

Final Environmental Assessment

Harris County Flood Control District Project ID E535-01-00-E004

Jersey Village, Harris County, Texas

HMGP-DR-1791-TX, Project No. 69

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FEMA

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LIST OF ACRONYMS (Continued)

NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PCE	Tetrachloroethene
PFCs	Perfluorocarbons
PUBHx	Palustrine, Unconsolidated Bottom, Permanently Flooded, and Excavated
RCP	Reinforced concrete pipe
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SH	State Highway
SW3P	Stormwater Pollution and Prevention Plan
TCE	Trichloroethene
TCEQ	Texas Commission on Environmental Quality
TCMP	Coastal Management Program
THC	Texas Historical Commission
TPDES	Texas Pollutant Discharge Elimination System
TOB	Top of Bank
TPWD	Texas Parks and Wildlife Department
TSS	Total Suspended Solids
TWDB	Texas Water Development Board
USACE	United States Army Corps of Engineers
USC	United States Code
USCB	United States Census Bureau
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 INTRODUCTION

1.1 Project Authority

On September 13, 2008, President Bush declared a major disaster as a result of damage due to Hurricane Ike (FEMA-1791-DR-TX). As a direct result of Hurricane Ike's heavy rainfall inundating Jersey Village, Texas, severe flooding caused damages to several structures located in the community. The Harris County Flood Control District (HCFCD) has prepared and submitted an application for Federal Emergency Management Agency (FEMA) funding under the Hazard Mitigation Grant Program (HMGP). HCFCD has prepared and submitted the application through the Texas Division of Emergency Management (TDEM). Under this application, FEMA is considering funding the construction of improvements to a stormwater detention basin to reduce the likelihood of future flooding in this area. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act which is a funding source for cost-effective measures that would reduce or eliminate the threat of future similar damage to a facility during a disaster.

This Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the President's Council on Environmental Quality regulations to implement NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and FEMA's regulations implementing NEPA (44 CFR Part 10). FEMA is required to consider potential environmental impacts before funding or approving actions and projects. The purpose of this EA is to analyze the potential environmental impacts associated with the proposed project. FEMA will use the findings in this EA to determine whether to prepare an Environmental Impact Statement (EIS) or issue a Finding of No Significant Impact (FONSI).

1.2 Project Location

Jersey Village is a small community in Harris County, Texas with a population of 6,880 (USCB, 2010) and located approximately 17 miles northwest of the geographic center of Houston, Texas. White Oak Bayou, a major drainage tributary in Harris County, flows through Jersey Village. White Oak Bayou was directly impacted from flooding associated with the passing of Hurricane Ike in 2008. The Harris County Office of Homeland Security and Emergency Management (HCOEM) maintains stream gauges and records of historical stream levels. The closest gauge to the project site is located in White Oak Bayou at Jones Road approximately two miles above the confluence of HCFCD E135-00-00 and White Oak Bayou. This gauge recorded an average water level reading of approximately 5 feet above top of bank (TOB) on September 15, 2008 and cresting at approximately 9 feet above top of bank on September 19, 2008, six days after Hurricane Ike made landfall (HCOEM, 2010).

The proposed project is located approximately 0.5 mile northeast of the Northwest Freeway (US 290) and approximately 0.4 mile east of Jones Road in Jersey Village, Harris County, Texas. A vicinity map of the project site is attached as Figure 1. The project site has a rectangular shape and is bound by Harris County Flood Control District (HCFCD) Unit E135-00-00 to the south, a utility easement to the west, residential properties abutting Pearl Drive to the north, and Rio Grande Drive to the east. The project is located approximately one-third of a mile upstream of the confluence with HCFCD Unit E100-00-00 (White Oak Bayou). The proposed improvements would be constructed entirely within the boundaries of a 41.93 acre tract of land.

1.3 Project Site History

The project site is an undeveloped 41.93 acre tract of land currently owned by HCFCD. The tract was previously the site of a nine-hole golf course that was previously a portion of the Jersey Meadow Golf

Course located to the south of the project site. The project site was purchased by HCFCD from the City of Jersey Village for the purpose of establishing a detention basin. The existing borrow site was excavated by HCFCD between May 2002 and December 2003 to a depth of approximately 5 feet. As part of the purchase agreement, HCFCD and the City of Jersey Village entered into an inter-local agreement to establish recreational facilities on the project site. The project site currently contains a paved jogging trail around the outside perimeter of the borrow site with benches and a parking area for recreational patrons. Appendix A includes site photographs that document the existing condition of the project area.

2.0 PURPOSE AND NEED

The HMGP provides grants to state and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property damage due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster.

As a direct result of the flooding in White Oak Bayou, Jersey Village experienced property damage to residential and commercial structures. Apart from flooding associated with Hurricane Ike, homes and businesses in Jersey Village along White Oak Bayou experience frequent and severe flooding during storm events. When severe flooding occurs, residential structures are damaged, roads are made impassible, and other critical infrastructure can be damaged and/or destroyed which adversely affects public safety, health and welfare.

3.0 ALTERNATIVES

3.1 No-Action Alternative

The No-Action alternative would entail no improvements to stormwater detention in the project area. Consequently, the citizens of Jersey Village and Harris County living adjacent to White Oak Bayou and its associated tributaries would be without an adequate stormwater detention system to prevent flooding. The community would remain vulnerable to flooding from storm events and could again experience flood inundation that could result in property damage to surrounding homes and businesses and lead to unnecessary costs to the local community.

3.2 Proposed Action – Construct an Improved Drainage System

Studies conducted by the HCFCD indicate that the construction of a stormwater detention basin on an upstream tributary of White Oak Bayou would significantly reduce the risk of flooding and would prevent future flood losses and damages to property in the project area. Based on these studies and the overlying need when severe flooding occurs in the project area, the HCFCD prepared and submitted an application for FEMA funding under an HMGP grant to develop a stormwater detention basin on an upstream tributary of White Oak Bayou.

The proposed project would be constructed entirely with an existing 41.93 acre tract of land west of Rio Grande Drive and north of HCFCD Unit E135-00-00, centered at 29°53'51.14"N, 95°34'30.89"W. The proposed action would include improving stormwater detention along White Oak Bayou in Jersey Village by construction of a 399 acre-foot stormwater detention basin with an inlet channel/inlet weir to divert flood flows from HCFCD Unit E135-00-00 into the basin. The proposed action would also include a 48-inch reinforced concrete pipe (RCP) or corrugated metal pipe (CMP) located in the southeast corner of the project area to provide discharge from the proposed stormwater detention basin to HCFCD Unit E135-00-00.

The inlet channel would be located immediately adjacent to HCFCD Unit E135-00-00 along the southern property boundary, approximately halfway between the southwestern and southeastern corners of the property. The inlet weir would be located approximately 150 feet north of the centerline of HCFCD Unit E-135-00-00 and consist of a tiered concrete structure. The bottom elevation of the weir would be 101 feet (National Geodetic Vertical Datum [NGVD] 1929) and have a width of 60 feet. The top elevation of the weir would be 109 feet (NGVD 1929) and have a width of 120 feet.

The slopes of the interior of the proposed detention basin would include side slopes of 4:1 from the existing elevation of the surrounding area, approximately 109 feet NGVD to the toe of slope at approximately 97 feet NGVD. The bottom of the proposed basin would have a typical slope of 0.2% from the northwest corner towards the southeast corner of the basin, with the exception of areas surrounding the inlet structure which would have a slope of 1.0%. The proposed basin bottom would be wet-bottom and the ordinary high water line would be at approximately 94 feet NGVD. Construction of these facilities would consist of excavation, soil compaction, and the placement of weir inlets and an RCP/CMP outlet. Appendix B shows a plan view of the proposed project and a typical section of the proposed inlet weir.

The majority of the southern portion of the property would not be excavated to allow for the proposed future expansion of Jersey Meadows Drive from its current terminus to the west of the project site to its proposed terminus at Rio Grande Drive. A portion of the southeastern corner of the project site would also be excavated in a similar vertical configuration as the main detention area to allow for additional flood storage capacity.

The existing jogging trail would remain, but would be required to be realigned around proposed detention basin, as portions of the trail would be impacted from project construction. Pedestrian bridges would be installed over the proposed weir and over the wet-bottom areas to an interior “island” within the detention basin.

The proposed project would provide flood water detention that would serve to detain stormwater volumes during excessive rainfall events. This project would benefit the residents and business of Jersey Village and Harris County along the White Oak Bayou and associated tributaries by reducing peak volumes during excessive rainfall events.

3.3 Alternatives Considered and Dismissed

There were a number of alternatives considered but not carried forward. These alternatives were eliminated due to cost and/or feasibility. These alternatives included slight modifications to the proposed project including the size of the proposed basin. The alternatives with smaller detention basins were dismissed as they produced lower flood control benefits to the surrounding area. The proposed project was the most cost-effective alternative for a significant reduction of future flood damages in the project area.

4.0 AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

4.1 Physical Resources

4.1.1 *Geology and Soils*

The proposed project is located in the southern part of Texas in the physiographic region known as the Gulf Coast Coastal Prairie. The land surface in the Gulf Coast Coastal Prairie region is a nearly flat depositional plain rising from sea level to about 300 feet (Wermund E.G., 1996). Harris County is primarily drained by the Buffalo-San Jacinto Watershed (United States Geological Survey [USGS] Hydrologic Unit Code [HUC] 12040104).

The Geologic Atlas of Texas indicates the proposed project is underlain by Pleistocene-age deposits of the Lissie Formation (TWDB, 2010). Sediments of the Lissie Formation consist of clays, silts, sands, and very minor siliceous gravel. These sediments are fluvial in origin and located on fairly flat and featureless surfaces except for numerous shallow depressions and pimple mounds.

The soils on the site are mapped as Addicks loam (USDA, 2010). Addicks loam consists of deep, poorly drained, moderately permeable soils that formed in thick loamy sediments. This is a nearly level soil in broad areas on the upland prairies. The areas are slightly higher on the landscape than those of the adjacent or surrounding soils.

The Houston-Galveston Subsidence District (HGSD) has reported that subsidence between 1906 and 2000 is approximately six to seven feet within the project vicinity. HGSD also reports that a majority of this subsidence, approximately four to five feet, occurred between the years of 1978 and 2000, with a decline in subsidence from 1995 to 2000 with 0.4 to 0.6 feet of subsidence occurring during that period (HGSD, 2010).

The Houston metropolitan area is not prone to earthquakes. The City of Houston contains approximately 86 mapped and historically active faults. These faults move very slowly and due to the clay below the surface, do not build up friction which results in earthquakes. (Moser, 2002)

The Farmland Protection Policy Act (FPPA) (P.L. 97-98, Sec. 1539-1549; 7 U.S. Code 4201, et seq.) was enacted to minimize the unnecessary conversion of farmland to non-agricultural uses as a result of federal actions. The site is mapped as Addicks loam soils which is not classified as prime farmland (USDA, 2010).

No-Action Alternative

The No-Action Alternative would have no impacts on the soils, geology, or prime or unique farmlands of the project area.

Proposed Action Alternative

The proposed project would cause disturbance to soils as part of the site preparation work. Soils would be excavated to construct the detention basin. Exposed soils could be subject to erosion. Silt fence and/or other storm water runoff best management practices (BMPs) would be utilized during construction. Effects to soils would be minor and temporary in nature. The proposed project is not anticipated to have any effects to the geology of the project area.

The FPPA is intended to minimize the unnecessary conversion of farmland to non-agricultural uses as a result of federal actions. The proposed project would not affect soils defined by the NRCS as prime or unique farmland; therefore, the FPPA is not applicable and no formal coordination with the NRCS is required.

4.1.2 Air Quality

The Clean Air Act (CAA) requires that states adopt ambient air quality standards. The standards have been established in order to protect the public from potentially harmful amounts of pollutants. The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six air pollutants. These pollutants include sulfur dioxide (SO₂), particulate matter with a diameter less than or equal to ten micrometers (PM₁₀), carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), and lead. The EPA has designated specific areas as NAAQS attainment or non-attainment areas. Non-attainment areas are any areas that do not meet (or that contribute to ambient air quality in a nearby area that does not meet) the quality standard for a pollutant. Attainment areas are any areas that meet ambient air quality standards.

In addition to the criteria air pollutants for which there are National Ambient Air Quality Standards (NAAQS), EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The project is located within Harris County, Texas, which is in the Houston-Galveston-Brazoria (HGB) Non-Attainment Area. The HGB Non-Attainment Area is designated as severe non-attainment for the 8-hour ozone standard with an attainment date as expeditiously as practicable, but no later than June 15, 2019 (TCEQ, 2010).

No-Action Alternative

The No-Action Alternative would have no impacts on air quality in the project area.

Proposed Action Alternative

During the construction phase of this project, there may be temporary increases in air pollutant emissions from construction activities, equipment, and related vehicles. The primary construction related emissions are particulate matter (fugitive dust) from site preparation and construction and non-road MSATs from construction equipment and vehicles. The primary MSAT emission related to construction is diesel particulate matter from diesel powered construction equipment and vehicles.

These emissions are temporary in nature (only occurring during actual construction) and it is not possible to reasonably estimate impacts from these emissions due to limitations of the existing models. The potential impacts of particulate matter emissions will be minimized by using dust control techniques such as covering or treating disturbed areas with dust suppression techniques, sprinkling, and other dust abatement controls, as appropriate. The MSAT emissions will be minimized by measures to encourage use of EPA required cleaner diesel fuels, limits on idling, increasing use of cleaner burning diesel engines, and other emission limitation techniques, as appropriate. Construction equipment with EPA designated Tier 2 and Tier 3 engines would be utilized to minimize emissions. Considering the temporary and transient nature of construction related emissions as well as the mitigation actions to be utilized, it is not anticipated that emissions from construction of this project will have any significant impact on air quality in the area.

4.1.3 Climate Change

The climate in Harris County, Texas can be classified as humid subtropical and characterized by hot, humid summers and cool winters. Harris County has an average annual temperature of 68.8°F and an average rainfall amount of 47.84 inches annually. Monthly average temperatures range from 51.8°F in January to 83.6°F in July. The highest temperature recorded was 109°F in September of 2000 and the lowest temperature recorded was 7°F in December of 1989. Monthly average rainfall amounts range from 2.98 inches in February to 5.35 inches in June. The highest monthly average rainfall recorded was 16.28 inches in June of 1989 and the lowest monthly average rainfall recorded was 0.04 inches in May of 1998. Snowfall is rare in Harris County with an average of 0.5 inches per year (NOAA, 2010).

Prevailing winds are from the southeast and south, except in January when frequent high pressure areas bring invasions of polar air and prevailing northerly winds. Temperatures are moderated by the influence of winds from the Gulf of Mexico, which results in mild winters and relatively cool summer nights. Another effect of the nearness of the Gulf of Mexico is abundant rainfall, except for rare extended dry periods. Monthly rainfall is evenly distributed throughout the year. Thundershowers are the main source of rainfall and precipitation may vary substantially in different sections of Harris County on a day-to-day basis. The project area is prone to flooding impacts from large tropical storms and hurricanes during late summer and early fall. Major named storms that have impacted the project area in the past few decades include Tropical Storm Claudette (July 1979), Tropical Storm Allison (June 2001), Hurricane Rita (September 2005), and Hurricane Ike (September 2008).

Most climate change scenarios project that greenhouse gas concentrations will increase through 2100 with a continued increase in average global temperatures. Many greenhouse gases, like water vapor and carbon dioxide (CO₂), occur naturally. Fuel burning and other human activities are adding large amounts of CO₂ and other gases to the natural mix at a faster rate than at any other time on record. Other important greenhouse gases produced by human activity include methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆). Due to uncertainties about future emissions and concentrations of greenhouse gases, their net warming effect in the atmosphere, and the response of the climate system, estimates of future temperature change are uncertain. Advancements in model simulations, combined with more data on observed changes in climate have led to increased confidence in projections of future temperature changes. Recent climate change projections predict the average surface temperature of the earth is likely to increase by 2°F to 11.5°F by the end of the 21st century relative to 1980-1990, with a best estimate of between 3.2°F to 7.2°F. Although warming will not be evenly distributed around the globe, most of North America is likely to warm more than the global average (IPCC, 2007).

According to the Intergovernmental Panel on Climate Change (IPCC), an increase in the average global temperature is very likely to lead to changes in precipitation and atmospheric moisture because of changes in atmospheric circulation and increases in evaporation and water vapor. Tropical storms and hurricanes are likely to become more intense, produce stronger peak winds, and produce increased rainfall over some areas due to warming sea surface temperatures, which act to energize tropical storms.

No-Action Alternative

Changes in precipitation and storm intensity from climate change may affect frequency and duration of flooding in the area. Implementing the No-Action Alternative would leave property and lives at risk of damage and loss from these climate change effects.

Proposed Action Alternative

As described in section 4.1.2, during the construction phase of this project there may be temporary increases in air pollutant emissions from construction activities, equipment, and related vehicles.

Considering the temporary and transient nature of construction related emissions, it is not anticipated that emissions from construction of this project will have any substantial effects on air quality in the area. Due to the small scale of the project, the proposed action would not measurably exacerbate climate change.

Changes in precipitation and storm intensity from climate change may affect frequency and duration of flooding in the area. Implementation of the proposed action would mitigate these effects from climate change.

4.2 Water Resources

4.2.1 Water Quality

Water quality is an indicator of the overall health of an aquatic resource and the environment that it surrounds. Numerous natural and anthropogenic factors can contribute to the water quality of an aquatic resource. The areas surrounding the project area are highly urbanized; therefore, non-point source pollution is an important factor affecting the water quality of the surrounding watershed. Land use within any watershed directly correlates to the volume of non-point source discharge into the system. The existing and projected land use patterns in the vicinity of the project area make the water quality of the system susceptible to degradation from non-point sources. These non-point source loadings vary with climatological patterns as significant rainfall events which typically produce an influx of pollutants from non-point sources.

The project area is located in the White Oak Bayou sub-watershed of the Buffalo-San Jacinto watershed (USGS HUC 12040104). The White Oak Bayou watershed is located in central Harris County. The bayou originates northwest of Farm to Market Road (FM) 1960 and flows generally toward the southeast. The bayou drains areas in northwest portions of the county as well as the City of Jersey Village and portions of the City of Houston. White Oak Bayou joins Buffalo Bayou near downtown Houston. The watershed covers about 111 square miles and includes three primary streams: White Oak Bayou, Little White Oak Bayou and Cole Creek. There are about 151 miles of open streams in the White Oak Bayou watershed, including the primary and tributary channels.

The existing basin is largely a dry-bottom basin, with the exception of a series of ditches that are located throughout the basin, which contained water during the site assessment. The nearest surface water feature to the project is HCFCD Unit E135-00-00, which is located along the southern property boundary of the project site. The confluence of HCFCD Unit E135-00-00 with White Oak Bayou (Texas Commission on Environmental Quality [TCEQ] Stream Segment 1017) is approximately one-third of a mile downstream of the project site. According to TCEQ, Stream segment 1017 is listed as an impaired water body due to bacterial levels not meeting assigned water quality standards (TCEQ, 2008). Bacteria impairments are generally the result of urban and agricultural nonpoint source pollution. Water quality is largely regulated through Section 402 of the Clean Water Act.

No-Action Alternative

Construction of the detention basin would not occur as part of the No-Action Alternative and storm events would continue to flood the urban areas in Jersey Village along White Oak Bayou. Flooding events would continue to inflict damage to surrounding properties. Water quality would be affected through continued non-point source pollution generated from the surrounding watershed.

Proposed Action Alternative

The proposed detention basin to be constructed would include an increase in the amount of permanent wet-bottom and wetland areas. These features would contribute beneficial impacts to water quality within

the project area more so than the existing dry-bottom basin currently provides. Wet-bottom features would aid in removing Total Suspended Solids (TSS) from the aquatic system, resulting in cleaner and clearer water within the watershed.

Potential adverse impacts to water quality associated with the construction of the proposed project include the potential for erosion and sedimentation during construction. Excavation and grading would be needed as part of the site preparation work. During this period, stormwater runoff could carry sediment offsite into receiving water and possibly result in temporary increases in TSS. The impacts to receiving waterways downstream of this project would be temporary and minimal. This project would benefit the landowners along White Oak Bayou downstream of the project area. HCFCD will prepare a Storm Water Pollution Prevention Plan (SW3P) and implement erosion and sedimentation control BMPs to minimize any detrimental effects to water quality during construction.

The project will disturb more than one acre. HCFCD will be responsible for obtaining a Texas Pollutant Discharge Elimination System (TPDES) storm water permit from TCEQ before the start of construction and complying with all permit conditions. Any effects to water quality associated with the construction of the new facility would be short term and minimized by the use of BMPs. The project is not expected to exacerbate bacterial levels to areas downstream of the project site. No long-term effects to water quality are expected as a result of the proposed project.

4.2.2 Waters of the United States, Including Wetlands

The U.S. Army Corps of Engineers (USACE) regulates the discharge of dredged or fill material into waters of the U.S., including wetlands, pursuant to Section 404 of the Clean Water Act (CWA). Wetlands are identified as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions. In addition, Executive Order (EO) 11990, Protection of Wetlands, directs federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the values of wetlands on federal property.

Under Section 404 of the CWA, a permit is required from the USACE for any activities involving the discharge of dredged or fill material into waters of the U.S., including wetlands and tidally influenced waters. Dependent on the scope and type of impacts to waters of the U.S., authorizations may be in one of two primary forms: general permits, which are issued for a specific category of similar activities and include nationwide permits defined in 33 CFR Part 30, and individual permits issued after individual review of the project, project alternative, and proposed mitigation.

A review of the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) map of the area was conducted in order to identify the potential for wetlands and/or other waters of the U.S. There are two potential wetland areas identified in the project area on the NWI map. Figure 4 displays the location of the potential wetland areas identified by USFWS in relation to the project limits. Both areas are identified by USFWS as Palustrine, Unconsolidated Bottom, Permanently Flooded, and Excavated (PUBHx).

The project site received an Approved Jurisdictional Determination (AJD) from the USACE on July 31, 2002 (D-13063). It was determined by the USACE that the project site did not contain any waters of the United States, including wetlands. The current borrow site bottom includes a network of drainage ditches to facilitate drainage towards the southeast corner of the project site where runoff discharges into HCFCD Unit E135-00-00. The existing borrow site has been in its existing configuration since 2003. Under the right hydrological and soil conditions, wetlands developed in the bottom of the borrow site in this amount of time.

A wetland delineation was performed in April 2010 and identified five areas that meet the definition of wetlands. The spatial positions of these areas are closely correlated with the locations of the previously existing ponds. These wetland areas, which were determined to be non-jurisdictional (see below) were found within the drainage ditches inside of the borrow site that convey runoff toward the southeastern corner of the site. Approximately 1.59 acres of non-jurisdictional wetlands were present on-site.

The wetland delineation performed was coordinated with the USACE. An AJD was issued by the USACE on July 23, 2010 (SWG-2010-00397). The USACE determined that the 40-acre project site does not contain waters of the United States, including jurisdictional wetlands. A copy of the AJD is included in Appendix C. All wetlands identified within the project boundaries were determined to be non-jurisdictional pursuant to Section 404 of the CWA.

No-Action Alternative

The No-Action Alternative would have no impacts on waters of the United States, including jurisdictional and non-jurisdictional wetlands, in the project area.

Proposed Action Alternative

The proposed project is not anticipated to impact waters of the U.S., including jurisdictional wetlands. There are no navigable waters in the area; therefore, Section 10 of the Rivers and Harbors Act of 1899 does not apply.

The proposed project has avoided and minimized impacts to non-jurisdictional wetlands to the greatest extent practicable. There is no practicable alternative to avoiding impacts to non-jurisdictional wetlands and still meet the purpose and need of the proposed project. The proposed detention basin would include a substantial amount of permanent wet-bottom and wetland areas for water quality treatment purposes. The project design also includes the creation of a 1.6 acre wetland mitigation area located in the southwest corner of the proposed basin to offset unavoidable impacts to non-jurisdictional wetland areas as a result of the proposed project. The wetland mitigation area is separated from the water quality wetland areas through a 12 ft. wide berm.

These wet-bottom features and wetland creation area would contribute beneficial impacts to water quality and provide suitable habitat for many species of wildlife including birds, amphibians, fish, reptiles, and small mammals. The functions and services from the 1.6 acre area would offset those functions and services the non-jurisdictional areas present currently provide. The requirements of EO 11990 have been met.

4.2.3 Floodplains

Executive Order 11988 (Floodplain Management) requires Federal agencies to avoid direct or indirect support of development within the 100-year floodplain whenever there is a practicable alternative. FEMA uses Flood Insurance Rate Maps (FIRMs) to identify the regulatory 100-year floodplain for the National Flood Insurance Program (NFIP). Consistent with EO 11988, a FIRM was examined during the preparation of this EA. 2.52 acres along the southern portion of the project site are located in Flood Zone AE, which is within the 100-year floodplain (Community Panel Number: 48201C0440L, effective 6/18/2007; FEMA, 2007). In addition, the eastern portions of the project site include areas in the Shaded X Zone, which are areas within the 500-year floodplain. Figures 4 and 5 display the location of the project in relation to the 100-year and 500-year flood zones identified by FEMA.

No-Action Alternative

Under the No-Action Alternative, no construction would occur and there would be no impacts to the floodplain.

Proposed Action Alternative

Ninety four percent of the 41.93-acre project site is located outside of the 100-year floodplain. Excavation of the detention basin would occur outside of the 100-year floodplain. Only a portion of the 2.52 acres along the southern portion of the project site that lie within the 100-year floodplain will be developed under the Proposed Action. Construction within the 100-year floodplain includes a maintenance ramp, and inlet weir, and a reinforced concrete pipe outlet into HCFCD Unit E135-00-00.

The project was located in an area that minimized impacts to the 100-year floodplain to the maximum possible extent although slight modifications to the 100-year floodplain will result from construction of the project. The proposed weir, outlet, and ramp would have minor impacts on the 100-year floodplain. As required by EO 11988, floodplain impacts have been identified, minimized, and would be mitigated by construction of the proposed detention basin. The proposed detention basin would add 100-year floodplain capacity, thus compensating for the minimal impacts to the 100-year floodplain as a result of construction of the proposed project.

Beneficial impacts would occur to the floodplain due to the reduction of flooding events in the Jersey Village area. The previous flooding experienced within the project area is anticipated to be reduced as a result of the proposed project. Adverse impacts on structures, infrastructure, and public safety from flooding would be significantly reduced. Surrounding areas in the 100-year floodplain that would benefit from the reduction in flood levels as a result of the Proposed Action are already developed as residential neighborhoods. Therefore, it is not anticipated that this project would induce any further development in the floodplain as it is already developed. Modification of the floodplain would provide benefits to existing structures in previously developed areas.

HCFCD must coordinate with the floodplain administrator of the City of Jersey Village and obtain any required permits prior to initiating work. All coordination pertaining to these activities and HCFCD's compliance with any permit conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.

4.3 Coastal Resources

The Coastal Zone Management Act (CZMA) enables coastal states to designate state coastal zone boundaries and develop coastal management programs to improve protection of sensitive shoreline resources and guide sustainable use of coastal areas. The Texas Coastal Management Program (TCMP) is administered by Texas General Land Office (GLO). The Texas GLO designated coastal zone boundary runs through Harris County (GLO, 2010). Only the southeastern portion of Harris County is inside the coastal zone management area boundary and the boundary is approximately 13 miles to the southeast from the project site. The project site lies outside the coastal zone management area boundary.

No-Action Alternative

Under the No-Action Alternative, there would be no impacts to resources in the coastal zone.

Proposed Action Alternative

The project site is located outside the coastal zone management area boundary. No impacts to resources in the coastal zone would occur.

4.4 Biological Resources

4.4.1 Vegetation

The project area is located in the Gulf Coast Prairies and Marshes natural region of Texas, which includes approximately 20,312 square miles (UT, 1978). Gulf coast prairies are nearly level with slow surface drainage and elevations ranging from sea level to approximately 250 feet above mean sea level (MSL). In addition to wildlife habitat, the prairies are used for crops, livestock grazing, and urban and industrial centers. It is estimated that as much as 99 percent of the coastal prairies in Texas have been converted to agricultural land (McMahan, et. al, 1984).

Gulf coast marshes are low, wet, marshy coastal areas commonly inundated with saline water, ranging from sea level to a few feet in elevation above MSL. These marshes support species of sedges, rushes, cordgrasses, reeds, and forbs, which provide beneficial wildlife habitat for numerous birds and marine fisheries. Many areas in the region have been invaded by noxious volunteer species such as honey mesquite (*Prosopis glandulosa*), smutgrass (*Sporobolus indicus*), and Chinese tallow (*Triadica sebifera*).

According to *The Vegetation Types of Texas*, the project area is within the Crops (Number 44) vegetation type (McMahan, et.al., 1984). Commonly associated plants within this region are cultivated row or cover crops that provide food and fiber for man and livestock. Grasslands associated with crop rotation may be present as well. The vegetation type present within the study area does not exhibit the vegetation typically found in the Crops vegetation type and would be better described as the Urban vegetation type.

Vegetation within the project study area is characteristic of an urbanized park-like setting. Two distinct vegetative communities were observed within the project limits: maintained park area and herbaceous detention basin. Photographs in Appendix A show the typical vegetation present within the project study area.

The maintained park area is located around the periphery of the project site and consists largely of herbaceous vegetation that is maintained or mowed. Trees were also observed which included mowed and maintained herbaceous areas underneath. Species observed in this vegetative community included Bermudagrass (*Cynodon dactylon*), bahiagrass (*Paspalum notatum*), dallisgrass (*Paspalum dilatatum*), southern carpet grass (*Axonopus affinis*), burr clover (*Medicago polymorpha*), common dandelion (*Taraxacum officinale*), loblolly pine (*Pinus taeda*), Chinese tallow, river birch (*Betula nigra*), American elm (*Ulmus americana*), and red maple (*Acer rubrum*).

The detention basin vegetative community is located in the center of the project site and consists largely of herbaceous vegetation with a few scattered tree species. Species observed included black willow (*Salix nigra*), Eastern baccharis (*Baccharis halimifolia*), Chinese privet (*Ligustrum sinense*), poisonbean (*Sesbania drummondii*), bushy bluestem (*Andropogon glomeratus*), sand spikerush (*Eleocharis montevidensis*), creeping seedbox (*Ludwigia repens*), woodrush flatsedge (*Cyperus entrerianus*), broadleaf cattail (*Typha latifolia*), *Rhynchospora* species, and *Panicum* species.

No-Action Alternative

Under the No-Action Alternative, there would be no impacts to vegetation on the project site.

Proposed Action Alternative

Under the Proposed Action Alternative, there would be impacts to vegetation on the project site. Excavation activities would impact on-site habitat. The few trees located within the project footprint would be impacted; however HCFCD will plant native tree species around the proposed detention basin perimeter and along the slopes, post construction. Herbaceous vegetation in the existing borrow site and

the maintained park area would be impacted by construction activities including excavation and the use of construction equipment. Impacts to vegetation are expected to be minimal, as herbaceous vegetation would re-vegetate the project area from natural seed source on the project site. Exposed side slopes would be manually re-vegetated using BMPs upon completion of construction to minimize soil erosion impacts.

4.4.2 Threatened and Endangered Species and Critical Habitat

4.4.2.1 Federal Regulations

Since 1973, the Endangered Species Act (ESA) has regulated a wide range of activities affecting flora and fauna classified as endangered or threatened. Reauthorized in 1988, provisions of the act apply only to species listed in the Federal Register as endangered or threatened. Under the provisions of the ESA, all federal agencies are required to undertake programs for conservation of threatened and endangered species and are prohibited from authorizing, funding, or carrying out any action that would jeopardize a listed species or destroy or alter its critical habitat.

A species may be classified as “endangered” when it is in danger of extinction within the foreseeable future in all or a significant portion of its range. A “threatened” classification is assigned to a species likely to become endangered within the foreseeable future in all or a significant portion of its range. A “species” includes any species or subspecies of fish, wildlife, or plant. It also includes any variety of plant or any distinct population segment of any vertebrate species that interbreeds when mature. Excluded are those species of the Class Insecta deemed by the Secretary to be pests presenting an overwhelming and overriding risk to man. Additionally, actions affecting species proposed for listing would require the same coordination with state and federal agencies as those actions affecting listed species.

Specifically, the ESA prohibits acts, by anyone or any organization, including:

- The importation and exportation of endangered species from the U.S.
- Taking (killing, capturing, collecting, harming, harassing, pursuing, hunting, trapping) within the United States and territorial waters.
- Taking on the high seas.
- Possessing, delivering, selling, delivering, carrying, transporting, or shipping any such species unlawfully taken within the United States or on the high seas.
- Selling or offering for sale any such species in interstate or foreign commerce.

The USFWS and the National Marine Fisheries Service (NMFS) share responsibility for administration of the ESA. In general, the USFWS is responsible for terrestrial and freshwater species and migratory birds, while the NMFS regulates and protects marine species and anadromous fish. Additionally, the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service oversees importation and exportation of listed terrestrial plants.

The Federal list of endangered and threatened species and species of concern in Harris County is located in Table 1 in Section 4.4.2.1.

Table 1: Federal List of Endangered and Threatened Species and Species of Concern in Harris County

Common Name	Scientific Name	Federal Status	Habitat Description	Suitable on-site Habitat Present (Nearest NDD-EO)
AMPHIBIANS				
Houston Toad	<i>Bufo houstonensis</i>	E†	Sandy soil, breeds in ephemeral pools	No (2.7 mi.)
BIRDS				
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	DL†	Potential migrant. Winters along coast; occupies wide range of habitat during migration, including urban, concentrations along coast and barrier islands	TM
Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>	DL†	Potential migrant. Winters along coast; occupies wide range of habitat during migration, including urban, concentrations along coast and barrier islands	TM
Bald Eagle	<i>Haliaeetus leucocephalus</i>	DM	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water	No
Brown Pelican	<i>Pelecanus occidentalis</i>	DM†	Near coastal and near shore areas; nests on islands and spoil banks	No
Mountain plover	<i>Charadrius montanus</i>	PT†	Nests on igh plains or shortgrass prairie, on ground in shallow depression (breeding); shortgrass plains and bar, dirt (plowed) fields (non-breeding)	No
Red-cockaded Woodpecker	<i>Picoides borealis</i>	E†	Cavity nests in older pines (60+ years); forages in younger pine (30+ years); prefers longleaf, shortleaf, and loblolly	No
Whooping Crane	<i>Grus americana</i>	E†	Potential migrant through plains throughout most of the state to the coast; winters in coastal marshes of Aransas, Calhoun, and Refugio Counties	TM
FISH				
Smalltooth Sawfish	<i>Pristis pectinata</i>	E†	Young found close to shore in muddy and sandy bottoms, in sheltered bays, on shallow banks, and in estuaries or river mouths; Adults found in various habitat types (mangrove, reef, seagrass, and coral)	No
MAMMALS				
Louisiana Black Bear	<i>Ursus americanus luteolus</i>	T†	Bottomland hardwoods; large, undisturbed forested areas	No
Red Wolf	<i>Canis rufus</i>	E†	Extirpated; formerly known throughout the eastern half of Texas in brushy and forested areas, as well as coastal prairies	No
REPTILES				
Green Sea Turtle	<i>Chelonia mydas</i>	T†	Gulf and bay system; shallow water seagrass beds, open water between feeding and nesting areas, barrier island beaches	No
Kemp's Ridley Sea Turtle	<i>Lepidochelys kempii</i>	E†	Gulf and bay system, adults stay within shallow waters of Gulf of Mexico	No
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	E†	Gulf and bay system	No

Table 1: Federal List of Endangered and Threatened Species and Species of Concern in Harris County

Common Name	Scientific Name	Federal Status	Habitat Description	Suitable on-site Habitat Present (Nearest NDD-EO)
Loggerhead Sea Turtle	<i>Caretta caretta</i>	T†	Gulf and bay system primarily for juveniles, adults are pelagic	No
VASCULAR PLANTS				
Texas Prairie Dawn	<i>Hymenoxys texana</i>	E	Poorly drained, sparsely vegetated areas (slick spots) at the base of mima mounds in open grassland or almost barren areas on slightly saline soils that are sticky when wet and powdery when dry.	Yes (2.6 mi.)
<p>NOTES: † Species is listed by the U.S. Wildlife Service, however, it is not listed to occur within this county by the Clear Lake office of the U.S. Fish and Wildlife Service (August 2010).</p> <p>DL = Delisted Taxon DM = Delisted Taxon, recovered, being monitored first five years E = Endangered EO = Element of Occurrence</p> <p>NDD = Natural Diversity Database SOC = Species of Concern TM = Transitory Migrant PT = Proposed Threatened</p>				

The bald eagle is listed by the USFWS as occurring within Harris County, however, the bald eagle has been delisted and is not protected by the ESA. The bald eagle is protected under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act.

No critical habitat exists in the project area.

4.4.2.2 Listed Species Occurrence

Texas Parks and Wildlife Department (TPWD) was contacted on December 22, 2009, regarding their knowledge of recorded data about the documented presence or potential presence of listed species on or adjacent to the site. TPWD responded on December 23, 2009, with a search of the National Diversity Database (NDD) that showed that the following federally listed species were documented within a 10 mile radius of the project site:

- Bald Eagle (*Haliaeetus leucocephalus*), 3 occurrences
- Texas Prairie Dawn (*Hymenoxys texana*), 37 occurrences
- Houston Toad (*Bufo houstonensis*), 1 occurrence

No species documented by TPWD were observed on the project site during field investigations. Table 1 outlines those species identified in the NDD search with their closest approximate distances from the project area. The NDD cannot be used for presence/absence determinations. Copies of correspondence with TPWD and USFWS can be found in Appendix C.

The State of Texas threatened and endangered species inventory compiled by TPWD was also consulted during the listed species assessment for the potential occurrence of these species and/or their habitats.

During an initial assessment, suitable on-site habitat was considered to be present for the Texas prairie dawn. Due to its urban setting, the amount of anthropogenic activities on and around the project area and the amount of previous disturbance to the project site, the available on-site habitat was considered suboptimal for this species. A species specific survey for Texas prairie dawn was conducted by a plant

taxonomist on May 12, 2000 and on February 14, 2011. Both surveys were conducted during the flower season of this species. Both surveys found no Texas prairie dawn plants on the project site. Copies of these reports are included in Appendix C.

Threatened or endangered transitory migrant species could potentially visit the site including the American and Arctic peregrine falcon, and whooping crane. These species will not be affected by the proposed project because of their high mobility.

No-Action Alternative

Under the No-Action Alternative, there would be no effect to endangered or threatened species or critical habitat.

Proposed Action Alternative

Based upon the information provided above, FEMA has determined that the proposed project will have no effect to threatened and endangered species or critical habitat. Suitable habitat for the Texas prairie dawn flower is present on-site, but a species-specific survey conducted by a qualified plant taxonomist determined that this species was not present at the project site. The proposed project is not anticipated to have any effect on any other state listed species.

4.4.3 *Wildlife and Fish*

The project area falls within the Texan Biotic Province (Blair, 1950). The Texan Biotic Province is a broad, ecologically transitional region (ecotone) between the Tamaulipan Province grasslands to the west and the Austroriparian Province forests to the east. Because of its transitional nature, the Texan Province supports a mixture of plant and animal species characteristic of the Tamaulipan Province grasslands and Austroriparian Province forests.

The vegetation present within the project study area could support limited diversity of wildlife species, such as small birds and mammals. Some mammalian species may continue to exist for years in these areas because of their ability to adapt to urban development. Typical mammals that could occur within the project area include nine-banded armadillo (*Dasypus novemcinctus*), Virginia opossum (*Didelphis virginiana*), house mouse (*Mus musculus*), common raccoon (*Procyon lotor*), and eastern cottontail (*Sylvilagus floridanus*).

The Fish and Wildlife Coordination Act (FWCA) protects fish and wildlife when federal actions result in a modification of a natural stream or body of water. If a modification of a natural stream or body of water is expected, coordination with the USFWS is required.

Section 305(b) of the Magnuson-Stevens Fishery Management and Conservation Act (1996) requires that the Fishery Management Councils (FMC) and other federal agencies identify and protect important marine and anadromous fish habitat, referred to as Essential Fish Habitat (EFH). EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. The proposed project is located within Harris County, Texas which has been identified as containing tidally influenced waters. The proposed project does not contain or does not discharge stormwater into a tidally influenced tributary; therefore, the requirements of Essential Fish Habitat (EFH) does not apply.

The proposed project is within the North American Flyway and neo-tropical migrants pass over the project area annually. The Migratory Bird Treaty Act protects many of these species and states that it is unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory birds, including the feathers or other parts, nests, eggs, or migratory bird parts.

No-Action Alternative

Under the No-Action Alternative, there would be no impacts to wildlife and fish.

Proposed Action Alternative

Under the Proposed Action Alternative, wildlife may be temporarily displaced during construction activities. Burrows of small mammals could be destroyed during construction activities. The project would replace the existing habitat, a borrow site, with a habitat that is very similar and it would be expected that any displaced wildlife would return post-construction to utilize the available habitat. Small mammals could re-establish burrows post-construction. In addition, the wetland, wet-bottom, and wetland mitigation areas planned to be created by construction of the proposed project are anticipated to result in beneficial habitat for many wildlife species including birds, amphibians, reptiles, fish, and small mammals.

The Proposed Action Alternative would not result in the modification of a natural stream or body of water. Coordination with the USFWS is not required pursuant to the FWCA.

FEMA does not anticipate a take of migratory birds based on the habitat that is available at the project site.

4.5 Cultural Resources

Section 106 of the National Historic Preservation Act of 1966, as amended requires federal agencies “to take into account” the “effect” that an undertaking would have on historic properties. Historic properties are those included in or eligible for inclusion in the National Register of Historic Places (NRHP) and may include archeological sites, buildings, structures, sites, objects, and districts. In accordance with the Advisory Council on Historic Preservation regulations pertaining to the protection of historic properties (36 CFR 800.4), federal agencies are required to identify and evaluate historic resources for NRHP eligibility and assess the effects that the undertaking would have on historic properties.

The Area of Potential Effect (APE) of a federal undertaking is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The APE for the Proposed Action Alternative consists of the 41.93 acre tract of land within which the stormwater detention basin, discharge pipe, and inlet channel would be constructed (see Figures and Appendix B).

A cultural resources investigation was conducted by Moore Archeological Consulting, Inc. (MAC) on May 4, 2000. The purpose of the investigation was to determine, through excavation of shovel tests during a pedestrian survey, whether potentially significant archeological deposits existed within the project area. No intact, potentially significant archeological deposits were encountered as a result of the survey and no further cultural resources investigations were recommended. The Texas Historical Commission (THC) provided concurrence with the findings of MAC investigation on July 19, 2000. The MAC report and THC concurrence are included in Appendix C.

THC was initially contacted regarding the Proposed Action Alternative on August 5, 2009, and again on February 11, 2010, via email (see Appendix C) to determine if they had records of American Indian, Native Hawaiian and/or Native Alaskan cultural and/or religious sites in the vicinity of the project site. The THC concurred that the project would have no effect to historic resources. A copy of this concurrence, dated January 31, 2011, is included in Appendix C.

A search of the Texas Historic Sites Atlas (THC, 2010) resulted in no historical markers, national register properties, national register districts, cemeteries, or museums within 1,000 meters of the proposed project.

No-Action Alternative

The No-Action Alternative would have no effect on cultural resources in the area.

Proposed Action Alternative

Based on the MAC report, THC Atlas results, and consultation with the SHPO, FEMA has determined that the Proposed Action Alternative will have no effect on historic properties. In the event that archeological deposits, including any Native American pottery, stone tools, bones, or human remains, are uncovered, the project shall be halted and the applicant shall stop all work immediately in the vicinity of the discovery and take all reasonable measures to avoid or minimize harm to the finds. All archeological findings will be secured by HCFCD and access to the sensitive area will be restricted by HCFCD. The applicant will inform TDEM and FEMA immediately, and FEMA will consult with the SHPO. Work in sensitive areas shall not resume until consultation is completed and until FEMA determines that the appropriate measures have been taken to ensure complete project compliance with the NHPA and its implementing regulations.

4.6 Socioeconomic Resources

4.6.1 Environmental Justice

Executive Order 12898, entitled “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” mandates that federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of programs on minority and low-income populations. This Executive Order also tasks federal agencies with ensuring that public notifications regarding environmental issues are concise, understandable, and readily accessible. Socioeconomic and demographic data were studied to determine if a disproportionate number of minority or low-income persons have the potential to be adversely affected by the proposed project.

The study area for Environmental Justice included Census Tract (CT) 5517, Block Group (BG) 1; CT 5517, BG 5; and CT 5518 BG 1. The 2000 Census lists 74.6 percent of the residents within the study area as white and therefore 25.4 percent as a minority consisting of Black or African Americans, American Indians, Alaska Natives, Asians, Native Hawaiians and other Pacific Islanders. Of the 8,737 residents within the study area, 10.6 percent identify themselves as Hispanic or Latino. The median family income within the project study area in 1999 was \$74,658 and 3.0 percent of families were below the poverty level (USCB 2000). The 2010 poverty guidelines, per the US Department of Health and Human Services (HHS), is \$10,830 for a one person family to \$22,050 for a four person family.

In comparison, the 2000 Census lists 42.1 percent of Harris County’s residents as white and therefore 57.9 percent as a minority. Of the 3,400,578 residents within Harris County, 32.9 percent identify themselves as Hispanic or Latino. The median family income in 1999 is \$42,598 and 15.0 percent of families were below the poverty level (USCB 2000).

No-Action Alternative

The No-Action Alternative would not have disproportionate impacts on minority or low-income populations.

Proposed Action Alternative

The Proposed Action Alternative is not expected to have adverse or disproportionate impacts on minority or low-income populations. The benefits of the proposed project are expected to be proportional to all residents in the area.

4.6.2 Noise

Noise is generally defined as unwanted sound. The closest noise receivers to the proposed project site would be the surrounding residential areas to the west, north, and east of the project site and Jersey Meadow Golf Course to the south of the project site. Noise levels within and adjacent to the project area would increase during the proposed construction activities as a result of construction equipment and vehicular traffic. The noise levels generated would be limited to workday daylight hours for the duration of the construction work. Local noise ordinances from Section 42-162 of the Code or Ordinances of the City of Jersey Village, Texas (City of Jersey Village, 1998) prohibit operation of any pile driver, steam shovel, pneumatic hammer, derrick, steam or electric hoist or similar appliances between the hours of 10:00 p.m. and 7:00 a.m. or at any time on Sundays.

No-Action Alternative

The No-Action Alternative would not result in impacts to noise receivers in the area.

Proposed Action Alternative

Construction of the Proposed Action Alternative would result in a slight increase in noise during the construction of the facility. The increase in noise is expected to be minor and would not affect any sensitive noise receivers. Local noise ordinances would be adhered to and construction equipment would not be run between the hours of 10:00 p.m. and 7:00 a.m. or at any time on Sundays.

4.6.3 Traffic

Roadways in the immediate vicinity of the proposed project include Rio Grande Drive to the east and Jersey Meadows Drive to the west. Jersey Meadows Drive is located to the southwest of the project site and turns into a public access road that enters the project site at its southwestern corner. The public access roadway provides access to an existing on-site parking lot for public patrons of the on-site jogging/walking trail. The public access roadway continues offsite onto bridge over HCFCU Unit E135-00-00, into the parking area for Jersey Meadow Golf Course and intersects with Rio Grande Street southeast of the project site. Rio Grande Street continues north and turns into Rio Grande Drive north of the bridge over HCFCU Unit E135-00-00. Rio Grande Drive is located along the eastern boundary of the project site, but does not provide direct access to the project site. Rio Grande Drive terminates to the east of the project site and provides access into a single family residential subdivision to the east of the project site. US 290 is a major highway located approximately 0.75 mile southwest of the project site that provides access to the southeast into the Houston metropolitan area and to the northwest into the Austin metropolitan area.

No-Action Alternative

The No-Action Alternative would have no effect on transportation in the area.

Proposed Action Alternative

Implementation of the Proposed Project Alternative would close down and eliminate the portion of the public access roadway on the project site that connects from Jersey Meadows Drive to Jersey Meadow Golf Course. Public traffic would no longer have access to Jersey Meadow Golf Course via the public access roadway off of Jersey Meadows Drive. Traffic would still be able to access Jersey Meadow Golf

Course via Rio Grande Street from the east. This change in traffic patterns would be temporary and only affect traffic associated with Jersey Meadow Golf Course. A slight increase in daily traffic counts along Rio Grande Street would likely result from construction of the Proposed Project Alternative. Contractors and project related construction would access the site via Jersey Meadows Drive. No other road closures would result from implementation of the Proposed Action Alternative.

4.6.4 Public Service and Utilities

The project site is within the public service jurisdictions of the Jersey Village Fire Department, Jersey Village Police Department, Harris County Sheriff's Department and Harris County Constable Precinct 4.

Utilities observed on or adjacent to the project site during the site assessment on January 21, 2010, include underground water lines and fire hydrants, underground storm sewers, pole mounted telephone/electric lines, tower mounted electrical transmission lines, communications towers, and underground telecommunications cables. Photographs of all utilities observed on and adjacent to the project site are included in Appendix A.

Public potable water lines were observed running underneath the western sides of the bridge at Rio Grande Drive and the bridge at the public access road that cross HCFCD Unit E135-00-00. The water line adjacent to Rio Grande Drive runs along the western side of Rio Grande Drive, immediately adjacent to the project site. A water meter associated with this water line is located west of Rio Grande Drive and approximately 100 feet to the north of the Rio Grande Drive Bridge. Two fire hydrants associated with this water line are located along the western side of Rio Grande Drive. A second public potable water line under the public access road to the golf course does not continue into the project site. A water line stub is located under the bridge and could be used for future expansion, if needed. A relict water line that enters the property is located next to the new water line stub.

Two drainage grates were observed on-site which likely lead to underground drainage pipes. These structures were likely utilized for drainage when the property was part of a golf course. There is one pole mounted telephone/electrical line on the project site immediately north of the existing parking area. Telephone/electrical wires run to the south and connect into existing lines on the Jersey Meadow Golf Course property. The telephone/electrical pole and associated wires on the property did not appear to be currently utilized. Tower mounted electrical transmission lines are located along the western boundary of the project site. One communications tower and associated underground communications cables operated by Center Point Energy are located offsite and adjacent to the southwestern portion of the subject site.

No-Action Alternative

The No-Action Alternative would have no effect on public services or utilities.

Proposed Action Alternative

The Proposed Action Alternative would not affect public services nor would it increase the demand for such services. The Proposed Action Alternative would minimally affect public utilities on-site. Construction of the Proposed Action Alternative would require the removal of the on-site telephone pole and associated wires. In addition, any relict storm water grates and underground pipes on the property might be required to be removed. Because the existing on-site telephone pole and wires and drainage structures and pipes appear to be relict and do not currently provide service to the project site, impacts as a result of construction of the proposed project would be minimal. All other public utilities in the vicinity of the project are off-site and would not be impacted by the proposed project.

4.6.5 *Public Health and Safety*

Safety and security issues that were considered in this EA include the health and safety of area residents, the public at-large, and the protection of personnel involved in activities related to the implementation of the proposed project.

No-Action Alternative

The No-Action alternative could have a negative effect on the general safety of the residents within the proposed project area. Without augmentation of the current drainage system, White Oak Bayou could continue to flood residential and commercial properties in the vicinity of the proposed project and affect downstream communities. Due to the increasing impervious cover within the watershed, the current stormwater drainage system was not designed to contain higher than peak stormwater events, which caused the project area to experience flooding and associated property damage as a result of Hurricane Ike.

Proposed Action Alternative

Proposed improvements to the stormwater drainage system would provide the community of Jersey Village and citizens of Harris County along White Oak Bayou with flood protection due to the proposed facilities' ability to detain water during above peak volume storm events. Detention of flood waters as a result of construction of the proposed project would minimize future loss of property and/or life in the vicinity of the proposed project.

4.6.6 *Hazardous Materials*

Hazardous wastes, as defined by the Resource Conservation and Recovery Act (RCRA), are defined as “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may; (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or; (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.”

Hazardous materials and wastes are regulated in Texas by a combination of federal laws and state laws. Federal regulations governing the assessment and disposal of hazardous wastes include RCRA, the RCRA Hazardous and Solid Waste Amendments, Comprehensive Environmental Response, Compensation and Liability Act, Solid Waste Act, and Toxic Substances Control Act.

Visual observation of the project area did not reveal obvious existing or potential hazardous materials, substances, or conditions. No drums or other sources of potential hazardous materials were observed in the project area.

A Phase I Environmental Site Assessment was conducted on the project site by Turner, Collie & Braden Inc. in July of 2000. This assessment found six Environmental Data Resources, Inc. (EDR) listed sites within one mile of the project site and determined that none of these sites would have an effect on the project site. The property owner at the time of this assessment, Mr. Mims, of Jersey Meadows Golf Partners was not aware of any environmental incident that may have indicated the presence of environmental contaminants of the property. Pesticides and herbicides were used on the site, but they were used to the manufacturer's recommendations. The assessment found overhead electrical lines and buried utility lines on the property. The executive summary of the Phase I Environmental Site Assessment is included in Appendix D.

Numerous federal and state government environmental databases were recently searched by EDR on December 21, 2009. The Executive Summary and Radius Search Map of this EDR Database Report are included in Appendix D. Specific environmental databases searched are described in pages 1-4 of the EDR Database Report Executive Summary. No facilities or properties within the project limits were listed on the databases reviewed by EDR.

According to the EDR Radius Search Map, one EDR listed site occurs approximately 0.55 mile northwest of the project site, although further investigations of the exact location of this EDR listed site (described in the subsequent paragraph) confirm that the location of this site is wrong in the EDR Report. The site, referred to as the Jones Road Ground Water Plume Site was listed on the proposed National Priority List (NPL) and the Record of Decision (ROD) list. The NPL is also known as the Superfund Program, which is a subset of Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and identifies over 1,200 sites for priority cleanup under the Superfund program. The source of the NPL database is the EPA. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid the cleanup.

Based upon a more detailed investigation of TCEQ files, the Jones Road Water Plume Site is located near the intersection of Jones Road and Forest Valley Drive, approximately 3.0 miles north-northwest of the project site. The groundwater plume associated with the site included the presence of hazardous substances, including cis-1,2-dichloroethene (DCE), tetrachloroethene (PCE), and trichloroethene (TCE). Based upon the most recent sampling event in February 2009, TCEQ groundwater monitoring wells located to the northwest of FM 1960 and southeast of Tower Oaks Boulevard did not detect any hazardous constituents, therefore the groundwater plume is confined to areas north of FM 1960, and does not pose any immediate environmental threat to the project site. Based upon a February 2009 Remedial Investigation Report, the dissolved-phase PCE plume appears to be relatively stable, but threatens down-gradient drinking water wells and deeper drinking water aquifers (Shaw Environmental, 2009).

The Jones Road Water Plume Site does not likely have the potential to affect the environment of the project site in the future as it is contained within an area 2-3 miles from the site and is not anticipated to migrate towards the project.

No-Action Alternative

The No-Action alternative would not disturb any hazardous materials or create any potential hazard to human health.

Proposed Action Alternative

Construction of the proposed project does not have the potential of intercepting contaminated groundwater from the Jones Road Water Plume Site. The Jones Road Water Plume Site is approximately 3 miles to the north-northwest of the project site and is stable. The topographical gradient would direct any potential groundwater contaminants in a direction away from the project site. The potential for the proposed project being affected by any other hazardous materials is unlikely based upon field investigations and regulatory agency database research.

Unusable equipment, debris, and material shall be disposed of in an approved manner and location. In the event significant items (or evidence thereof) are discovered during implementation of the project, HCFCD will handle, manage, and dispose of petroleum products, hazardous materials and toxic waste in accordance to the requirements and to the satisfaction of the governing local, state and federal agencies. HCFCD will take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction staging area.

4.7 Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations for implementing NEPA require an assessment of cumulative effects during the decision-making process for federal projects. Cumulative effects are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects are considered for the Proposed Action and the addition of the supplemental actions. Cumulative effects were determined by combining the effects of the actions with other past, present, and reasonably foreseeable future actions.

Presently, a majority of the construction activity is occurring in the upper portion of the White Oak Bayou watershed, upstream of North Houston-Rosslyn Road. Construction on the first 1.2 miles of the Jersey Village Bypass Channel has begun, while significant channel modifications on White Oak Bayou between Beltway 8 and North Houston-Rosslyn Road will begin soon. The Jersey Village Bypass Channel will divert some of the water from White Oak Bayou around the City of Jersey Village. The Jersey Village Bypass Channel begins at the confluence of White Oak Bayou and HCFCD Unit E135-00-00, heads to the east to Beltway 8, and then to the south and east where it re-joins White Oak Bayou west of North Gessner Road.

One detention basin, HCFCD Unit E500-03-00, is currently under construction. This 63 acre basin is located north and east of the intersection of Hollister Street and West Little York Road in Harris County, Texas. There are other recently constructed detention basins that are already in operation in the areas along White Oak Bayou.

Project construction impacts on environmental resources are expected to be temporary and minimal as recommended practices for construction and maintenance are employed. No activities that violate existing state or federal water quality standards are anticipated. Local and regional governments (including Harris County as well as the City of Houston) include the management of stormwater through SW3Ps in their comprehensive planning efforts to control the discharge of pollutants. As urbanization in the project area continues at its current and projected rate and new projects are constructed, stringent requirements for stormwater management as well as BMPs are enforced to prevent cumulative impacts on water quality and quantity.

With appropriate implementation of regulation and control strategies, as discussed in more detail in the Water Quality section of this EA, it is expected that future potential effects to the areas water quality would be substantially reduced. The proposed project would not contribute to significant cumulative impacts to the area’s water quality.

Cumulative impacts to wetlands and waters of the U.S. would include direct effects to this resource as a result of the proposed project. The most common cause and effect issue is land conversion from wetlands to other uses, primarily urban/developed land. As a result of such development, stresses on wetlands may include water quality effects, changes in water levels, and overall effects from urban development.

Effects to wetlands from construction and associated indirect development that may result from the projects discussed above would be limited based on the current regulations as well as compensatory mitigation required from the USACE for wetland effects. Because of the federal mandate in regard to wetlands, “no net loss” of wetlands from future proposed land use would be anticipated. The flood reduction projects discussed previously would likely result in the creation of wetland areas in detention basins and flanking alongside natural bottom linear features. Between the required compensatory mitigation and the likely creation of wetlands within man-made features, the proposed project would likely lead to a net increase in wetlands. A net increase in wetlands would provide a beneficial effect to

the environment as suitable habitat for many species of wildlife would be added. Water quality within the project area could potentially be enhanced due to the net increase in wetlands.

The proposed project in combination with the current and future proposed project along White Oak Bayou would lead to temporary impacts to floodplains with a net long term increase in floodplain capacity. Therefore, the cumulative effects to floodplains would be positive and beneficial to flood storage and damage reduction in the vicinity of the project area. No other cumulative effects to environmental resources beyond short term construction related effects and long term beneficial effects are anticipated.

5.0 MITIGATION MEASURES

The NEPA guidelines and regulations define mitigation as (1) avoiding adverse impacts by not taking an action, (2) minimizing impacts by limiting the degree of action, (3) rectifying by repairing, rehabilitating, or restoring the affected environment, (4) reducing or eliminating impacts over time through preservation and maintenance activities and (5) compensating for an impact by replacing or providing substitute resources or environments.

During the development of the proposed project, mitigation measures were incorporated and considered in an effort to avoid and minimize impacts to the greatest extent practicable, while meeting the project purpose and need. The following list summarizes the conditions or mitigation measures to offset those impacts.

Geology and Soils – Silt fence and/or other storm water BMPs will be utilized during construction.

Air Quality – Dust control techniques, such as covering or treating disturbed areas with dust suppression techniques, sprinkling, and other dust abatement controls will be implemented during construction of the proposed project. Construction equipment with EPA designated Tier 2 and Tier 3 engines will be utilized during construction. The MSAT emissions will be minimized by measures to encourage use of EPA required cleaner diesel fuels, limits on idling, increasing use of cleaner burning diesel engines, and other emission limitation techniques, as appropriate.

Water Quality – A SW3P will be prepared and implemented, and a Notice of Intent (NOI) will be posted at the construction site. Erosion and sedimentation BMPs will be installed, monitored and maintained during construction to minimize any detrimental effects to water quality during construction. HCFCD will obtain a TPDES storm water permit from TCEQ before the start of construction and comply with all permit conditions.

Waters of the U.S., including Wetlands – The proposed project will include the creation of a 1.6 acre wetland mitigation area within the proposed project limits. This 1.6 acre wetland creation area will offset impacts to 1.59 acres of non-jurisdictional wetlands within the project limits. The creation of this wetland mitigation area will offset the functions and services of those wetland areas currently present on-site and provide an enhanced benefit to water quality and habitat diversity within the watershed.

Vegetation – Native tree species will be planted around the basin perimeter and along the slopes after construction is complete. Exposed side slopes will be manually re-vegetated using BMPs upon completion of construction. Non-invasive and non-exotic herbaceous species will be utilized for re-vegetation of exposed side slopes.

Cultural Resources – In the event that archeological deposits, including any Native American pottery, stone tools, bones, or human remains, are uncovered, the project shall be halted and the applicant shall stop all work immediately in the vicinity of the discovery and take all reasonable measures to avoid or minimize harm to the finds. All archeological findings will be secured by HCFCD and access to the sensitive area will be restricted by HCFCD. The applicant will inform TDEM and FEMA immediately, and FEMA will consult with the SHPO. Work in sensitive areas shall not resume until consultation is completed and until FEMA determines that the appropriate measures have been taken to ensure complete project compliance with the NHPA and its implementing regulations.

Noise – Construction of the proposed project will adhere to local noise ordinances and construction equipment will not operate between the hours of 10:00 p.m. and 7:00 a.m. or at any time on Sundays.

Hazardous Materials – Unusable equipment, debris, and material shall be disposed of in an approved manner and location. In the event significant items (or evidence thereof) are discovered during implementation of the project, HCFCFCD will handle, manage, and dispose of petroleum products, hazardous materials and toxic waste in accordance to the requirements and to the satisfaction of the governing local, state and federal agencies. HCFCFCD will take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction staging area.

6.0 RESOURCE AGENCY COORDINATION, PUBLIC INVOLVEMENT, AND PERMITS

6.1 Agency Coordination

As part of the development of this EA, federal and state resource protection agencies were contacted. It is anticipated that permits and/or approvals would be necessary as described below in Section 5.3 of this EA from local, state, and Federal regulatory agencies. The following agencies have been contacted regarding affected environment of the proposed project site. Resource agency comment request and response letters, if available are attached in Appendix C.

- Texas Historical Commission
- United States Fish and Wildlife Service
- Texas Parks and Wildlife Department
- Texas Commission on Environmental Quality
- Texas Water Development Board
- General Land Office
- U.S. Army Corps of Engineers

6.2 Public Involvement

The public was invited to comment on the proposed action and the Draft EA. A legal notice was posted in the *Houston Chronicle* and on FEMA's website (<http://www.fema.gov/plan/ehp/envdocuments/ea-region6.shtm>) on May 19, 2011. Additionally, the Draft EA was made available for review for a period of 30 days at the Harris County Public Library – Fairbanks Branch located at 7122 North Gessner Road, Houston, Texas 77040. A copy of the public notice is attached in Appendix E. The public comment period ended on June 18, 2011. No comments on the Draft EA were received.

6.3 Permits

The HCFCD is required to obtain and comply with all required local, state, and federal permits and approvals prior to implementation of the Proposed Action Alternative. Permits that may be required include:

- Grading and Erosion Control Permit – issued by Harris County
- Submission of project-specific documents necessary to comply with TCEQ's construction stormwater general permit
- Floodplain Development Permit – issued by Harris County

7.0 REFERENCES

- Blair, W. F. 1950. The biotic provinces of Texas. *Texas Journal of Science* 2: 93-117. Modified by TPWD.
http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_mp_e0100_1070ae_08.pdf.
Accessed February 5, 2010.
- City of Jersey Village, Texas. 1998. Code of Ordinances, City of Jersey Village, Texas. Adopted July 20, 1998. Effective August 1, 1998. Published by Municipal Code Corporation.
http://library7.municode.com/default-test/home.htm?infobase=10228&doc_action=whatsnew.
Accessed February 11, 2010.
- Federal Emergency Management Agency (FEMA). 2007. Flood Insurance Rate Map: Harris County, Texas and Incorporated Areas. Panel 440 of 1150. Map Number 48201C0440L. June 18, 2007.
- Harris County Office of Homeland Security and Emergency Management (HCOEM). 2010. Harris County Historical Flood Data. <http://www.hcoem.org/HistoricalData.aspx>. Accessed February 19, 2010.
- Harris Galveston Subsidence District (HGSD). 2010. Subsidence Maps for 1906 – 2000, 1978-2000 and May 1995 – October 2000. <http://www.hgsubsidence.org/about/subsidence/pdf/1906-2000.pdf>, <http://www.hgsubsidence.org/about/subsidence/pdf/1978-2000.pdf>, and, <http://www.hgsubsidence.org/about/subsidence/pdf/1995-2000.pdf>. Accessed February 19, 2010.
- Intergovernmental Panel on Climate Change (IPCC). 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.
- McMahan, C.A, Frye, R.G., and Brown, K.L. The vegetation types of Texas including Croplands: An Illustrated Synopsis to Accompany the Map.
http://www.tpwd.state.tx.us/publications/pwdpubs/pwd_bn_w7000_0120/download_book.
Accessed February 19, 2010.
- Moser Development Systems. 2002. Houston geographic description: accessed February 19, 2010, at <http://www.texasbest.com/houston/geograph.html>.
- National Oceanographic and Atmospheric Association (NOAA). 2010. <http://cdo.ncdc.noaa.gov/cgi-bin/climatenormals/climatenormals.pl>. Accessed January 25, 2010.
- Shaw Environmental, Inc. 2009. Jones Road Groundwater Plume Federal Superfund Site – Remedial Investigation Report.
- Texas Commission on Environmental Quality (TCEQ). 2010. Texas Attainment Status by Region.
<http://www.tceq.state.tx.us/implementation/air/sip/siptexas.html>. Accessed January 28, 2010.
- Texas Commission on Environmental Quality (TCEQ). 2008. 2008 Texas 303 (d) list. Texas Commission on Environmental Quality. Austin, Texas.
http://www.tceq.state.tx.us/assets/public/compliance/monops/water/08twqi/2008_303d.pdf.
Accessed January 28, 2010.

- Texas General Land Office (GLO). 2010. Texas Coastal Zone Map. <http://www.glo.state.tx.us/coastal/jpegs/vert5x13cmp.jpg>. Accessed January 29, 2010.
- Texas Historical Commission (THC). 2010. Texas Historic Sites Atlas. <http://atlas.thc.state.tx.us/index.asp>. Accessed February 5, 2010.
- Texas Water Development Board (TWDB). 2010. Geologic Atlas of Texas. <http://www.twdb.state.tx.us/GwRD/GTA/GAT/index.htm>. Accessed January 28, 2010.
- United States Census Bureau (USCB). 2010. http://factfinder.census.gov/home/saff/main.html?_lang=en. Accessed January 25, 2010.
- United States Department of Agriculture (USDA) Natural Resources Conservation Service. 2010. Web Soil Survey. <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>. Accessed January 28, 2010.
- University of Texas at Austin (UT). 1978. Preserving Texas' Natural Heritage. LBJ School of Public Affairs Policy Research Project Report 31. http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_mp_e0100_1070s_34.pdf. Accessed February 19, 2010.
- Wermund, E.G., 1996. Physiographic Map of Texas 1996: Information Sheet. <http://lib.utexas.edu/geo/fieldguides/physiography.html>. Accessed January 25, 2010.

8.0 LIST OF PREPARERS

Document Preparers:

Technical Principal

Greg Crouch, Vice President, Crouch Environmental Services, Houston, Texas

Project Manager

David Young, Senior Environmental Consultant, Crouch Environmental Services, Houston, Texas

Technical Writer

Ryan Robol, Environmental Consultant, Crouch Environmental Services, Houston, Texas

Haley Norman, Environmental Consultant, Crouch Environmental Services, Houston, Texas

Graphics

Patrick Forrest, Geographic Information Systems Specialist, Crouch Environmental Services, Houston, Texas

Government Contributors:

Kevin Jaynes, CHMM, Regional Environmental Officer, FEMA, Denton, Texas

Dorothy Weir, Environmental Specialist, FEMA, Denton, Texas

Connie Dill, HMA Specialist, FEMA, Denton, Texas

Hildy Soper, Mitigation Grants Officer, Texas Division of Emergency Management, Austin, Texas

Local Sponsor Contributors:

Eddie George, Harris County Flood Control District, Houston, Texas

Jackson Lamb, Regulatory Coordinator, Harris County Flood Control District, Houston, Texas