5,000	$25,000	$10,000	$10,000	$50,000
2026	$5,000	$25,000	$10,000	$10,000	$50,000
2028	$5,000	$25,000	$10,000	$10,000	$50,000
TOTALS	**$40,000**	**$200,000**	**$80,000**	**$80,000**	**$400,000**

13.3 Long-Term Management Funding

Following the accomplishment of the predetermined performance standards, the City of Morgan's Point will provide the necessary funds to allow for the perpetual management of the mitigation site. The itemized analysis of the necessary funds may include, but is not limited to, expected long-term management costs that are required after the initial 8-year monitoring period, such as posting, fencing, maintenance of structures, control of invasive species, and legal defense of any easements or restrictive covenants recorded to protect the mitigation site.

Table 6
Estimated Cost of Long-Term Management

Item	Estimated Annual Cost
Annual Inspection	$1,000
Maintenance and Invasive Species Control	$2,000
Security and Remedial Actions	$1,000
Annual Total	**$4,000**

14.0 References

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Appendix A

Project Figures

VICINITY PLAN

LOCATION PLAN

PURPOSE:	PROPOSED SHIP DOCK 5 PRM SITE	OWNER:	LBC HOUSTON, LP
		APPLIED BY:	LLOYD ENGINEERING
		APPLIC. No:	SWG-2016-00832
LOCATION:	MORGAN'S POINT, TX	COUNTY:	HARRIS
		WATER BODY:	HOUSTON SHIP CHANNEL
		DATUM:	MLLW

LLOYD ENGINEERING, INC
HOUSTON TEXAS, USA
LICENSE NO. F-002846

DESIGN BY:	POP
DRAWN BY:	JV
SCALE:	N.T.S.
DATE:	11/29/16

SHEET No: FIGURE 1

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PURPOSE:	PROPOSED SHIP DOCK 5 ALTERNATIVES ANALYSIS	OWNER:	LBC HOUSTON, LP	LLOYD ENGINEERING, INC HOUSTON TEXAS, USA LICENSE NO. F-002846	DESIGN BY:	POP
		APPLIED BY:	LLOYD ENGINEERING		DRAWN BY:	JV
		APPLIC. No:	SWG-2016-00832		SCALE:	1"=6000'-0"
LOCATION:	HARRIS COUNTY, TX	COUNTY:	HARRIS		DATE:	11/21/16
		WATER BODY:	HOUSTON SHIP CHANNEL		SHEET No:	FIGURE 2
		DATUM:	MLLW			

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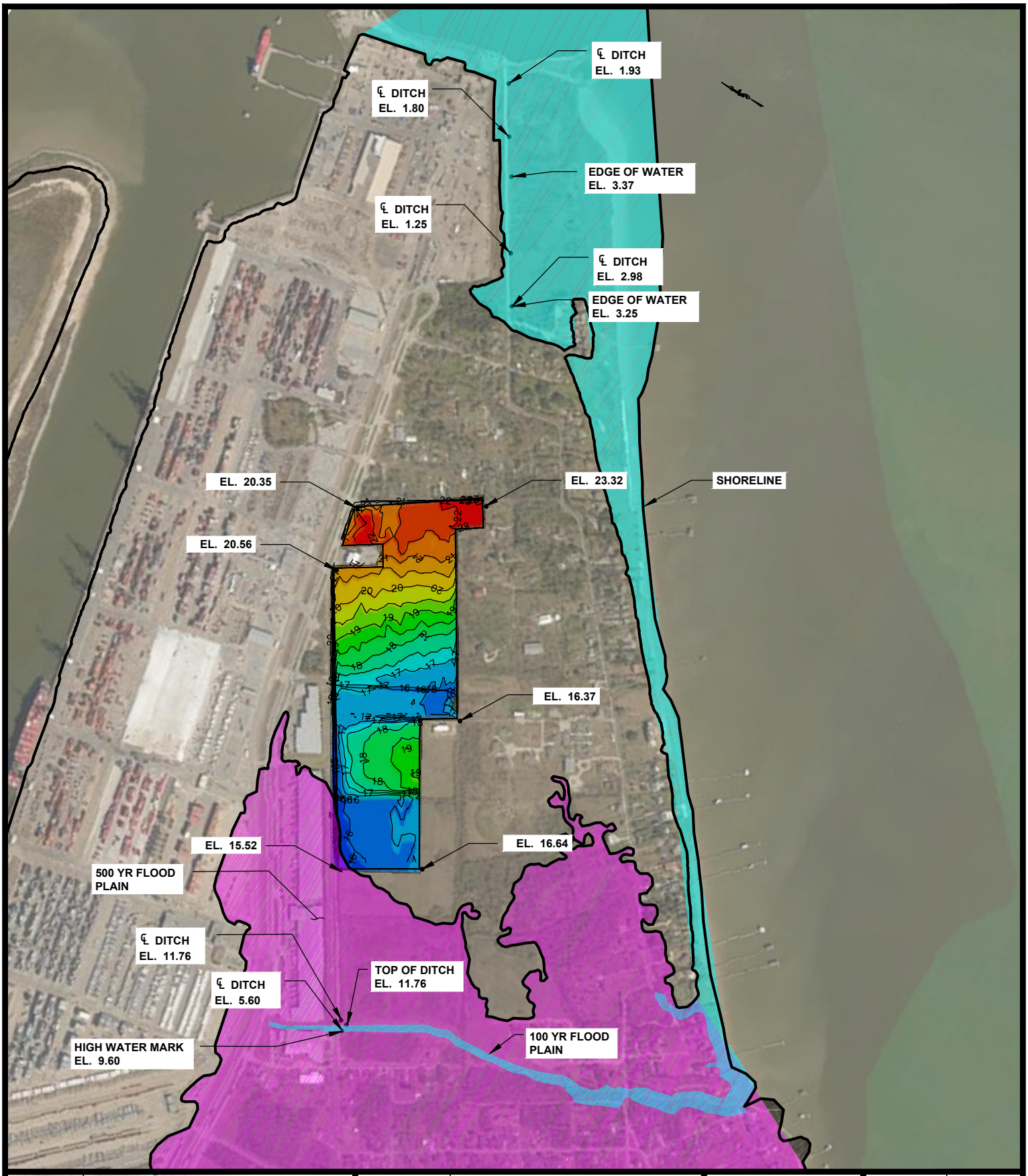

PURPOSE:	PROPOSED SHIP DOCK 5 PRM SITE	OWNER:	LBC HOUSTON, LP	LLOYD ENGINEERING, INC HOUSTON TEXAS, USA LICENSE NO. F-002846	DESIGN BY: POP DRAWN BY: JV SCALE: N.T.S. DATE: 11/21/16
		APPLIED BY:	LLOYD ENGINEERING		
		APPLIC. No:	SWG-2016-00832		
LOCATION:	MORGAN'S POINT, TX	COUNTY:	HARRIS		SHEET No: FIGURE 3
		WATER BODY:	HOUSTON SHIP CHANNEL		
		DATUM:	MLLW		

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		APPLIED BY:	LLOYD ENGINEERING	DRAWN BY:	JV
		APPLIC. No:	SWG-2016-00832	SCALE:	1"=400'
LOCATION:	MORGAN'S POINT, TX	COUNTY:	HARRIS	DATE:	11/21/16
		WATER BODY:	HOUSTON SHIP CHANNEL	SHEET No:	FIGURE 4
		DATUM:	MLLW		

LLOYD ENGINEERING, INC
HOUSTON TEXAS, USA
LICENSE NO. F-002846

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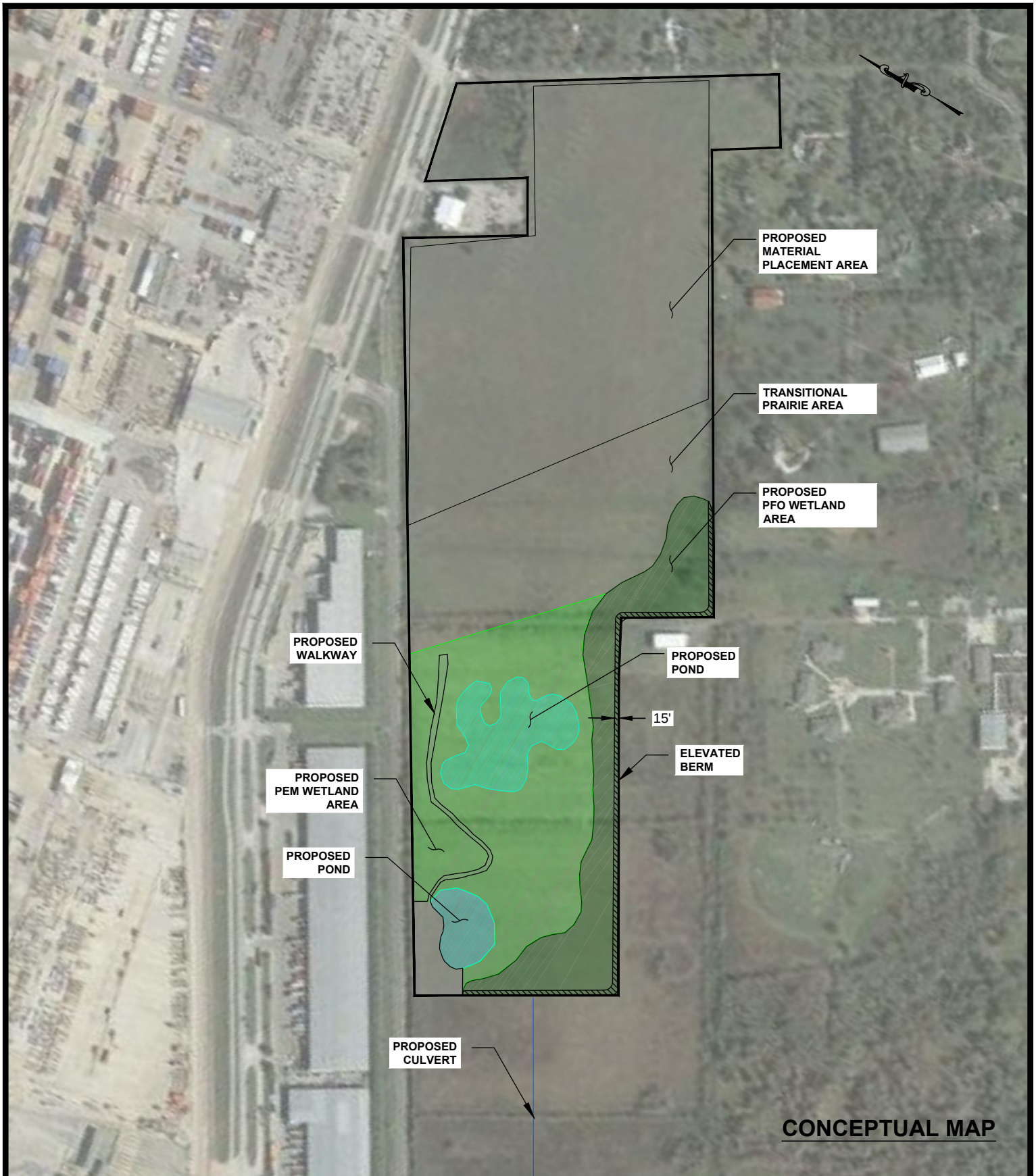

PURPOSE:	PROPOSED SHIP DOCK 5 PRM SITE	OWNER:	LBC HOUSTON, LP	LLOYD ENGINEERING, INC HOUSTON TEXAS, USA LICENSE NO. F-002846	DESIGN BY:	POP
		APPLIED BY:	LLOYD ENGINEERING		DRAWN BY:	JV
		APPLIC. No:	SWG-2016-00832		SCALE:	1"=400'
LOCATION:	MORGAN'S POINT, TX	COUNTY:	HARRIS		DATE:	11/29/16
		WATER BODY:	HOUSTON SHIP CHANNEL		SHEET No:	FIGURE 5
		DATUM:	MLLW			

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Appendix B

Mitigation Instrument (Memorandum of Understanding)

LBC HOUSTON, LP
CITY OF MORGAN'S POINT
SHIP DOCK 5 PERMITTEE-RESPONSIBLE MITIGATION
MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (MOU or Agreement) is entered into by and between LBC Houston, LP (LBC) a for-profit corporation organized and existing under the laws of the State of Texas, and the City of Morgan's Point, a Type A general law municipality.

1.0 INTRODUCTION AND PURPOSE

LBC and the City of Morgan's Point have agreed to work together to:

1) Implement wetland reestablishment and enhancement on approximately 52 acres of land currently under the ownership and maintenance of the City of Morgan's Point located south of the intersection of East Main Street and East Barbours Cut Boulevard, which shall include modifications to existing contours and elevations to create conditions conducive for the establishment of wetland area, the minimization and otherwise eradication of invasive species, and the planting of desirable tree species and wetland prairie vegetation; and

2) Monitor and report the results of such wetland establishment and enhancement, in accordance with and to satisfy the requirements of the Final Permittee-Responsible Mitigation Plan for LBC Ship Dock 5 Project (Mitigation Plan) associated with U.S. Army Corps of Engineers (USACE) Permit No. SWG-2016-00832 (such mitigation efforts hereinafter referred to as the Mitigation Project). The Mitigation Plan is attached hereto as Exhibit A and is incorporated by reference into this MOU.

2.0 SCOPE OF THE UNDERSTANDING

A. LBC agrees to:

1) Provide prime contracting services to perform the requirements of the Mitigation Plan (Prime Contracting Services), including the design, construction, monitoring, inspection, and reporting requirements described in Exhibit A for the establishment and enhancement of wetland area within the mitigation site.

2) The Prime Contracting Services shall include:

a) Surveying and marking the Mitigation Area boundaries to ensure the wetland establishment and enhancement acreage of palustrine emergent and palustrine forested wetlands as described within the Mitigation Plan are met;

b) Developing a project implementation schedule for the Mitigation Plan;

c) Act as the responsible party for contracting services for the engineering design and construction of the mitigation site.

c) Performing all work required by the Mitigation Plan, including changes made to the Mitigation Plan, as approved by the USACE. The Mitigation Plan will be refined throughout the Mitigation Project using adaptive management techniques. Any changes to the Mitigation Plan will be agreed upon by both LBC and the City of Morgan's Point, approved by the USACE, and comply with the Special Conditions set forth in USACE Permit No. SWG-2016-00832.

3) Require all contractors entering the Mitigation Area are to sanitize equipment (e.g., heavy machinery, all-terrain vehicles, and other off-road equipment) including the removal of all vegetative matter prior to entry of the Mitigation Area;

4) Coordinate with the City of Morgan's Point to develop an implementation plan consistent with the Mitigation Plan that takes into consideration preliminary designs and future development;

5) Ensure compliance with the implementation, maintenance, and monitoring requirements of the Mitigation Plan and USACE Permit No. SWG-2016-00832;

6) Designate a Project Officer and inform the City of Morgan's Point in writing of any changes in said Officer; and

7) Maintain complete and accurate financial records associated with the implementation of the Mitigation Plan, and retain such records for a period of three (3) years from the completion of the Mitigation Project. During this time, such records shall be made reasonably available to the City of Morgan's Point or its designee for review and audit upon request.

B. The City of Morgan's Point agrees to:

1) Permit LBC to implement, maintain, and otherwise comply with the requirements of the Mitigation Plan, including providing LBC with a right of access to the entirety of the mitigation area and additional surrounding area reasonably required for the execution of the Mitigation Plan;

2) Provide project oversight to ensure good-faith coordination and cooperation with LBC to implement the requirements of the Mitigation Plan;

3) Designate a City of Morgan's Point Project Officer and inform LBC in writing of any changes in said officer;

4) Act as the responsible party for the funding, coordination, and implementation of long-term management practices for a period of 8 years to ensure the sustainability, functionality, and longevity of the established aquatic resources, including;

a) The completion of a City of Morgan's Point Natural Resource Management Plan, which shall incorporate the goals and objectives and long-term management plan to be used and implemented within the Mitigation Area.

b) Protect the Mitigation Area, as needed, including; temporarily installing construction or wire fencing to prevent grazing of fauna, prohibit vehicular traffic within the mitigation area preventing soil compaction, plant mortality; install fencing around the perimeter of wetland restoration areas to prohibit people and domestic animals from entering wetlands and disturbing vegetation and native wildlife.

5) Not perform any activities within the Mitigation Area that would violate any of the requirements of USACE Permit No. SWG-2016-00832 or the Mitigation Plan; and

6) Not perform any activities within the Mitigation Area that materially impede the implementation of the Mitigation Plan or the satisfaction of the performance standards identified therein.

C. LBC and the City of Morgan's Point mutually agree to:

1) Commence work on the Mitigation Project during calendar year 2017, but should that not be possible, on a date mutually agreeable to both parties.

3.0 OTHER CONDITIONS

1) Hunting, fishing, trapping, and the carrying of firearms within the Mitigation Area and surrounding areas by LBC and its employees, contractors, subcontractors, agents, or representatives is strictly prohibited while conducting operations relating to the implementation of the Mitigation Plan.

2) LBC must comply with all federal, state, and local laws and must secure all applicable permits and regulatory approvals before initiating any operations relating to the Mitigation Plan. When required for the expeditious performance of the requirements of the Mitigation Plan, the City of Morgan's Point agrees to reasonably cooperate with LBC to obtain any such permits or regulatory approvals.

3) Upon termination of this Agreement, regardless of the reason, LBC shall:

a. Remove all equipment, materials, supplies, trash, or debris placed, stored, or used within or surrounding the Mitigation Area which are directly attributable to the activities of LBC or its agents in the implementation of the Mitigation Project;

b. Repair or restore site conditions within the Mitigation Area and/or surrounding areas as a result of damage directly attributable to the activities of LBC or its agents in the implementation of the Mitigation Project, including, for example,

damage to existing roads, bridges, levees, water channels, culverts, or other man-made structures. The designated City of Morgan's Point Project Officer, after reasonable consultation with LBC, shall determine the conditions and the extent of restoration required to such structures that have been damaged by LBC or its agents, and any conditions or required restoration shall be reasonable and customary. In the case of roads, restoration may include, but shall not be limited to, the purchase of gravel and road grading.

Any repair or restoration costs provided for in this paragraph shall be borne by LBC, *provided that* the City of Morgan's Point provide LBC with written notice detailing any damages alleged to have been directly attributable to the activities of LBC or its agents. If after receiving such written notice, LBC or its contractor fails to commence good faith efforts to remedy the damage to the Mitigation Area and/or surrounding areas within a commercially reasonable time considering the totality of the circumstances (no less than 30 calendar days), the City of Morgan's Point may have the damages corrected at LBC's cost, up to the undisputed amount between the parties.

4) For the duration of the period wherein LBC requires site access under this Agreement, LBC shall maintain, or alternatively shall ensure that its contractors or subcontractors maintain, at all times while performing the work under this Agreement, the following insurance coverage (the "Insurance"):

   a. Commercial General Liability or Comprehensive General Liability insurance with limits of not less than $1,000,000 for each occurrence and $1,000,000 general aggregate;

   b. Business Automobile Liability insurance covering all vehicles used in the operations of LBC with limits of liability of not less than: Bodily injury $1,000,000 each person, $1,000,000 each accident; Property damage $1,000,000 or a Combined Single Limit of $1,000,000 for bodily injury and property damage;

   c. Workers' Compensation Insurance and/or Longshoremen's and Harborworkers' compensation insurance as required by laws and regulations applicable to and covering employees of LBC engaged in the performance of the work under this Agreement;

   d. Employers' Liability Insurance protecting LBC against common law liability, in the absence of statutory liability, for employee bodily injury arising out of the master-servant relationship with a limit of not less than $500,000 each accident; $500,000 Disease-Policy Limit; $500,000 Disease-Each Employee;

   e. Longshoremen's and Harborworkers' Compensation Act Insurance to the extent required under such Act with regard to the work to be performed hereunder; and

f. Excess Liability Insurance over coverages afforded by the primary policies described above, with a minimum limit of $5,000,000.

LBC shall furnish proof of such insurance to the City of Morgan's Point prior to entering onto the Park for the first time after the effective date of this Agreement and annually thereafter.

5) LBC shall indemnify, save, and hold harmless the City of Morgan's Point, its officials, agents, employees, contractors, subcontractors, or representatives for or from any and all claims or causes of action of whatever kind or nature arising from or on account of acts or omissions attributable to LBC, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on its behalf or under its control in carrying out activities associated with the implementation of the Mitigation Project.

6) The City of Morgan's Point agrees to replace and restore any damage to the Mitigation Project caused by the intentional, reckless, or negligent conduct of its officials, agents, employees, contractors, subcontractors, or representatives.

7) Nothing in this Agreement is intended or should be construed as releasing LBC of any legal claim for damages that the City of Morgan's Point may be able to assert as a result of negligent or willful and wanton acts on the part of LBC's employees, contractors, subcontractors, agents, or representatives and no express or implied waiver of any claim is intended.

8) This Agreement shall be governed by, interpreted, and construed under the laws of the State of Texas.

9) This Agreement, along with the USACE Permit No. SWG-2016-00832 included therein, constitutes the entire agreement between the City of Morgan's Point and LBC relating to access to and use of the Mitigation Area and surrounding areas for purposes of the Mitigation Project.

10) This Agreement does not create a partnership, joint venture, or relationship of trust or agency between the parties. Neither party shall be authorized to act on behalf of the other, or to make representations or commitments of any kind on behalf of the other party.

11) This Agreement shall not be assigned without the prior written consent of the non-assigning Party; which consent shall not be unreasonably withheld.

12) If any provision of this Agreement (or part thereof) is or becomes unlawful or void, the legality, validity, and enforceability of any other part of that provision or any other provision of this Agreement shall not be affected, but shall continue in force and effect. The unlawful or void provision shall be deleted from this Agreement by

written agreement of the parties or final court order but only to the extent of any invalidity so as to preserve the Agreement to the maximum extent.

13) For the purpose of any written notice permitted or required under this Agreement, the addresses of the parties are as follows and may be changed by written notice to the other party. Unless otherwise provided in this Agreement, any written communications shall be effective upon deposit in the U.S. Mail, postage prepaid, addressed as follows or upon hand or courier delivery to the following addresses:

For the City of Morgan's Point:

The City of Morgan's Point
Attn: Mayor Michel Bechtel
1415 East Main Street
Morgan's Point, TX 77571

For LBC:

LBC Houston, LP
Attn: John Grimes
11666 Port Road
Seabrook, TX 77586

14) The City of Morgan's Point financial obligations under this Agreement are subject to the continued appropriation of funds authorized for use to support, maintain, and conserve the Mitigation Area as detailed within Mitigation Plan of this Agreement.

4.0 EXECUTION, MODIFICATION, AND DURATION OF AGREEMENT

This Agreement shall be effective upon the date of last signature by the parties hereto and shall continue in force until the USACE has determined that LBC has satisfied the performance standards and monitoring requirements contained in the Mitigation Plan, at which point LBC may terminate this Agreement. Amendment to this Agreement may be proposed by either party, to the extent not inconsistent with the Mitigation Plan (as amended), and any such amendments shall become effective upon approval by both parties, provided that this Agreement may not be changed, amended or modified except by instrument in writing signed by all the parties hereto. Within 180 days from the date of this Agreement, the City of Morgan's Point shall cause to be recorded in the deed records of Harris County, Texas, a restriction on use of the 52 acres subject to this Agreement that prevents any use of such property except in a manner consistent with this Agreement.

IN WITNESS WHEREOF, the parties have executed this Memorandum of Understanding No. _____ as of the date and year first written above.

LBC HOUSTON, LP

BY: _____

TITLE: Business President Americas

CITY OF MORGAN'S POINT

BY: _____

TITLE: Mayor

Appendix C

Permittee-Responsible Mitigation Site Wetland Delineation Report

Lloyd Engineering, Inc.
6565 West Loop South, Suite 708
Houston, Texas 77401
Telephone: (832) 426-4656
Fax: (832) 514-7003
www.lloydeng.com

November 1, 2016

Mr. Patrick McKinney
LBC Houston, LP
11666 Port Road
Seabrook, Texas 77586

Dear Mr. McKinney:

Re: LBC Ship Dock 5 Permittee-Responsible Mitigation Site
Wetland Delineation Report
Harris County, Texas

Lloyd Engineering, Inc. (LEI) performed environmental investigations intermittently from October 26th through DATE, on behalf of LBC Houston, LP (LBC) to identify potential environmental constraints (i.e., potentially jurisdictional areas), including wetlands within the proposed permittee-responsible mitigation (PRM) site to offset impacts to waters of the U.S. (WOUS) associated with the proposed LBC Ship Dock 5 Project. The proposed PRM site is an approximate 52-acre site located in Morgan's Point, Texas. The proposed PRM site intersects portions of the Morgan's Point and La Porte Texas, U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps (USGS, 1993; 1982). Refer to the Figure 1 in Attachment A for a vicinity map depicting the location of the proposed PRM site.

This wetland delineation report documents the existing conditions as well as the location of any potential WOUS known to occur within the proposed PRM site (project area). In order to effectively execute the mitigation efforts, modifications to existing site contours and elevations will be required within the project area to enhance existing site conditions to be conducive for the establishment of jurisdictional wetlands and other WOUS.

The following discussion describes the vegetation communities, hydrology, and hydric soil indicators identified during the field investigations.

METHODS

Impact assessments to potential jurisdictional areas (including wetlands), as defined by 33 Code of Federal Regulations (CFR) 328, were conducted within the entirety of the proposed project area. This evaluation included assessments of ephemeral, intermittent, and perennial streams, navigable and non-navigable waterways, wetlands, and other special aquatic sites. Trimble Geo 7X global navigation satellite system (GNSS), with sub-meter accuracy were used to map each feature delineated on the ground.

LEI ecologists conducted field investigations intermittingly from October 26th to DATE, 2016. Aerial photography, National Wetlands Inventory (NWI) maps, and Natural Resources Conservation Service (NRCS) soil survey data were reviewed by ecologists prior to field investigations. As required by existing regulations or regional general permits, potential wetlands, as defined by the U.S. Army Corps of Engineers (USACE) 1987 Wetlands Delineation Manual, were evaluated based on the presence of hydrophytic vegetation, wetland hydrology, and hydric soils, as amended by the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* (*Version 2.0*) (Regional Supplement) (USACE, 2010).

At the time of the field investigations, plant species were recorded to assess the vegetation component of the site, the area was inspected for indicators of wetland hydrology, and the soils were inspected for

indicators of hydric conditions. The 2016 National Wetland Plant List (NWPL) website, Version 3.3 (Lichvar, et al., 2016) was used to determine the indicator status of plant species. Taxonomy of plant species follows Lichvar, et al. (2014) and the NRCS PLANTS Database (U. S. Department of Agriculture [USDA] NRCS, 2016). At those sites where the vegetation, soil, and hydrology criteria were met, the site was identified as a wetland and categorized following suggestions of Cowardin, et al. (1979).

VEGETATION

During the field investigations, one vegetation community, upland grassland, was identified within the proposed project area. The wetland vegetation community types are based on the Cowardin, et al. (1979) classification system. Refer to Attachment B for representative photographs of the vegetation communities observed within the proposed project areas.

The wetland indicator status for plant species as defined in Table 1 is included in the vegetation lists that follow. Indicator statuses were determined using Lichvar, et al. (2016). Each indicator status reflects a plant species' fidelity and preference for wetlands or uplands based upon its frequency and abundance in wetlands versus uplands and the availability of wetland habitat across the local to regional landscape (Lichvar and Minkin, 2008). The resulting indicator status categories are used in determining dominance of hydrophytic versus non-hydrophytic vegetation at each data point.

Table 1
Plant Species Wetland Indicator Status Categories

Code	Category	Definition
OBL	Obligate Wetland	Hydrophyte - Almost always occurs in wetlands
FACW	Facultative Wetland	Hydrophyte - Usually occurs in wetlands, but may occur in non-wetlands
FAC	Facultative	Hydrophyte - Occurs in wetlands and non-wetlands
FACU	Facultative Upland	Non-hydrophyte - Usually occurs in non-wetlands, but may occur in wetlands
UPL	Obligate Upland	Non-hydrophyte - Almost never occurs in wetlands

Source: Lichvar et al., 2016. The National Wetland Plant List. 2016 Wetland Ratings. Phytoneuron: 2016-4-30. Website Version 3.3 available at http://rsgisias.crrel.usace.army.mil/nwpl_static/mapper/mapper.html.

Vegetation observed within the upland grassland communities is listed in Table 2 below. Based on the technical criteria outlined in the Regional Supplement (USACE, 2010), the dominant vegetation observed within the upland grassland communities is not representative of a hydrophytic plant community.

Table 2
Typical Vegetation Observed in Upland Grassland Communities
Within the LBC Ship Dock 5 PRM Site

Layer	Scientific Name	Indicator	Common Name
Shrub	*Vachellia farnesiana*	FACU	sweet acacia
Herb and Vine	*Ambrosia artemisiifolia*	FACU	annual ragweed
	Andropogon virginicus	FAC	broomsedge bluestem
	Campsis radicans	FAC	trumpet creeper
	Cynodon dactylon	FACU	bermudagrass
	Cyperus virens	FACW	green flatsedge
	Ipomoea cordatotriloba	FACU	tievine
	Paspalum notatum	FACU	bahiagrass
	Paspalum urvillei	FAC	Vasey's grass
	Rubis trivialis	FACU	southern dewberry

HYDROLOGY

Indicators of wetland hydrology were not observed within the project area during field investigations. Based on a review of the topographic maps and survey elevations, the proposed project area slopes in a west to east fashion with minor depressional areas adjacent to elevated, unimproved vehicle trails. For site-specific observations each data point location, please refer to the Regional Supplement Wetland Determination Data Forms provided in Attachment C.

SOILS

Based on the mapped soil data for Harris County, Texas (NRCS, 2016), the proposed project area consists of four mapped soil units. Descriptions of the mapped soil types are provided below; the parenthetical numbers following each soil name correspond with the soil unit numbers provided on the aerial-based project maps in Attachment A.

Mapped Soils

Addicks-Urban land complex (Ak)– Addicks soils are very deep, poorly drained, moderately permeable, with slow surface runoff and internal drainage. These soils are on coastal prairies of Pleistocene Age. Based on the national hydric soils list (NRCS, 2015), these soils are considered hydric in Harris County, Texas.

Bernard clay loam, 0 to 1 percent slopes (Bd) – Bernard soils consist of very deep, somewhat poorly drained soils, with high runoff. These gently sloping to sloping soils formed in clayey fluviomarine deposits derived from igneous, metamorphic and sedimentary rock. Based on the national hydric soils list (NRCS, 2015), these soils are considered hydric in Harris County, Texas.

Lake Charles clay, 0 to 1 percent slopes (LcA) – Lake Charles soils consist of very deep, moderately well drained, very slowly permeable soils, with high runoff on 0 to 1 percent slopes. These gently sloping to sloping soils formed in clayey sediments and primarily exhibit slopes less than 1 percent. Based on the national hydric soils list (NRCS, 2015), these soils are not considered hydric in Harris County, Texas.

Beaumont clay, 0 to 1 percent slopes (BeaA) – Beaumont soils consist of very deep, poorly drained soils, with very slow permeability and negligible runoff. These nearly level soils formed in clayey sediments on the Beaumont Formation of the Pleistocene Age with slope ranges from 0 to 1 percent. Based on the national hydric soils list (NRCS, 2015), these soils are considered hydric in Harris County, Texas.

LLOYD ENGINEERING, INC.

Observed Soils

Soils observed during field surveys within the proposed project areas varied between communities. Observed soils typically exhibited textures that ranged from clay to clay loam with matrix hues of 10YR, as determined using Munsell Soil Color Charts (Kollmorgen Instruments Corporation, 2000).

Soils observed within the project area were evaluated and determined to be hydric based on the criteria defined by NRCS (2010) and as outlined by Environmental Laboratory (1987) and USACE (2010). Hydric soil indicators observed within the project area were F3-Depleted Matrix Criterion and F6-Redox Dark Surface Criterion. Soils observed within the proposed project area ranged in color from very dark gray (10YR 3/1) to brown (10YR 4/3). When present, redox concentrations ranged in color from strong brown (7.5YR 4/6) to yellowish-brown (10YR 5/6).

Areas where soils met the criteria to be considered hydric either lacked hydrophytic vegetation or wetland hydrology, and therefore were not considered a wetland.

For detailed descriptions of observed soils within the project area, refer to the Regional Supplement Wetland Determination Data Forms provided in Attachment C.

POTENTIAL WATERS OF THE U.S.

Field surveys were conducted intermittingly from January 29 through September 8, 2014, to identify any waters of the U.S., including wetlands, subject to USACE jurisdiction under Section 404 of the Clean Water Act (CWA). The vegetation, hydrology, and soils characteristics at each data point were recorded on Regional Supplement Wetland Determination Data Forms (Attachment C).

Based on the results of field surveys, no wetlands or waterbodies, considered potential WOUS, subject to USACE jurisdiction under Section 404 of the CWA, were identified within the proposed project area.

CONCLUSIONS

Based on the results of field investigations, no potential WOUS, including wetlands subject to USACE jurisdiction under Section 404 of the CWA, were identified within the project area. Additionally, no traditional navigable waterbodies are located within the proposed project area, subject to USACE jurisdiction under Section 10 of the Rivers and Harbors Act. Based on LEI's understanding of the proposed project area as depicted in Attachment A, the project would not result in impacts to potentially jurisdictional aquatic resources requiring authorization from USACE. Thank you for the opportunity to assist with this project and if you have any questions or require additional information, please feel free to contact me.

Very truly yours,

Marisa Weber
Director of Environmental Services

References

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Attachment A

Project Figures

VICINITY PLAN

LOCATION PLAN

PURPOSE:	PROPOSED SHIP DOCK 5 PRM SITE	OWNER:	LBC HOUSTON, LP
		APPLIED BY:	LLOYD ENGINEERING
		APPLIC. No:	SWG-2016-00832
LOCATION:	MORGAN'S POINT, TX	COUNTY:	HARRIS
		WATER BODY:	HOUSTON SHIP CHANNEL
		DATUM:	MLLW

LLOYD ENGINEERING, INC
HOUSTON TEXAS, USA
LICENSE NO. F-002846

DESIGN BY:	POP
DRAWN BY:	JV
SCALE:	N.T.S.
DATE:	11/29/16

SHEET No: FIGURE 1

FILE NAME: E:\Dropbox (Lloyd Engineering)\LEI PROJECTS\LBC\Houston DOCK\Ship Dock 5\PERMITS\mitigation plan\Vic Map.dwg LAYOUT NAME: Layout1 PLOTTED: Tuesday, November 29, 2016 - 9:58am USER: LLOYD_ENG

PURPOSE:	PROPOSED SHIP DOCK 5 PRM SITE	OWNER:	LBC HOUSTON, LP	DESIGN BY:	POP
		APPLIED BY:	LLOYD ENGINEERING	DRAWN BY:	JV
		APPLIC. No:	SWG-2016-00832	SCALE:	1"=400'
LOCATION:	MORGAN'S POINT, TX	COUNTY:	HARRIS	DATE:	11/21/16
		WATER BODY:	HOUSTON SHIP CHANNEL	SHEET No:	FIGURE 4
		DATUM:	MLLW		

LLOYD ENGINEERING, INC
HOUSTON TEXAS, USA
LICENSE NO. F-002846

FILE NAME: E:\Dropbox (Lloyd Engineering)\LEI PROJECTS\LBC\Houston DOCK\Ship Dock 5\PERMITS\mitigation plan\Wetland Map-11-18-16.dwg LAYOUT NAME: Layout1 PLOTTED: Monday, November 21, 2016 - 4:31pm USER: LLOYD_ENG

Attachment B

Representative Photographs

LBC Houston, LP – Permittee-Responsible Mitigation Site
Wetland Delineation Report
Representative Photographs

Photo 1: View upland grassland communities located in the northeast corner of the project area. View at DP T1-01, facing north.

Photo 2: View upland grassland communities located in the project area. View at DP T2-02, facing north.

Photo 3: View upland grassland communities located in the project area. View at DP T2-02, facing east.

Photo 4: View upland grassland communities located in the southeast corner of the project area. View at DP T1-03, facing north.

Attachment C

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: LBC Ship Dock 5 PRM Site City/County: Harris Sampling Date: 10/26/2016

Applicant/Owner: LBC Houston, LP State: TX Sampling Point: DP T1-01

Investigator(s): J. Wiedeman, D. Johnston Section, Township, Range: NA

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 0-1

Subregion (LRR or MLRA): MLRA – Gulf Coast Prairies (150A) Lat: 26.676360 Long: -94.993963 Datum: NAD 83

Soil Map Unit Name: Benard clay loam, 0 to 1 percent slopes NWI classification: UPL

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

VEGETATION (Five Strata) Sampling Point: DP T1-01

Tree Stratum (Plot size: 30-ft Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5-ft Radius)			
1. *Solidago canadensis*	40	Y	FACU
2. *Sorghum halepense*	10	N	FACU
3. *Trifolium repens*	5	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	55 = Total Cover		
50% of total cover: 27.5	20% of total cover: 11		
Woody Vine Stratum (Plot size: 30-ft Radius)			
1. *Ipomoea cordatotriloba*	40	Y	FACU
2. *Campsis radicans*	20	Y	FAC
3. *Rubis trivialis*	5	N	FACU
4.			
5.			
	65 = Total Cover		
50% of total cover: 32.5	20% of total cover: 13		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Test is ≤3.0[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: DP T1-01

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/2	98	10YR 6/8	2	C	M	CL	

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

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

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Organic Bodies (A6) (**LRR P, T, U**)
- ____ 5 cm Mucky Mineral (A7) (**LRR P, T, U**)
- ____ Muck Presence (A8) (**LRR U**)
- ____ 1 cm Muck (A9) (**LRR P, T**)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Coastal Prairie Redox (A16) (**MLRA 150A**)
- ____ Sandy Mucky Mineral (S1) (**RLRR O, S**)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7) (**LRR P, S, T, U**)
- ____ Polyvalue Below Surface (S8) (**LRR S, T, U**)
- ____ Thin Dark Surface (S9) (**LRR S, T, U**)
- ____ Loamy Mucky Mineral (F1) (**LRR O**)
- ____ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ Marl (F10) (**LRR U**)
- ____ Depleted Ochric (F11) (**MLRA 151**)
- ____ Iron-Manganese Masses (F12) (**LRR O, P, T**)
- ____ Umbric Surface (F13) (**LRR P, T, U**)
- ____ Delta Ochric (F17) (**MLRA, 151**)
- ____ Reduced Vertic (F18) (**MLRA 150A, 150B**)
- ____ Piedmont Floodplain Soils (F19) (**MLRA 149A**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 149A, 153C, 153D**)

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) (**LRR O**)
- ____ 2 cm Muck (A10) (**LRR S**)
- ____ Reduced Vertic (F18) (**outside MLRA 150A,B)**
- ____ Piedmont Floodplain Soils (F19) (**LRR P, S, T**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 153B**)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: LBC Ship Dock 5 PRM Site City/County: Harris Sampling Date: 10/26/2016

Applicant/Owner: LBC Houston, LP State: TX Sampling Point: DP T1-02

Investigator(s): J. Wiedeman, D. Johnston Section, Township, Range: NA

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 0-1

Subregion (LRR or MLRA): MLRA – Gulf Coast Prairies (150A) Lat: 26.675673 Long: -94.993705 Datum: NAD 83

Soil Map Unit Name: Bernard clay loam, 0 to 1 percent slopes (Bd) NWI classification: UPL

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

VEGETATION (Five Strata) Sampling Point: DP T1-02

Tree Stratum (Plot size: 30-ft Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5-ft Radius)			
1. *Paspalum urvillei*	40	Y	FACU
2. *Paspalum notatum*	20	Y	FACU
3. *Cynodon dactylon*	15	N	FACU
4. *Solidago canadensis*	5	N	FACU
5. *Andropogon virginicus*	5	N	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	85 = Total Cover		
50% of total cover: 42.5	20% of total cover: 17		
Woody Vine Stratum (Plot size: 30-ft Radius)			
1. *Rubis trivialis*	10	Y	FACU
2.			
3.			
4.			
5.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Test is ≤3.0[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: DP T1-02

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

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

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

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

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Organic Bodies (A6) (**LRR P, T, U**)
- ____ 5 cm Mucky Mineral (A7) (**LRR P, T, U**)
- ____ Muck Presence (A8) (**LRR U**)
- ____ 1 cm Muck (A9) (**LRR P, T**)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Coastal Prairie Redox (A16) (**MLRA 150A**)
- ____ Sandy Mucky Mineral (S1) (**RLRR O, S**)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7) (**LRR P, S, T, U**)
- ____ Polyvalue Below Surface (S8) (**LRR S, T, U**)
- ____ Thin Dark Surface (S9) (**LRR S, T, U**)
- ____ Loamy Mucky Mineral (F1) (**LRR O**)
- ____ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ Marl (F10) (**LRR U**)
- ____ Depleted Ochric (F11) (**MLRA 151**)
- ____ Iron-Manganese Masses (F12) (**LRR O, P, T**)
- ____ Umbric Surface (F13) (**LRR P, T, U**)
- ____ Delta Ochric (F17) (**MLRA, 151**)
- ____ Reduced Vertic (F18) (**MLRA 150A, 150B**)
- ____ Piedmont Floodplain Soils (F19) (**MLRA 149A**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 149A, 153C, 153D**)

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) (**LRR O**)
- ____ 2 cm Muck (A10) (**LRR S**)
- ____ Reduced Vertic (F18) (**outside MLRA 150A,B)**
- ____ Piedmont Floodplain Soils (F19) (**LRR P, S, T**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 153B**)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: LBC Ship Dock 5 PRM Site City/County: Harris Sampling Date: 10/26/2016

Applicant/Owner: LBC Houston, LP State: TX Sampling Point: DP T1-03

Investigator(s): J. Wiedeman, D. Johnston Section, Township, Range: NA

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 0-1

Subregion (LRR or MLRA): MLRA – Gulf Coast Prairies (150A) Lat: 26.674434 Long: -94.992976 Datum: NAD 83

Soil Map Unit Name: Bernard clay loam, 0 to 1 percent slopes (Bd) NWI classification: UPL

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

VEGETATION (Five Strata) Sampling Point: DP T1-03

Tree Stratum (Plot size: 30-ft Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5-ft Radius)			
1. *Paspalum urvillei*	40	Y	FACU
2. *Paspalum notatum*	20	Y	FACU
3. *Cynodon dactylon*	15	N	FACU
4. *Solidago canadensis*	5	N	FACU
5. *Andropogon virginicus*	5	N	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	85 = Total Cover		
50% of total cover: 42.5	20% of total cover: 17		
Woody Vine Stratum (Plot size: 30-ft Radius)			
1. *Rubis trivialis*	30	Y	FACU
2.			
3.			
4.			
5.			
	30 = Total Cover		
50% of total cover: 15	20% of total cover: 6		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Test is ≤3.0[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: DP T1-03

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

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

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

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

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Organic Bodies (A6) (**LRR P, T, U**)
- ____ 5 cm Mucky Mineral (A7) (**LRR P, T, U**)
- ____ Muck Presence (A8) (**LRR U**)
- ____ 1 cm Muck (A9) (**LRR P, T**)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Coastal Prairie Redox (A16) (**MLRA 150A**)
- ____ Sandy Mucky Mineral (S1) (**RLRR O, S**)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7) (**LRR P, S, T, U**)
- ____ Polyvalue Below Surface (S8) (**LRR S, T, U**)
- ____ Thin Dark Surface (S9) (**LRR S, T, U**)
- ____ Loamy Mucky Mineral (F1) (**LRR O**)
- ____ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ Marl (F10) (**LRR U**)
- ____ Depleted Ochric (F11) (**MLRA 151**)
- ____ Iron-Manganese Masses (F12) (**LRR O, P, T**)
- ____ Umbric Surface (F13) (**LRR P, T, U**)
- ____ Delta Ochric (F17) (**MLRA, 151**)
- ____ Reduced Vertic (F18) (**MLRA 150A, 150B**)
- ____ Piedmont Floodplain Soils (F19) (**MLRA 149A**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 149A, 153C, 153D**)

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) (**LRR O**)
- ____ 2 cm Muck (A10) (**LRR S**)
- ____ Reduced Vertic (F18) (**outside MLRA 150A,B)**
- ____ Piedmont Floodplain Soils (F19) (**LRR P, S, T**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 153B**)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: LBC Ship Dock 5 PRM Site City/County: Harris Sampling Date: 10/26/2016

Applicant/Owner: LBC Houston, LP State: TX Sampling Point: DP T2-01

Investigator(s): J. Wiedeman, D. Johnston Section, Township, Range: NA

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 0-1

Subregion (LRR or MLRA): MLRA – Gulf Coast Prairies (150A) Lat: 29.673736 Long: -94.995494 Datum: NAD 83

Soil Map Unit Name: Lake Charles clay, 0 to 1 percent slopes (LcA) NWI classification: UPL

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

VEGETATION (Five Strata) Sampling Point: DP T2-01

Tree Stratum (Plot size: 30-ft Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5-ft Radius)			
1. *Cynodon dactylon*	75	Y	FACU
2. *Cyperus virens*	15	N	FACW
3. *Vachellia farnesiana*	5	N	FACU
4. *Paspalum urvillei*	5	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 30-ft Radius)			
1. *Rubis trivialis*	15	Y	FACU
2.			
3.			
4.			
5.			
	15 = Total Cover		
50% of total cover: 7.5	20% of total cover: 3		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

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

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Test is ≤3.0[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: DP T2-01

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/1	99	10YR 5/6	1	C	M	C	

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

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

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Organic Bodies (A6) (**LRR P, T, U**)
- ____ 5 cm Mucky Mineral (A7) (**LRR P, T, U**)
- ____ Muck Presence (A8) (**LRR U**)
- ____ 1 cm Muck (A9) (**LRR P, T**)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Coastal Prairie Redox (A16) (**MLRA 150A**)
- ____ Sandy Mucky Mineral (S1) (**RLRR O, S**)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7) (**LRR P, S, T, U**)
- ____ Polyvalue Below Surface (S8) (**LRR S, T, U**)
- ____ Thin Dark Surface (S9) (**LRR S, T, U**)
- ____ Loamy Mucky Mineral (F1) (**LRR O**)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- X Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ Marl (F10) (**LRR U**)
- ____ Depleted Ochric (F11) (**MLRA 151**)
- ____ Iron-Manganese Masses (F12) (**LRR O, P, T**)
- ____ Umbric Surface (F13) (**LRR P, T, U**)
- ____ Delta Ochric (F17) (**MLRA, 151**)
- ____ Reduced Vertic (F18) (**MLRA 150A, 150B**)
- ____ Piedmont Floodplain Soils (F19) (**MLRA 149A**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 149A, 153C, 153D**)

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) (**LRR O**)
- ____ 2 cm Muck (A10) (**LRR S**)
- ____ Reduced Vertic (F18) (**outside MLRA 150A,B)**
- ____ Piedmont Floodplain Soils (F19) (**LRR P, S, T**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 153B**)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: LBC Ship Dock 5 PRM Site City/County: Harris Sampling Date: 10/26/2016

Applicant/Owner: LBC Houston, LP State: TX Sampling Point: DP T2-02

Investigator(s): J. Wiedeman, D. Johnston Section, Township, Range: NA

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 0-1

Subregion (LRR or MLRA): MLRA – Gulf Coast Prairies (150A) Lat: 29.675662 Long: -94.996855 Datum: NAD 83

Soil Map Unit Name: Lake Charles clay, 0 to 1 percent slopes (LcA) NWI classification: UPL

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

VEGETATION (Five Strata) Sampling Point: DP T2-02

Tree Stratum (Plot size: 30-ft Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5-ft Radius)			
1. *Cynodon dactylon*	35	Y	FACU
2. *Andropogon virginicus*	20	Y	FAC
3. *Paspalum urvillei*	15	N	FAC
4. *Solidago canadensis*	10	N	FACU
5. *Setaria parviflora*	5	N	FACW
6. Ambrosia artemisiifolia	5	N	FACU
7.			
8.			
9.			
10.			
11.			
	90 = Total Cover		
50% of total cover: 45	20% of total cover: 18		
Woody Vine Stratum (Plot size: 30-ft Radius)			
1. *Rubis trivialis*	30	Y	FACU
2.			
3.			
4.			
5.			
	30 = Total Cover		
50% of total cover: 15	20% of total cover: 6		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Test is ≤3.0[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: DP T2-02

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/1	95	10YR 4/6	5	C	M	C	

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

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

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Organic Bodies (A6) (**LRR P, T, U**)
- ____ 5 cm Mucky Mineral (A7) (**LRR P, T, U**)
- ____ Muck Presence (A8) (**LRR U**)
- ____ 1 cm Muck (A9) (**LRR P, T**)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Coastal Prairie Redox (A16) (**MLRA 150A**)
- ____ Sandy Mucky Mineral (S1) (**RLRR O, S**)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7) (**LRR P, S, T, U**)
- ____ Polyvalue Below Surface (S8) (**LRR S, T, U**)
- ____ Thin Dark Surface (S9) (**LRR S, T, U**)
- ____ Loamy Mucky Mineral (F1) (**LRR O**)
- ____ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ Marl (F10) (**LRR U**)
- ____ Depleted Ochric (F11) (**MLRA 151**)
- ____ Iron-Manganese Masses (F12) (**LRR O, P, T**)
- ____ Umbric Surface (F13) (**LRR P, T, U**)
- ____ Delta Ochric (F17) (**MLRA, 151**)
- ____ Reduced Vertic (F18) (**MLRA 150A, 150B**)
- ____ Piedmont Floodplain Soils (F19) (**MLRA 149A**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 149A, 153C, 153D**)

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) (**LRR O**)
- ____ 2 cm Muck (A10) (**LRR S**)
- ____ Reduced Vertic (F18) (**outside MLRA 150A,B)**
- ____ Piedmont Floodplain Soils (F19) (**LRR P, S, T**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 153B**)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: LBC Ship Dock 5 PRM Site City/County: Harris Sampling Date: 10/26/2016

Applicant/Owner: LBC Houston, LP State: TX Sampling Point: DP T3-01

Investigator(s): J. Wiedeman, D. Johnston Section, Township, Range: NA

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 1-2

Subregion (LRR or MLRA): MLRA – Gulf Coast Prairies (150A) Lat: 29.672681 Long: -94.999923 Datum: NAD 83

Soil Map Unit Name: Lake Charles clay, 0 to 1 percent slopes (LcA) NWI classification: UPL

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

VEGETATION (Five Strata) Sampling Point: DP T3-01

Tree Stratum (Plot size: 30-ft Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5-ft Radius)			
1. *Paspalum urvillei*	35	Y	FAC
2. *Andropogon virginicus*	15	N	FAC
3. *Ambrosia artemisiifolia*	15	N	FACU
4. *Solidago canadensis*	10	N	FACU
5. *Setaria parviflora*	5	N	FACW
6.			
7.			
8.			
9.			
10.			
11.			
	80 = Total Cover		
50% of total cover: 40	20% of total cover: 16		
Woody Vine Stratum (Plot size: 30-ft Radius)			
1. *Rubis trivialis*	30	Y	FACU
2.			
3.			
4.			
5.			
	30 = Total Cover		
50% of total cover: 15	20% of total cover: 6		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

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

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Test is ≤3.0[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: DP T3-01

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/1	95	10YR 4/6	5	C	M	CL	

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

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

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Organic Bodies (A6) (**LRR P, T, U**)
- ____ 5 cm Mucky Mineral (A7) (**LRR P, T, U**)
- ____ Muck Presence (A8) (**LRR U**)
- ____ 1 cm Muck (A9) (**LRR P, T**)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Coastal Prairie Redox (A16) (**MLRA 150A**)
- ____ Sandy Mucky Mineral (S1) (**RLRR O, S**)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7) (**LRR P, S, T, U**)
- ____ Polyvalue Below Surface (S8) (**LRR S, T, U**)
- ____ Thin Dark Surface (S9) (**LRR S, T, U**)
- ____ Loamy Mucky Mineral (F1) (**LRR O**)
- ____ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ Marl (F10) (**LRR U**)
- ____ Depleted Ochric (F11) (**MLRA 151**)
- ____ Iron-Manganese Masses (F12) (**LRR O, P, T**)
- ____ Umbric Surface (F13) (**LRR P, T, U**)
- ____ Delta Ochric (F17) (**MLRA, 151**)
- ____ Reduced Vertic (F18) (**MLRA 150A, 150B**)
- ____ Piedmont Floodplain Soils (F19) (**MLRA 149A**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 149A, 153C, 153D**)

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) (**LRR O**)
- ____ 2 cm Muck (A10) (**LRR S**)
- ____ Reduced Vertic (F18) (**outside MLRA 150A,B)**
- ____ Piedmont Floodplain Soils (F19) (**LRR P, S, T**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 153B**)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: LBC Ship Dock 5 PRM Site City/County: Harris Sampling Date: 10/26/2016

Applicant/Owner: LBC Houston, LP State: TX Sampling Point: DP T3-02

Investigator(s): J. Wiedeman, D. Johnston Section, Township, Range: NA

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 1-2

Subregion (LRR or MLRA): MLRA – Gulf Coast Prairies (150A) Lat: 29.673740 Long: -95.000571 Datum: NAD 83

Soil Map Unit Name: Lake Charles clay, 0 to 1 percent slopes (LcA) NWI classification: UPL

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

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

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

VEGETATION (Five Strata) Sampling Point: DP T3-02

Tree Stratum (Plot size: 30-ft Radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15-ft Radius)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5-ft Radius)			
1. *Paspalum urvillei*	35	Y	FAC
2. *Andropogon virginicus*	20	Y	FAC
3. *Ambrosia artemisiifolia*	10	N	FACU
4. *Solidago canadensis*	10	N	FACU
5. *Setaria parviflora*	5	N	FACW
6.			
7.			
8.			
9.			
10.			
11.			
	80 = Total Cover		
50% of total cover: 40	20% of total cover: 16		
Woody Vine Stratum (Plot size: 30-ft Radius)			
1. *Rubis trivialis*	40	Y	FACU
2.			
3.			
4.			
5.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.6 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Test is ≤3.0[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: DP T3-02

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/1	95	10YR 4/6	5	C	M	CL	

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

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

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Organic Bodies (A6) (**LRR P, T, U**)
- ____ 5 cm Mucky Mineral (A7) (**LRR P, T, U**)
- ____ Muck Presence (A8) (**LRR U**)
- ____ 1 cm Muck (A9) (**LRR P, T**)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Coastal Prairie Redox (A16) (**MLRA 150A**)
- ____ Sandy Mucky Mineral (S1) (**RLRR O, S**)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7) (**LRR P, S, T, U**)
- ____ Polyvalue Below Surface (S8) (**LRR S, T, U**)
- ____ Thin Dark Surface (S9) (**LRR S, T, U**)
- ____ Loamy Mucky Mineral (F1) (**LRR O**)
- ____ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ Marl (F10) (**LRR U**)
- ____ Depleted Ochric (F11) (**MLRA 151**)
- ____ Iron-Manganese Masses (F12) (**LRR O, P, T**)
- ____ Umbric Surface (F13) (**LRR P, T, U**)
- ____ Delta Ochric (F17) (**MLRA, 151**)
- ____ Reduced Vertic (F18) (**MLRA 150A, 150B**)
- ____ Piedmont Floodplain Soils (F19) (**MLRA 149A**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 149A, 153C, 153D**)

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) (**LRR O**)
- ____ 2 cm Muck (A10) (**LRR S**)
- ____ Reduced Vertic (F18) (**outside MLRA 150A,B)**
- ____ Piedmont Floodplain Soils (F19) (**LRR P, S, T**)
- ____ Anomalous Bright Loamy Soils (F20) (**MLRA 153B**)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

Appendix D
Impact and Mitigation iHGM Results

Impacts to PEM & PSS1 Wetlands iHGM Calculations

Functional Capacity Index (FCI):

Temporary Storage & Detention of Storage Water:

= sqrt(sqrt(**V_dur** * **V_freq**) * (**V_topo** + ((**V_herb** + (**V_mid**/2))/2)))

Maintain Plant and Animal Community:

= (**V_mid** + **V_herb** + **V_connect**)/3

Removal & Sequestrian of Elements & Compounds:

= (**V_wood** + **V_freq** + **V_dur** + ((**V_topo** + **V_herb** + **V_mid**)/3) + ((**V_detritus** + **V_redox** + **V_sorpt**)/3))/5

Functional Capacity Units (FCU):

= **FCI** * **wetland acres** per WAA

TOTAL	FCU
Temp Storage of Water:	1.254
Maintain Plant & Animal:	2.083
Removal of Elements:	1.083

Total Acreage	3.403

WET 2 0.389 acres

V_dur:	0.25
V_freq:	0.25
V_topo:	0.10
V_wood:	0.25
V_mid:	0.25
V_herb:	0.75
V_connect:	0.75
V_detritus:	0.30
V_redox:	0.10
V_sorpt:	0.50

Temporary Storage & Detention of Storage Water: FCI: 0.37

Maintain Plant and Animal Community: FCI: 0.58

Removal & Sequestrian of Elements & Compounds: FCI: 0.28

WET 2	FCU
Temp Storage of Water:	0.14
Maintain Plant & Animal:	0.23
Removal of Elements:	0.11

WET 3 0.397 acres

V_dur:	0.25
V_freq:	0.25
V_topo:	0.10
V_wood:	0.25
V_mid:	0.50
V_herb:	0.25
V_connect:	0.75
V_detritus:	0.30
V_redox:	0.10
V_sorpt:	0.50

Temporary Storage & Detention of Storage Water: FCI: 0.30

Maintain Plant and Animal Community: FCI: 0.50

Removal & Sequestrian of Elements & Compounds: FCI: 0.27

WET 3	FCU
Temp Storage of Water:	0.12
Maintain Plant & Animal:	0.20
Removal of Elements:	0.11

WET 6 2.126 acres

V_dur:	0.25
V_freq:	0.25
V_topo:	0.10
V_wood:	0.25
V_mid:	0.50
V_herb:	0.25
V_connect:	0.75
V_detritus:	0.30
V_redox:	0.10
V_sorpt:	0.50

Temporary Storage & Detention of Storage Water: FCI: 0.30

Maintain Plant and Animal Community: FCI: 0.50

Removal & Sequestrian of Elements & Compounds: FCI: 0.27

WET 6	FCU
Temp Storage of Water:	0.63
Maintain Plant & Animal:	1.06
Removal of Elements:	0.57

WET 7 0.491 acres

V_dur:	0.25
V_freq:	0.25
V_topo:	0.10
V_wood:	0.25
V_mid:	0.50
V_herb:	0.25
V_connect:	0.75
V_detritus:	0.30
V_redox:	0.10
V_sorpt:	0.50

Temporary Storage & Detention of Storage Water: FCI: 0.30

Maintain Plant and Animal Community: FCI: 0.50

Removal & Sequestrian of Elements & Compounds: FCI: 0.27

WET 7	FCU
Temp Storage of Water:	0.15
Maintain Plant & Animal:	0.25
Removal of Elements:	0.13

PEM & PSS1 Restoration iHGM Calculations

Functional Capacity Index (FCI):

Temporary Storage & Detention of Storage Water:

= sqrt(sqrt(**V_dur** * **V_freq**) * (**V_topo** + ((**V_herb** + (**V_mid**/2))/2)))

Maintain Plant and Animal Community:

= (**V_mid** + **V_herb** + **V_connect**)/3

Removal & Sequestrian of Elements & Compounds:

= (**V_wood** + **V_freq** + **V_dur** + ((**V_topo** + **V_herb** + **V_mid**)/3) + ((**V_detritus** + **V_redox** + **V_sorpt**)/3))/5

Functional Capacity Units (FCU):

= **FCI** * **wetland acres** per WAA

Summary of Impacts vs. Restoration Efforts

PEM &PSS1 Impacts		PEM &PSS1 Restoration	
Physical FCU	1.254	Physical FCU	8.732
Chemical FCU	1.083	Chemical FCU	5.767
Biological FCU	2.083	Biological FCU	4.000
Acreage	3.403	Acreage	10.000

Impact to Restoration FCU Δ		Percent Increase	
Physical FCU	7.478	Physical FCU	596%
Chemical FCU	4.684	Chemical FCU	432%
Biological FCU	1.917	Biological FCU	92%
Acreage	6.597	Acreage	194%

Pre-Construction Mitigation Site Conditions

Pre-Construction 0.000 acres

V_dur:	0.00
V_freq:	0.00
V_topo:	0.00
V_wood:	0.00
V_mid:	0.00
V_herb:	0.00
V_connect:	0.00
V_detritus:	0.00
V_redox:	0.00
V_sorpt:	0.00

Temporary Storage & Detention of Storage Water:
FCI: 0.00

Maintain Plant and Animal Community:
FCI: 0.00

Removal & Sequestrian of Elements & Compounds:
FCI: 0.00

Pre-Construction	FCU
Temp Storage of Water:	0.00
Maintain Plant & Animal:	0.00
Removal of Elements:	0.00

Post-Construction Mitigation Site Conditions

Post-Construction 10.000 acres

V_dur:	1.00
V_freq:	0.25
V_topo:	1.00
V_wood:	0.10
V_mid:	0.10
V_herb:	1.00
V_connect:	0.10
V_detritus:	1.00
V_redox:	1.00
V_sorpt:	0.50

Temporary Storage & Detention of Storage Water:
FCI: 0.87

Maintain Plant and Animal Community:
FCI: 0.40

Removal & Sequestrian of Elements & Compounds:
FCI: 0.58

Post-Construction	FCU
Temp Storage of Water:	8.732
Maintain Plant & Animal	4.000
Removal of Elements:	5.767

Impacts to PFO1 Wetlands iHGM Calculations

Functional Capacity Index (FCI):

Temporary Storage & Detention of Storage Water:

= sqrt(sqrt(**V_dur** * **V_freq**) * ((**V_topo** + **V_cwd** + **V_wood**)/3))

Maintain Plant and Animal Community:

= (**V_tree** + **V_cwd** + **V_rich** + ((**V_basal** + **V_density**)/2) + ((**V_mid** + **V_herb**)/2) + **V_connect**)/6

Removal & Sequestrian of Elements & Compounds:

= (**V_wood** + **V_freq** + **V_dur** + ((**V_topo** + **V_cwd** + **V_wood**)/3) + ((**V_detritus** + **V_redox** + **V_sorpt**)/3))

Functional Capacity Units (FCU):

= **FCI** * **wetland acres** per WAA

TOTAL	FCU
Temp Storage of Water:	0.576
Maintain Plant & Animal:	0.900
Removal of Elements:	0.548

Total Acreage	2.165

WET 1 0.069 acres

V_dur:	0.25
V_freq:	0.25
V_topo:	0.10
V_cwd:	0.50
V_wood:	0.25
V_tree:	0.10
V_rich:	0.40
V_basal:	0.60
V_density:	0.60
V_mid:	0.50
V_herb:	0.30
V_detritus:	0.10
V_redox:	0.10
V_sorpt:	0.50
V_connect:	0.75

Temporary Storage & Detention of Storage Water: FCI: 0.266

Maintain Plant and Animal Community: FCI: 0.408

Removal & Sequestrian of Elements & Compounds: FCI: 0.253

WET 1	FCU
Temp Storage of Water:	0.02
Maintain Plant & Animal:	0.03
Removal of Elements:	0.02

WET 4 1.777 acres

V_dur:	0.25
V_freq:	0.25
V_topo:	0.10
V_cwd:	0.50
V_wood:	0.25
V_tree:	0.10
V_rich:	0.40
V_basal:	0.60
V_density:	0.60
V_mid:	0.50
V_herb:	0.30
V_detritus:	0.10
V_redox:	0.10
V_sorpt:	0.50
V_connect:	0.75

Temporary Storage & Detention of Storage Water: FCI: 0.266

Maintain Plant and Animal Community: FCI: 0.408

Removal & Sequestrian of Elements & Compounds: FCI: 0.253

WET 4	FCU
Temp Storage of Water:	0.47
Maintain Plant & Animal:	0.73
Removal of Elements:	0.45

WET 5 0.319 acres

V_dur:	0.25
V_freq:	0.25
V_topo:	0.10
V_cwd:	0.50
V_wood:	0.25
V_tree:	0.10
V_rich:	0.40
V_basal:	0.60
V_density:	0.60
V_mid:	0.50
V_herb:	0.30
V_detritus:	0.10
V_redox:	0.10
V_sorpt:	0.50
V_connect:	0.75

Temporary Storage & Detention of Storage Water: FCI: 0.266

Maintain Plant and Animal Community: FCI: 0.458

Removal & Sequestrian of Elements & Compounds: FCI: 0.253

WET 5	FCU
Temp Storage of Water:	0.08
Maintain Plant & Animal:	0.15
Removal of Elements:	0.08

PFO1 Restoration iHGM Calculations

Functional Capacity Index (FCI):

Temporary Storage & Detention of Storage Water:

= sqrt(sqrt(**V_dur** * **V_freq**) * ((**V_topo** + **V_cwd** + **V_wood**)/3))

Maintain Plant and Animal Community:

= (**V_tree** + **V_cwd** + **V_rich** + ((**V_basal** + **V_density**)/2) + ((**V_mid** + **V_herb**)/2) + **V_conne**

Removal & Sequestrian of Elements & Compounds:

= (**V_wood** + **V_freq** + **V_dur** + ((**V_topo** + **V_cwd** + **V_wood**)/3) + ((**V_detritus** + **V_redox** + **V_sorpt**)/3))/5

Functional Capacity Units (FCU):

= **FCI** * **wetland acres** per WAA

Summary of Impacts vs. Restoration Efforts

PFO1 Impacts		PFO1 Restoration	
Physical FCU	0.576	Physical FCU	3.096
Chemical FCU	0.548	Chemical FCU	4.017
Biological FCU	0.9	Biological FCU	3.271
Acreage	2.165	Acreage	5.000

Impact to Restoration FCU Δ		Percent Increase	
Physical FCU	2.520	Physical FCU	437%
Chemical FCU	3.469	Chemical FCU	633%
Biological FCU	2.371	Biological FCU	263%
Acreage	2.835	Acreage	131%

Pre-Construction Mitigation Site Conditions

Pre-Construction 0.000 acres

V_dur:	0.00
V_freq:	0.00
V_topo:	0.00
V_cwd:	0.00
V_wood:	0.00
V_tree:	0.00
V_rich:	0.00
V_basal:	0.00
V_density:	0.00
V_mid:	0.00
V_herb:	0.00
V_detritus:	0.00
V_redox:	0.00
V_sorpt:	0.00
V_connect:	0.00

Temporary Storage & Detention of Storage Water:
FCI: 0.000

Maintain Plant and Animal Community:
FCI: 0.000

Removal & Sequestrian of Elements & Compounds:
FCI: 0.000

Pre-Construction	FCU
Temp Storage of Water:	0.00
Maintain Plant & Animal:	0.00
Removal of Elements:	0.00

Post-Construction Mitigation Site Conditions

Post-Construction 5.000 acres

V_dur:	1.00
V_freq:	0.25
V_topo:	1.00
V_cwd:	0.30
V_wood:	1.00
V_tree:	1.00
V_rich:	1.00
V_basal:	0.40
V_density:	1.00
V_mid:	0.25
V_herb:	1.00
V_detritus:	1.00
V_redox:	1.00
V_sorpt:	1.00
V_connect:	0.50

Temporary Storage & Detention of Storage Water:
FCI: 0.619

Maintain Plant and Animal Community:
FCI: 0.654

Removal & Sequestrian of Elements & Compounds:
FCI: 0.803

Post-Construction	FCU
Temp Storage of Water:	3.10
Maintain Plant & Animal:	3.27
Removal of Elements:	4.02