

**PATRICK'S BAYOU
FLOOD MITIGATION PROJECT**

ENVIRONMENTAL ASSESSMENT

For the

**CITY OF DEER PARK
HARRIS COUNTY, TX**

**As part of an HMGP application
(HMGP-DR-1791-TX Project #79)**

**Revised
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ABBREVIATIONS & ACRONYMS

ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
BMP	Best Management Practices
CEQ	Council on Environmental Quality
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
HCFCDD	Harris County Flood Control District
HMGP	Hazard Mitigation Grant Program
HMGP	Hazard Mitigation Grant Program
NFIP	Flood Insurance Rate Program
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
PER	Preliminary Engineering Report
SH	State Highway
SHOP	State Historic Preservation Office
TCEQ	Texas Commission on Environmental Quality
TDEM	Texas Division of Emergency Management
TMDL	Total Maximum Daily Load
TXDOT	Texas Department of Transportation
USACE	United States Army Corps of Engineers

1.0 Introduction

The City of Deer Park is requesting assistance from the Federal Emergency Management Agency (FEMA) through the Texas Division of Emergency Management (TDEM) under the Hazard Mitigation Grant Program (HMGP) for funding for a 31.4-acre flood detention facility. The grant number is HMGP-DR-1791-TX Project #79. This facility will mitigate repetitive flooding in the Patrick's Basin area, whose residents have had millions of dollars in claims for repetitive losses from the National Flood Insurance Program (NFIP). These losses result from major storm events, including recent events like Hurricane Ike.

The City of Deer Park is located approximately 15 miles southeast of downtown Houston in Harris County. It is an urban flat land community bounded to the North by the Houston ship channel and the City of La Porte to the East which is located adjacent to Galveston Bay.

2.0 Purpose and Need

2.1 Purpose

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 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 of the Patrick's Bayou Flood Mitigation project. FEMA will use the findings in this EA to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

The City of Deer Park is seeking funding for this project under the Hazard Mitigation Grant Program (HMGP). The HMGP provides grants to States 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 due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

2.2 Need

The need of this project is to resolve the recurring flooding problem in the City of Deer Park. Flooding due to storms even of moderate size is a significant risk to the residents of the City. A summer storm that drops a large amount of water in a short period of time can cause flooding. Since 1979, the residents have filed 1,017 claims totaling \$18,307,291 under the National Flood Insurance Program. Of these claims, approximately 366 (36%) of these occurred within the Patrick Bayou drainage basin, resulting in losses of \$6,224,479 during this period.

There were approximately 186 homes damaged during Tropical Storm Allison in the Patrick's Bayou water shed. Most of the homes in this area had from 2 to 3 feet of water in them. In addition, the wastewater treatment plant was flooded causing severe damage to the facility and \$50,000 worth of damage. An additional 180 homes have been damaged during other rain events.

Due to flat topography and the restrictive size of the primary storm drain system running under State Highway (SH) 225, ponding of water in streets after storms is, unfortunately, a common event.

Numerous other storm events have caused damages in the Patrick Bayou area. On September 12, 2008 Hurricane Ike came ashore on Galveston island, near the mouth of the Houston Ship Channel. Luckily, lower than expected storm surges were observed. However, widespread flooding and power outages still occurred in and around the City of Deer Park.

It should be noted, that both the City of Deer Park and Harris County Flood Control District (HCFCD) have commissioned several studies over two decades to resolve the problem. The overall consensus of these studies is for the need to implement a regional flood control project. An evaluation of several alternatives to address this need is discussed in the following chapter.

3.0 Alternatives

Flood mitigation in the Patrick Bayou area is a priority of the City. During the past decade, the City of Deer Park, in partnership with the Harris County Flood Control District, has conducted multiple engineering feasibility studies in order to determine the best course of action. Meetings have been held with the Harris County Flood Control District, Harris County Commissioner Sylvia Garcia, the Army Corps of Engineers and the City of Deer Park. The following are alternatives which have been considered.

3.1 Alternative #1: No Action.

The first alternative, a “No Action Alternative,” would mean the City does nothing to address the problem, and recurrent flooding continues to plague the City.

3.2 Proposed Action: Detention Basin Located South of SH 225

The most recent study, Final Preliminary Engineering Report for Drainage Study, by the engineering firm PBS&J, determined that the City has two primary drainage basins (G-104 & G105) into which most of the flood waters drain. After a thorough evaluation of each basin utilizing hydraulic models, they determined that a 31.4-acre detention storage basin located within the northern portion of the G-104 drainage basin would be the most cost effective solution to alleviate a significant portion of the flooding within the City. A likely location was identified south of SH 225 which is an undeveloped parcel of land. Maps of this location are included in Appendix A on the USGS 7.5 minute quadrangle (Map A), Site Map (Map B), FEMA flood map (Map C), and National Wetland Inventory Map (Map D). Latitude of the project area is 29.4219 and longitude is -95.0626. The proposed project site is a vacant wooded lot. Development exists on three sides of the project sites: SH 225 and railroad tracks on the north, a residential development to the west, an industrial petroleum facility on the east. A vacant, heavily wooded lot lies to the south. These two vacant lots together are an island of undeveloped land on the edge of town.

A drainage channel lies to the west and south of the project site, into which the detention pond will be tied. Upstream floodwaters which are detained in the pond will be emptied into the channel after waters in the channel drain into the shipping channel.

A smaller parcel of land is owned by the City to the northwest, which will be used as a staging area and for access to the site from Luella Street. This was previously a business property with a parking lot.

3.2.1 Design Options #1 and #2

Two proposed design alternatives for the detention basin are included in Appendix D. Both designs meet the storm storage requirements outlined in the preliminary design report.

Option 1 (Appendix E, Figure E-1), represents a single pond area and consists of: excavating 29.4 acres of existing land; relocating the existing underground water and sewer pipelines that cross the existing site; and the construction of a single weir and outfall channel system. Both the new water and sewer lines will be installed along the southern boundary of the proposed detention storage basin. The new water line will be approximately 1,910 LF long while the new sewer line will be approximately 1,945 LF long. Both of these line relocations are shown in Appendix E, Figure E-2, "Water & Sewer Relocation Map".

Option 2 (Appendix E, Figure E-3), represents a multi-bottom pond and consists of: excavating 33.4 acres of existing land; relocating the existing sewer line; localized lowering of the existing water line; and the construction of dual weir and flood channel outfall systems. The existing sewer line is deeper than the water line and will not need to be relocated. Note that each of the two ponds are linked via an overflow weir and underground conveyance conduits. This option, while eliminating the need to relocate minor conveyance lines is more difficult to construct and maintain due to the need to maintain inter connectivity between the two adjacent ponds.

3.3 Other Action Alternative and Dismissed: Additional Culverts North of SH 225

A Preliminary Engineering Report (PER) was originally commissioned by the Harris County Flood Control District (HCFCD). In the PER, one other alternative that was subsequently dismissed was to add additional drainage channels north of SH 225 between two major petroleum companies. The findings of the HCFCD report revealed that the additional channel alternative had numerous obstacles, including (1) no existing public right-of-way or easements through the multiple refineries, (2) the requirement of crossing under two major highways, (3) the potential for crossing a large number of pipelines in undocumented depths and locations (4) possible refining equipment along channel alignment, (5) possible disruption of refining facility operations during construction, and (6) and disruption of contaminated sediments in the Superfund area of the channel.¹ These obstacles pose a number of unknown costs and complexities associated with this alternative. Thus this option was dismissed from further consideration.

4.0 Affected Environment and Potential Impacts

The required affected environment and potential impacts will be discussed in this section according to the "FEMA guidance for writing EAs." In accordance with the guidance, issues not being affected by the project will not be discussed. These include Climate Change and Native Hawaiian/Native Alaskan Cultural & Religious Sites.

Based upon guidance received in an email dated July 20, 2009 from TDEM staff, formal communication with the following agencies was implemented:

- a. Texas Parks & Wildlife
- b. The State Historical Preservation Officer
- c. General Land Office (Coastal Resources Commission)
- d. Texas Commission on Environmental Quality
- e. U.S. Army Corps of Engineers

Copies of the letters sent to and the responses from the five agencies listed above are included in Appendix B. Formal written responses were received from all with the exception of the Texas Parks & Wildlife. A follow up phone call with the Texas Parks & Wildlife was made and their response is included in this report.

4.1 Physical Resources

The proposed parcel of land lies close to highly industrialized petroleum areas, a major state highway, and urban and educational facilities. Vegetation on the proposed site is a mix of shrubs and deciduous and evergreen trees. The area has not had previous construction. A few cattle stalls and watering troughs are on the perimeter of the property.

4.1.1 Geology and Soils

The project is in the Coastal Plains area of Texas. The area is underlain by the Beaumont Formation, in an area which is dominantly clay and mud of low permeability, high water-holding capacity, high compressibility, high to very high shrink-swell potential, poor drainage, level to depressed relief, low shear strength and high plasticity.

An online review of the Web Soil Survey on the project site indicated that the dominant soil as being Bernard-Edna Complex. Parent material is loamy

fluviomarine deposits of the Pleistocene age. The soil is somewhat poorly drained. Depth to restrictive layer is more than 80 inches. The Bernard Complex typical profile is as follows: 0-6" clay loam; 6-34" clay ; 35-68" clay. The Edna Complex typical profile is as follows: 0-5" fine sandy loam; 6-41" clay; 41-72" clay; 72-76" sandy clay loam.

The Farmland Protection Policy Act (FPPA) states that federal agencies must "minimize the extent to which Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses...". In addition, USDA Rural Development guidance states that prime farmland "does not include land already in or committed to urban development or water storage."²

Bernard Edna Complex soils are generally not important prime farmlands. Furthermore, the proposed detention storage site is completely surrounded by urbanized areas and thus the existing land is in an area that has already been committed to urban development. Therefore, the proposed project is not anticipated to directly or indirectly adversely impact important farmlands or formally classified lands.

A Phase II Environmental Site Assessment was conducted by Camp Dresser & McKee Inc. in November 2009 to assess if groundwater and soils were impacted by petroleum activities nearby. It was concluded that soil and water samples did not indicate petroleum contamination of the site.³ A copy of the assessment is included in Appendix C of this EA.

The following impacts are anticipated for the project alternatives:

- Impacts Under No Action Alternative –
 - Positive Impacts: No geology or soils will be excavated.
 - Negative Impacts: Continued flooding enables street debris and chemicals to be deposited into flooded homes and yards.
- Impacts Under Option 1 (Single bottom) – Soils will be excavated from the site. The excavated soils will be used to create a berm around the detention pond, and excess soils will be hauled away for beneficial use. Although firm commitments as to where the proposed soil be hauled to cannot be made until this is approved and funded, an initial evaluation of

potential hauling sites include: (i) foundation for the proposed permanent dry docking of the Battleship Texas Museum; (ii) Texas Department of Transportation (TXDOT) road construction projects in Harris County; or (iii) other beneficial reuse of fill in non-floodplain and/or wetlands sites.

In addition, one water line and one sewer lines will be trenched along a new alignment adjacent to the southern perimeter of the new detention area. As this is an open cut, install and backfill utility line installation process, no additional fill is required to install these two new lines.

- Positive Impacts: Adequate amounts of suitable soils for environmentally appropriate construction projects are hard to obtain. Often times hauling from far distances is required. This project will provide a large quantity of fill soil for use in south Harris County construction projects. This will reduce air pollution, fuel, noise, and related impacts by not having to haul in soils from far distances.
- Negative Impacts: The main negative impact to geology and soils is the removal of soils from the area. However, as this area of the greater metropolitan Houston area is no longer agrarian, the negative impacts are minimal.

When compared to Option 2, Option 1 requires less soil movement (29.4 acres vs. 33.4 acres) and thus has less negative impacts.

- Impacts Under Option 2 (Multi-bottom) – Soils will be excavated from the site. Excavated soils will be used to create a berm around the detention pond, and excess soils will be hauled away as outlined in Option 1. One existing water line will be lowered, so a narrow trench will be cut and filled.
 - Positive Impacts: Similar to Option 1
 - Negative Impacts: Similar to Option 1. However, an additional four (4) acres of land will need to be removed to construct this option. Thus, Option 2 has slightly higher negative impact when compared to Option 1.

4.1.2 Air Quality

The Clean Air Act is the law that defines EPA's responsibilities for protecting and improving the nation's air quality and the stratospheric ozone layer. The latest revision was in 1990.

Deer Park is highly industrialized with oil refineries along its northern border on the Houston Shipping Channel. A local citizen's group sued Shell Oil in 2008 for air quality violations. Although Shell Oil has reduced its air violations during the past few years, the air quality continues to need improvement.

Correspondence from TCEQ (Appendix B, Correspondence D) acknowledged that "although any ...construction...project will produce dust and particulate emissions, these actions should pose no significant impact upon air quality standards. Any minimal dust and particulate emissions should be easily controlled by the construction contractors using standard dust mitigation techniques."

Therefore, the mitigation project will have minimal short term effects on air quality during construction due to the requirement of heavy construction equipment and earthwork. If dry weather conditions persist, applicant will water construction areas for dust suppression.

The following impacts are anticipated for the project alternatives:

Impacts Under No Action Alternative – No positive or negative impacts on air quality.

- Impacts Under Option 1 – Air quality will be adversely impacted only in the short term due to exhaust from construction equipment. Minimal dust and particulate emissions should be easily controlled by the construction contractors using standard dust mitigation techniques.
- Positive Impacts: When flooding occurs, certain sections of roadway within the community become impassible. This results in increased traffic congestion as drivers converge on the remaining existing roadways. Thus, this project will provide positive long term impacts due to less traffic congestion and resulting carbon generated vehicle exhaust when future road closures are avoided.

- Negative Impacts: Minimal short term air quality issues as described above. No long term impacts are anticipated.
- Impacts Under Option 2 - Air quality will be adversely impacted only in the short term due to exhaust from construction equipment. Minimal dust and particulate emissions should be easily controlled by the construction contractors using standard dust mitigation techniques.
- Positive Impacts: Similar to Option #1
- Negative Impacts: Slightly more negative short term impacts due to a slightly increased quantity of soil needing to be removed from the site.

4.2 Water Resources

4.2.1 Water Quality.

The Clean Water Act (CWA) is the primary Federal Statute regulating the protection of the nation's waters. The CWA established national programs for prevention, reduction, and elimination of pollution in navigable water and groundwater, including a water quality standards program, a permit program for discharge and treatment of wastewater and stormwater, and an oil pollution prevention program.

Under Section 303(d) of the Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet the water quality standards set by states, territories, or authorized tribes. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop Total Maximum Daily Load, or TMDL, for these waters. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.

In the TMDL for Patrick's Bayou at the Houston Shipping Channel, residential drainage was identified as one component which negatively impacts water and soil quality. While reducing flooding in neighborhoods and streets is the main benefit of the project, the detention basin will also improve water quality flowing into the Houston Shipping Channel by serving as an initial filter for chemicals and other particulate matter that drain from City streets. Correspondence from TCEQ (Appendix B, Correspondence D) requested that "the applicant take necessary steps to insure that best management practices

are utilized to control runoff from construction sites to prevent detrimental impact to surface and ground water". This recommendation shall be implemented. During the design phase, the plans and specifications shall include a section on Storm Water Pollution Prevention. This section shall incorporate the following Best Management Practices (BMP): (i) the installation and maintenance of silt fences; (ii) stabilized construction entrances, and (iii) and other related pollution prevention control devices that are site appropriate.

The following impacts are anticipated for the project alternatives:

- Impacts Under No Action Alternative –
 - Positive impacts: No impacts.
 - Negative Impacts: Continued negative impact to Patrick's Bayou and the Houston Shipping Channel due to street flooding.
- Impacts Under Option 1 – Sedimentation barriers will be put in place before construction to mitigate sedimentation and runoff. Therefore, minimal sedimentation/runoff is anticipated during construction.
 - Positive Impacts: Improved water quality in Patrick's Bayou and the Houston Shipping Channel due to street flooding mitigation.
 - Negative Impacts: Minimal short term negative impacts are anticipated due to rain generated construction runoff. The adverse effects of this shall be mitigated by the strict adherence to and maintenance of appropriate Storm Water Pollution Prevention Best Management Practices.
- Impacts Under Option 2 – As in Option 1, sedimentation barriers will be put in place before construction to mitigate sedimentation and runoff. Therefore, minimal sedimentation/runoff is anticipated.
 - Positive Impacts: Similar to Option 1.
 - Negative Impacts: Similar to Option 1.

4.2.2 Wetlands

In support of the Clean Water Act, Executive Order 11990 was established in 1977 to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands". To meet these objectives, the order requires federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided.

There are no wetlands on the proposed property. The NRCS soil classification description of Bernard-Edna Complex contains "frequency of ponding: none." To verify, five low-lying areas that had standing water during an inspection shortly after a rain incident in early December 2009 were evaluated. After five days, only two areas remained wet, as reported by Mr. Larry Tew, Chief Surveyor for the City of Deer Park. The water was very clear and had no accumulation of algae or other microbiologicals as is normally evident in standing water. This indicates that the water had not been there long. An examination of the online National Wetland Map via Google Maps (Appendix A, Map D) shows a wetland in the parcel to the south of the project site, but no wetlands in the project area. No high water marks were observed around the wet areas. There was no change in vegetation in the wet areas from dry areas, nor was there any wetland vegetation. The trees did not have raised buttressed roots as is a typical wetland adaptation, and no wetland hydrology was seen. Therefore, the two low-lying areas with standing water are determined not to be wetlands, but ephemeral ponding resulting from localized drainage from rainfall events.

Correspondence from USACE (Appendix B, Correspondence E) stated that "We ... regulate any discharge of dredged and/or fill material into any waters of the U.S. (including adjacent wetlands) under Section 404 of the Clean Water Act. If any of your proposed project(s) involve impacts under the aforementioned federal laws ... provide the project specifics to our Regulatory Branch".

The project will not require any dredging and/or disposal of any material in any wetlands or waterways. Soil excavated from the site will be hauled off site and disposed of in accordance with the provisions of Section 404 of the Clean Water Act. Therefore a USACE Section 404 permit will not be required.

Although firm commitments as to where the proposed soil be hauled to cannot be made until this is approved and funded, an initial evaluation of potential hauling sites include: (i) foundation for the proposed permanent dry docking of the Battleship Texas Museum; (ii) Texas Department of Transportation (TXDOT) road construction projects in Harris County; or (iii) other beneficial reuse of fill in non-floodplain and/or wetlands sites.

- **Impacts Under No Action Alternative** – No wetlands exist on the project site. Therefore, direct positive or negative impacts will not result from no action. However, wetlands downstream in the Houston Shipping Channel will continue to be negatively impacted by street flooding and the corresponding downstream conveyance of oils, debris, and other particulate matter.
- **Impacts Under Option 1** - No wetlands exist on the project site. Therefore, direct positive or negative impacts will not occur on the project site.
 - **Positive Impacts:** Upon completion of the proposed detention storage basin, improved water quality downstream along Patrick's Bayou and the Houston Shipping channel is expected. This will be the result of the partial treatment of storm conveyed oils, debris, and other particulate matter. Therefore, downstream wetlands will be positively impacted.
 - **Negative Impacts:** No direct negative impacts since no wetlands exist on the project site. There is however a potential for minimal indirect impacts due to storm related construction runoff that may potentially makes it thru the installed Storm Water Pollution Prevention BMP's described in the Water Quality section of this report.
- **Impacts Under Option 2** - No direct impacts.
 - **Positive Impacts:** Same as Option 1.
 - **Negative Impacts:** Similar to Option 1. There is however a slightly higher chance for negative short term impacts as an additional four (4) acres of land will be excavated during the construction of this alternative. This requires an increase in earthwork movement and a corresponding rise in the potential of adverse impacts.

4.2.3 Floodplains

Executive Order (EO) 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 Flood Insurance Rate Program (NFIP). Consistent with EO 11988, the FIRM was examined during the preparation of this EA.

The proposed flood detention storage facility is located outside of the 100 and 500 yr floodplains (FEMA 2007, Community Panel 48201C0930L, revised June 18, 2007). However, numerous streets, homes, educational facilities, and the City's wastewater treatment plant are located within the Shaded Zone X of the 100-yr floodplain. A main benefit of this project is that once the new detention storage facility is built, the area within Shaded Zone X will significantly be reduced. Upon project completion, a FEMA letter of Map Revision shall be prepared to update the FEMA maps in this area.

The City participates in the NFIP program and data shows the repetitive flooding occurrence in this area has cost NFIP millions of dollars cumulatively for several storms over the years. The project will have a beneficial impact on the floodplain, designed to contain flooding from the 100-year storm.

The following impacts are anticipated for the project alternatives:

- Impacts Under No Action Alternative –
 - Positive Impacts: No impacts.
 - Negative Impacts: No change in floodplain. Homes, businesses, streets will remain in the existing floodplain and remain vulnerable to flooding. During very strong storms, nearby educational facilities and the wastewater treatment plant remain vulnerable.
- Impacts Under Option 1 –
 - Positive Impacts: Significant positive impact on structures within the existing floodzone. The new detention basin will protect a large portion of the area that is currently within the limits of the Shaded Zone X of the 100-year storm. Beneficial impact on the NFIP program

will be realized with repetitive losses in this area vastly diminished, if not eliminated.

- Negative Impacts: None anticipated.
- Impacts Under Option 2 -
 - Positive Impacts: Same as Option 1.
 - Negative Impacts: None anticipated.

4.3 Coastal Resources

The Coastal Zone Management Act (CZMA) enables coastal states, including Texas, 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 project is located in the Coastal Zone, however it will not impact goals of the Coastal Resources Program. The project has received a Coastal Zone Consistency Determination from the Coastal Resources Program (Appendix B, Correspondence C).

The following impacts are anticipated for the project alternatives:

- Impacts Under No Action Alternative –
 - Positive Impact: No impact.
 - Negative Impact: Continued degradation of coastal resources by street debris and flooding into Patrick's Bayou.
- Impacts Under Option 1 – Project is consistent with the Coastal Zone Management Act.
 - Positive Impacts: Positive long term water quality impacts will occur to downstream wetlands and the Houston Ship Channel resulting from sediment capture at the new detention storage basin.

- Negative Impacts: Minimal negative short term impacts due to the potential for construction generated storm related runoff. No long term negative impacts are anticipated.
- Impacts Under Option 2 – Project is consistent with the Coastal Zone Management Act.
 - Positive Impacts: Same positive impacts as Option 1.
 - Negative Impacts: Similar to Option 1. There is a slightly higher chance for negative short term impacts as an additional four (4) acres of land will be excavated during the construction of this alternative.

4.4 Biological Resources

4.4.1 Threatened and Endangered Species and Critical Habitat

The Endangered Species Act (ESA) of 1973 protects plants and animals that are listed by the federal government as "endangered" or "threatened." ESA Section 9 makes it unlawful for anyone to "take" a listed animal, and this includes significantly modifying its habitat. Section 7 imposes an affirmative duty on federal agencies to ensure that their actions (including permitting) are not likely to jeopardize the continued existence of a listed species (plant or animal) or result in the destruction or modification of critical habitat.

The parcel of land lies close to highly industrialized petroleum areas, a major state highway, and urban and educational facilities. There are no sensitive ecosystems such as springs, natural waterways, wetlands, bays, estuaries, native grasslands, etc.

A list of threatened and endangered species for Harris County was obtained from the Texas Parks & Wildlife Department web page and is included in Appendix C. This list differentiates between Federal and/or State listings. The only federally listed species with potential habitat within the project site is the Texas Prairie Dawn plant. An evaluation of the potential impacts to this species shall be discussed.

Federally Listed Species

A. Texas Prairie Dawn-Flower (Federal Status - Endangered)

The Texas Prairie Dawn-Flower (*Hymenoxys texana*) is listed as Harris County's only federally listed species with potential habitat within the project area.

The plant can grow in harsh conditions and therefore completes its lifecycle during spring and summer. According to a document by the U.S. Fish & Wildlife Service titled, "Hymenoxys Texana Recovery Plan (1989)", which is included in Appendix C, the plant's habitat is described as "sparsely vegetated areas of fine-sandy soil in open grasslands. Poorly drained depressions and saline swales, including periphery of low pimple mounds. Soil often covered with a blue-green algae. Disturbed soils if soil structure remains relatively intact."

According to the Center for Plant Conservation's website, the plant "grows within a narrow range of soil and site conditions...slick areas composed of fine-sandy compacted soil in seasonally wet depressions or saline swales at the periphery of low mounds termed mima or pimple mounds. The upper 7 inches of the soils, in the Narta soil series, are poorly drained and are powdery when dry and sticky and soft when wet. These soils are often saline and moderately alkaline. It also persists in the low areas of abandoned rice fields, vacant lots, and pastures where mima mounds have been bulldozed and natural vegetation has returned." Changes in soil salinity and acidity occur in these areas as result of the fluctuating water table. Also, according to the article, Prairie dawn is susceptible to competition and heavy grazing by cattle.

The critical habitat described above does not exist in the project area. During the onsite environmental assessment visit conducted in December 2009, no mima or pimple mounds were found in the grassy areas. In addition, water with blue-green alga, a common indicator, was not found. Furthermore, the proposed excavation area is moderately wooded, which would out-complete the plant. Since the critical habitat does not exist on the project site, it is concluded that the project site does not contain this federally listed species and thus will have no direct impact on it.

B. Bald Eagle (Federal Status - Delisted; but included on the Federal Migratory Bird Treaty Act)

The Bald Eagle (*Haliaeetus leucocephalus*) is listed on the U.S. Fish & Wildlife Service website for Harris County, but it has been delisted from the federal endangered and threatened species list since June 28, 2007. It remains, however, protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Under the acts, criminal and civil penalties are imposed on anyone who takes (which includes possesses, sells, purchases, barter, offers to sell or purchase or barter, transports, exports or imports at any time or in any manner a bald or golden eagle, alive or dead; or any part, nest or egg of these eagles). This definition of "takes" also includes the prohibition of disturbing the birds.

Eagles are migratory and also live year round in southeastern Texas and in the Houston area. They prefer areas near water in close proximity to fish, their primary food source. Eagles prefer nesting in hardwood forests of large deciduous trees. They build large nests, which have a depth of about 2 feet and a width of about 5 feet. The trees on the project site are moderate in height and density. A large nest would be unlikely, and if existing, would be easily spotted. No eagles or large nests were observed during the onsite inspection in December 2009. In the event that a bald or golden eagle nest is discovered on site during construction, the City of Deer Park will stop all work immediately in the vicinity of the nest. The City of Deer Park will inform FEMA immediately of the discovery, and FEMA will consult with the United States Fish and Wildlife Service (USFWS). Work around the nest cannot resume until consultation is completed and appropriate measures have been taken to ensure compliance with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Texas State Listed Species

The Texas State-listed species that may potentially be impacted are: (i) American Peregrine Falcon; (ii) White-tailed hawk; (iii) Plains spotted skunk; and (iv) Timber/canebrake rattlesnake. Although these species may potentially be present, dominant habitat indicators for them were not observed during a recent field survey conducted in early December, 2009. Because these species are not federally listed species, federal funding will not support mitigation actions to protect them. However, it is expected that impacts will be minimum and that if any of these species exist on the proposed site, they will likely move to the wooded parcel of land to the south.

Correspondence was sent to the Texas Parks and Wildlife Agency on August 4, 2009 (Appendix B, Correspondence A), but no response was received. During a follow-up phone conversation on January 6, 2010, Mr. Tom Heger evaluated the project. He acknowledged the value of woodlands for wildlife habitats and recommended that the City mitigate the loss by planting woodlands nearby in a 1:1 equal amount of acreage and density. He suggested that the grassy area to the north of the project site would be appropriate. As there are no critical habitats for federally listed species, this action will not be enforced or funded by FEMA. However, the City intends to mitigate the loss of trees by planting new sapling on the northern boundary of the project site, between the proposed location of the detention storage basin and the existing State Highway 225. It is estimated that between 2-3 acres of land along the northern face of the proposed detention storage basin will be replanted.

The following impacts are anticipated for the project alternatives:

- Impacts Under No Action Alternative – No positive or negative impacts on federally-listed threatened and endangered species.
- Impacts Under Option 1 – If nesting Bald Eagles are spotted on-site, construction will be delayed. Other impacts are summarized below.
 - Positive Impacts: The proposed project will permanently remove a large portion of undeveloped land that due to its proximity to State Highway 225 is potential site for future urban development. Once completed, the proposed project site will be replanted with grasses and other erosion reducing ground cover. Over time the site will attract new species for repopulation.
 - Negative Impacts: The proposed project will convert existing woodlands that support wildlife habitats into a constructed drainage basin that will by design periodically flood. In the short term, this will displace a number of existing species. In the long term, the new site has the potential for not supporting as diverse a population of species as currently exist.
- Impacts Under Option 2 – If nesting Bald Eagles are spotted on-site, construction will be delayed. Other impacts are summarized below.

- Positive Impacts: Same positive impacts as Option 1.
- Negative Impacts: Same negative impacts as Option 1.

4.4.2 Wildlife and Fish

According to the U.S. Fish & Wildlife website, “The Fish & Wildlife Coordination Act authorizes the Secretaries of Agriculture and Commerce to provide assistance to and cooperate with Federal and State agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife.”

Also, “The 1958 amendments added provisions to recognize the vital contribution of wildlife resources to the Nation and to require equal consideration and coordination of wildlife conservation with other water resources development programs.”

TCEQ also address the need to improve the water quality in the area. Although no permanent waters or fish are contained within the project area, downstream of the Patrick Bayou drainage channel, where it drains into the Houston Shipping Channel, the Total Maximum Daily Load (TMDL) for Copper and Temperature and Toxicity in Water & Sediment are exceeded. The TMDL report was obtained from TCEQ and is included in Appendix C.

According to the TMDL report, the tidal portions of Patrick Bayou support abundant wildlife in the form of birds (such as ducks, shorebirds, roseate spoonbills, ospreys), turtles, and fish. The TMDL states that, “The bayou is affected by industrial and municipal wastewater discharges and by stormwater runoff from industrial and urban areas.”

Thus, the detention basin project supports both the Fish and Wildlife Coordination Act, and the TCEQ TMDL reduction goals, by reducing oils, heavy metals, and suspended particles from floodwaters which flow from homes and streets via a concrete lined channel into the Patrick’s Bayou and thence into the Houston Shipping Channel. This is done by diverting the flows from the concrete lined channel into the new detention storage basin, which during low flows, will allow for the natural absorption and filtration of the concentrated rainwater.

The majority of the detention basin site consists of an area with moderately dense trees but with few shrubs, probably due to cattle grazing. The adjacent wooded parcel to the south probably supports a greater amount of wildlife as it is more densely wooded. The southern parcel will likely support disturbed wildlife populations from the project site. The City will plant sapling trees on the northern end of the property as a visual buffer. Though they will not replace the woodlands, as the trees mature, they will provide for some wildlife habitat. It is estimated that between 2-3 acres of land along the northern face of the proposed detention storage basin will be replanted and is the same mitigation proposed in Section 4.4.1

The following impacts are anticipated for the project alternatives:

- Impacts Under No Action Alternative –
 - Positive Impacts: Wooded area on the project site is not disturbed, thereby not impacting existing wildlife and habitats.
 - Negative Impacts: Continued negative impacts on wildlife downstream in the Houston Shipping Channel TMDL site by stormwater runoff.
- Impacts Under Option 1 –
 - Positive Impacts: Beneficial impact on wildlife downstream in the Houston Shipping Channel TMDL site by reducing flood waters in streets which drain street debris and chemicals.
 - Negative Impacts: Wooded area will be disturbed, reducing wildlife habitat on the project site.
- Impacts Under Option 2 -
 - Positive Impacts: Same impacts as Option 1.
 - Negative Impacts: Same impacts as Option 1.

4.5 Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA), as amended, and implemented by 36 CFR Part 800, requires Federal agencies to consider the effects of their actions on historic properties and provide the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on Federal projects prior to implementation. Historic properties are defined as archeological sites, standing structures, or other historic resources listed in or eligible for listing in the National Register of Historic Places (NRHP).

4.5.1 Historic Properties

The San Jacinto Monument commemorating the site of the battleground of San Jacinto is located about four miles northeast of Deer Park.

Correspondence was sent to the Texas Historical Commission (Appendix B, Correspondence B) to ascertain whether an archeological survey would be required. The correspondence was returned with a signed stamp of approval stating, "No Survey Required. Project May Proceed." The San Jacinto Battlefield has been archeologically surveyed several times. Thousands of artifacts have been recovered, which have been preserved and displayed at several museums. Areas surveyed include the battlefield as well as the retreat of Santa Ana's army.

The Area of Potential Effects (APE) for the detention basin construction would be limited to the excavation area of the detention basin. If cultural materials are found, work will stop in the immediate vicinity of the discovery and reasonable measures to avoid or minimize harm to the finds will be taken. All archeological findings will be secured and access to the sensitive area restricted. The applicant shall immediately inform TDEM, FEMA, and the State Historic Preservation Office (SHPO). Work in sensitive areas cannot resume until consultation is completed and appropriate measures have been taken to ensure that the project is in compliance with the THC.

The following impacts are anticipated for the project alternatives:

- Impacts Under No Action Alternative – No positive or negative impacts.
- Impacts Under Option 1 – No positive or negative impacts are anticipated other than in the event that a find of historical importance is unearthed. Then work will stop as outlined in the previous paragraph.

- Impacts Under Option 2 – Same as Option 1

4.5.2 Native American Cultural/Religious Sites

There are no known tribal interests in Harris county and in the project area in particular. The Karankawa Indian groups inhabited the southern/coastal Texas area from Galveston to Corpus Christi before the Europeans arrived. However, according to the Handbook of Texas online, “exposure to new infectious diseases, loss of control over territory, conflict with the newly arrived Europeans, and war brought them to extinction before 1860.”

If cultural materials are found, work will stop in the immediate vicinity of the discovery and reasonable measures to avoid or minimize harm to the finds will be taken. All cultural findings will be secured and access to the sensitive area restricted. The applicant shall inform TDEM, FEMA, and the State Historic Preservation Office (SHPO) if artifacts are found. Work in sensitive areas cannot resume until consultation is completed and appropriate measures have been taken to ensure that the project is in compliance with the THC.

The following impacts are anticipated for the project alternatives:

- Impacts Under No Action Alternative – No positive or negative impacts.
- Impacts Under Option 1 – No positive or negative impacts are anticipated other than in the event that a find of historical importance is unearthed. Then work will stop as outlined in the previous paragraph.
- Impacts Under Option 2 – No positive or negative impacts are anticipated.

4.6 Socioeconomic Resources

4.6.1 Environmental Justice

EO 12898 (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 their programs, policies, and activities on minority and low-income populations.

In the 2000 U.S. Census, the City had a population of 32,000 with a medium income of \$62,000. The demographic profile is 81% white, 1.5% African-American, 16% Hispanic and 1.5% Asian.

The immediate project area is vacant land with no residential demographics. Residential neighborhoods to the south are newer and are probably owned by middle-income families. The neighborhoods to the west and southwest are smaller, older homes potentially with a lower income, minority or elderly populations. These neighborhoods have the highest percentage of repetitive flood losses in the City, which is why the project site was chosen. Nearby small businesses along the major thoroughfare of Center Street Avenue near SH 225 will also benefit with flood mitigation as well.

Environmental justice issues are not anticipated because of the positive impact of the project on the community as a whole. The raising of utility rates as a result of the expense of the project is not anticipated if the financing is subsidized with Federal funds.

The following impacts are anticipated for the project alternatives:

- Impacts Under No Action Alternative –
 - Positive Impacts: City saves on construction costs of flood mitigation project.
 - Negative Impacts: Continued negative impact on neighborhoods due to recurring flooding. Property values remain low. Large storms continue to cause flooding which poses an economic burden to homeowners and businesses.
- Impacts Under Option 1 –
 - Positive Impacts: Positive socioeconomic impact on surrounding neighborhoods and businesses due to flood mitigation.
 - Negative Impacts: Although not anticipated, utility rates could be raised.
- Impacts Under Option 2 -

- Positive Impacts: Same as in Option 1.
- Negative Impacts: Although not anticipated, slightly higher possibility for increased utility rates than Option 1 due to higher construction costs.

4.6.2 Noise

Noise is generally defined as unwanted sound. Sound is most commonly measured in decibels (dB) on the A-weighted scale, which is the scale most similar to the range of sounds that the human ear can hear. The Day-Night Average Sound Level (DNL) is an average measure of sound. The DNL descriptor is accepted by the Federal agencies as a standard for estimating sound impacts and establishing guidelines for compatible land uses. EPA guidelines, and those of many other Federal agencies, state that outdoor sound levels in excess of 55 DB DNL or “normally unacceptable” or noise-sensitive land uses such as residences, schools, or hospitals. The proposed project site is located near a residential area.

Short term noise impacts are anticipated from machinery during the construction period. To reduce noise levels during that period, construction activities will take place during normal business hours. Equipment and machinery at the proposed project site would meet all local, State, and Federal noise regulations.

The following impacts are anticipated for the project alternatives:

- Impacts Under No Action Alternative – No positive or negative impacts.
- Impacts Under Option 1 –
 - Positive Impacts: No impacts.
 - Negative Impacts: Short term noise impacts during construction phase. No long term noise impacts.
- Impacts Under Option 2 -
 - Positive Impacts: No impacts.

- **Negative Impacts:** Slightly higher short term impacts during construction phase due to additional excavation and hauling than Option 1. No long term noise impacts.

4.6.3 Traffic

The project will be accessed primarily via Luella Lane to a staging area northwest of the project site. Impacts on traffic will be minimal and short term during construction. The project will have a long term beneficial impact on traffic in the area, as street flooding will be greatly reduced, if not eliminated.

The following impacts are anticipated for the project alternatives:

- **Impacts Under No Action Alternative** –
 - **Positive Impacts:** No construction-related traffic impacts.
 - **Negative Impacts:** Street closures and increased traffic in flooded areas. Traffic and street flooding also can impede emergency vehicles from assisting those in need.
- **Impacts Under Option 1** –
 - **Positive Impacts:** Positive long term traffic will be achieved as flooding will no longer impede the flow of traffic in residential and business districts.
 - **Negative Impacts:** Minimal short term negative impacts during construction phase.
- **Impacts Under Option 2** –
 - **Positive Impacts:** Same as Option 1.
 - **Negative Impacts:** Minimal short term negative impacts during construction phase, although slightly higher than Option 1 as more excavation and hauling are necessary.

4.6.4 Public Service and Utilities

An existing water and sewer line crosses the center of the property in an east/west direction. Two design alternatives have been proposed, one relocating the lines, and the other deepening the water line so it is not in conflict with the bottom of the basin. During the final engineering assessment, costs associated with each alternative will be evaluated, and the best option will be determined.

Service may be disrupted for a short time during construction for connection of the pipe(s). Affected utility customers will be notified several days prior to the disruption. The connection(s) will be accomplished as efficiently as possible to minimize time of disruption.

The following impacts are anticipated for the project alternatives:

- Impacts Under No Action Alternative –
 - Positive Impacts: There would be no changes at the proposed project site, so there would be no service disruption during construction.
 - Negative Impacts: Potential for large storms to continue to impact public utilities with flooding.
- Impacts Under Option 1 –
 - Positive Impacts: Positive long term impacts due to protection of the water treatment plant.
 - Negative Impacts: Short term disruption during construction when connecting the new water and sewer lines.
- Impacts Under Option 2 -
 - Positive Impacts: Positive long term impacts due to protection of the water treatment plant.
 - Negative Impacts: Short term disruption during construction when connecting the new water line. Less impact than Option 1 as only one utility line is moved.

4.6.5 Public Health and Safety

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

EO 13045, Protection of Children, requires Federal agencies to make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children.

The project will positively impact public health of the community by protecting them from floodwaters which can cause mold and fungus growth in their homes. Barriers and fencing will be in put into place in order to protect the public from construction hazards. The detention pond would normally be empty, except for a short time during and after flooding occurrences. Fencing around the perimeter will prevent children from potential accidents associated with the pond.

Construction activities could also present safety risks to those performing the activities. To minimize risks to safety and human health, all construction activities will be performed using qualified personnel trained in proper use of the appropriate equipment, including all appropriate safety precautions. All activities will be conducted in a safe manner in accordance with the standards specified in the Occupational Safety and Health Administration (OSHA) regulations. Appropriate signage and barriers will be in place prior to construction activities to alert pedestrians and motorists of project activities.

The following impacts are anticipated for the project alternatives:

- Impacts Under No Action Alternative –
 - Positive Impacts: No positive impacts.
 - Negative Impacts: Continued negative impacts on public health and safety issues due to flooding (ie. mold).
- Impacts Under Option 1 –

- Positive Impacts: Long term positive health benefits will be realized due to mitigation of flooding into homes.
- Negative Impacts: Short term risks to construction personnel. Impacts will be minimized with properly trained personnel, appropriate equipment, adherence to OSHA regulations, and placement of signage and barriers.

Impacts Under Option 2 –

- Positive Impacts: Long term positive health benefits will be realized due to mitigation of flooding into homes.
- Negative Impacts: Short term risks to construction personnel, slightly higher than Option 1 due to additional construction requirements. Impacts will be minimized with properly trained personnel, appropriate equipment, adherence to OSHA regulations, and placement of signage and barriers. Option 2 will also require additional long term maintenance, which could pose risk to maintenance personnel.

4.7 Summary of Impacts and Mitigation Measures

Affected Environment/ Resource Area	Impacts	Agency Coordination/Permits	Mitigation/BMPs
Geology & Soils	Excavation of soil; no prime farmland will be impacted.	N/A	None required
Air Quality	Potential for short-term dust impact during construction.	TCEQ	Standard dust mitigation techniques. Watering for dust reduction as necessary.
Water Quality	Positive impact on Patrick's Bayou and Houston Shipping Channel	TCEQ	Sedimentation barriers will be put in place before construction to mitigate sedimentation and runoff.
Wetlands	None on the project site. Wetlands in the Patrick's Bayou and Houston Shipping Channel will be positively impacted by reduced street flooding.	USACE	None required
Floodplains	Positive impact on flood zone, will reduce flooding in streets & homes.	N/A	None required
Coastal Resources	None	Coastal Coordination Council approval received.	None required
Threatened & Endangered Species	No effect to threatened & endangered species.	USFWS & Texas Parks and Wildlife	USFWS - No effect to threatened and endangered species; in the event that a bald or golden eagle nest is discovered on site during construction, the City of Deer Park will stop all work immediately in the vicinity of the nest. The City of Deer Park will inform FEMA immediately of the discovery, and FEMA will consult with

			<p>the USFWS. Work around the nest cannot resume until consultation is completed and appropriate measures have been taken to ensure compliance with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.</p> <p>TPWS - No mitigation required, but City will plant trees as a visual buffer, which will partially mitigate tree loss.</p>
Wildlife & Fish	Short term impacts on wildlife.	USFWS & Texas Parks and Wildlife	<p>USFWS - No effect to threatened and endangered species;</p> <p>TPWS - No mitigation required, but City will plant trees as a visual buffer, which will partially mitigate tree loss.</p>
Cultural Resources	No impacts anticipated.	Texas Historical Commission approval received.	<p>If cultural materials are found, work will stop in the immediate vicinity of the discovery and reasonable measures to avoid or minimize harm to the finds will be taken. All archeological findings will be secured and access to the sensitive area restricted. The applicant shall immediately inform TDEM, FEMA, and the State Historic Preservation Office (SHPO). Work in sensitive areas cannot resume until consultation is completed and appropriate measures have been taken to ensure that the project is in compliance with the THC.</p>
Socioeconomic Resources	No impacts.		None
Noise	Short-term impacts.		Work will proceed during normal daytime work hours with equipment meeting all State, Federal and local regulations.

Public Service & Utilities	Short-term impact possible if design alternative is chosen.		Affected utility customers will be notified several days prior to the disruption. The connection(s) will need to be accomplished as efficiently as possible to minimize time of disruption.
Public Health & Safety	Positive impact.		Signage, barriers and fencing will be in place before construction to alert traffic and pedestrians.

5.0 Cumulative Impacts

According to CEQ (Council on Environmental Quality) regulations, cumulative impacts represent 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).” In accordance with NEPA and to the extent reasonable and practical, this EA considered the Proposed action alternative and potential other actions which may occur in the vicinity of the proposed project site.

The proposed site is adjacent to a heavily wooded unimproved lot to the south. The reduction of flooding in this area could potentially open the land to development and the reduction of habitat for wildlife. However, the close proximity to the oil refineries and railroad probably makes this area undesirable for residential purposes. No other cumulative impacts are anticipated

6.0 Conclusions

Three alternatives have been discussed for the flooding problem in the Patrick's Bayou area of the City of Deer Park. The "No Action" alternative does nothing to mitigate the recurring flooding, allowing continued inundation every couple of years. This greatly impacts residents and businesses, and also impacts water quality downstream in the Houston Shipping Channel. For these reasons, this alternative is unacceptable to the City. Flooding has been costly to the City, as infrastructure has been damaged from tropical storms.

This problem has been studied numerous times, and it has been concluded that a detention basin would be the best project to alleviate the problem. Two design alternatives have been proposed. In Option 1, the water and sewer lines which transect the project area are to be moved, and the detention basin maintains a consistent depth at the bottom of the structure. This option poses minimal environmental concerns, as follows:

- 1) Geology and soils will be impacted, but no important farmlands will be impacted as none exist in the project area.
- 2) Air quality will be minimally impacted, as mitigation measures by the contractor will be utilized to reduce impacts.
- 3) Water quality downstream will be positively impacted due to the reduction of flooding in streets where waters can drain trash and chemicals.
- 4) There are no wetlands on the project site, however, wetlands in Patrick's Bayou and the Houston Shipping Channel will be positively impacted.
- 5) Floodplains will be positively impacted as flooding is mitigated. Home and business owners will benefit from reduced insurance payments as they will no longer be in a flood zone. The NFIP will benefit by not having to pay recurring claims losses.
- 6) Coastal Resources will be positively impacted, as this project is consistent with the goals of the coastal program.
- 7) Threatened & endangered species should not be impacted, as critical habitats have not been found in the project area.
- 8) Wildlife will be impacted during the short term, as trees are cut in the area of the detention facility. However, the parcel to the south can likely sustain additional wildlife. Fish downstream in the Houston Shipping Channel will potentially be positively impacted with the improved quality of water draining into the channel.

Option 2 minimizes moving of the utility lines, leaving the sewer line in place, and lowering a portion of the water line. The design works around the utility lines by having a multi-leveled bottom with sloping high and low points rather than one single flat bottom. This design option is more complex, requiring a slightly larger footprint, higher construction costs, and slightly higher environmental impacts.

The eight (8) general conclusions outlined for Option 1 on the previous page apply to Option 2. The only modification is that the stated adverse impacts is slightly higher for Option 2 as more dirt will have to be disturbed and moved offsite.

Conclusion

Option 1 is marginally the recommended design because of its slightly lower costs, and slightly less negative environmental impacts. However, as the overall costs and cumulative environmental impacts of both alternatives are very similar, the final selection of the proposed alternative shall be determined during the design phase.

7.0 Agency Coordination, Public Involvement and Permits

7.1 Agency Coordination

On August 4, 2009, correspondence was sent to five (5) agencies determined by the TDEM as potentially being interested in providing comments to this project. Correspondence included a letter with project description and maps. Copies of correspondence and responses are contained in Appendix B. The agencies were:

- A. Mr. Carter Smith
Executive Director
Texas Parks & Wildlife
4200 Smith School Road
Austin, TX 78744
(512) 389-4571

- B. Mr. F. Lawrence Oaks
Texas Historical Commission
1511 Colorado Street
Austin, TX 78701

- C. Jodenna Henneke
Deputy Commissioner
Coastal Resources Program (Coastal Coordination Council)
Texas General Land Office
P.O. Box 12873
Austin, TX 78711-2873

- D. Ms. Glenda Thorn
TCEQ
Water Program Section
12100 Park 35 Circle
Austin, TX 78753

- E. Mr. Kevin Morgan
Chief, Evaluation Section
U.S. Army Corps of Engineers
Jadwin Building
2000 Fort Point Road
Galveston, TX 77550

7.2 Public Involvement

The flooding problem has been revisited several times during the last decade with public input. More recently, a City Council meeting was held on January 8, 2008, in which this project was discussed. During the discussion period, positive public feedback from those present was received. Subsequently, by unanimous consent the City Council agreed to proceed with this project. The project was also discussed during an open City Council meeting in February 2010 after submission of the preliminary engineering report. Response to the project was positive.

7.3 Permits

No permits are anticipated for this project.

8.0 List of Preparers

Kayla L. Saperstein
Environmental Coordinator
Essayon Engineering & Development, Inc.

David G. McSwain, P.E.
Civil/Environmental Engineer
Essayon Engineering & Development, Inc.

9.0 Appendices

Appendix A - Maps & Photos

Map A - USGS 7.5 Quadrangle Map

Map B - Site Map

Map C - FEMA Flood Map

Map D – National Wetland Inventory Map

Photos

Appendix B - Agency Correspondence

Agency Responses

Correspondence to Agencies

Appendix C - Endangered & Threatened Species

TPWS Species List

Texas Prairie Dawn Flower Research

Appendix D - Phase II Environmental Site Assessment

Phase II Environmental Site Assessment

Appendix E – Design Alternatives

Base-Detention Storage Basin (Option 1)

Water and Sewer Reolcation (Option 1)

Alternate-Detention Storage Basin (Option 2)

10.0 References

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