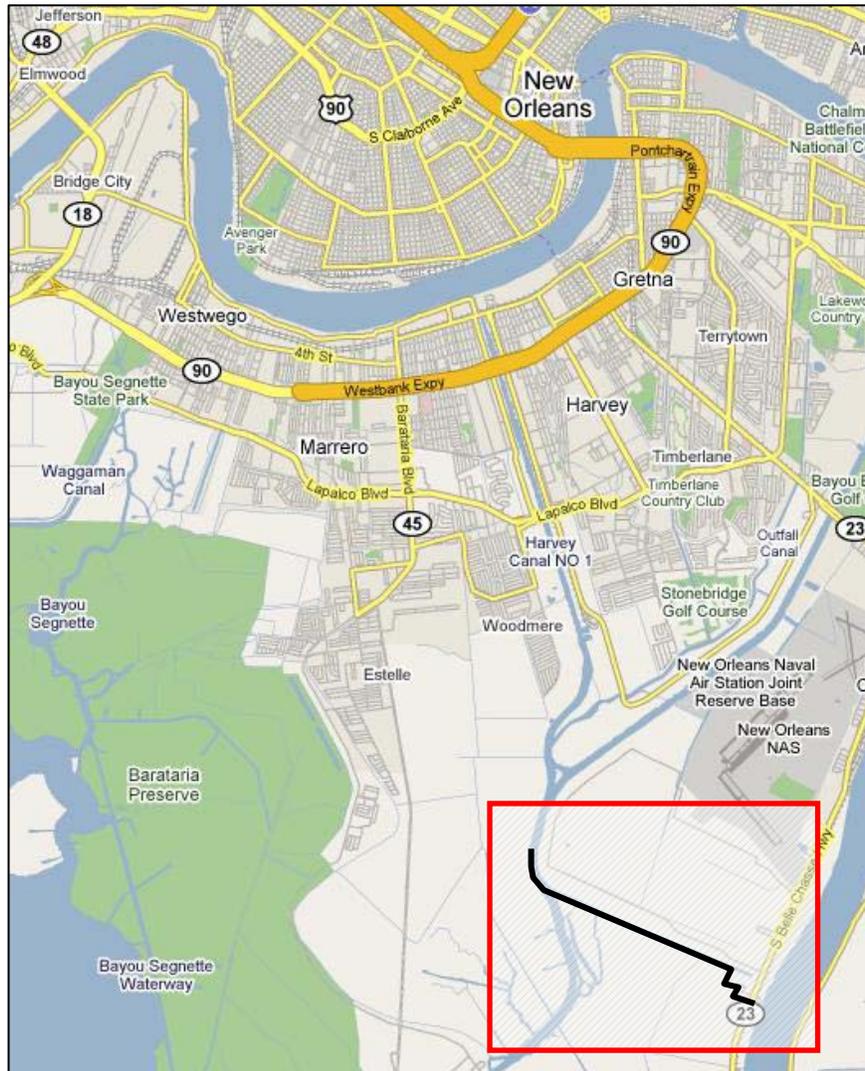


DRAFT INDIVIDUAL ENVIRONMENTAL REPORT

WEST BANK AND VICINITY HERO CANAL LEVEE AND EASTERN TERMINUS

PLAQUEMINES PARISH, LOUISIANA

IER # 13



**US Army Corps
of Engineers®**

April 2009

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CHAPTER 1 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (CEMVN), has prepared this Individual Environmental Report # 13 (IER # 13) to evaluate the potential impacts associated with the proposed enlargement to the Hero Canal levee, and construction of the Eastern Tie In portion of the West Bank and Vicinity, Louisiana Project (WBV). The WBV project is a portion of the larger Greater New Orleans Hurricane and Storm Damage Risk Reduction System (HSDRRS). The proposed action is located in Plaquemines Parish in the State of Louisiana (LA) (figure 1).

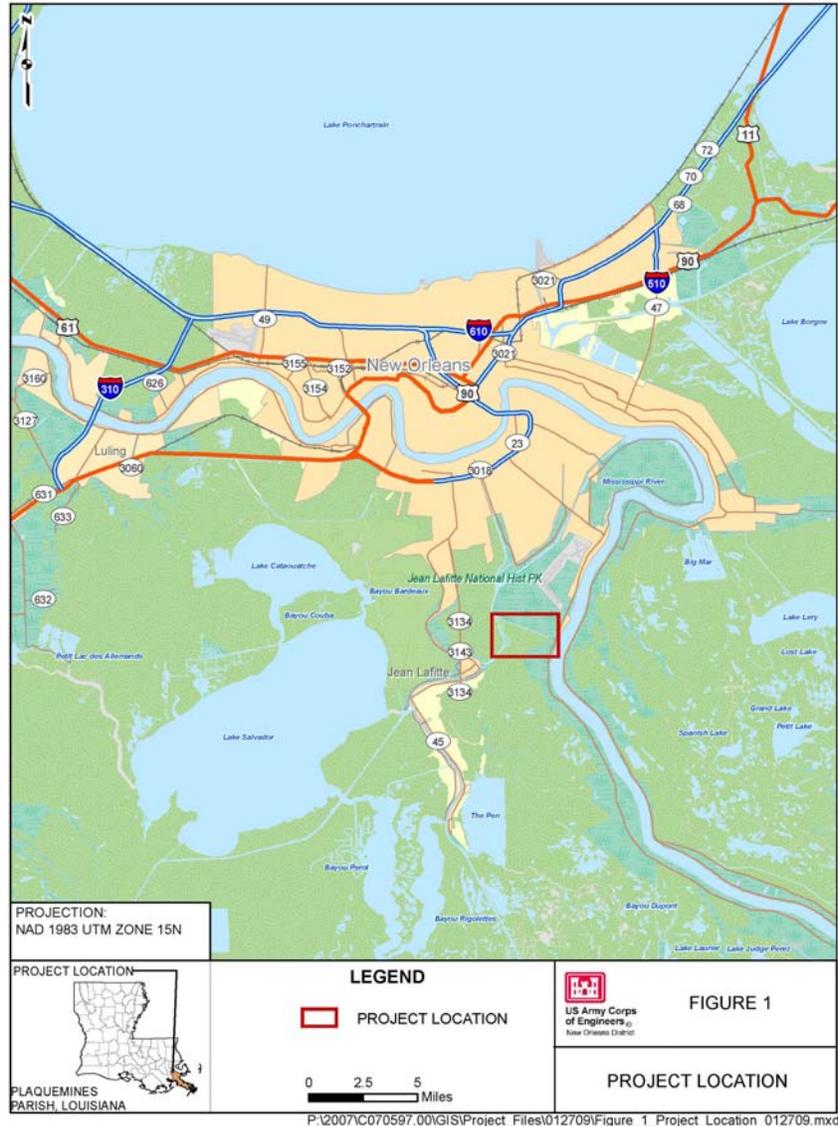


Figure 11: Project Location

IER # 13 has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality's (CEQ) Regulations (40 CFR §1500-1508), as reflected in the USACE Engineering Regulation (ER), ER 200-2-2. The execution of an IER, in lieu of a traditional Environmental Assessment (EA) or Environmental Impact Statement (EIS), is provided for in ER 200-2-2, Environmental Quality (33 CFR §230) Procedures for

Implementing the NEPA and pursuant to the CEQ NEPA Implementation Regulations (40 CFR §1506.11). The Alternative Arrangements can be found at www.nolaenvironmental.gov, and are herein incorporated by reference.

The CEMVN implemented Alternative Arrangements on 13 March 2007 under the provisions of the CEQ Regulations for Implementing the NEPA (40 CFR §1506.11). This process was implemented in order to expeditiously complete environmental analysis for any changes to the authorized system and the 100-year level of the Greater New Orleans Hurricane and Storm Damage Risk Reduction System (HSDRRS), formerly known as the Hurricane Protection System (HPS), authorized and funded by Congress and the Administration. The proposed actions are located in southeastern Louisiana and are part of the Federal effort to rebuild and complete construction of the HSDRRS in the New Orleans metropolitan area as a result of Hurricanes Katrina and Rita.

This draft IER will be distributed for a 30-day public review and comment period and will be available at www.nolaenvironmental.gov. A public meeting specific to the proposed action will be held if requested by a stakeholder during the review period. Any comments received during this public meeting will be considered part of the official record. After the 30-day comment period, and public meeting if requested, the CEMVN District Commander will review all comments received during the review period and make a determination if they rise to the level of being substantive. If comments are not considered to be substantive, the District Commander will make a decision on the proposed action. This decision will be documented in an IER Decision Record. If a comment(s) is determined to be substantive in nature, an Addendum to the IER will be prepared and published for an additional 30-day public review and comment period. After the expiration of the public comment period the District Commander will consider any public comments and will make a decision on the proposed action. The decision will be documented in an IER Decision Record.

1.1 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to provide hurricane and storm damage risk reduction to a portion of the community on the west bank of the Mississippi River near New Orleans. The USACE would construct and maintain levees, floodwalls, and related facilities designed to provide a 100-year level of risk reduction for the residents and businesses in the Belle Chasse and Oakville vicinity. In particular, the proposed action would enlarge the existing levee along the northern bankline of the Hero Canal and construct the eastern tie-in south of the canal and west to the Mississippi River Levee. This would reduce the flood risk for the greater New Orleans area and complete a necessary component of the HSDRRS. The proposed project is part of the West Bank and Vicinity (WBV) project in the Belle Chasse Basin, and would reduce risk for Belle Chasse, Oakville, and other unincorporated areas in Plaquemines Parish. The proposed action would provide an important segment of the system of levees and floodwalls reducing flood risk for the WBV east of the Algiers Canal (figure 2).

The proposed action would address a need to reduce flood risk and storm damages to urban development and infrastructure from hurricanes and other tropical high water events. Hurricane Katrina on 29 August 2005, and Hurricane Rita on 24 September 2005, made landfall in southeast LA and seriously damaged residences, businesses and portions of the HSDRRS. Since that time, the USACE has been working with state and local officials to restore and improve the HSDRRS. The completed HSDRRS would lower the risk of damage to property and infrastructure during a major storm event. The safety of people in the region is the highest priority of the USACE.

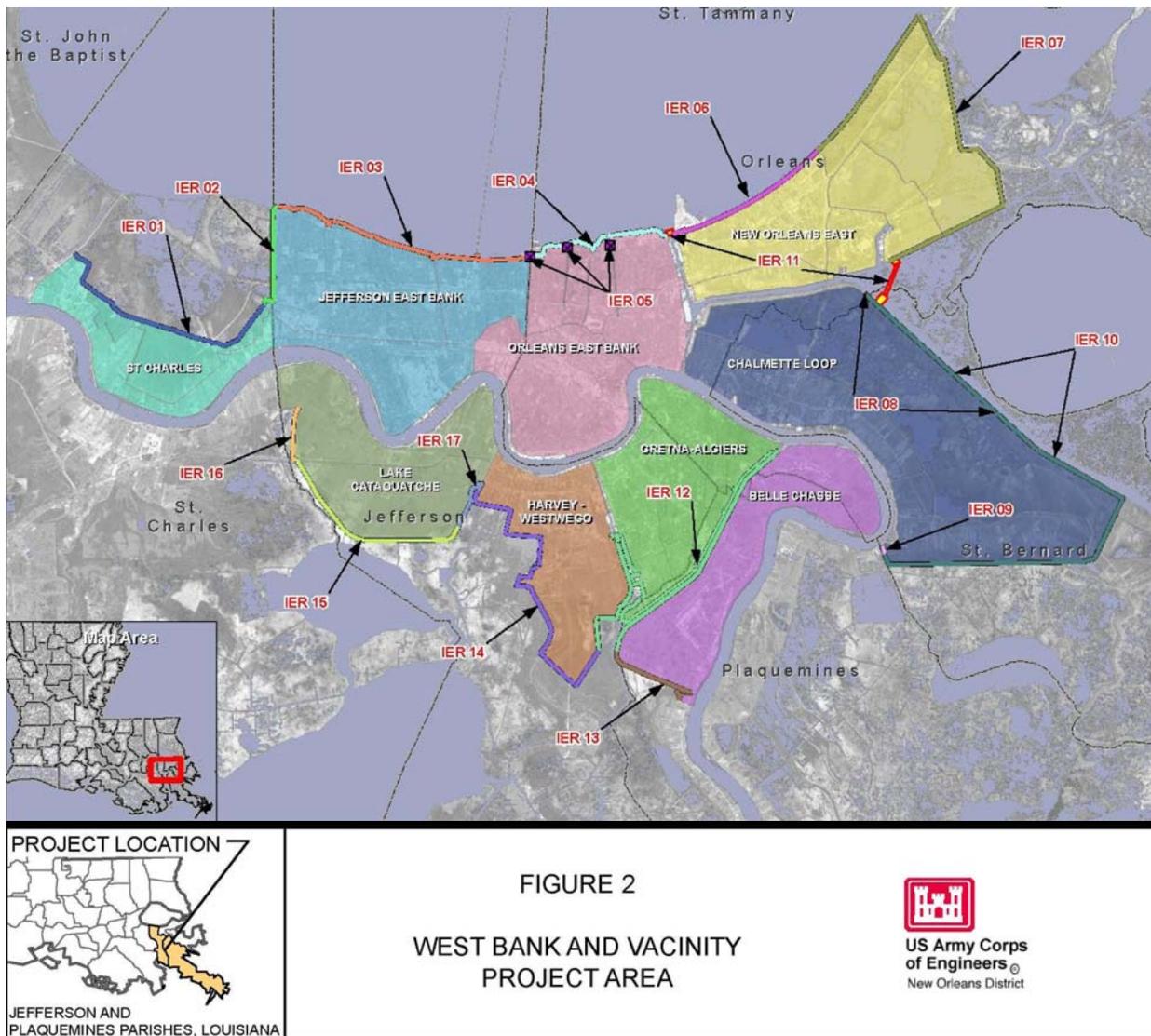


Figure 22: West Bank and Vicinity Project Area

The term “100-year level of risk reduction”, as it is used throughout this document, refers to a level of risk reduction which reduces the risk of hurricane surge and wave driven flooding that the New Orleans metropolitan area has a 1 percent chance of experiencing each year.

1.2 AUTHORITY FOR THE PROPOSED ACTION

The authority for the proposed action was provided as part of a number of hurricane and storm damage risk reduction projects spanning southeastern LA, including the Lake Pontchartrain and Vicinity (LPV) Hurricane Protection Project and the WBV Hurricane Protection Project. Congress and the Administration granted a series of supplemental appropriations acts following Hurricanes Katrina and Rita to repair and upgrade the project systems damaged by the storms and gave additional authority to the USACE to construct the 100-year HSDRRS projects.

The Westwego to Harvey Canal Hurricane Protection Project was authorized by the Water Resources Development Act (WRDA) of 1986 (P.L. 99-662, Section 401(b)). The WRDA of 1996 modified the project and added the Lake Cataouatche Project and the East of Harvey Canal

Project (P.L. 104-303, Sections 101(a)(17) and 101(b)(11)). The WRDA of 1999 combined the three projects into one project under the name the West Bank and Vicinity Hurricane Protection Project (P.L. 106-53, Section 328).

The Department of Defense, Emergency Supplemental Appropriations to Address Hurricanes in the Gulf of Mexico, and Pandemic Influenza Act of 2006 (3rd Supplemental - P.L. 109-148, Chapter 3, Construction, and Flood Control and Coastal Emergencies) appropriated funds to accelerate the completion of the previously authorized project and to restore and repair the project at full Federal expense. The Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery of 2006 (4th Supplemental - P.L. 109-234, Title II, Chapter 3, Construction, and Flood Control and Coastal Emergencies) appropriated funds and added authority to raise levee heights where necessary, reinforce and replace floodwalls, and otherwise enhance the project to provide the levels of protection necessary to achieve the certification required for participation in the National Flood Insurance Program. Additional Supplemental Appropriations include the U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 (P.L. 110-28) Title IV, Chapter 3, Flood Control and Coastal Emergencies, Section 4302 (5th Supplemental), and the 6th Supplemental (P.L. 110-252), Title III, Chapter 3, Construction..

1.3 PRIOR REPORTS

A number of studies and reports on water resource development in the proposed project area have been prepared by the USACE, other Federal, state, and local agencies, research institutes, and individuals. Pertinent studies, reports, and projects are discussed below:

- On 13 March 2009, the CEMVN District Engineer signed the Decision Record on IER # 4 entitled "Lake Pontchartrain and Vicinity, Orleans East Bank, New Orleans Lakefront Levee, West of Inner Harbor Navigational Canal to Eastbank of 17th Street Canal, Orleans Parish, Louisiana." IER # 4 evaluates the potential impacts associated with rebuilding and/or modifying earthen levees and floodwalls, replacing or adding new floodgates, modifying the Bayou St. John gate structure, and rebuilding roadway ramps within Orleans parish.
- On 18 February 2009, the CEMVN District Engineer signed Decision Record on IER # 12 entitled "GIWW, Harvey, and Algiers Levees and Floodwalls, Jefferson, Orleans, and Plaquemines Parishes, Louisiana." IER # 12 evaluates the potential impacts associated with raising and/or constructing levees, floodwalls, and other structures to meet the 100-year level of risk reduction for Harvey-Westwego, Gretna-Algiers, and Belle Chase areas.
- On 3 February 2009, the CEMVN District Engineer signed a Decision Record on IER # 25 entitled "Government Furnished Borrow Material, Orleans, Plaquemines and Jefferson Parishes, Louisiana." IER # 25 evaluates the potential impacts associated with the actions taken by commercial contractors to excavate borrow material for use in construction of the HSDRRS.
- On 21 January 2009, the CEMVN District Engineer signed a Decision Record on IER #17 entitled "Company Canal Floodwall, Jefferson Parish, Louisiana." This document evaluates the potential environmental impacts associated with the construction and maintenance of floodwalls built to the 100-year level of risk reduction along the WBV, Company Canal Floodwall from the Bayou Segnette State Park to the New Westwego Pumping Station.
- On 21 October 2008, the CEMVN District Engineer signed a Decision Record on IER # 11 Tier 2 Borgne entitled "Improved Protection on the Inner Harbor Navigation Canal, Tier 2 Borgne Orleans and St. Bernard Parishes, Louisiana." The document evaluates the potential impacts associated with constructing a surge barrier on Lake Borgne.

- On 20 October 2008, the CEMVN District Engineer signed a Decision Record on IER # 26 entitled “Pre-Approved Contractor Furnished Borrow Material # 3, Jefferson, Plaquemines, and St. John the Baptist Parishes, Louisiana, and Hancock County, Mississippi.” IER # 26 evaluates the potential impacts associated with the actions taken by commercial contractors to excavate borrow material for use in construction of the HSDRRS.
- On 26 August 2008, the CEMVN District Engineer signed a Decision Record on IER # 14, entitled “Westwego to Harvey, Levee Jefferson Parish, Louisiana.” IER # 14 was prepared to examine the potential environmental impacts associated with the proposed construction and maintenance of levees built to a 100-year level of risk reduction along the WBV, Westwego to Harvey Levee project area.
- On 12 June 2008, the CEMVN District Engineer signed a Decision Record on IER # 15, entitled “Lake Cataouatche Levee, Jefferson Parish, Louisiana.” The proposed action includes raising and/or constructing levees, floodwalls, and other structures to meet the 100-year level of risk reduction in the project area.
- On 30 May 2008, the CEMVN District Engineer signed a Decision Record on IER # 22 entitled “Government Furnished Borrow Material, Plaquemines and Jefferson Parishes, Louisiana.” IER # 22 evaluates the potential impacts associated with the actions taken to excavate borrow material for use in construction of the HSDRRS.
- On 6 May 2008, the CEMVN District Engineer signed a Decision Record on IER # 23 entitled “Pre-Approved Contractor Furnished Borrow Material # 2, St. Bernard, St. Charles, Plaquemines Parishes, Louisiana, and Hancock County, Mississippi.” IER # 23 evaluates the potential impacts associated with the actions taken by commercial contractors to excavate borrow material for use in construction of the HSDRRS.
- On 21 February 2008, the CEMVN District Engineer signed a Decision Record on IER # 18 entitled “Government Furnished Borrow Material, Jefferson, Orleans, Plaquemines, St. Charles, and St. Bernard Parishes, Louisiana.” IER # 18 evaluates the potential impacts associated with the actions taken to excavate borrow material for use in construction of the HSDRRS.
- On 14 February 2008, the CEMVN District Engineer signed a Decision Record on IER # 19 entitled “Pre-Approved Contractor Furnished Borrow Material, Jefferson, Orleans, St. Bernard, Iberville, and Plaquemines Parishes, Louisiana, and Hancock County, Mississippi.” IER # 19 evaluates the potential impacts associated with the actions taken by commercial contractors to excavate borrow material for use in construction of the HSDRRS.
- On July 2006, the CEMVN District Engineer signed a FONSI on EA #433 entitled, “USACE Response to Hurricanes Katrina & Rita in Louisiana.” EA # 433 evaluated the potential impacts associated with the actions taken by the USACE as a result of Hurricanes Katrina and Rita.
- On 23 August 2005, the CEMVN District Engineer signed a FONSI on EA # 422 entitled “Mississippi River Levees – West Bank Gaps, Concrete Slope Pavement Borrow Area Designation, St. Charles and Jefferson Parishes, Louisiana.” EA # 422 investigates the impacts of obtaining borrow material from various areas in LA.
- On 22 February 2005, the CEMVN District Engineer signed a FONSI on EA # 306A entitled “West Bank Hurricane Protection Project – East of the Harvey Canal, Floodwall Realignment and Change in Method of Sector Gate.” The report discussed the impacts related to the

relocation of a proposed floodwall moved to accommodate the aforementioned sector gate, as authorized by the LPV Project.

- On 5 May 2003, the CEMVN District Engineer signed a FONSI on EA # 337 entitled “Algiers Canal Alternative Borrow Site.”
- On 16 May 2002, the CEMVN District Engineer signed a FONSI on EA # 306 entitled “West Bank Hurricane Protection Project - Harvey Canal Sector Gate Site Relocation and Construction Method Change.” The report discusses the impacts related to the relocation of a proposed sector gate within the Harvey Canal, as authorized by the LPV Project.
- On 30 August 2000, the CEMVN District Engineer signed a FONSI on EA # 320 entitled “West Bank Hurricane Protection Features.” The report evaluates the impacts associated with borrow sources and construction options to complete the Westwego to Harvey Canal Hurricane Protection Project.
- The final EIS for the WBV, East of Harvey Canal, Hurricane Protection Project was completed in August 1994. A Record of Decision (ROD) was signed by the CEMVN District Engineer in September 1998.
- In December 1996, the USACE completed a post-authorization change study entitled, “Westwego to Harvey Canal, Louisiana Hurricane Protection Project Lake Cataouatche Area, EIS.” The study investigated the feasibility of providing hurricane surge risk reduction to that portion of the west bank of the Mississippi River in Jefferson Parish between Bayou Segnette and the St. Charles Parish line. A Standard Project Hurricane (SPH) level of risk reduction was recommended along the alignment followed by the existing non-Federal levee. The project was authorized by Section 101 (b) of the WRDA of 1996 (P.L. 104-303) subject to the completion of a final report of the Chief of Engineers, which was signed on 23 December 1996.
- On 12 January 1994, the CEMVN District Engineer signed a FONSI on EA # 198 entitled, “West Bank of the Mississippi River in the Vicinity of New Orleans, LA, Hurricane Protection Project, Westwego to Harvey Canal, Jefferson Parish, Louisiana, Proposed Alternate Borrow Sources and Construction Options.” The report evaluates the impacts associated with borrow sources and construction options to complete the Westwego to Harvey Canal Hurricane Protection Levee.
- In August 1994, the CEMVN District Engineer completed a feasibility report entitled “WBV (East of the Harvey Canal).” The study investigated the feasibility of providing hurricane surge risk reduction to that portion of the west bank of metropolitan New Orleans from the Harvey Canal eastwards to the Mississippi River. The final report recommends that the existing West Bank Hurricane Project, Jefferson Parish, Louisiana, authorized by the WRDA of 1986 (P.L. 99-662), approved November 17, 1986, be modified to provide additional hurricane and storm damage risk reduction east of the Harvey Canal. The report also recommends that the level of risk reduction for the area east of the Algiers Canal deviate from the National Economic Development Plan’s level of risk reduction and provide risk reduction for the SPH. The Division Engineer’s Notice was issued on 1 September 1994. The Chief of Engineer’s report was issued on 1 May 1995. Preconstruction, engineering, and design was initiated in late 1994 and is continuing. The WRDA of 1996 authorized the project.
- On 20 March 1992, the CEMVN District Engineer signed a FONSI on EA # 165 entitled “Westwego to Harvey Canal Disposal Site.”
- On 3 June 1991, the CEMVN District Engineer signed a FONSI on EA # 136 entitled “West Bank Additional Borrow Site between Hwy 45 and Estelle Pump Station.”

- On 15 March 1990, the CEMVN District Engineer signed a FONSI on EA # 121 entitled “West Bank Westwego to Harvey Changes to EIS.” The report addresses the impacts associated with the use of borrow material from Fort Jackson for LPV construction. The material was used for constructing the second life for the Plaquemines West Bank levee upgrade, as part of LPV construction.
- In December 1986, the USACE District Engineer completed a Feasibility Report and EIS entitled, “West Bank of the Mississippi River in the Vicinity of New Orleans, La.” The report investigates the feasibility of providing hurricane and storm damage risk reduction to that portion of the west bank of the Mississippi River in Jefferson Parish between the Harvey Canal and Westwego, and down to the vicinity of Crown Point, LA. The report recommends implementing a plan that would provide SPH level of risk reduction to an area on the west bank between Westwego and the Harvey Canal north of Crown Point. The project was authorized by the WRDA of 1986 (P.L. 99-662).

1.4 INTEGRATION WITH OTHER INDIVIDUAL ENVIRONMENTAL REPORTS

In addition to this IER, the CEMVN is preparing a draft Comprehensive Environmental Document (CED) that will describe the work completed and remaining to be constructed to complete the HSDRRS. The draft CED will document the work completed by the CEMVN on a system-wide scale. The draft CED will describe the integration of individual IERs into a systematic planning effort. Overall cumulative impacts and future operations and maintenance requirements will also be analyzed. Additionally, the draft CED will contain updated information for any IER that had incomplete or unavailable data at the time it was posted for public review.

The draft CED will be available for a 60-day public review period. The document will be posted on www.nolaenvironmental.gov, or can be requested by contacting the CEMVN. A notice of availability will be mailed/e-mailed to interested parties advising them of the availability of the draft CED for review. Additionally, a notice will be placed in national and local newspapers. Upon completion of the 60-day review period, all comments will be compiled and appropriately addressed. Upon resolution of any comments received a final CED will be prepared, signed by the District Commander, and made available to any stakeholders requesting a copy.

Compensatory mitigation for unavoidable impacts associated with this and other proposed HSDRRS projects will be documented in forthcoming mitigation IERs, which are being written concurrently with all other IERs.

1.5 PUBLIC CONCERNS

This section presents a summary of the public concerns received regarding the proposed action. In addition, section 6.1 lists public involvement meetings held for the project and the concerns stated, while appendix B contains a public comment and response summary.

Comments at public meetings included concern that the community of Oakville be included as part of the HSDRRS; that their community be provided risk reduction by construction of a levee and floodwall system. Other public comments included a concern that construction of the GIWW West Closure Complex, consisting of floodgates in the vicinity of the Hero Canal and the Gulf Intracoastal Waterway would increase the likelihood that the levees along the north bank of the Hero Canal would be overtopped by a hurricane-induced tidal surge. Additional concerns included the perceived lack of integration of the federal and non-federal levee systems. During a number of public meetings there were questions asked, concerning the construction completion date for the 100-year level of risk reduction system.

Residents of Oakville have strongly urged that Oakville be included in the risk reduction plan, that no local residences or businesses be displaced, and that any hazardous waste issues associated with the adjacent landfill be properly addressed. The Oakville residents were very concerned about impacts to their community due to the floodwall access roads and the proposed bridge required to traverse the floodwall across Hwy 23. Several questions were posed concerning construction across Hwy 23 (Belle Chasse Hwy). Members of the public expressed concern for daily traffic, pedestrian safety, and access to Hwy 23 during hurricane evacuations. Additionally, residents near the Hero Canal expressed concern about encroachments onto their properties required by enlargement of the Hero Canal Levee, and compensation levels for any potential takings.

Additional commenters urged the consideration of alternative designs that did not impact nearby wetlands or natural areas. Other concerns included the testing of borrow for toxins or other pollutants, understanding who is responsible for closing floodgates and starting pumps, and possible seepage in the vicinity of existing levees along the Mississippi River.

Local businesses along the Hero Canal have expressed a need for canal access during all construction activities and that any proposed floodgate in the Hero Canal allow for barge traffic similar to the Algiers Lock. In addition, local businesses requested that the location of proposed levees take into account future business expansion plans.

1.6 DATA GAPS AND UNCERTAINTY

At the time of submission of this report, engineering evaluations have not been completed for the proposed action and alternatives. The analysis of environmental impacts contained within this IER represents the best possible estimate of qualified professionals utilizing preliminary designs. Final selection and engineering details (e.g., location, type, and height of specific project features, actual footprint) of the proposed action could vary from their current model. Substantial changes to the proposed action resulting in further impact to the natural or human environment would be addressed in a supplemental IER.

Future variations in the final engineering design, construction materials and methods, and the discovery of new information could alter the impacts discussed in this document. For example, construction costs and materials are expected to vary based upon numerous economic factors that are difficult to predict. Impacts of the project to the local transportation infrastructure cannot be fully quantified without final engineering designs, construction materials, and defined transportation routes. The exact dates of construction within the project study area are approximate at the time of this report's development. Changes to the site that will occur between the submission of this IER and the commencement of construction activities will alter impacts and cannot be reasonably predicted with any substantial degree of resolution.

Thus, this analysis has been performed based on an incomplete level of design using reasonable assumptions regarding the proposed action. While the alternatives identified are preliminary, their basic function and their construction footprints should be substantially the same as currently understood. The environmental impacts have been assessed broadly, allowing design to proceed within the proposed footprint and with certain static features without compromising the integrity of this assessment.

CHAPTER 2 ALTERNATIVES

2.1 ALTERNATIVES DEVELOPMENT AND PRELIMINARY SCREENING CRITERIA

NEPA requires that in analyzing alternatives to a proposed action a Federal agency considers an alternative of “No Action.” Likewise, Section 73 of the WRDA of 1974 (Public Law (PL) 93-251) requires Federal agencies to give consideration to non-structural measures to reduce or prevent flood damage. The CEMVN Project Delivery Team (PDT) considered a “no-action” alternative and non-structural measures in this IER, discussed in sections 2.4.1 and 2.5.1, respectively.

In addition to these mandated alternatives, a range of reasonable alternatives was formulated through input by the CEMVN PDT, Value Engineering Team, engineering and design consultants, Federal and state resource agencies, local government, and the public.

The “action” alternatives are comprised of varying alternatives. The CEMVN investigated all possible alternative alignments to provide the most reliable, time sensitive and cost effective solution with the least adverse environmental impacts within the WBV IER 13 study area (figure 3). Once a full range of alternatives was established, a preliminary screening was conducted to identify alternatives which would proceed through further analysis. The criteria used to make this determination included engineering, effectiveness, economic efficiency, and environmental and social acceptability. Those alternatives that did not adequately meet these criteria were considered infeasible and therefore were eliminated from further study in this IER.

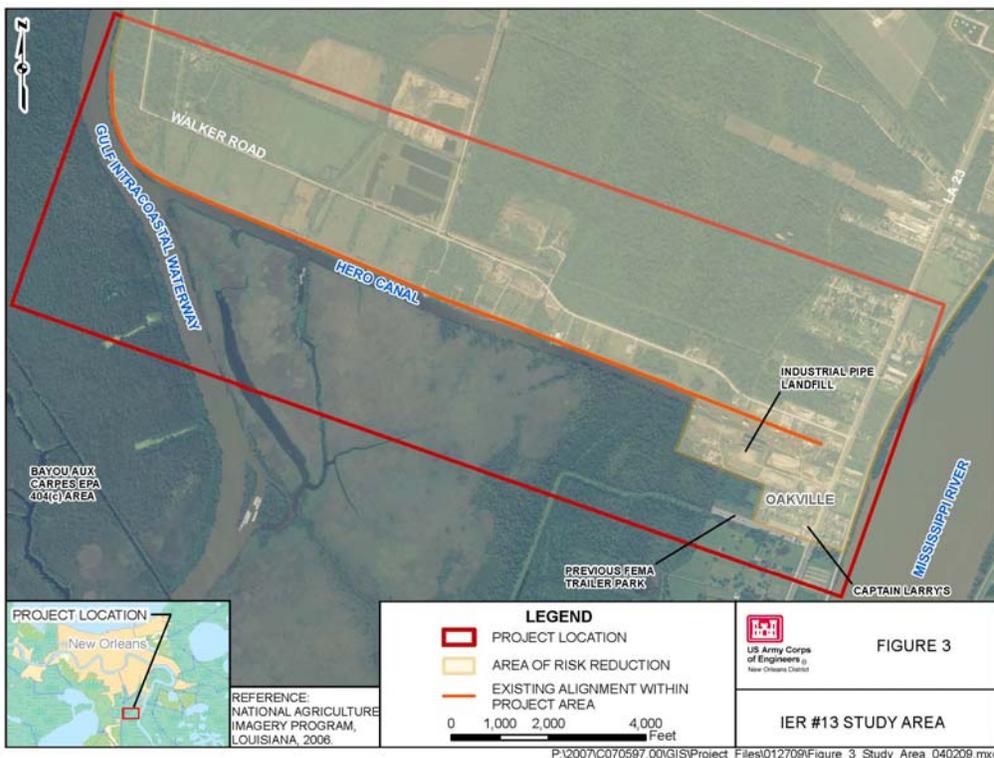


Figure 33: IER #13 Study Area

2.2 DESCRIPTION OF THE ALTERNATIVES

Although it is the CEMVN’s intent to employ an integrated, comprehensive, and systems-based approach to hurricane and storm damage risk reduction in constructing and/or raising the HSDRRS to provide a 100-year level of risk reduction (LORR), each reach has its own range of alternatives. For this reason planners have allowed unique local circumstances to guide

decisions about individual reach alternatives. At the same time, the alternatives analysis and selection remain integrated and comprehensive, considering reaches in relation to one another and other past, current, and reasonably foreseeable actions by the CEMVN and other entities within the project study area. The alternatives analysis also states how each alternative would tie into other, adjacent HSDRRS projects to ensure that the functionality of the system as a whole remains a priority in decision-making.

The report “Elevations for Design of Hurricane Protection Levees and Structures Lake Pontchartrain, Louisiana and Vicinity Hurricane Protection Project and West Bank and Vicinity, Hurricane Protection Project” provides detailed documentation of the coastal and hydraulic engineering analysis performed to determine the 1 percent project design elevations for hurricane protection projects (USDOD 2007). The report has been prepared to provide levee and structure elevations so that the USACE could initiate detailed design and construction as described in the 4th Supplemental Appropriation, Public Law 109-234 of the One Hundred Ninth Congress.

All references to project feature elevations or El. (height) are design elevations for a specific level of risk reduction (i.e. previously authorized, 100-year, etc.). For more information on the existing flood protection system, the upgrades proposed, and details on risk and reliability visit www.nolaenvironmental.gov.

The project is divided into two Reaches: Reach 1- improvements to the existing levee north of the Hero Canal (photograph 1) where improvements are common to all alternatives; and Reach 2 - provision of a levee/floodwall system south of the Hero Canal in the vicinity of the community of Oakville (photograph 2) where three alignments were considered in detail.

The existing Hero Canal levee, Reach 1, extends eastward approximately 2.3 miles along the Hero Canal from its western terminus near the Gulf Intracoastal Waterway (GIWW) to near Oakville. At its western terminus, Reach 1 ties into the GIWW West Closure Complex, as discussed in IER 12. Land use in this part of the project area is partially rural with vegetative cover and some industrial development along the Hero Canal’s north bank. Improvements to the levee would include raising the height of the existing Hero Canal levee approximately 5.5 feet over the current height, and widening the levee as required to meet the USACE design criteria (USACE design criteria can be found at <http://www.mvn.usace.army.mil/eng/hurrdesign.asp>).

Reach 2 is near Oakville and south of the Hero Canal. This IER includes evaluation of alternatives for protecting Oakville and nearby commercial and industrial areas. Land uses in the area include a salvage yard and landfill, a restaurant/convenience store, churches, a cemetery, a community park, residential properties, sections of 4-lane Louisiana State Highway 23 (LA 23), among other uses. At its eastern end, reach 2 ties into the Mississippi River Levee (MRL) system.

Alternatives. Four alternatives were evaluated for Reach 1 and 10 alternatives were considered for Reach 2. During the preliminary screening process for reasonableness, constructability, and probability that the alternative would meet the project purpose and need two alternatives were eliminated from further consideration for Reach 1 and six alternatives were eliminated for Reach 2. The alternatives carried forward for detailed analysis are discussed in sections 2.3 and 2.4. The alternatives eliminated from further consideration are described in section 2.5. A no action alternative, as well as non-structural alternatives (sections 2.4 and 2.5), were evaluated for each reach. The following is a list of the alternatives carried forward for a detailed analysis.

Reach 1

- No-Action Alternative

- Alternative 1, Enlargement via protected side shift (proposed action)
- Non structural
- Hollow Core

Reach 2

- No-Action Alternative
- Alternative 1, Hero Canal closure structure with levee along eastern side of landfill and Oakville included (bridge and gate options) (Proposed Action) (figure 4A)
- Alternative 3, Hero Canal closure structure with additional wetlands and Oakville included (figure 4B)
- Alternative 5, Around Hero Canal and through landfill with Oakville included (figure 4C)
- Alternative 2, Hero Canal closure structure with additional wetlands enclosed and Oakville included
- Alternative 4, Along Hero Canal crossing Hwy 23 straight to MRL excluding landfill and Oakville
- Alternative 6, Around Hero Canal through landfill with Oakville impacted and included
- Alternative 7, Along Hero Canal crossing Hwy 23 to MRL excluding landfill and Oakville
- Non structural
- Hollow Core

The discussion of levees, floodwalls, gates, and alignments associated with these alternatives are excerpted from these reports: (1) *Engineering Alternatives Report (EAR), WBV-09, Hero to Oakville, March 5, 2008*; (2) *Hero Canal levees and Floodwalls, Hero Canal to Oakville Reach – 1st Lift, Alternative Alignment Study, July 2006*; (3) *West Bank of the Mississippi River in the Vicinity of New Orleans, LA (East of Harvey Canal) Feasibility Report and Environmental Impact Statement, August 1994*; (4) *Supplemental Soils Report for the Hero Canal, September 1996*; and (5) *Planning – Planning Guidance Notebook, ER 1105-2-100 dated April 22, 2000*.

All elevations (El.) throughout this IER are presented as North American Vertical Datum of 1988, 2004.65 (NAVD88). NAVD88 uses one base monument located at Father's Point, Quebec Canada as Mean Sea Level (MSL). All other bench marks in North America are referenced to that one base monument for NAVD88 elevations. The NAVD88 datum is now the standard datum used by the surveying community. In addition, all elevations for any flood risk reduction structures (i.e., levees, floodwalls, gates) presented here are design elevations. Design elevations represent the final elevations that are necessary for a given structure to achieve the 100-year level of risk reduction. Earthen flood risk reduction structures would typically be constructed, in lifts, to elevations above the stated design elevation to account for settling and subsidence.



Photograph 1: Existing Hero Canal levee



Photograph 2: West Oakville Street

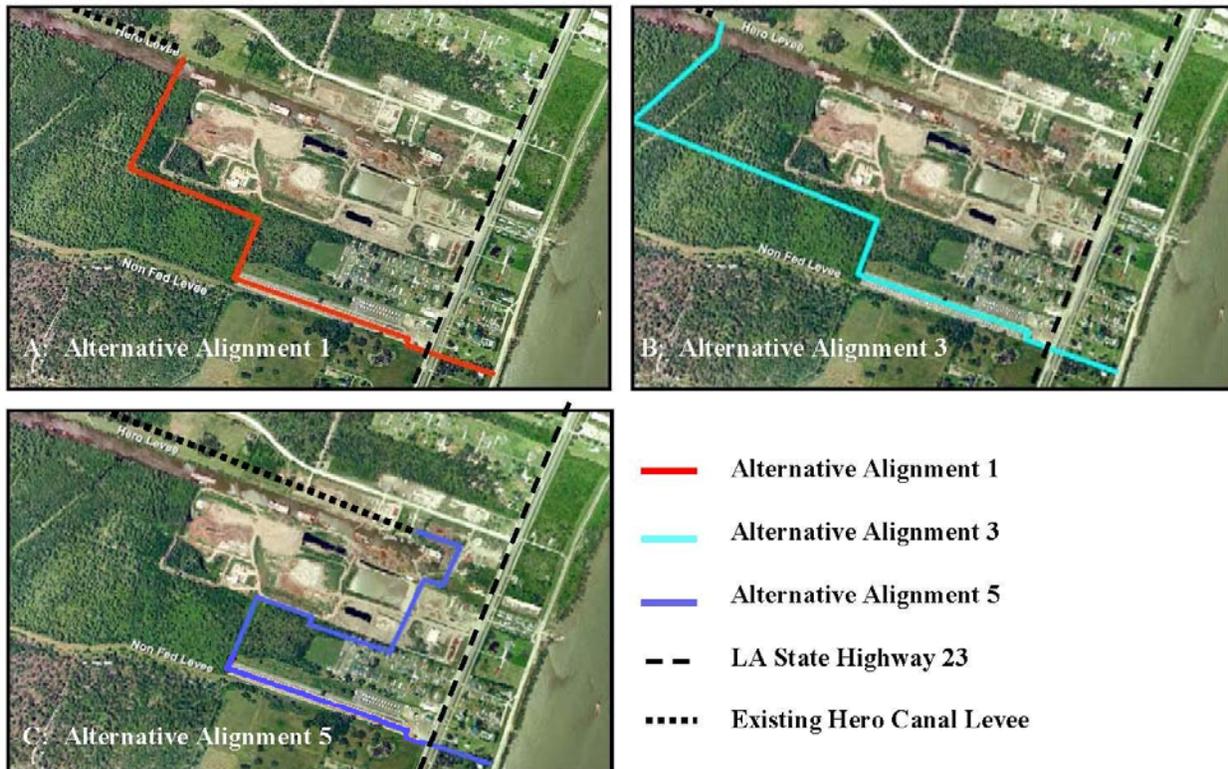


Figure 4: Alternatives carried forward for detailed analysis.

2.3 PROPOSED ACTION

2.3.1 Alternative Alignment 1

The PDT evaluated many factors in the process of identifying the overall best alternative to provide hurricane and storm damage risk reduction. These factors included criteria such as risk reduction and reliability, economic efficiency, environmental and social acceptability, cost, schedule, operability, and maintenance. The review team investigated the use of floodwalls to minimize footprint impacts to the environment, however, the loads in the landfill and the geotechnical soil properties would create an unstable plane and exert a large unbalanced force on the t-wall making this option impractical.

Use of the existing right-of-way (ROW) for the Hero Canal levee and innovation in design served as guiding principles. Incorporation of these concepts in the early analytical stages helped to avoid or minimize potential adverse environmental consequences. Other significant factors considered were maximizing reliability of the system and minimizing impacts to the environment and social systems. The selection of the proposed action, alternative 1, is the result of internal and external meetings, public involvement, stakeholder comments, and field investigations to determine the most feasible action, taking into consideration all applicable factors and related parameters.

The proposed action for the existing levee north of the Hero Canal (Reach 1) is an earthen levee enlargement on the protected side. Only one action alternative has been considered in detail for bringing the existing levee north of the Hero Canal up to the standard of a 100-year level of risk reduction. The alternatives, floodside shift or straddle alignment, were determined to be unreasonable due to navigation and environmental impacts to the Hero Canal channel and adjacent bottomland hardwood (BLH) system on the southern side of the Hero Canal (figure 5A,

5B). This proposed action would follow the approved alignments as described in an Environmental Impact Statement (USACE 1994) (figure 5C). Details are provided in section 2.3.1.1.

For Reach 2 (figure 5B sheet 1, figure 5B sheet 2), alternative 1 starts at the eastern end of the proposed Reach 1 levee enlargement on the northern side of the Hero Canal and crosses the Hero Canal via a new closure structure and follows the previously authorized levee alignment south before turning east, generally following along the Industrial Pipe Inc, southern boundary until it joins with an existing Plaquemines Parish non-Federal levee. A positive barrier system would be installed on the protected side of the levee to clearly mark a no work area in order to prevent future expansions of the landfill within the no work area. The proposed levee would again proceed south and upon reaching the point where the existing non-Federal levee turns west, the proposed levee would instead turn east towards LA 23. Floodgate structures would be constructed across LA 23 and the existing New Orleans and Gulf Coast Railway Company Railroad's (NOGCR) railroad track. These floodgate structures would transition to an earthen levee that would then tie into the Mississippi River Levee (MRL) section. An emergency bypass road would be built to allow for authorized vehicles to bypass the LA 23 floodgates when they are closed.

The option to build a floodwall and bridge across Hwy 23 was investigated, but due to public concerns for socioeconomic impacts and safety the bridge option was not further developed. Two new pump stations along reach 2 are proposed to allow for the expected drainage of stormwater confined by the levees.

The 100-year elevation for all levees, floodwalls, and floodgates would be approximately 14 NAVD88 in reach 1 and 14 - 16 feet NAVD88 in Reach 2. The proposed action for Reaches 1 and 2 are described in greater detail in sections 2.3.1.1 to 2.3.1.6. These reaches are arranged spatially from north to south as the alternative runs from the GIWW toward Oakville to the existing MRL.

2.3.1.1 Reach 1 - North of the Hero Canal (alternative alignment 1, proposed action)

The proposed action for Reach 1 is a protected-side shift, with all toe-to-toe growth occurring on the protected side of the existing levee (figure 5B sheet 1)(diagram 1). This approach would utilize undeveloped land on the protected side and construction would incur only minor environmental impact. Additional actions to meet the newest design criteria would currently require the relocation of one residential structure.

The existing Hero Canal levee consists of a 10-foot wide crown with 1V:3H side slopes on the flood side, 1V:4H on protected side, and is below the currently authorized elevation of 10.5 feet NGVD. The proposed action consists of raising the top of the levee elevation to a 100-year elevation (+14 NAVD88), with a 10-foot wide crown, 1V:3H side slopes on flood side and 1V:4H on the protected side, and landside stability berms at varying elevations and slopes. All improvements would be constructed on the protected side. Approximately 12,000 LF of levee would be improved in this reach of the project (see diagram 1).

Access for construction of Reach 1 of the proposed action would be provided via staging areas and access roads in between the existing levee and Walker Road. These staging areas and access roads would be located in previously disturbed and cleared lands or existing public roads. Improvements to gravel or dirt roads may be necessary.

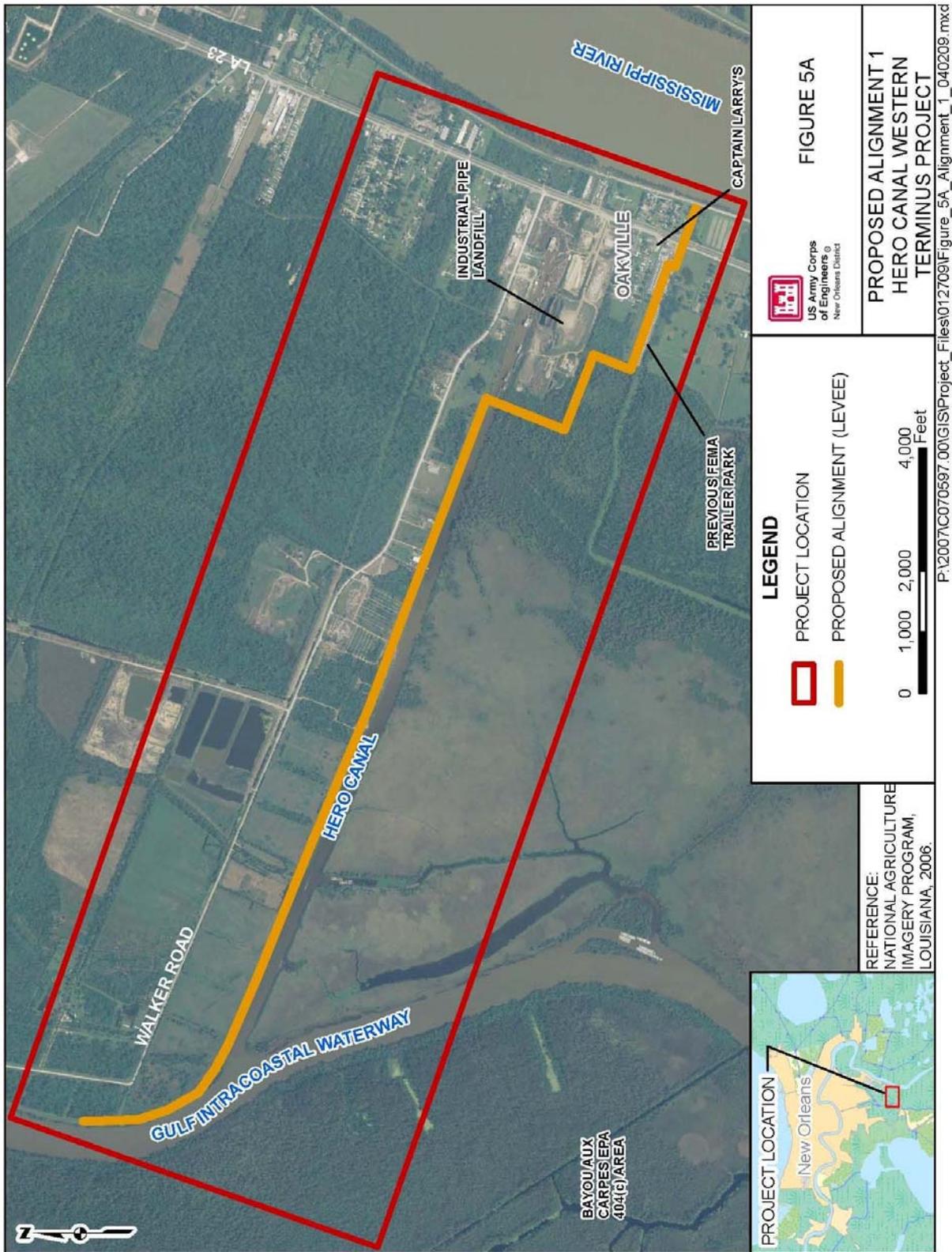


Figure 5A: Proposed alternative alignment 1

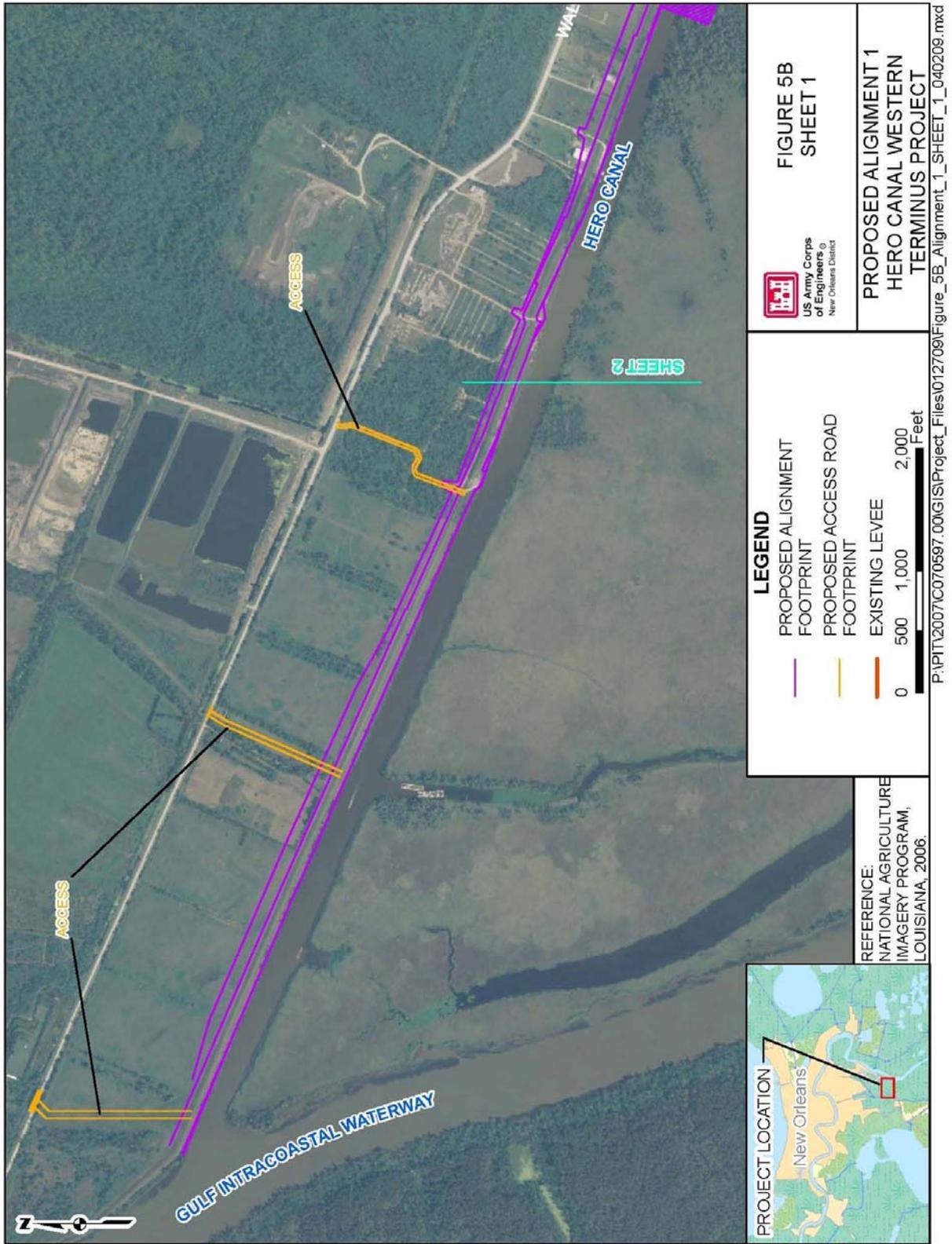


Figure 5B Sheet 1: Proposed alternative alignment 1

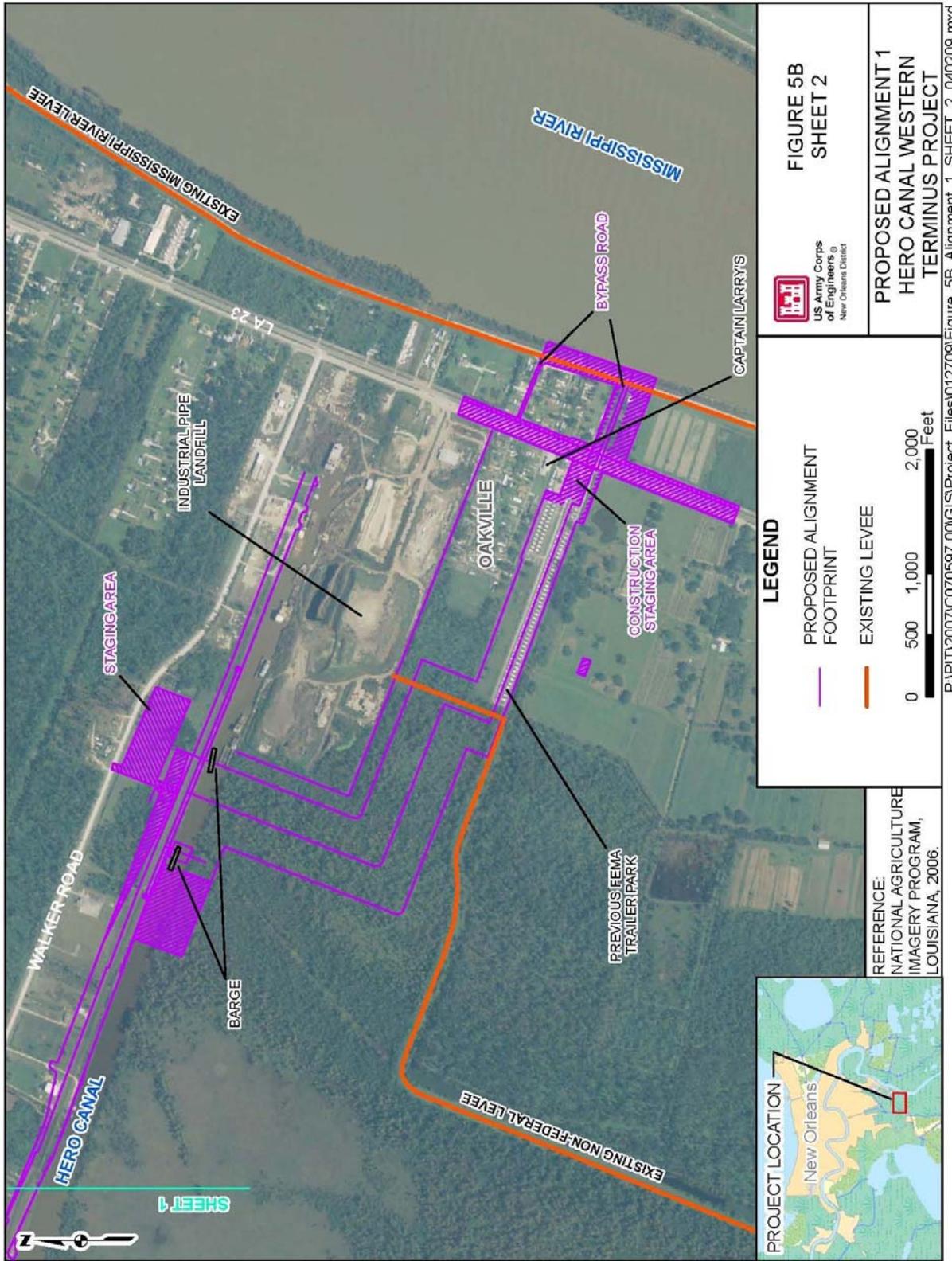


Figure 5B Sheet 2: Proposed alternative alignment 1



Figure 5C: 1994 previously authorized alignment

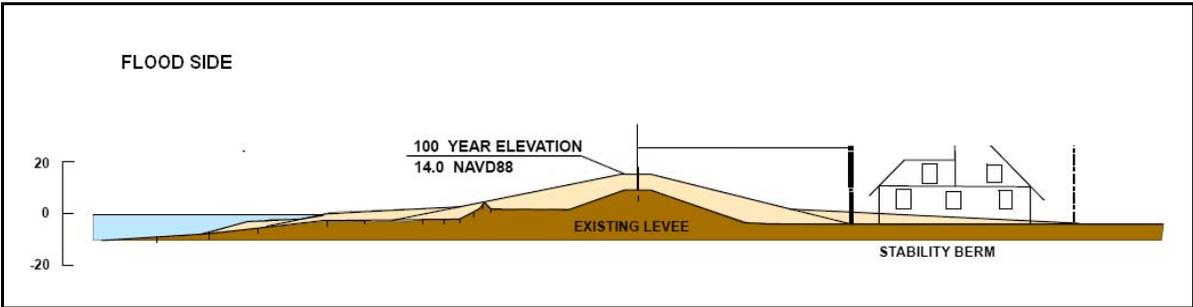


Diagram 11: Earthen levee construction diagram

2.3.1.2 Reach 2 - Crossing the Hero Canal (alternative 1, proposed action)

For Reach 2 near Oakville (figure 5B sheet 2), alternative 1 begins at the Hero Canal levee just west of the Industrial Pipe Inc. landfill and proceeds southward across the Hero Canal. A new 56-foot wide stoplog closure structure with T-wall transitions would connect the existing Hero Canal levee on the north side to a new levee on the south side of the canal. A new 70 cfs pump station would be constructed at the closure structure location to evacuate stormwater intercepted by the levees and closure structure. The top of the proposed closure structure would be at an elevation of 15 feet to 16 feet, with the bottom at an elevation of -10 feet to -12 feet. The structure would be a stoplog gate with a crane mounted in place to allow for installing the stoplogs and needles as needed for maintenance and or during a storm event.

During construction the stoplog closure would be built in phases, allowing continuous passage of vessels in the canal. It may be necessary to dredge reaches of the Hero Canal in the vicinity of the proposed gate to establish the designed depth for vessel passage. Dredged materials would be used, if suitable, as borrow or, if not, disposed of in the designated disposal areas identified for the WBV HSDRRS projects. This activity would increase the potential for the release of suspended sediments into the water column.

The stoplog closure would allow for navigation throughout the canal; however, vessels exceeding 52 feet in width would not be able to pass through the stoplog closure. The enclosed area behind the stoplog closure would have a small pump station without any valves to allow water levels to equalize. The stoplog closure would be opened only when flood waters recede and the water level is approximately equal on both sides of the gate.

The structure foundations would be slabs founded on steel H-piles due to the very weak soil in the project area. Both vertical and battered piles would be used to resist the water pressure from either the direct (flooded) side or the reverse side. The surrounding walls would be cantilevered. There would be a walkway on top of the walls.

Two abandoned barges are located in Hero Canal in the vicinity of the project footprint (figure 5B). In order for construction of the proposed action to proceed, the barges would have to be removed.

2.3.1.3 Reach 2 - South of the Hero Canal Crossing (alternative 1, proposed action)

In 1994, the USACE approved the construction of a Federal levee south of the Hero Canal (figure 5C). The majority of the levee alignment for alternative 1 follows the previously approved alignment, but due to improved post Hurricane Katrina design standards the levee footprint and elevation is wider and higher than what is discussed in the 1994 EIS. A new earthen levee to elevation 14 feet would continue south approximately 1,400 LF from the Hero Canal closure structure, and then turn east along the south side of the landfill for a distance of approximately 1,360 LF where it would intersect with a non-Federal parish levee.

For levee designs south of the Hero Canal, various construction methods were considered to address levee stability, including unreinforced levees with and without stability berms, levees using deep soil mixing, and levees with geotextile-reinforcement and stability berms. Generally the proposed levee section would have a crown approximately 10 feet wide with slopes of 1V:4H. If stability berms were added, they would extend outward on 1V:20H or shallower slopes in order to meet the required design safety factors. Geotextile reinforced earthen levee would be used when possible to reduce the environmental impact.

2.3.1.4 Reach 2 - Non-Federal Levee Improvements (alternative 1, proposed action)

Beginning at the intersection of the non-Federal levee with the portion of Reach 2 described in section 2.3.1.3, alternative 1 continues south along the non-Federal levee alignment for approximately 400 feet. Improvements to the non-Federal levee in this area would impact surrounding BLH. Any existing portions of the non-Federal levee would be razed to the surrounding grade, with initial federal levee construction straddling the non-Federal levee centerline. The Federal levee would be constructed to the HSDRRS authorized design elevation of 14 feet.

2.3.1.5 Reach 2 - Pump Station, South Levee, and LA 23 Crossing (alternative 1, proposed action)

In this portion of Reach 2 under alternative 1, the levee alignment continues south from the landfill for approximately 400 LF then turns eastward. At this location, a new 150 cfs pump station would be required to discharge intercepted stormwater. This pump station would discharge into the existing Oakville drainage canal. A sluice gate at this location would allow rain to drain during non-hurricane events and would be closed during storm events. The Reach 2, alternative 1 levee alignment in this area proceeds for a distance of approximately 1,773 LF running through an area previously utilized as a FEMA trailer park. From the site of the former FEMA trailer park, a T-wall (diagram 2) alignment runs south and east for approximately 485 feet. The T-wall alignment connects with new vehicular gate(s) across LA Hwy 23 then ties into a railroad gate (photograph 3) across the New Orleans and Gulf Coast Railway Company railroad tracks. The T-wall along the Reach 2, alternative 1 alignment would transition to an earthen levee for approximately 551 LF and tie into the Mississippi River Levee. The T-wall, vehicular floodgate(s), and railroad floodgate would be constructed to elevation 14 feet, which includes 1.5 feet of structural superiority.

During a storm event, the vehicular and railroad gates would be closed. Vehicular traffic would be detoured to an emergency bypass roadway. Such measures are necessary since LA 23 is the primary vehicular access to and from lower Plaquemines Parish, and is a designated hurricane evacuation route. The emergency bypass roadway would begin just south of the proposed vehicular gate location, proceed east along an existing private road, and ramp up the Mississippi River Levee. The bypass road is approximately 640 feet long and the ramp height would be approximately 15 feet to 20 feet. At this point, the bypass road would continue north on top of the Mississippi River Levee for approximately 915 LF. The bypass road continues down a ramp off of the Mississippi River Levee to East Oakville St. East Oakville Street connects to LA Hwy 23. The bypass road would be hardened and designed for emergency and other authorized vehicular traffic.

2.3.1.6 Reach 2 - Levee from the Railroad to the MRL (alternative alignment 1, proposed action)

New earthen levee would be built from the railroad crossing to the MRL, a distance of approximately 580 LF. This portion of reach 2, alternative 1 would be built to elevation 14 feet.

See table 1 for an overall summary of the project features required by the proposed action.

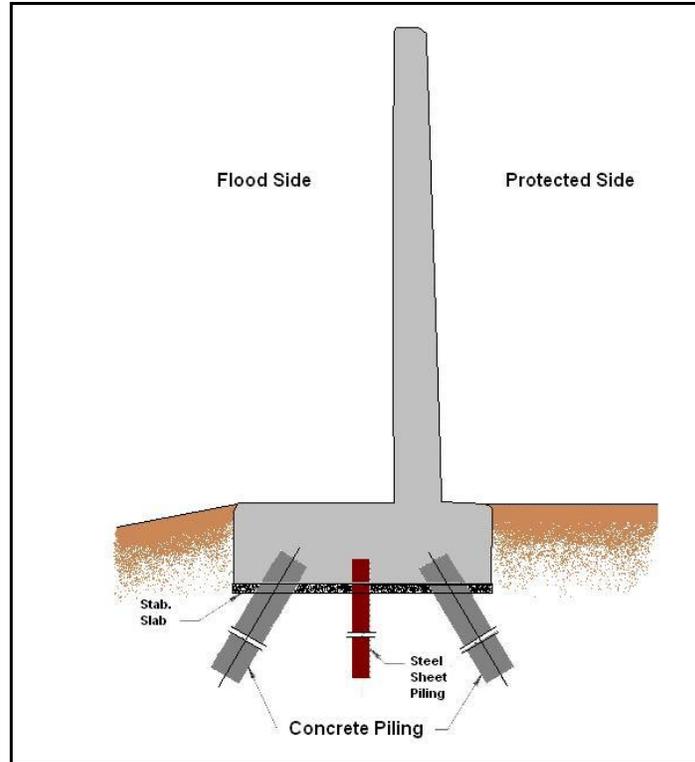


Diagram 2: Typical T-wall diagram



Photograph 3: Typical railroad gate (shown open)

Table 1: Summary of Project Features

Alternative 1 – Proposed Action	2057 Design Elevations * (ft)	Approximate Length (LF)	Estimated New ROW Needed (acres)	Estimated Existing ROW Utilized (acres)	Descriptions
Hero Canal levee (Reach 1)	14	12,250 LF Levee	41	49	Existing Levee Enlargement
Hero Canal Crossing (Reach 2)	16	56-foot wide Stoplog Closure Structure (70 cfs Pump Station), 400 – 500 LF Floodwall	2.5	0	Stoplog Closure Structure, Pump Station Floodwalls, Crane Platform
Levee (Reach 2)	14	3,200LF Levee	54.9	0	New Levee in BLHs
Pump Station and Levee (Reach 2)	14	1750-1850 LF Levee, (150 cfs Pump Station)	6.7	0	New Levee along non-Federal Levee alignment, Tie-ins, New Pump Station
LA 23 Crossing (Reach 2)	14	400-800 LF Vehicular Gate(s) with T-wall and Levee tie ins	1	0	New T-wall/Levee/ Vehicular Gate(s)
NOGCR Crossing (Reach 2)	14	T-wall transitions and Railroad Gate	0.5	0	Railroad Gate/Transition T-wall
RR to MRL Levee	14	500-600 LF Levee	1.8	0	New Levee
Bypass Road	N/A	2,250 LF	0.22	N/A	For Emergency and Authorized Vehicles

* Includes initial HSDRRS elevation plus likely settlement to the 2057 design year.

2.3.2 Alternative 1 Design and Construction Considerations

Overview of Design Consideration: For the alternative 1 proposed action, all flood protection structures would be built to the HSDRRS elevation with a design year of 2057 (calculated to provide a 100-year level of risk reduction). Levees would be constructed in lifts plus some overbuild for initial settlement. Floodwalls would be constructed to 2057 elevation and some hardened structures (like floodgates) would be constructed to the 2057 elevation plus 1.5 feet of structural superiority.

Construction Duration and Materials: Construction durations for the proposed action are estimated as follows: approximately 0.8 years for LA 23/NOGCR crossing, 1.4 years for levee construction, and 1.4 years for Hero Canal closure structure. These estimates include

construction based on initial build (2011), secondary lift and final lift construction to the 2057 design year (providing 100-year level of risk reduction).

Table 2 lists estimated construction material data for the proposed action. Over one million cubic yards of fill material would be needed for the levee work alone.

Table 2: Alternative 1 Estimated Construction Materials

Reach 1 North of the Hero Canal		Reach 2 South of the Hero Canal	
Material	Quantity	Material	Quantity
Fill	665,000 cy	Soil	28,000 cy
Surfacing, Crushed Stone	525 cy	Sand	92,000 cy
Reinforced Geotextile	19,675 sy	Fill	600,000 cy
Silt Fence	20,000 LF	Reinforced Concrete	5,000 cy
		Sheet Pile	59,000 sf

Note: (cy – cubic yard, sf – square feet, sy – square yard, LF – linear feet).

*Approximations subject to change as engineering designs progress.

2.3.3 Other Necessary Actions

2.3.3.1 Armoring

Armoring may be required at a number of locations throughout the HSDRRS. These locations may include: transition points (where levees transition into any hardened features such as other capped levees, floodwalls, and pump stations), floodwall protected side slopes, pipeline crossings, and earthen levees that are exposed to excessive wave overtopping during a 500-year hurricane event. The specific locations have not yet been determined. Armoring types vary, but the following materials are commonly used, and listed below in order of hardness:

- ACB – Articulated concrete blocks.
- ACB/TRM – Articulated concrete blocks/turf reinforced mattress.
- TRM – Turf reinforcement mattress.
- TRM/Grass - Turf reinforcement mattress which could allow a reduction to grass.
- Well maintained grass cover.

2.3.3.2 Relocations

As needed, utilities would be relocated to cross the project area in accordance with existing standards. Disruptions of service would be kept to a minimum.

2.3.3.3 Operation and Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R)

In addition to initial construction activity, the proposed action includes all of the routine Operation and Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) activities required to keep this element of the HSDRRS at full operational capability. OMRR&R activities include mowing, re-paving, repairs to the structures, in-kind replacement, etc., to be provided by Coastal Protection and Restoration Authority of Louisiana (CPRA).

OMRR&R of the HSDRRS would have minimal impact on the significant resources in the area. Levees would be periodically mowed and herbicides might be used (on a very limited basis) around control structures. The floodwalls and levees would be annually inspected and repaired, as needed, to maintain design standards. This includes adding subsequent lifts of earthen material to levees in order to address subsidence. The stoplog closure would require periodic equipment maintenance and the crane would be replaced after 25 years. All activities would be conducted within the established ROW and within previously disturbed areas. Temporary and localized maintenance-related effects (e.g., noise, air emissions, increased traffic, temporary erosion and sedimentation, etc.) might occur during OMRR&R work.

2.3.3.4 Temporary Flood Risk Reduction Contractually Required During Construction

As part of the construction process, temporary flood risk reduction measures would be required whenever a reach of the existing floodwall or levee is degraded until the replacement floodwall or levee was sufficiently completed to withstand floodwaters. Sufficiently completed is defined as the time when the concrete in the replacement floodwall reaches a compressive strength of 4,000 pounds per square inch (psi) and all earthwork for the floodwall/levee replacement has been completed. Typically, the contractor would provide temporary flood risk reduction through installation of a cofferdam that would not diminish the flood protection of the existing facility or the facility under construction. The contractor would maintain all temporary flood control measures, including maintaining and operating drainage facilities. The contractor would provide, maintain, and operate pumps of adequate capacities, for the removal of the water that could accumulate in excavations within the areas protected by the temporary flood risk reduction facilities during construction. All temporary pumps would discharge to the project's flood side. The contractor would remove all temporary flood control structures and incidental features when no longer required. All material used in providing temporary flood control structures, and any debris generated during their removal would be removed from the job site prior to completion.

Prior to beginning work, the contractor would submit for approval his proposed plan to accomplish the specified temporary flood risk reduction. The submittal would be in accordance with Section 01330, "Submittal Procedures" and would include, but not necessarily be limited to the following:

1. Design and layout of temporary flood risk reduction works,
2. Methods and duration of maintenance of temporary flood risk reduction,
3. Methods, sequence, equipment and materials to be used for draining of excavations for floodwall demolition and floodwall replacement, and
4. Method and sequence of removal, including disposal of materials.

These measures provide assurance that risk reduction would be maintained during the construction process even in the event of significant flooding.

2.4 ALTERNATIVES TO THE PROPOSED ACTION

Three alternatives to the proposed action were considered in detail. These alternatives include the no action alternative and alternatives 3 and 5.

2.4.1 No-Action Alternative

Under the no action alternative, the proposed action would not be constructed by the CEMVN. The previously authorized levee alignment would be constructed, according to the plans approved in the 1994 USACE West Bank EIS, using the newest design standards, which may increase the footprint and/or elevation. The previously authorized alignment would include the

existing Hero Canal levee, and a new levee extending from the existing Hero Canal levee along the northern and western borders of the landfill, eventually tying into the existing non-Federal levee to the south of Oakville. The authorized alignment did not close the polder because this alignment did not include a levee reach that tied into the Mississippi River Levee. The previously authorized alignment would provide the eastern section of the project area with approximately 50-year level of risk reduction. This is the approximate level of risk reduction (except for new levee improvements near the landfill and Oakville recently completed) afforded the area prior to Hurricanes Katrina and Rita.

2.4.2 Alternative 3, Hero Canal Expanded

In alternative 3, Reach 1 is similar to alternative 1, Reach 1. All proposed construction methods are the same as alternative 1. For Reach 2, the proposed stoplog structure across the Hero Canal would be 961 feet west of the location for the structure proposed in alternative 1 (figure 6A). Once across Hero Canal, alternative 3 Reach 2 is similar to alternative 1 Reach 2 in that it proceeds essentially through BLH land and consists almost entirely of earthen levee construction (figure 6B). However, natural system impacts are greatest for this alternative since this alternative encloses more wetlands (approximately 53 acres).

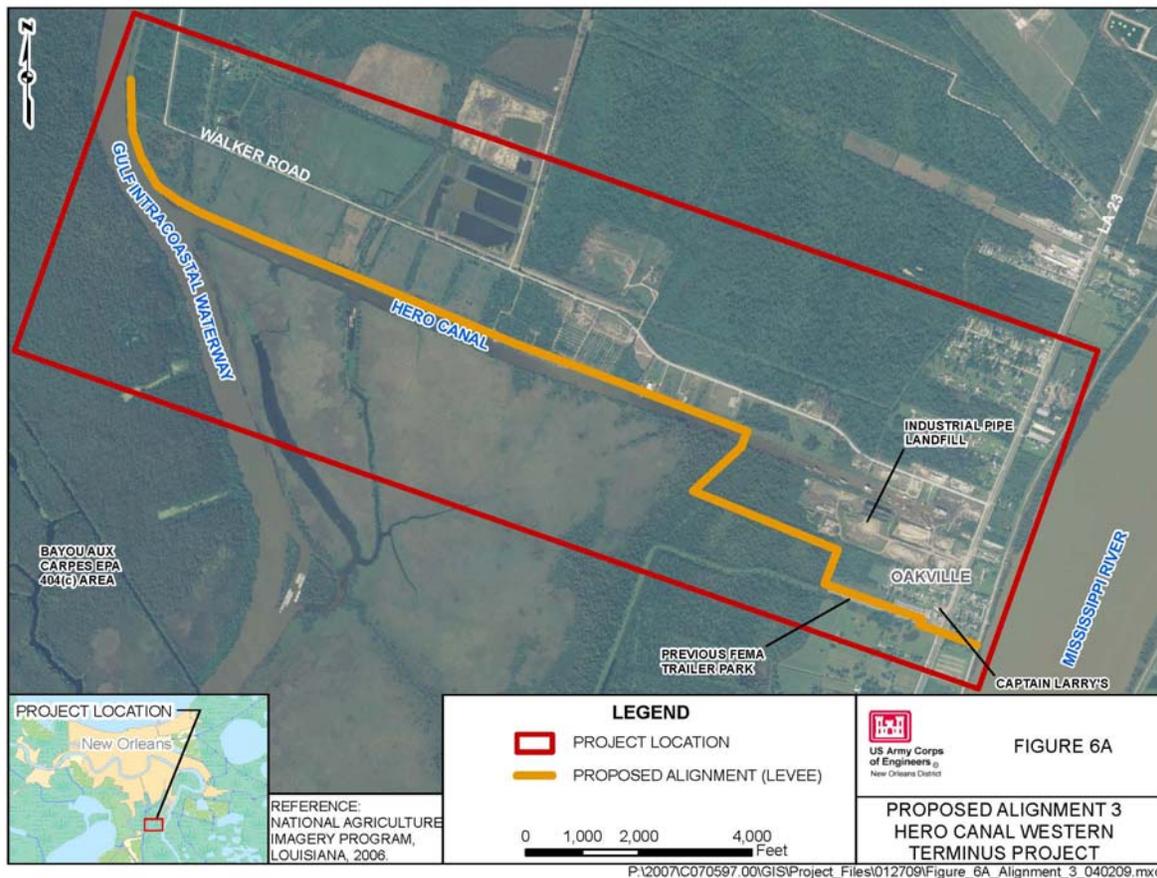


Figure 6A: Proposed Alternative 3

The major change for this alternative from alternative 1 is that it begins further west on the Hero Canal Levee and extends further west through BLH land. After turning east through BLH land, this alignment joins the non-Federal levee. From this point onward, the alternative 3 is exactly the same as the proposed action. Alternative 3 considers all of the structure and levee

engineering options as described in alternative 1. The total length for the entire alternative 3, Reach 2 segment is approximately 7,900 feet (compared to appx. 5,500 feet for alternative 1, Reach 2 and appx. 7,300 feet for alternative 5, Reach 2). Alternative 3, Reach 2 also requires a pump station, floodgates across Hwy 23 and the NOGCR railroad, and a bypass road. Natural system impacts are greatest for this alternative due to the impacted and enclosed wetlands. This alternative is not recommended for implementation because it presents more impact to BLH and cypress/tupelo swamp wetlands and is more difficult to construct, thereby increasing construction duration.

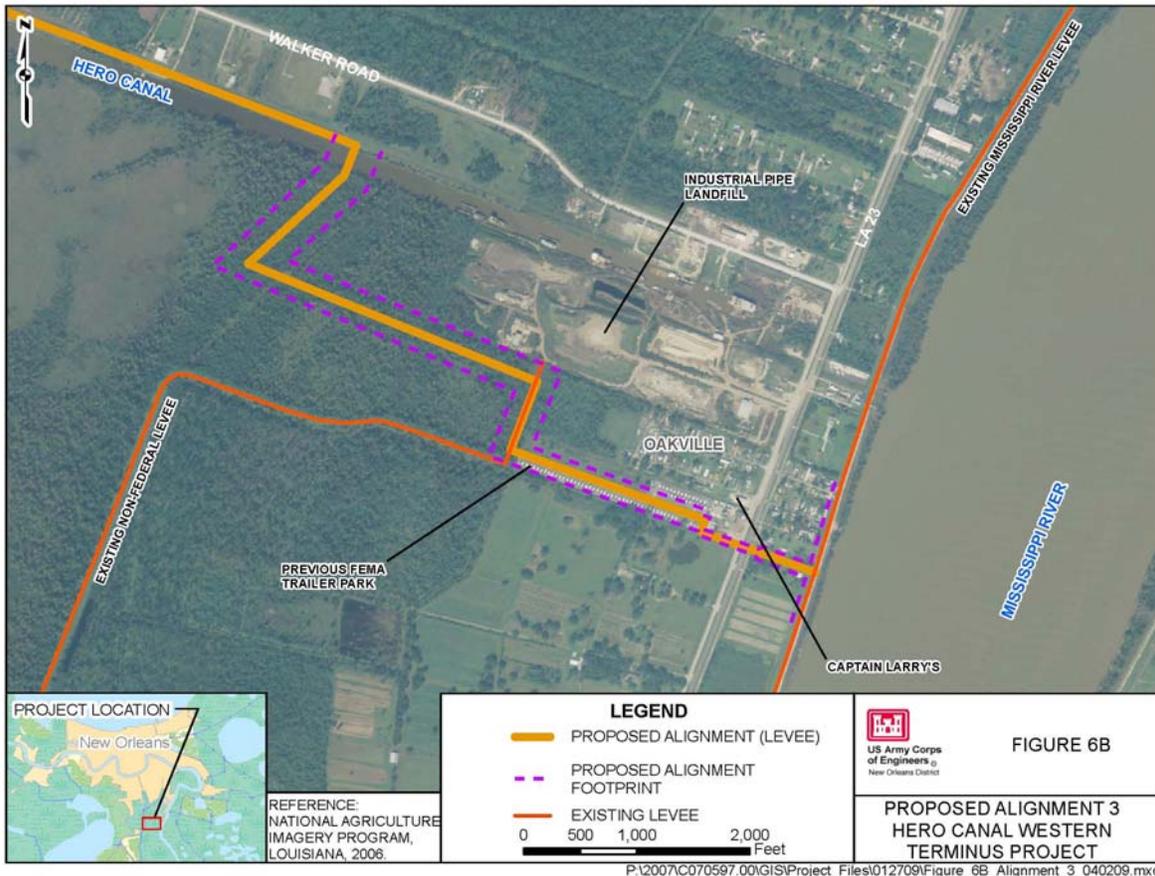


Figure 6B: Proposed Alternative 3

2.4.3 Alternative 5, Hero Canal through Industrial Pipe

In common with the other alignments considered, alternative 5, Reach 1 would include the same improvements to the Hero Canal levee, except for the exit point (see figure 7A for general alignment location). The alternative 5 alignment would not require the construction of a stoplog closure structure across Hero Canal. Alternative 5, Reach 1 would begin on the existing Hero Canal levee near the GIWW and extend eastward for 19,000 LF (compared to 12,000 LF for alternatives 1 and 3). A portion of this 19,000 feet would be new levee that begins at the end of the existing Hero Canal and continue east and then south at the end of the Hero Canal. The alignment for the portion of Reach 2, alternative 5 near Oakville is depicted in figure 7B. The levee continues south past Hero Canal and transitions to a new T-wall through the landfill area with four vehicular gates for access to active work areas. The T-wall continues south and then turns west proceeding along West Oakville Street requiring relocation of approximately 16 residences on the north side of that street. ROW requirements would also encroach onto the community park at the western end of West Oakville Street.

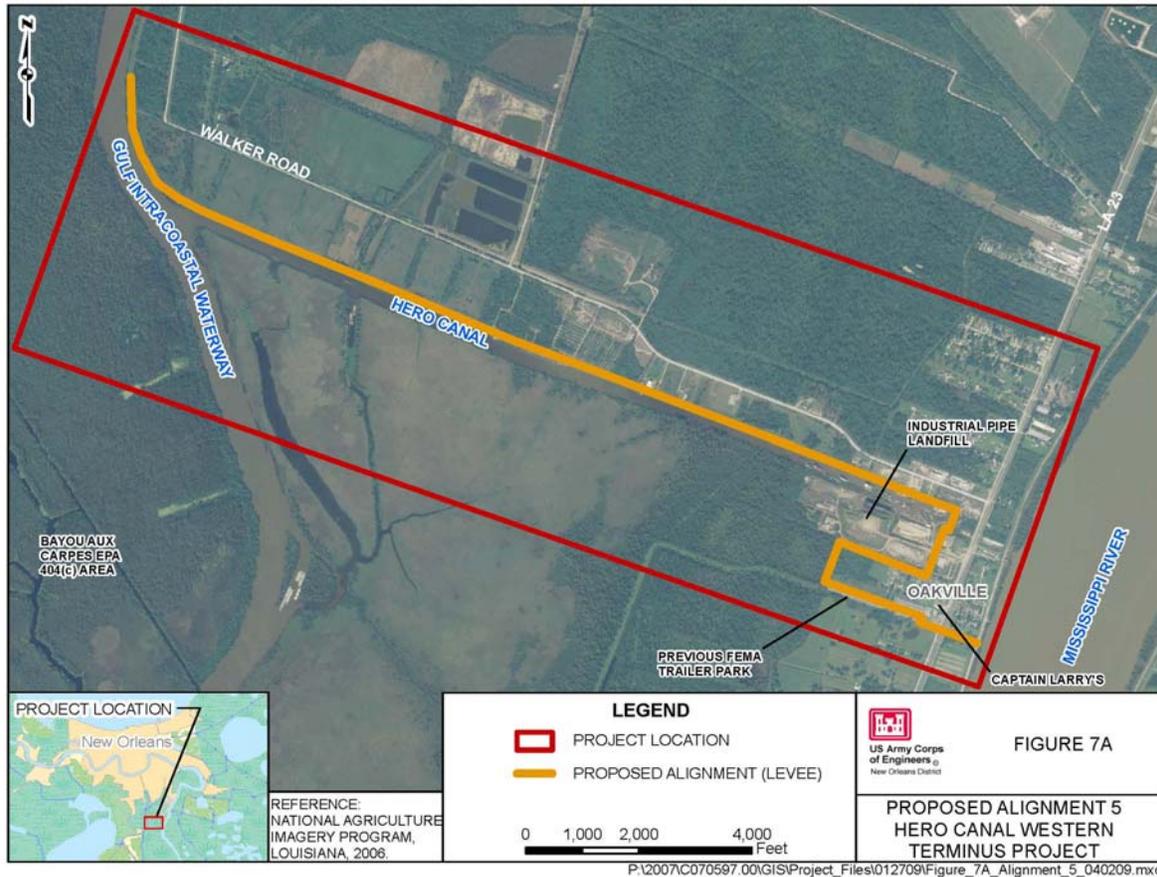


Figure 7A: Proposed Alternative 5

The T-wall transitions to an earthen levee at the Oakville community park boundary and continues west tying into the non-Federal levee. From the intersection with the non-Federal levee, alternative 5 continues south and at the point where the non-Federal levee turns west, this alternative alignment turns east to the MRL. This alternative has similar engineering options for the LA 23 and NOGCR crossings as well as the levee and T-wall from the non-Federal levee to the MRL as alternatives 1 and 3. The entire alternative 5, Reach 2 length would be approximately 7,300 LF (5,000 LF earthen levee and 2,000 LF of floodwall).

The authorized elevation of the landfill combined with the vicinity soil properties creates an instable plane, which would cause a large, unbalanced force on the alternative 5 T-wall.

Alternative 5 was not recommended as the proposed action because of impacts to residential structures in Oakville and because of significant subsurface instability surcharging to the proposed T-wall.

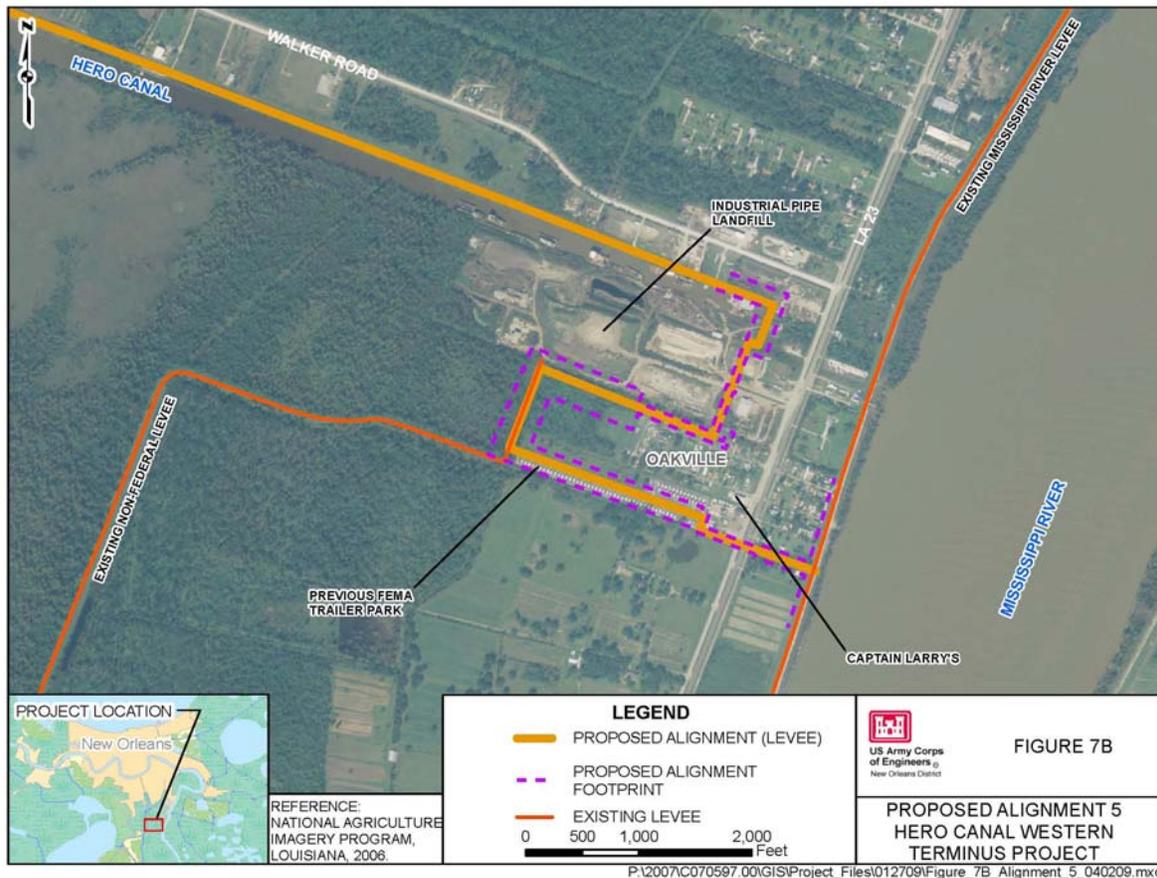


Figure 7B: Proposed Alternative 5

2.5 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

2.5.1 Hollow Core Levees

Large amounts of borrow material are needed to construct the hurricane risk reduction system in the New Orleans area to the levels required. The CEMVN considered several alternatives to earthen levees that would reduce the quantity of borrow material required. One alternative requiring less borrow material would be construction of a hollow core levee. The concept of the hollow core levee system is that open sections fill with water from the bottom as the storm surge rises. The combined weight of the concrete frame and its water-filled voids inside the frame result in a gravity structure that is designed to resist hydrostatic forces (from a surge), while resisting impact forces from possible vessel collisions. Hollow core levees are comprised of trapezoidal shapes similar to earthen levees. The levee superstructure is comprised of sloped side-walls with a flat-bottom slab, with access to the interior via steel grating or manholes in the crest.

Water inlets or ports are incorporated into the cross-sections near the levee base on the flood side to allow the section to flood with water to contribute to the overall weight for stability purposes. Shear keys in the base are designed to protect against sliding under design loading conditions. The substructure consists of a concrete base slab (pad) that would be supported by steel pipe piles.

Excavation and granular backfilling would be required to construct the pile-supported concrete pad. The concrete base slab serves a two-fold purpose. It distributes loads to the pile foundation as well as serves as a “roadway” for cast-in-place construction.

Hollow core levees would not be advantageous to use in lieu of traditional reinforced levee sections for this proposed project. The existing levees in Plaquemines Parish only need to be raised approximately 4 feet to 6 feet. Hollow Core levees are costly and would require a massive footprint to stabilize in the IER # 13 wetland terrain. Therefore, degrading an existing levee and replacing it with a hollow core levee section would not be cost effective.

2.5.2 Reach 1 - Straddle and Flood Side Levee Construction

Originally, the options of straddle, flood side construction, and protected side construction were considered. The existing Hero Canal levee is built near water’s edge, leaving little or no land area for levee expansion. Straddle or flood side shift construction would require enlarging the levee into the Hero Canal. Typically this is accomplished by placing fill at the toe of the existing grade and proceeding out into the open water with a “mud wave” until the desired ground surface elevation is achieved. Preliminary calculations of flood side expansion of a levee from elevation 10 feet to approximately 14 feet NAVD88 indicate that the toe of the existing levee would need to be expanded at least 40 LF into the canal. The mud wave might push existing vegetation out an addition 70 LF into the channel. Due to the relatively small size of Hero Canal, approximately 200 feet in width, the mud wave would create considerable permanent impacts to the canal and to the wetlands adjacent to it. These impacts would be avoided by building on the protected side, which is currently pasturelands and small wooded plots. In addition, improvements on the protected side allow for better opportunities in the future for increased protection in this area.

2.5.3 Nonstructural Measures

The nonstructural measures alternative includes options that might significantly reduce flood damage without the construction of major flood risk reduction structures. Such measures include raising residential and commercial structures in flood prone areas, structure relocation, and rezoning, among others. Generally, each of these potential options incurs high costs and could have high socioeconomic impacts, while providing limited and varying levels of flood damage relief.

According to Section 73 of WRDA, ER 1105-2-100, non-structural measures can be considered independently or in combination with structural measures. Independently, nonstructural measures cannot achieve the federal statutory mandate of 100-year level of risk reduction in the project area. Nonstructural measures reduce flood damages without significantly altering the nature and extent of flooding, so a gap would occur in the required 100-year level of risk reduction for the WBV if this option were pursued. Flood damage reduction is achieved from nonstructural measures by changing the use of the floodplain, or by accommodating the uses there to the flood hazard. The typical non-structural measures employed to reduce flood damage risk include structure relocations, raising of structures, flood proofing, and regulation of the use of the floodplain.

2.5.3.1 Structure Relocations

One way to reduce damages from storms and hurricanes is a mandatory public acquisition of vulnerable properties in areas subject to flooding. Acquisitions would be accomplished pursuant to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, which mandates financial assistance to owners of properties affected by Federal actions. Accordingly, a nonstructural program based on acquisition of commercial and residential properties in flood-prone areas would be subject to these guidelines, including payment of just compensation for the acquired properties and payment of Uniform Relocation Assistance Benefits under Title II of the Uniform

Act for the displacement of individuals, families, businesses, farms, and non-profit organizations. Two primary options exist under this alternative: (1) relocation of the structure to a comparable site outside of the area of flooding; and (2) acquisition of the structure and site by the local sponsor for demolition of the structure. Neither of these options is considered as viable under the existing circumstances. The entire Belle Chasse polder, town of Oakville, and industry along the eastern end of the Hero Canal would require relocation if excluded from the HSDRRS. Acquisition and relocation would be both very expensive (approximately 1.5 billion dollars) and would not reduce the risk of storm damage and flooding to vulnerable commercial, industrial, and residential structures in Plaquemines Parish.

2.5.3.2 Raise in Place

This form of flood proofing would require elevating all commercial and residential properties subject to flooding in the study area above the 100-year flood level. In addition, certain infrastructure that needs to continue operating in a flood event might have to be raised also, including roadways, public buildings and certain utilities. The average cost of elevating residential structures in the New Orleans area has been estimated at \$95 per square foot (USACE 2007). The cost of raising a typical 1,800-square-foot residence would amount to approximately \$171,000 and the cost of raising all the residential structures in the polder would be approximately 1.1 billion dollars. Since the proposed action would be a component in the overall system of levee improvements in the WBV, all residential structures in the WBV would need to be raised if the raise-in-place program was implemented for the Hero Canal levee reach.

2.5.3.3 Floodproofing

Flood proofing can be used to reduce flood damages by modifying structures and relocating building contents. Flood proofing involves techniques to keep water out of structures, as well as reducing the damaging effects of inundation. Raising the structure is a primary technique that can be used as part of a collective action. This can be done either when the building is under construction or through retrofitting of an existing structure. For purposes of compliance with the National Flood Insurance Program, non-residential structures are not normally raised. Instead, exterior walls and door framing is sealed with a floodproofing material up to 3 feet. Floodproofing is problematic for heavy-commercial improvement such as warehouses, industrial structures, and critical facilities such as are found at the Belle Chasse Naval Air Station. As just identified, this range of techniques has been eliminated as a major element for consideration due to prohibitive costs, estimated to be more than \$500,000,000.

2.5.3.4 Rezoning

This option provides for the use of zoning tools to preclude or limit land development in flood-prone areas. While this option could minimize future damages by restricting new development in flood-prone areas, the goal is to provide a system of 100-year level of risk reduction throughout the WBV according to federal statutory requirements. Zoning changes at this time cannot achieve this goal. However, with this option government agencies would limit the expansion of flood risk within the WBV area

In summary, no combination of non-structural tools for this project area can achieve the required 100-year level of risk reduction needed to provide for hurricane surge risk reduction on the WBV intended by federal statutes.

2.5.4 Alternative 2, Hero Canal Enclosing Wetlands

Alternative 2, Reach 1 would extend 12,000 LF from the existing Hero Canal levee eastward. Alternative 2, Reach 2 (figure 8A) would extend from the same starting point as alternative 1, Reach 2 in a southward direction. From the Hero Canal, the new levee would extend south through BLH habitat until it meets the non-Federal levee. The alignment turns east along the non-Federal levee and continues to the MRL. Alternative 2, Reach 2 would include all of the structure and levee engineering as described in alternative 1, Reach 2. Because it would enclose additional wetlands, this alternative was eliminated from consideration.

This alignment would result in additional avoidable wetland impacts. Thus, it has no advantages over either the proposed action or alternative 3. Due to the BLH impact; other environmental considerations, and a field evaluation, this option was not discussed in broad detail in the engineering alternatives report and in this IER and was not carried forward for detailed analysis.

2.5.5 Alternative 4, Hero Canal to MRL

Alternative 4, Reach 1 is similar to the proposed action. Alternative 4, Reach 2 (figure 8B) is an extension from the end of the existing Hero Canal levee directly eastward, crossing LA 23 and the railroad track using floodgates and connecting with the MRL. This alignment is different from alternatives 1, 2, and 3 as it would be the shortest distance from the existing Hero Canal levee System to the MRL and the least cost to construct. However, it does not protect Oakville, the landfill or nearby industrial/commercial property.

Reach 2 begins with a new levee at the end point of the existing Hero Canal and continues east paralleling Walker Road until reaching LA 23 and the NOGCR crossings. The crossing of LA 23 would be accomplished with vehicular gates and at the NOGCR with a railroad gate, with T-wall transitions similar to that proposed for alternative 1. Beyond the transition T-wall, the new earthen levee would continue onward to tie into the MRL. For the new levee section, unreinforced stability berms with high-strength geotextile and deep soil-mixing options were considered.

Alternative 4 was eliminated from consideration because it would not achieve the planning objective of protecting Oakville. The decision to protect Oakville as a project objective was made in the 1994 Feasibility Report and Environmental Impact Statement. Congress ratified this objective in P.L. 104-303 Sec. 101(a) (17) (WRDA 1996). Thus, risk reduction for Oakville is highly desired for the WBV project and this alternative does not achieve that objective.

2.5.6 Alternative 6, Hero Canal through Landfill, Option B

This alternative is almost exactly the same as alternative 5 except that the location of the T-wall at the eastern side of the landfill area has been moved to the interior of the landfill. In alternative 5 the landfill T-wall is offset approximately 90 feet to 100 feet to the west. In this alternative, the alignment is directly adjacent to the landfill and within its limits of influence for geotechnical slope stability. Due to the large driving force of the landfill from the heavy loads and unstable soil types, the T-wall design is infeasible. As documented by inspection, this alignment has no advantages over alternative 5 and a major disadvantage in that a floodwall could not be used without a much larger footprint. Therefore, alternative 6 was not developed further and was not carried forward for detailed analysis (figure 8C).

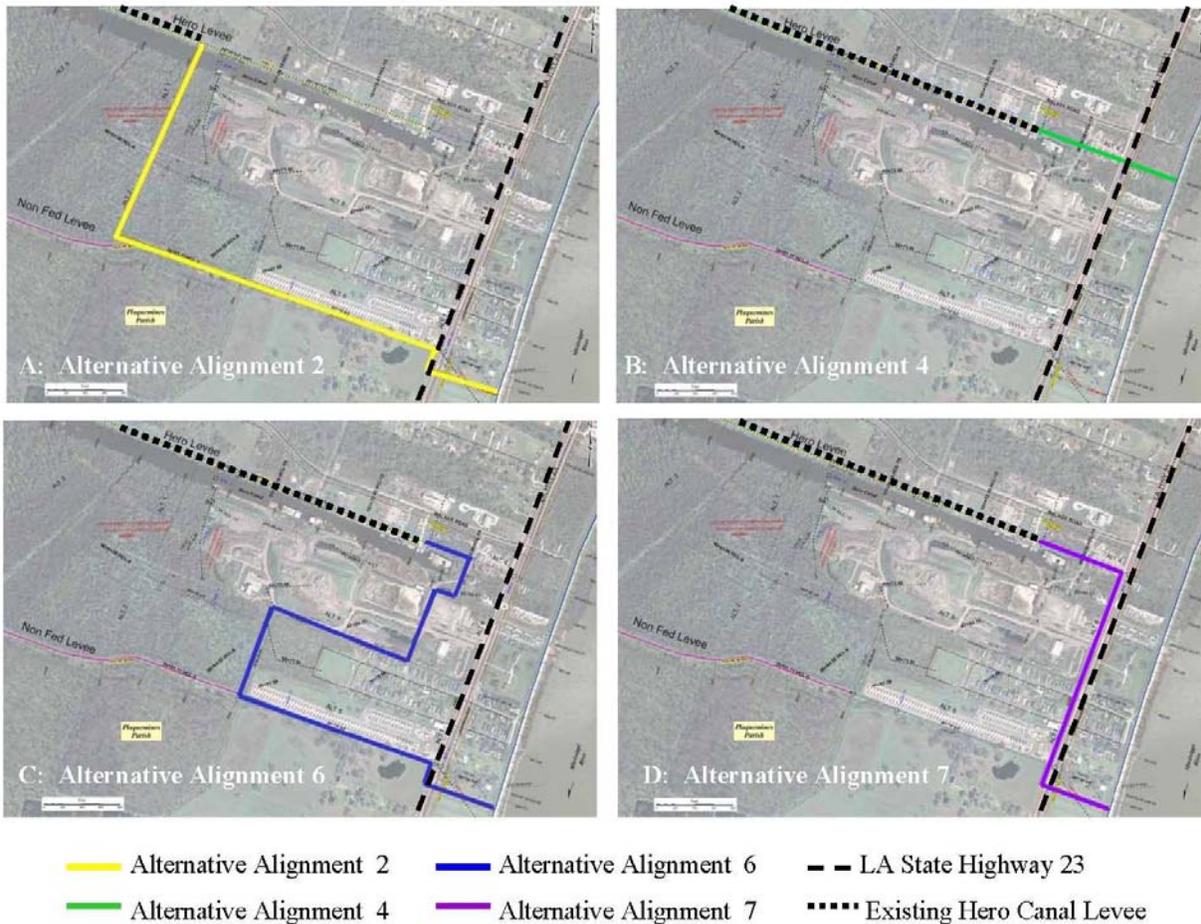


Figure 8: Structural alternatives removed from consideration

2.5.7 Alternative 7, Hero Canal down Hwy 23 to MRL

Alternative 7 (figure 8D) was considered in the original preliminary design report completed in 2006. This alignment would begin at the east end of the Hero Canal levee, then extend eastward to LA 23, at which point it would turn south and runs parallel to LA 23 and crosses Hwy 23 in the same location as alternative 1. The alignment for alternative 7 would continue eastward crossing LA 23 using floodgates, and connect with the existing Mississippi River Levee. The reach crossing Hwy 23 would consist of vehicular and railroad gates.

Alternative 7, for the same reasons as alternative 4, was eliminated from consideration because it would not achieve the planning objective of risk reduction for Oakville. The decision to reduce flood risk for Oakville as a project objective was made in the 1994 Feasibility Report and Environmental Impact Statement. Congress ratified this objective in P.L. 104-303 Sec. 101(a) (17) (WRDA 1996). Thus, risk reduction for Oakville is required for the WBV project and this alternative does not achieve that objective.

2.6 SUMMARY TABLE

Table 3 provides a summary of the preliminary alternative screening results.

Table 3: Preliminary Alternatives Screening Summary

Alternative	Screening Results
No-Action, Authorized Alignment	☑
Non-Structural	X
Existing Alignment	
• Earthen Levee	☑
• T-wall Floodwall	☑
• Earthen Levee with armoring	☑
Flood-side Shift	
• Earthen Levee	X
• T-wall Floodwall	X
• Earthen Levee with armoring	X
Protected-side Shift	
• Earthen Levee	X
• T-wall Floodwall	X
Navigation Closure across Hero Canal	•
Pump Stations	•
Bridge over Hwy 23	•
Floodgates across Hwy 23	•
T-Wall through Landfill	•
X = eliminated from further study • = considered in detail n/a = not applicable; this alternative was not formulated for this reach	

CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 ENVIRONMENTAL SETTING

3.1.1 General

The study area is located on the west bank of the Mississippi River within Plaquemines Parish, LA, extending westward from the Mississippi River along the Hero Canal to the eastern bank of the GIWW (figure 3). The study area includes the communities of Belle Chasse, English Turn, and Oakville. Numerous sensitive environmental resources are located near the project study area including the Bayou aux Carpes 404(c) area to the west, Barataria Bay and the Gulf of Mexico to the south, and the Mississippi River to the east. In general, these environmental resources are largely comprised of bottomland hardwood forests, cypress swamps, and various freshwater emergent, scrub-shrub, and forested wetland habitat. Alternatives specific to this project are situated along the Hero Canal, extending from the east bank of the GIWW levee to the west bank of the Mississippi River levee (figures 4-8).

3.1.2 Land Use

3.1.2.1 Hero Canal

The Hero Canal extends from the east bank of the GIWW eastward and terminates near the intersection of Walker Rd. and LA 23. Walker Road runs east to west, paralleling the northern bank of the Hero Canal in this vicinity. Areas to the north of the canal contain scattered remnants of BLH forest nested within a matrix of low-density residential development, emergent wetlands, scattered oil and gas wells, and cleared grazing lands. The eastern end of the canal is surrounded by several construction yards, salvage yards and a dredging operation. Areas south of the Hero Canal near the GIWW consist primarily of marsh habitat. Further east, the marsh transitions into a well established bottomland hardwood/cypress swamp.

3.1.2.2 Oakville

Towards the southeastern end of the Hero Canal, the bottomland hardwood/cypress swamp area abruptly ends at the western boundary of a landfill (Industrial Pipe, Inc.) and the community of Oakville. The landfill abuts the Hero Canal near the canal's eastern terminus. The community of Oakville lies just south and east of the landfill. The community is essentially bisected and served by LA 23. The eastern border of the community abuts the Mississippi River. Oakville is primarily residential, including a park, cemetery, general store (Captain Larry's) and several churches. The community was established shortly after the Civil War by freed slaves. After Hurricane Katrina in 2005, a temporary FEMA trailer park was constructed on the southern border of the community. Currently, the FEMA trailer park has been decommissioned; however, the landowner is allowing recreational vehicles to use the site. Adjacent areas to the south of Oakville are comprised of pasturelands and scattered citrus groves.

Table 4 identifies land uses near the project area described in this document. Figure 9 is a land use map showing features of the study area.

Table 4: Land Use in Study Area, by Reach (acres)

Land Use	Total (acres)
Residential	91.5
Commercial	96.5
Industrial	55.6
Cropland and Pasture	53.3
Streams and Canals	137.0
Forested Wetland	1154.8
Non-Forested Wetland	936.0
Strip Mine, Quarries, and Gravel Pits	74.1
Total	1,598.8

*Many non-forested wetland areas north of the Hero Canal are used as pasture for cattle

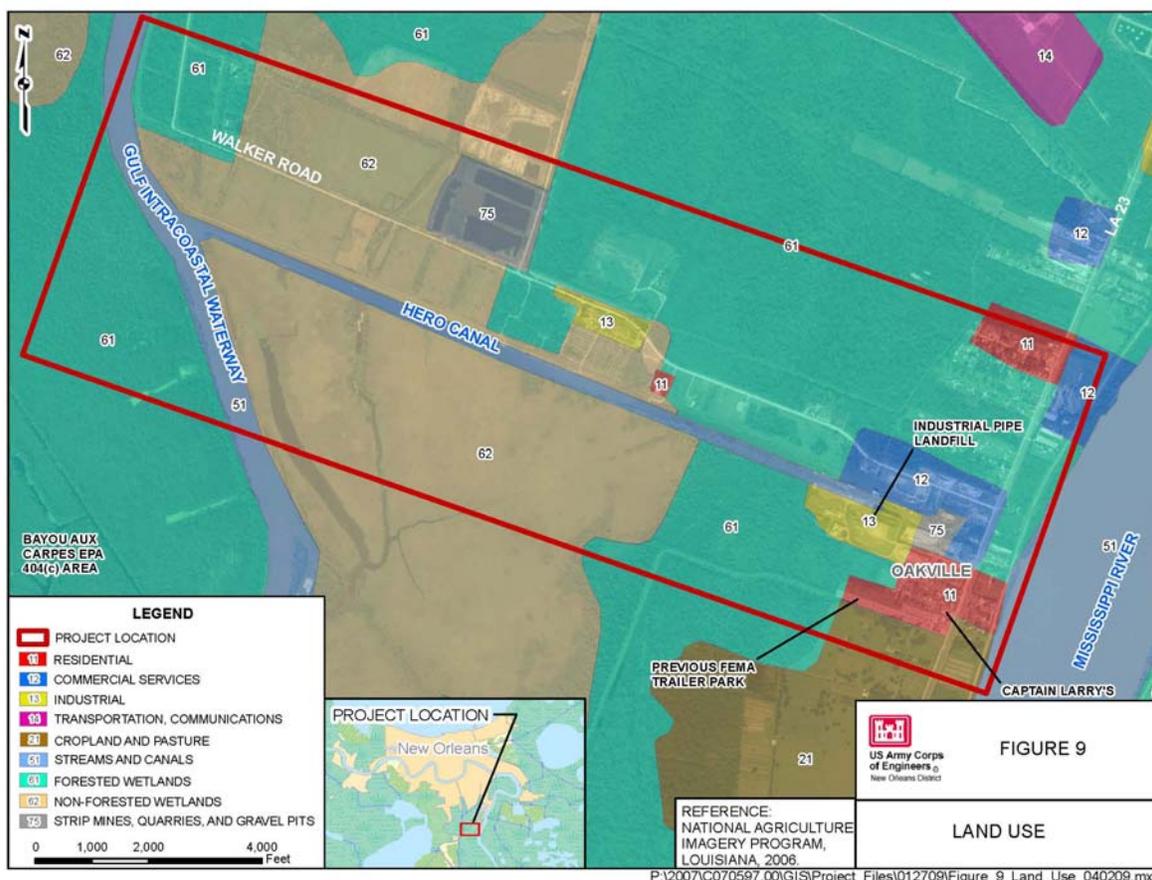


Figure 9: Land use

3.1.3 Climate

The project area and Plaquemines Parish fall within the Gulf Coast regional climate characterized as hot, humid, and subtropical (Ning *et al.* 2003). The maritime air masses associated with the Gulf of Mexico and the many water surfaces of rivers, streams and lakes in the area significantly influence the local climate. Summers are long and hot with high humidity. Tropical storms often enter the Gulf of Mexico in the summer and fall and can generate extensive rainfall and high winds. The area receives approximately 65 inches of precipitation annually. The summer average daily temperature is 81° Fahrenheit, with the average daily high temperature around 90°. During winter, cold, dry, polar air masses often move southward from Canada, often influencing the project area. Winter average daily temperature is 54° and the average daily minimum is 44°.

Tropical storms and hurricanes frequent the region between August and October. These storms bring high winds (capable of exceeding 155 miles per hour), heavy precipitation, and storm surges that cause extensive flooding, property damage, environmental devastation, and loss of life (National Hurricane Center 2007).

Regional climate trends show that over the past decade Louisiana has been subject to increasing temperatures and humidity, increasing precipitation and more intense precipitation events, stronger tropical storms, and a rising sea level (Ning *et al.* 2003). Climate modeling to predict future hurricane frequency are currently inconclusive; however, the currently supported climatic trends listed above are generally agreed to result in future increases in flooding, erosion, and subsidence, specifically to coastal areas (Ning *et al.* 2003).

3.1.4 Soils

Soils in the project area consist primarily of: (1) soils found on naturally occurring levees that are protected from flooding, and (2) soils frequently ponded in marshes and swamps that experience frequent flooding. The north side of the Hero Canal is dominated by Rita mucky clay in the cleared areas in the west of the project area, and by Schriever clay in the vicinity of Oakville (USDA 2007). These soils are commonly found on natural levees within the Mississippi delta and alluvial plain, in areas relatively free from flooding. Rita mucky clay is formed from clay alluvial parent material. Schriever clay soils are formed from alluvial clays and are also poorly drained and slowly permeable.

The south side of the Hero Canal is dominated by Allemands Muck, with a minor component of Barbary Muck, in the marsh and BLH areas in the west of the project area. Allemands Muck is formed from an overlay of organic material on clay swamp deposits. Barbary Muck is similar to Allemands Muck, but lacks the organic soil component. These mucky soils are commonly found in low-lying, ponded back swamps and are all very poorly drained and slowly permeable.

The soils in Oakville and the immediate vicinity are a mix of Rita mucky clay, dredged Aquents, Carville silt loam, and Schriever clay (USDA 2007). With the exception of dredged Aquents, these soils are typically found on natural levees, protected from flooding. Carville silt loam is a deep, poorly-drained and moderately-permeable soil generally formed from loamy and clayey alluvium. Dredged Aquents are typically found on spoil banks, protected from flooding.

Almost all of the soils within the study area exhibit substantial subsidence ranging from 6 inches to 51 inches when dried (USDA 2007). To ensure 100-year flood level of risk reduction, final levee elevation should be determined as the elevation post predicted subsidence, or levee elevation should be monitored and reconstructed as needed. In addition, Carville silt loam and Schriever clay are designated prime farmland soils (USDA 2007). Areas of prime farmland soils are designated in figure 10.

3.1.5 Geology

The study area is located in Plaquemines Parish, which, in conjunction with St. Bernard Parish, forms the Lower Mississippi Delta Region. Natural ground elevations are near sea level. Dominant physiographic features in the area consist of the Mississippi River and its associated natural levees and Bayou Barataria.

The underlying geology of the study area is composed of extremely young sediment deposited by the Mississippi River and various tributaries. Exposed surfaces are typically Quaternary Holocene alluvial and coastal marsh deposits. The alluvial deposits are primarily sand, gravel, and rich muddy organic matter. The coastal marsh deposits are composed chiefly of muddy organic matter (Louisiana Geologic Survey 1936). Historically, the river system freely deposited sediments via flooding events, and continually changed course. These processes are responsible for the continual formation and maintenance of the Lower Mississippi Delta Region; however, due to human influences these processes no longer occur with the frequency needed to maintain the land masses in their current state. Levee construction has created a permanent unwavering path for the Mississippi River and has greatly limited flooding.

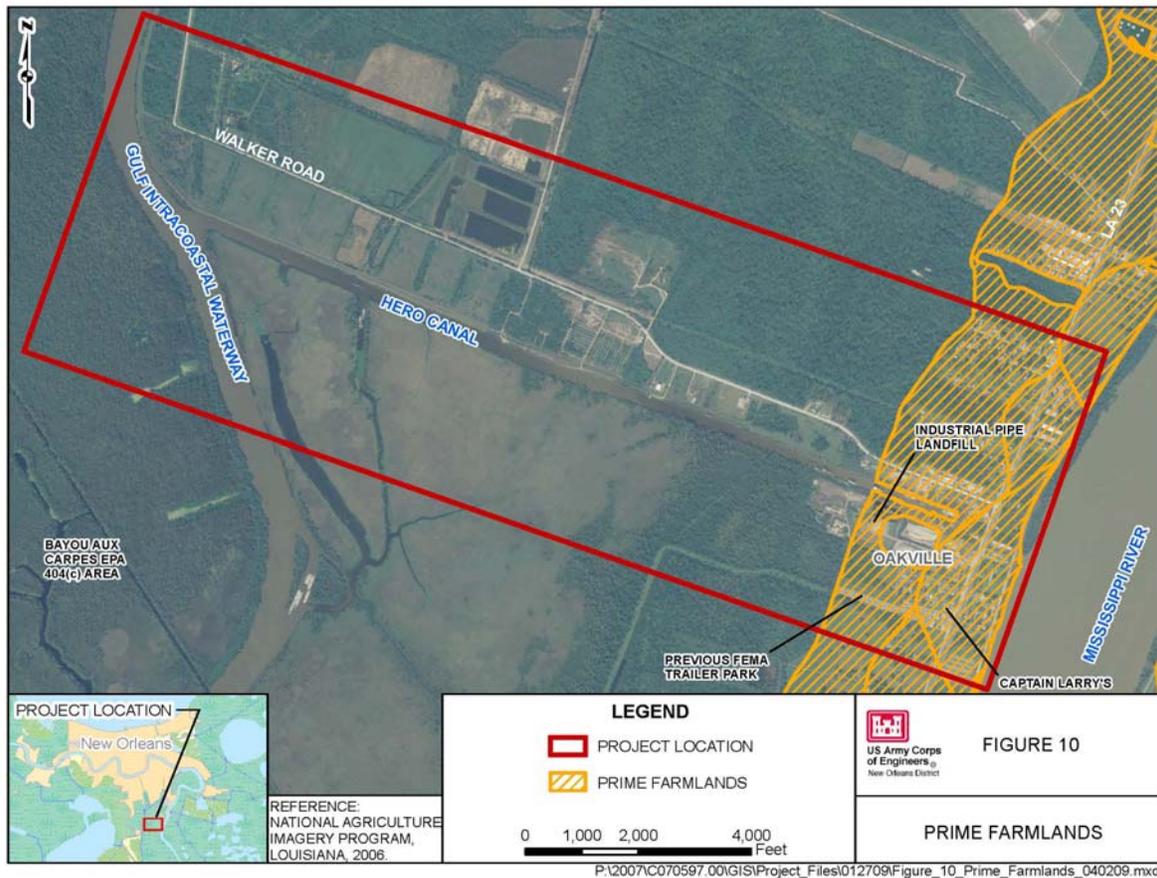


Figure 10: Prime farmland

Along the Hero Canal, the soil surface is largely composed of artificial levee material that ranges from 10 feet to 24 feet thick. Beneath the artificial levee deposits lie swamp deposits that are composed of organic clays, fat clays, and peats with occasional sand and silt layers. Swamp deposits are generally between 10 feet and 20 feet thick. Peat layers are common in the swamp deposits between 10 feet and 20 feet in elevation. An abandoned distributary channel crosses the

Algiers Canal due west of English Turn. It is located between 5 feet and 46 feet in elevation and filled with interbedded layers of sands, silts, and clays. Flanking the abandoned distributary are natural levee deposits composed of predominantly fat clays and silts. Natural levee deposits are located between 4 feet and 28 feet elevation and range in thickness from 4 feet to 24 feet. Interdistributary deposits are located beneath the natural levee and swamp deposits and consist of interbedded layers of fat and lean clays, silts, and silty sands. They average 40 feet in thickness. Intradelata deposits are present beneath swamp and within interdistributary deposits. Intradelata deposits are typically coarse material with interbedded layers of silt, silty sand, and sand with some clay layers. Intradelata deposits range in thickness from 2 feet to 20 feet and are generally found between 20 feet and 40 feet in elevation. Beneath the interdistributary deposits lie nearshore gulf sediments that are composed predominantly of sand and silty sand with clay layers and shell fragments and prodelta deposits that are mainly clay. Nearshore gulf deposits lie atop Pleistocene deposits that are composed of stiff to very stiff oxidized clays interbedded with layers and lenses of silts and sands. The top of the Pleistocene ranges from 75 feet to 100 feet in elevation and extends to an unknown depth.

Groundwater is at or near the surface and may be hydraulically connected to the Mississippi River and the GIWW.

Long-term relative subsidence rates average approximately 0.5 ft/century in the study area. It is estimated that eustatic sea level will rise an additional 1.3 feet over the next 100 years (Intergovernmental Panel on Climate Change 2002). Combined, the relative subsidence rate is estimated to be 1.8 feet over the next 100 years. (Note: all elevations are in NAVD 88).

3.2 SIGNIFICANT RESOURCES

This section contains a list of the significant resources located in the vicinity of the proposed action, and describes in detail those resources that would be impacted, directly or indirectly, by the alternatives. Direct impacts are those that are caused by the action taken and occur at the same time and place (40 CFR §1508.8(a)). Indirect impacts are those that are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable (40 CFR §1508.8(b)). Cumulative impacts are discussed in section 4.

The resources described in this section are those recognized as significant by laws, executive orders, regulations, and other standards of National, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public. Further detail on the significance of each of these resources can be found by contacting the CEMVN, or on www.nolaenvironmental.gov, which offers information on the ecological and human value of these resources, as well as the laws and regulations governing each resource. Table 5 shows those significant resources found within the project area, and notes whether they would be impacted by the proposed alternative.

This report assumes that under the “no action” alternative the risk reduction system would be raised to the originally authorized grade (El. 10 NAVD88), rather than the 100-year level of risk reduction (2057 El. 14 NAVD88). Consequently, the impacts discussed in this report are those impacts specifically associated with raising the level of risk reduction from the originally authorized grade up to the 100-year level of risk reduction. Rather, the no action alternative is considered as the baseline for the purposes of the analysis performed. All impact calculations and discussions are assumed to be impacts incurred in addition to the authorized action.

Table 5: Significant Resources in Project Study Area

SIGNIFICANT RESOURCES	IMPACTED (temporary or permanent)	NOT IMPACTED
Wetlands	X	
Upland Resources		X
Prime Farmland	X	
T&E Species		X
Fisheries	X	
Wildlife	X	
Water Quality	X	
Cultural Resources	X	
Recreational Resources		X
Air Quality	X	
Noise	X	
Socioeconomic	X	

X = Designates resource as impacted or not impacted

3.2.1 Wetlands

3.2.1.1 Existing Condition

Most of the project area consists of wetland, or previously drained wetland habitats retaining various wetland characteristics (figure 11). Certain locations within the project area have experienced a significant hydrological shift due to the construction of numerous levees and pumping stations during the 1960s to locally control drainage. These drained wetland habitats are primarily located to the north of the current Hero Canal levee and retain historic vegetative characteristics of BLH forests; however, many of these areas have been cleared for grazing. The remainder of the project area contains a wide array of wetland habitat types typical of the Bottomland Hardwood Region of the Mississippi River Alluvial Plain. These wetland habitat types include; (1) wet and non-wet bottomland hardwood forest, (2) cypress/tupelo swamp, (3) freshwater emergent and shrub-scrub wetland, and (4) marsh (figure 9). The only areas resembling any substantial upland habitat characteristics are the existing levees.

Bottomland hardwood forest provides all basic ecosystem services of a typical wetland (Smith et al. 1995). Hydrologically, forested wetlands act to store ground water, maintain surface water and aid in flood and storm risk reduction by acting as natural “sponges.” Biogeochemically, forested wetlands provide numerous valued services such as carbon sequestration, nutrient retention, and natural non-point source pollution mitigation (Coastal Wetland Forest Conservation and Use Science Working Group 2005). BLH forests also support significant wetland biological communities. Numerous species of insects, fish, amphibians, mammals, and birds utilize critical habitat found within BLH forests.

The maintenance of wetland habitat types in the bottomland hardwood region was historically dependent upon sediment input from freshwater flooding events producing a slow and gradual elevation transition. The gradual elevation change provides a highly elongated freshwater to saltwater transition zone capable of supporting a high diversity of wetland and marsh vegetation

communities. Currently, these coastal areas are in a transgressive phase resulting in the rapid replacement of freshwater marsh and swamp habitat with increasingly marine-dominated habitats (Roberts 1997). Historically, the coastal region encompassing the project area would receive freshwater and sediment inputs during frequent flooding events from the Mississippi River. These flooding events would act to maintain the freshwater habitat characteristics and negate the effects of tidal outwash through silt deposition; however, the construction of levees and other flood control measures have significantly altered freshwater, nutrient, and sediment inputs (Kesel 1989, Boesch et al. 1994, Day *et al.* 2000). If not developed, areas protected from both freshwater and backwater tidal flooding with levees and water pumps have significantly dried causing both subsidence, and the conversion of BLH forest to more upland habitat. Other areas protected from freshwater flooding and silt deposition, but not protected from backwater tidal flooding, have high rates of tidal outwash without silt replenishment and higher than normal saltwater concentrations.

Bottomland hardwood forests were once the dominant vegetation community type of the Mississippi River Alluvial Plain Region. Originally covering a nearly continuous 50 million acre expanse throughout the Southeastern United States, the vast majority of the BLH forests were cleared for their valuable timber and converted into agricultural lands throughout the last 100 years (Frayer et al. 1983, Dahl *et al.* 1991). Furthermore, extensive water control measures intended to maintain adequate drainage for converted agricultural land and other developments has negatively impacted any remaining BLH forest patches by drastically altering the natural hydrological regime, resulting in the colonization and establishment of upland species over time, thereby indirectly and slowly converting any remaining bottomland forest (Coastal Wetland Forest Conservation and Use Science Working Group 2005). Consequently, less than 10 million acres of BLH forest habitat remains, almost none of which is old growth. The degradation of BLH forests also impacts a highly lucrative economic resource. Containing countless species of harvestable high quality timber, habitat loss and regeneration failure have significantly impacted Louisiana's timber industry; an industry that has traditionally accounted for over 55% of land and water based economic production (Louisiana Department of Wildlife and Fisheries 2000).

In the immediate area of the Hero Canal levee, small remnant patches of non-wet BLH forest habitat are located adjacent to the north side of the existing Hero Canal levee. Most likely once entirely forested, the area has been cleared, drained, and is primarily utilized as grazing lands for cattle. Any remaining BLH habitat in this area becomes increasingly patchy, and less intact, moving from west to east along the northern border of the Hero Canal. The dominant overstory vegetation in the area is characterized by secondary growth water oak (*Quercus nigra*), live oak (*Quercus virginiana*), black willow (*Salix nigra*), swamp red maple (*Acer rubrum* var. *drummondii*), green ash (*Fraxinus pennsylvanica*), hickory species (*Carya spp.*) and hackberry species (*Celtis spp.*). Additional non-forested wetland habitats are scattered along the northern expanse of the Hero Canal. The transitional wetland habitat on the north side of the Hero Canal, between the Hero Canal and the Hero Canal levee consists of black willow, elephants ear (*Colocasia antiquorum*), bulltongue (*Sagittaria lancifolia*), *Sesbania spp.*, and soft rush (*Juncus effusus*) among others. These areas are also heavily invaded by chinese tallow (*Sapium sebiferum*). Most of the cleared land used for grazing north of the Hero Canal levee functions as palustrine emergent or scrub/scrub wetland habitat comprised of soft rush (*Juncus effusus*), marsh morning glory (*Ipomea sagittata*), *Carex spp.*, poison ivy (*Toxicodendron radicans*), waxmertyle (*Myrica cerifera*), and buttonbush (*Cephalanthus occidentalis*).

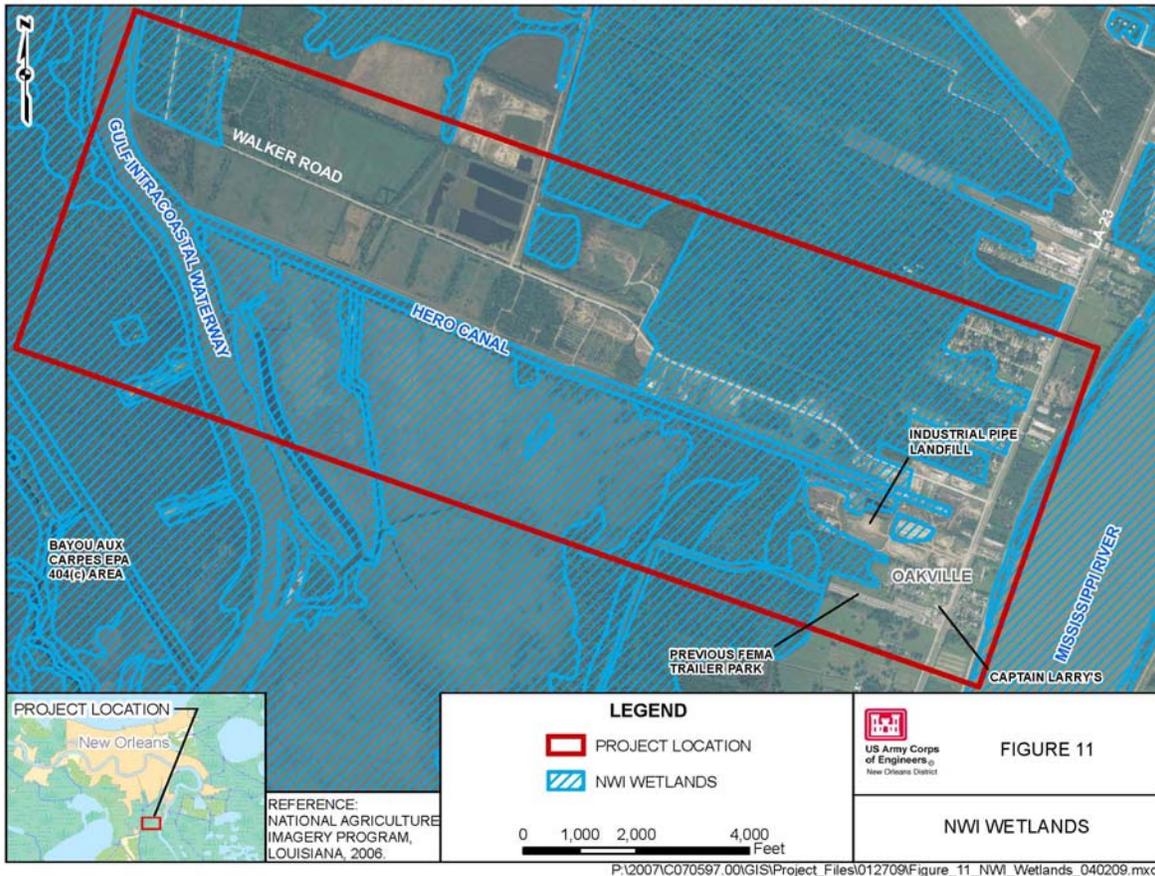


Figure 11: National Wetland Inventory Wetlands

Wet BLH forest habitat is primarily found south of the Hero Canal. High quality cypress-tupelo swamp habitat extends westward from Oakville and the landfill, gradually transitioning into non-forested marsh habitat approaching the GIWW. The forested overstory is dominated by bald cypress (*Taxodium distichum*), swamp red maple and tupelo gum (*Nyssa aquatica*), with a relatively sparse and flooded understory dominated by dwarf palmetto (*Sabal minor*). The marshes in this area are dominated by smartweed (*Polygonum spp.*), bulltongue, pennywort (*Hydrocotyle spp.*), and softstem bullrush (*Scirpus validus*). These areas south of the Hero Canal are completely inundated. Consequently, these areas provide spawning and nursery areas for larval and juvenile fish and shellfish of both freshwater and estuaries such as sunfish (*Lepomis spp.*), menhaden (*Brevoortia sp.*), blue crabs (*Callinectes sapidus*), and bay anchovies (*Anchoa mitchilli*). Regionally, the cypress/tupelo swamp and marsh habitat south of the Hero Canal functions as part of a large and highly-productive estuary complex consisting of the Bayou aux Carpes 404(c) area, Barataria Bay, and the greater Gulf of Mexico.

3.2.1.2 Discussion of Impacts

3.2.1.2.1 No Action

With the no action alternative, the 100-year level of risk reduction work would not occur and the HSDRRS system would be built around Hero Canal and along the landfill boundary only to the levels authorized prior to Hurricane Katrina. The alignment authorized in 1994 would be built using the latest design standards, which would increase the levee footprint. Generally, this would mean raising levee embankments and floodwalls to approximately 10 feet in elevation, and

providing higher access gates and modified pumping stations, if required. Wetland acreage impacted would increase because of the newer design standards. Few wetland impacts would occur that have not been previously authorized.

3.2.1.2.2 Proposed Action

Direct Impacts. Implementation of the proposed action (alternative 1) would directly impact approximately 36.6 total acres of quality wetland habitat (table 6). Wetlands types impacted by this alternative include wet and non-wet BLH hardwood forest and cypress-tupelo swamp habitats.

North of the Hero Canal, all wetland impacts would occur adjacent to sections of pre-existing ROW along the existing Hero Canal levee. In these areas, the proposed action would impact 13 acres of altered BLH, on the protected side. The quality of the BLH habitat north of the Hero Canal has been affected by previous levee construction or development activities. This BLH is considered to be a lower quality habitat as compared to the BLH south of the Hero Canal because it has been significantly altered due to land clearing and impoundment.

South of the Hero Canal, the proposed action (alternative 1) would impact 19 acres of high-quality BLH and 39 acres of cypress-tupelo swamp. The impacted area would primarily be a result of new ROW required adjacent to the western and southern borders of the existing landfill. Additional impacts would result from a straddle build along the parish levee running south from the landfill to the western border of the former FEMA trailer park. The BLH cypress/tupelo swamp is the only wetland type that would be impacted south of the Hero Canal.

Overall, a total of 39 acres of cypress-tupelo swamp, 13 acres of lower quality altered BLH, and 19 acres of high quality BLH habitat would be unavoidably impacted, specifically requiring in-kind mitigation. Direct impacts to any quality BLH forest habitat and cypress swamp would be permanent. Wetlands would be mechanically cleared and grubbed to facilitate the construction of the new levee structure and would require mitigation. All construction impacts would occur in or adjacent to reaches of the area which have been previously disturbed. Specific information regarding mitigation due to the proposed action can be found in section 7.

Indirect and Cumulative impacts. Indirect effects of construction (e.g., increased turbidity, noise, vibrations, fugitive dust, etc.) would have only temporary effects to the wetlands habitats adjacent to the areas directly impacted by the proposed action. The adjacent wetlands would stabilize following construction, allowing sediment to settle and vegetation to stabilize the area. Construction-related runoff into the wetlands would be managed through best management practices, which would minimize the potential indirect adverse impacts from this alternative on wetlands. Best management practices (BMP) are effective, practical, structural, or nonstructural methods which prevent or reduce the movement of sediment, nutrients, pesticides, and other pollutants from the land to surface or ground water, or which otherwise protect water quality from potential adverse effects of construction activities. BMPs would be used to minimize construction related impacts along the entire proposed action alignment.

By maximizing the use of existing habitat edges and levee ROWs, the proposed action would not significantly increase edge habitat, fragmentation, or hydrologic isolation within the study area. However, overall indirect and cumulative impacts due to additional wetland losses and levee construction may have a lasting and delayed impact on wetland habitat due to altered hydrological regimes leading to habitat alterations, changes in water salinity and nutrient load, and increased rates of subsidence. These factors may contribute to long-term wetland loss within the region and subsequent negative trickle-down effects on fish and wildlife community's dependent upon nearby wetland habitat.

Table 6: Wetland Impacts

Alternative	Tidal BLH wetland impacts (acres)	Impounded BLH wetland impacts (acres)	Swamp wetland impacts (acres)	Total wetland impacts (acres)	AAHUs*
1	19	13	39	71**	46.67
3	26	21	31	78	47.51
5	1	4	40	45	26.90

* Average Annualized Habitat Units (AAHUs) lost due to each alternative. See section 7 for a more detailed discussion. **These acreages reflect an expanded footprint developed further along in the design process to compensate for Spencer’s Optimized standards, include staging areas, and account for the emergency bypass road.

Cumulative wetland impacts are expected due to implementation of the proposed action in concert with additional WBV projects (see table 17). Construction of the proposed action would contribute to the cumulative losses of BLH within the HSDRRS.

3.2.1.2.3 Alternatives to the Proposed Action

Direct Impacts. Each alternative to the proposed action would directly impact wetland habitat within the project area.

North of the Hero Canal, alternatives 3 and 5 would impact wetland habitat adjacent to existing Hero Canal levee ROW. Similar to the proposed action, these impacts would primarily occur on the protected side of the existing levee. Both alternatives to the proposed action would primarily impact altered BLH. The quality of the BLH habitat north of the Hero Canal has been affected by previous levee construction or development activities. This BLH is considered to be a lower quality habitat as compared to the BLH south of the Hero Canal because it has been significantly altered due to land clearing and impoundment. North of the Hero Canal, alternative 3 would impact 31 acres of swamp, and 21 acres of BLH. Approximately 40 acres of swamp and 4 acres of BLH would be impacted by alternative 5.

South of the Hero Canal, alternative 3 would impact 26 acres of high-quality BLH and 40 acres of cypress-tupelo swamp. The impacted area would primarily be a result of new ROW required to the west of the existing landfill. Additional impacts would result from a straddle build along the parish levee running south from the landfill to the western border of the former FEMA trailer park. Alternative 5 would impact 1 acre of high-quality BLH and 4 acres of cypress-tupelo swamp. These impacts would occur due to newly acquired ROW along the southern border of the landfill between the parish levee and Oakville, and due to a straddle build along the parish levee ROW to the western border of the FEMA trailer park. Cypress-tupelo swamp is the only wetland type that would be impacted south of the Hero Canal by either alternative to the proposed action.

Direct impacts to any quality BLH forest habitat and cypress swamp due to the implementation of alternative 3 or 5 would be permanent. Wetlands would be mechanically cleared and grubbed to facilitate the construction of the new levee structure and would require mitigation. Both alternative 3 and 5 would require mitigation for wetland impacts incurred.

Alternative 3 utilizes an alignment that does not exclusively follow existing ROW or habitat edges. South of the Hero Canal this alternative would create new edge habitat and contribute to the fragmentation of the cypress-tupelo swamp adjacent to the landfill. The implementation of this alternative may cause long-term alterations of these isolated habitat patches. Overall changes in habitat type and quality would be expected due to habitat fragmentation, isolation, and changes in abiotic conditions (i.e., hydrology) as a result of the levee construction south of the Hero Canal

required for alternative 3. Alternative 5 would not significantly increase edge habitat, fragmentation, or hydrologic isolation within the study area by maximizing the use of existing habitat edges and levee ROWs.

Indirect and Cumulative Impacts. Overall, the indirect effects of construction (e.g., increased turbidity, noise, vibrations, fugitive dust, etc.) would have only temporary effects to wetland habitats adjacent to the areas directly impacted by either alternative to the proposed action. The adjacent wetlands would stabilize following construction, allowing sediment to settle and vegetation to stabilize the area. Construction-related runoff into the wetlands would be managed through BMPs, which would minimize the potential indirect adverse impacts from this alternative on wetlands.

Cumulative wetland impacts would be expected due to implementation of all of the alternatives in concert with additional WBV projects (see table 17). Construction of both alternatives would contribute to the cumulative losses of BLH within the HSDRRS.

3.2.2 Non-Wetland Resources/Upland Resources

3.2.2.1 Existing Conditions

There are non-wetland and upland resources that would benefit from the protection afforded by the project within the greater Plaquemines Parish area; however, there are no naturally occurring non-wetland or upland resources within the immediate area potentially impacted by any of the alternatives. Naturally occurring non-wetland upland resources are defined as areas naturally containing; (1) a prevalence of facultative or obligate upland plant species, (2) non-hydric soils, and (3) few or no occurrences of periodic inundation or soil saturation throughout the growing season. Historically, the entire study area was most likely BLH forest or inundated swamp habitat typical of lowland. The study area falls within the Southern Holocene Meander Belts and Deltaic Coastal Marshes and Barrier Islands Eco regions. These regions are generally characterized by coastal marshes, channels, oxbows, and natural levees with ponded and poorly drained soils. Natural elevation changes within the study area are slight, and the entire area is generally less than 3 feet above sea level. The limited areas that are not wetlands are the result of the deposition of soil or fill for the construction of levees, roads, railways; spoil from excavation of waterways; and landfill material. Therefore, naturally occurring non-wet uplands are not a significant resource in this area.

Although natural uplands and non-wetlands are not a significant resource within the study area, there are significant land uses in the study area that are typically associated with upland habitats. Within the study area, these land uses are limited to agricultural production on previously cleared and drained BLH forest lands. These areas currently support cattle and citrus orchards, and are located north of the Hero Canal along the Hero Canal levee, and adjacent to the MRL to the north and south of Oakville (figure 12). Impacts to these upland land uses are considered in section 3.3.

3.2.2.2 Discussion of Impacts

There are no naturally occurring uplands in the IER # 13 project footprint. Those limited areas that are not wetlands are the result of the deposition of soil fill for construction of levees, roads, and railways; spoil from excavation of waterways; and landfill material. Therefore, non-wet uplands are not a significant resource in this area and are not evaluated further with regard to potential impacts.

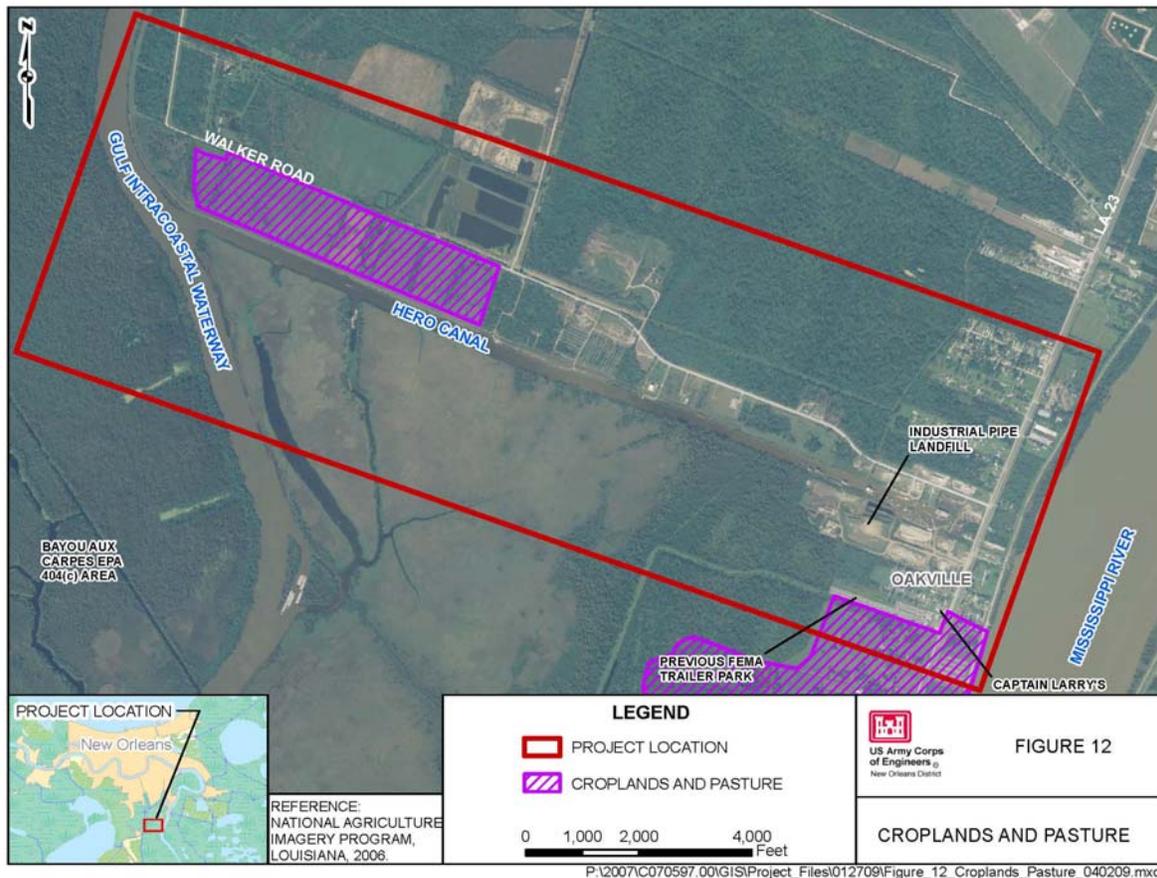


Figure 12: Croplands and Pastures

3.2.3 Prime Farmland Soils

3.2.3.1 Existing Conditions

Prime farmland soils and soils of statewide importance are best used for food, forage, and agricultural production due to their high and sustained yields. Most designated prime farmland soil within the study area have been previously developed or contains existing levees and ROW; however, some potentially impacted areas are currently used for agricultural production (cattle and citrus) and fall under jurisdiction of the Farmland Protection Policy Act (FPPA) —Subtitle I of Title XV, Section 1539-1549. United States Department of Agriculture (USDA) Farmland Conversion Impact Rating documents and correspondence with the USDA Natural Resources Conservation Service (NRCS) for the project can be found in appendix J. Cancienne silt loam, Cancienne silty clay loam, Carville silt loam, and Shriever clay are designated prime farmland soils (USDA, 2007) found within the IER #13 study area. These soils are found in a band running parallel to the Mississippi River, and are constrained to locations within the IER #13 study area extending from the MRL westward approximately 2,000 ft., including Oakville, the landfill, the salvage and construction yards, the former FEMA trailer park, and surrounding developments. There are no other prime farmland soils or soils of statewide importance mapped to the remainder of the study area.

Areas of prime farmland soils are illustrated in figure 10.

3.2.3.2 Discussion of Impacts

3.2.3.2.1 No Action

With the no action alternative, the 100-year level of risk reduction work would not occur and the HSDRRS system would be built only to the levels authorized prior to Hurricane Katrina. Generally, this would mean raising levee embankments and floodwalls to approximately a 10-foot elevation, and providing higher access gates and modified pumping stations. No foreseeable new impacts would occur to any prime and unique farmland soils within the project area that have not previously been authorized.

3.2.3.2.2 Proposed Action

Direct Impact. Implementation of the proposed action, alternative 1, would directly impact 6.4 acres of prime farmland soils in the project area due to levee expansion and new ROW acquisition. These impacts are isolated to areas south of the Hero Canal. Areas of prime farmland soil located within the footprint of the proposed action extend from the MRL tie-in point to the western end of the former FEMA trailer park. Much of the potentially impacted area has been previously developed, indicating that any impacts to prime farmland soils due to the proposed action would be less than anticipated based upon NRCS soil mapping data.

Indirect and Cumulative Impacts. Indirect and cumulative impacts due to the implementation of the proposed action could potentially alter areas of prime farmland soils not directly affected by levee construction and ROW acquisition. Additional flood risk reduction afforded by the implementation of the proposed action in coordination with additional WBV projects, could potentially decrease silt deposition and increase drying and subsidence in areas that are currently unprotected, thereby, potentially changing soils properties over the long term. These changes would result from future hydrological shifts due to any flood risk reduction structures associated with the HSDRRS. Therefore, soil properties could be indirectly altered due to the implementation of the proposed action, or due to the greater overall hydrological regime resulting from the overall HSDRRS system. These impacts have historically been common, and are not unexpected.

3.2.3.2.3 Alternatives to the Proposed Action

Direct Impacts. Both alternatives to the proposed action would impact areas of mapped prime farmland soil types.

Alternative 3 shares the same alignment as the proposed action through the band of mapped prime farmland soils south of the Hero Canal on the eastern end of the study area. Consequently, alternative 3 similarly would impact 6.4 acres of prime farmland soil extending from the MRL tie-in point to the western end of the FEMA trailer park. As with the proposed action, many of these areas have been previously developed, suggesting that the realized impacts to prime farmland soils would be less than indicated.

Alternative 5 would impact a total of 12.2 acres of prime farmland soil both north and south of the Hero Canal. Alternative 5 would impact areas of mapped prime farmland soils on the north side of the eastern end of Hero Canal near the construction and salvage yards. Impacts continue from this location along the remainder of the alignment eastward to the MRL tie-in location. This alternative would impact prime farmland soils mapped within the salvage yards, construction yards, landfill, Oakville, the former FEMA trailer park, and cleared undeveloped areas to the east of LA 23. Again, many of these areas have previously been developed suggesting that actual prime farmland impacts would be less than predicted.

Indirect and Cumulative Impacts. Indirect and cumulative impacts due to the implementation of alternative 3 or 5 could potentially alter areas of prime farmland soils not directly affected by levee construction and ROW acquisition. Additional flood risk reduction afforded by the implementation of these alternatives in coordination with additional WBV projects, could potentially decrease silt deposition and increase drying and subsidence in areas that are currently unprotected, thereby, potentially changing soils properties over the long term. These changes would result from future hydrological shifts due to any flood risk reduction structures associated with the HSDRRS. Therefore, soil properties could be indirectly altered due to the implementation of either alternative, or due to the greater overall hydrological regime resulting from the overall HSDRRS system. These impacts have historically been common, and are not unexpected.

3.2.4 Threatened and Endangered Species

3.2.4.1 Existing Conditions

There are several federal or state-listed threatened and endangered (T&E) species that are dependent on the habitat types present in the study area. Numerous rare migratory birds utilize many local habitats as stop-over points during migration along the Mississippi Flyway migration corridor (e.g., piping plover, peregrine falcon). Other species specifically utilize the habitat for breeding and raising young (e.g., Cooper’s hawk, bald eagle, and snowy plover). There are also numerous, permanent, rare wildlife residents (e.g., brown pelican, eastern glass lizard, and manatee). The Louisiana Natural Heritage Program (LNHP) lists BLH forest and all marsh habitats in Louisiana as either critically imperiled or rare natural communities (Louisiana Natural Heritage Program 2005).

According to the United States Fish and Wildlife Service (USFWS) and the LNHP, federally threatened or endangered species are known to occur, or have critical habitat within Plaquemines Parish (table 7).

Table 7: Federally-listed Threatened and Endangered Species for Plaquemines Parish, Louisiana

Scientific Name	Common Name	Federal Status	Likely to Occur In Study Area
<i>Charadrius alexandrinus</i>	snowy plover	Threatened	No
<i>Charadrius melodus</i>	piping plover	Endangered	No
<i>Falco peregrines</i>	peregrine falcon	Endangered	No
<i>Pelecanus occidentalis</i>	brown pelican	Endangered	No
<i>Trichechus manatus</i>	manatee	Endangered	No

(Louisiana Natural Heritage Program, 2005)

3.2.4.2 Discussion of Impacts

While these species are known to occur within the vicinity of the study area, there are no known T&E species thought to occur within the study area according to the USFWS (appendix D). Consequently, no direct impacts would be expected to occur due to the proposed action, or any considered alternative. Overall, indirect and cumulative effects due to other HSDRRS (LPV) projects may potentially impact gulf sturgeon (*Acipenser oxyrinchus desotoi*) populations and

habitat according to coordination with the National Marine Fisheries Service (NMFS). No additional indirect or cumulative impacts would be expected to occur due to IER # 13, assuming that areas impacted by the overall HSDRRS are not suitable habitat for any federally-listed species known to occur within the region. However, the conversion of natural areas may increase fragmentation, alter hydrology, and effect habitat quality.

3.2.5 Fisheries

3.2.5.1 Existing Conditions

The BLH forests, cypress swamps, marshes, and tidal channels provide habitat for an abundance of amphibians, reptiles, and shellfish as previously discussed (see section 3.2.1). Coastal wetlands, marshes and forests maintain statewide fish and wildlife resources by directly providing permanent habitat or indirectly acting as breeding and rearing refuges necessary to many economically important species.

Areas in and adjacent to the project area are important contributors to the local and regional fisheries. Water bodies within the project area provide habitat for resident populations of numerous species. The canals and surrounding marshes support bowfin (*Amia calva*), spotted gar (*Lepisosteus spatula*), shads (*Alosa spp.*), mosquitofish (*Gambusia affinis*), and channel catfish (*Ictalurus punctatus*), among others. In addition, the Bayou aux Carpes 404(c) area is located to the west of the designated IER #13 study area. The Bayou aux Carpes area was designated a 404(c) area in 1985 by the Environmental Protection Agency (EPA) as authorized by Section 404(c) of the Clean Water Act of 1972. Analysis of samples collected in 1985 indicated that forage species (e.g. mosquitofish, threadfin shad [*Dorosoma petenense*], and golden top minnow [*Fundulus chrysotus*]) were the most abundant fish species in the area. These areas provide valuable spawning, feeding, and nursery habitat for recreationally-important freshwater fish such as large-mouth bass (*Micropterus dolomieu*), bowfin, and sunfish; crustaceans such as crawfish and grass shrimp and the blue crab (*Callinectes sapidus*). Consequently, the Bayou aux Carpes 404(c) area and the IER #13 study area south of the Hero Canal are considered major contributors to the greater Barataria Bay Estuary, providing sensitive habitat for both freshwater and marine species. These wetland estuaries are critical to maintaining sustainable populations of commercially important marine and freshwater species, such as speckled trout (*Cynoscion nebulosus*), redfish (*Sebastes spp.*), flounder (*Paralichthys lethostigma*), croaker (*Micropogonias undulates*), and numerous shellfish, by functioning as nurseries.

3.2.5.2 Discussion of Impacts

3.2.5.2.1 No Action

No foreseeable new impacts would occur to the existing fisheries resources within the project area due to the no action alternative that have not been previously authorized. With the no action alternative, the 100-year level of risk reduction work would not occur and the HSDRRS system would be built only to the levels authorized prior to Hurricane Katrina. Generally, this would mean raising levee embankments and floodwalls to approximately a 10-foot elevation, and providing higher access gates and modified pumping stations.

3.2.5.2.2 Proposed Action

Direct Impacts. The proposed action would directly impact cypress-tupelo swamp south of the Hero Canal that function as part of the Barataria Bay Estuary, potentially negatively impacting fish and shellfish populations dependent upon estuary habitat to maintain locally and regionally sustainable populations. Primary impacts would occur while building the 56 feet stoplog gate in the Hero Canal. Other impacted areas would primarily occur to the south and east of the landfill. Impacts to wetlands potentially utilized as fish habitat total approximately 39 acres; however, as

previously discussed, the quality of these wetland areas and associated fish habitat have been affected by past development and flood control activities. BMPs would be used to minimize impacts to water quality and fisheries.

The proposed action consists of constructing gate(s) and a 70 cfs pumping station across the Hero Canal. This would temporarily disrupt open water fish habitat during construction. Installation of the structures would disturb wetland biota and sediments in the vicinity during construction. Additional impacts would be described for the proposed action as follows.

Under normal conditions, the gate structures would be open, channel velocities would remain stable, and the pump station would not be in operation; however, during a storm event, operation of the closure complex on the Hero Canal would directly impact fisheries. Only during a storm event would the gate structure be closed to fish, and during that time, closing the gates would limit fish movement on one side or the other. The pump station would only operate during a storm event, and at that time fish could be caught in the ancillary structures. Any increased velocities to the pump station during a storm event would be countered by storm surge.

The 150 cfs pumping station that would be constructed east of the non-Federal levee to evacuate stormwater from the protected side to the flood side of the alignment would only be operated during a storm event. A sluice gate at that location would allow rain to drain during non-hurricane events, and impacts to fisheries are not expected. During a storm event the pump station would discharge into the Oakville Drainage Canal. Any increased velocities in that canal during a storm event would be countered by storm surge. Similar to the pump station on Hero Canal, installation of the pump station would disturb wetland biota and sediments in the vicinity during construction.

Indirect Impacts. Indirect impacts on the fisheries and aquatic habitat are expected. Construction of the project features would disturb wetland biota and sediments in the vicinity and could cause downstream increases in turbidity and sedimentation. Suspended materials could clog fish gills, lower growth rates, and affect egg and larval development (USEPA 2003). Fisheries would be impacted as the habitat is cleared and grubbed for new construction. Motile organisms would relocate to adjacent undisturbed waters. Some benthic organisms would be impacted because they cannot vacate the construction area. Indirect effects to adjacent waters would consist primarily of effects from increased local turbidity on the surrounding open water areas, decreased dissolved oxygen levels, vibrations, and subsurface noise due to construction activities. Conditions of adjacent waters would return to normal after construction is completed, allowing sediment to settle, benthos to repopulate, and fish to return.

Cumulative Impacts. Although cumulative impacts due to the proposed action would be expected to be minimal, construction of the proposed action would contribute to the cumulative losses of fisheries and aquatic habitat resources within the HSDRRS.

3.2.5.2.3 Alternatives to the Proposed Action

Direct Impacts. Similar to the proposed action, Alternative 3 would directly impact cypress/tupelo swamp south of the Hero Canal that function as part of the Barataria Bay Estuary, potentially negatively impacting fish and shellfish populations dependent upon estuary habitat to maintain locally and regionally sustainable populations. Alternative 3 would also impact fisheries due to the gate across Hero Canal. The construction of alternative 3 would directly result in 31 acres of cypress swamp habitat loss.

Similar to the proposed action, alternative 3 consists of constructing gate(s) and a pumping station across the Hero Canal. This would temporarily disrupt open water fish habitat during construction. Installation of the structures would disturb wetland biota and sediments in the vicinity during construction. Additional impacts would be described for the proposed action as follows.

Under normal conditions, the gate structures would be open, channel velocities would remain stable, and the pump station would not be in operation; however, during a storm event, operation of the closure complex on the Hero Canal would directly impact fisheries. Only during a storm event would the gate structure be closed to fish, and during that time, closing the gates would limit fish movement on one side or the other. The pump station would only operate during a storm event, and at that time fish could be caught in the ancillary structures. Any increased velocities to the pump station during a storm event would be countered by storm surge.

Alternative 3 would also include construction of a 150 cfs pumping station that would be constructed east of the non-Federal levee to evacuate stormwater from the protected side to the flood side of the alignment. This pump station would only be operated during a storm event. A sluice gate at the pump station location would allow rain to drain during non-hurricane events, and impacts to fisheries are not expected. During a storm event, the pump station would discharge into the Oakville drainage canal. Any increased velocities in that canal during a storm event would be countered by storm surge. Similar to the pump station on Hero Canal, installation of the pump station would disturb wetland biota and sediments in the vicinity during construction.

Alternative 5, to a lesser extent, may impact fisheries in the wetland habitat. Impacts due to the implementation of alternative 5 would likely result in the loss of 40 acres of wetland. The general location of these impacts would be comparable to the preferred (to the south and/or east of the landfill). Alternative 5 would not include gate(s) or a pump station across the Hero Canal, therefore, none of the direct impacts previously discussed associated with these structures would occur.

The quality of the wetland areas and associated fish habitat that would be impacted by either Alternative 3 or 5 has been affected by past development and flood control activities. Best management practices would be used to minimize impacts to water quality and fisheries.

Indirect Impacts. Both alternative 3 and, to a lesser extent, 5 would be expected to result in additional indirect impacts on fisheries and aquatic habitat. These additional impacts would be comparable to those outlined for the proposed action. Construction of the project features would disturb wetland biota and sediments in the vicinity and could cause downstream increases in turbidity and sedimentation. Suspended materials could clog fish gills, lower growth rates, and affect egg and larval development (USEPA 2003). Fisheries would be impacted as the habitat is cleared and grubbed for new construction. Motile organisms would relocate to adjacent undisturbed waters. Some benthic organisms would be impacted because they cannot vacate the construction area. Indirect effects to adjacent waters would consist primarily of effects from increased local turbidity on the surrounding open water areas, decreased dissolved oxygen levels, vibrations, and subsurface noise due to construction activities. Conditions of adjacent waters would return to normal after construction is completed, allowing sediment to settle, benthos to repopulate, and fish to return.

Cumulative Impacts. Although cumulative impacts due to the proposed action would be expected to be minimal, construction of the proposed action would contribute to the cumulative losses of fisheries and aquatic habitat resources within the HSDRRS.

3.2.6 Wildlife

3.2.6.1 Existing Conditions

The diversity and abundance of wildlife inhabiting the project area is largely dependent on the quality and extent of suitable habitat present. The project area falls within a fragmented transition zone consisting of a patchy matrix of developed and natural areas. The project area is covered by fragments of forested wetlands, swamps, and marshes. To the south extend large expanses of marsh

habitat functioning as part of the greater Barataria Bay Estuary. Farther north, the landscape changes to industrial, commercial, and residential use. Numerous dredged canals traverse the project area. In addition, levees and floodwalls line the existing waterways.

Undeveloped areas to the west of the IER #13 project area, including the Bayou aux Carpes 404(c) area, are dominated by freshwater and brackish marsh and varying quality wooded wetlands that provide valuable food and shelter to a wide range of wildlife species.

A bald eagle (*Haliaeetus leucocephalus*) nest was documented in the nearby Bayou aux Carpes area in 2007. However, no bald eagles are known exist in the immediate IER # 13 project area. The bald eagle was removed from the List of Endangered and Threatened Species but, recommendations to minimize potential project impacts to eagles and their nests are provided by the USFWS in their National Bald Eagle Management Guidelines publication. The bald eagle continues to be protected under the Bald and Golden Eagle Protection Act and by the Migratory Bird Treaty Act.

BLH forests, cypress swamps, marshes, and tidal channels provide habitat for an abundance of birds, mammals, amphibians, reptiles, and fish as previously discussed (see sections 3.2.1, 3.2.4, 3.2.5). Coastal wetlands, marshes and forests maintain statewide fish and wildlife resources by directly providing permanent habitat or indirectly acting as breeding and rearing refuges necessary to many economically important species. Local wildlife specifically observed within the vicinity of the proposed project included alligator (*Alligator mississippiensis*), great blue heron (*Ardea herodias*), gray squirrel (*Sciurus carolinensis*), and white-tail deer (*Odocoileus virginianus*). The wildlife resources found within the project area have significant recreation and commercial uses.

Numerous rare migratory birds utilize project area habitats as stop-over points during migration (e.g., peregrine falcon). Other species specifically utilize the habitat for breeding and raising young (e.g., bald eagle). These species are highly dependent on BLH forest habitat found throughout the project area (Louisiana Department of Wildlife and Fisheries, 2007). Wetland game birds that occur in the study area are the wood duck (*Aix sponsa*), common snipe, and American woodcock. Non-game birds in the study area include many species of shorebirds, and songbirds (both migratory and non-migratory). Wading birds that utilize the nearby canals and roost in trees include the little blue heron, great blue heron, great egret, and snowy egret.

Amphibians likely to occur in these habitats include the southern dusky salamander (*Desmognathus auriculatus*), dwarf salamander (*Eurycea quadridigitata*), central newt (*Notophthalmus viridescens louisianensis*), three-toed amphiuma (*Amphiuma tridactylum*), western lesser siren (*Siren intermedia nettingi*), gulf coast toad (*Bufo valliceps*), and northern cricket frog (*Acris crepitans crepitans*), (Conant and Collins 1998, Felley 1992, Wigley and Lancia 1998).

Reptiles that typically utilize habitats such as those of the project area include the common snapping turtle (*Chelydra serpentina*), green anole (*Anolis carolinensis*), broadhead skink (*Eumeces laticeps*), and western cottonmouth (*Agkistrodon piscivorus leucostoma*) (Conant and Collins 1998, Felley 1992, Wigley and Lancia 1998).

Mammals that may occur in the habitats of the project corridor include the nutria (*Myocastor coypus*), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), swamp rabbit (*Sylvilagus aquaticus*), cotton mouse (*Peromyscus gossypinus*), fox squirrel (*Sciurus niger*), and raccoon (*Procyon lotor*) (Whitaker and Hamilton 1998, Wigley and Lancia 1998).

3.2.6.2 Discussion of Impacts

3.2.6.2.1 No Action

With the no action alternative, the 100-year level of risk reduction work would not occur and the HSDRRS system would be built only to the levels authorized prior to Hurricane Katrina. Generally, this would mean raising levee embankments and floodwalls to approximately a 10-foot elevation, and providing higher access gates and modified pumping stations. No new impacts to wildlife would occur that have not been previously authorized.

3.2.6.2.2 Proposed Action

Direct Impacts. The proposed action would directly impact wetland habitat utilized by local wildlife within the project area. ROW acquisition would potentially cause habitat loss to BLH forest and cypress-tupelo swamp totaling 71 acres both north and south of the Hero Canal. It is likely that local wildlife would disperse from the area during the construction phase of the project. Many dispersing wildlife species would most likely recolonize the project area post construction. Alternatively, adjacent habitat would likely be sufficient to absorb any species permanently displaced due to habitat alternations.

The greatest potential for effects on wildlife associated with the implementation of the proposed action would occur during the construction period (approximately 1.4 years). The presence of construction-related activity, machinery, and noise would be expected to cause most wildlife to avoid the area during the construction period. Although birds are highly mobile and able to move to other habitats in the vicinity, local populations of species that nest in colonies could be adversely affected if construction activities caused abandonment of nesting sites. In order to minimize the potential for construction under the proposed action to disturb colonial-nesting wading birds, procedures recommended by the USFWS would be followed (USFWS 2007a). A small number of less mobile and wetland dependent species (i.e., mice, reptiles, amphibians) would be lost during construction; however, most wildlife species would likely avoid the vicinity of the proposed action during the construction period but return following the completion of construction.

The overall abundance and diversity of species within the project area should remain unchanged. Levees constructed as part of this alignment would not act as a dispersal barrier for the majority of local native species; however, floodwall construction would hinder dispersal and migration of some terrestrial species

Indirect Impacts. Potential indirect impacts on wildlife from the proposed action include the potential movement of displaced wildlife currently inhabiting the project area into nearby habitats that would not be directly impacted by this alternative. Most likely, relatively small populations would be directly affected by the proposed alternative. The extensive adjacent habitats should be able to support any potential influx of migrants from the project area. This migration would not be expected to result in exceeding the carrying capacity of the extensive, similar terrestrial and aquatic habitats in the vicinity.

Cumulative Impacts. Although cumulative impacts due to the proposed action would be expected to be minimal, construction of the proposed action would contribute to the cumulative losses of wildlife habitat resources within the HSDRRS.

3.2.6.2.3 Alternatives to the Proposed Action

Direct Impacts. Both alternatives 3 and 5 would have impacts similar to those discussed for the proposed action, relative to the amount of habitat directly affected.

Alternative 3 would directly impact 78 acres of wildlife habitat, including BLH and cypress-tupelo swamp.

Approximately 45 acres of similar habitat would be impacted by alternative 5. Each alternative impacts habitat to the north and south of the Hero Canal.

It is likely that local wildlife would disperse from the area during the construction phase of the project. A small number of less mobile and wetland dependent species (i.e., mice, reptiles, amphibians) would be lost during construction; however, most wildlife species would likely avoid the vicinity of the proposed action during the construction period. Many dispersing wildlife species would most likely recolonize the project area post construction. Alternatively, adjacent habitat would likely be sufficient to absorb any species permanently displaced due to habitat alternations.

The greatest potential for effects on wildlife associated with the implementation of the proposed action would occur during the construction period (alternative 3 - 2.2 years, alternative 5 - 1.5 years). The presence of construction-related activity, machinery, and noise would be expected to cause most wildlife to avoid the area during the construction period. Although birds are highly mobile and able to move to other habitats in the vicinity, local populations of species that nest in colonies could be adversely affected if construction activities caused abandonment of nesting sites. In order to minimize the potential for construction under the proposed action to disturb colonial-nesting wading birds, procedures recommended by the USFWS would be followed (USFWS 2007a).

The overall abundance and diversity of species within the project area would remain unchanged due to the implementation of either alternative 3 or 5. Levees constructed as part of this alignment would not act as a dispersal barrier for the majority of local native species; however, floodwall construction would hinder dispersal and migration of some terrestrial species.

Indirect Impacts. Potential indirect impacts on wildlife from either alternative include the potential movement of displaced wildlife currently inhabiting the project area into nearby habitats that would not be directly impacted by this alternative. Most likely, relatively small populations would be directly affected by the proposed alternative. The extensive adjacent habitats should be able to support any potential influx of migrants from the project area. This migration would not be expected to result in exceeding the carrying capacity of the extensive, similar terrestrial and aquatic habitats in the vicinity.

Cumulative Impacts. Although cumulative impacts due to alternative 3 and 5 are expected to be minimal, construction of either alternative would contribute to the cumulative losses of wildlife habitat resources within the HSDRRS.

3.2.7 Cultural Resources

3.2.7.1 Existing Conditions

Records indicate five previously recorded archaeological sites are located within one mile of the IER #13 project area. Site forms and archaeological reports on file at the Louisiana Division of Archaeology and the CEMVN describe these known sites as associated with historic plantations or structures. None of these previously recorded archaeological sites are located in the proposed action or alternative alignments. One of these sites, Idlewild Plantation (16PL115), is located immediately south of the proposed action's eastern terminus adjacent to the Mississippi River levee. The remaining four sites (16PL89, 16PL116, 16PL124, and 16PL129) are located across the Mississippi River on the east bank. There are no National Register of Historic Places (NRHP) listed properties or historically significant standing structures previously recorded in the proposed action or alternative alignment footprints.

The CEMVN contracted Coastal Environments, Inc. to conduct reconnaissance, Phase 1 and Phase 2 cultural resources surveys of the proposed action and alternative alignments for the IER #13 project (Wells, 2008). In this study, researchers utilized background research, previous cultural resource investigations review, aerial photography and soil and topographic analyses, field reconnaissance information, and Phase 1 and Phase 2 survey data to identify, investigate and assess high potential areas for archaeological resources, historic structures and potential historic districts. One historic structure, the Sarpy House (38-00008), one previously recorded archaeological site, Idlewild Plantation (16PL115) and two newly discovered archaeological sites, Oakville (16PL168) and Mahoney-Crouere (16PL169), were identified.

The CEMVN held meetings with State Historic Preservation Office staff and Tribal governments to discuss the emergency alternative arrangements approved for NEPA project review and the development of a Programmatic Agreement (PA) to tailor the Section 106 consultation process under the alternative arrangements. The CEMVN formally initiated Section 106 consultation for the West Bank and Vicinity Hurricane Protection Project (100-year), which includes IER #13, in a letter dated April 9, 2007. This letter emphasized that standard Section 106 consultation procedures would be implemented during PA development. A public meeting was held on July 18, 2007 to discuss the working draft PA. We anticipate the PA will be executed in the near future.

In our initial letter sent to the State Historic Preservation Officer (SHPO) and Indian Tribes dated January 26, 2009, the CEMVN provided project documentation, evaluated cultural resources in the alternative 1 alignment, and found that the proposed action would have no impact on significant cultural resources. The SHPO, Choctaw Nation of Oklahoma and the Alabama Coushatta Tribe of Texas concurred with our "no historic properties affected" finding in letters dated February 18, 2009, February 5, 2009 and February 24, 2009 respectively. No other Indian Tribes responded to our first request for comment. In a second letter sent to SHPO and Indian Tribes dated February 17, 2009, the CEMVN evaluated the potential for cultural resources in newly expanded portions of the alternative 1 alignment and again found that the proposed action would have no impact on cultural resources. The SHPO and the Quapaw Tribe of Oklahoma concurred with our second "no historic properties affected" finding in letters dated March 30, 2009 and February 18, 2009 respectively. No other Indian Tribes responded to our second request for comments.

Section 106 consultation for the proposed action is concluded. However, if any unrecorded cultural resources are determined to exist within the proposed action boundaries, then no work would proceed in the area containing these cultural resources until a New Orleans District archaeologist has been notified and final coordination with the SHPO and Indian Tribes has been completed.

3.2.7.2 Discussion of Impacts

3.2.7.2.1 No Action

Under the no action alternative, the 100-year level of risk reduction work would not occur and the HSDRRS system would be built only to authorized levels within existing project right of way. No direct impacts to cultural resources would be expected to occur. The existing project right of way has been severely impacted by previous construction of flood control features and the likelihood for intact and undisturbed cultural resources in this area is considered extremely minimal.

3.2.7.2.2 Proposed Action

Direct Impacts. A review of background information found no previously recorded archaeological sites, historic structures, or properties listed on the National Register of Historic Places (NRHP) within the alternative 1 proposed action alignment. However, recent NRHP Phase 1 field investigations identified one new historic period archaeological site, the Mahoney-Crouere Site (16PL169), within the proposed action boundaries at the eastern end of the alignment in an area adjacent to the Mississippi River levee (Wells 2008). Subsequent Phase 2 testing at the site identified a strong late nineteenth to mid-twentieth century component with a modest collection of mid-nineteenth century artifacts. However, no intact architectural or subsurface features were identified and the cultural deposits appeared to be disturbed. Researchers found that the Mahoney-Crouere Site (16PL169) is not eligible for listing on the NRHP and no further investigations are recommended. The proposed action would have no direct impact on significant cultural resources.

Indirect Impacts. One historic structure, the Sarpy House (38-0008), and one previously recorded historic period archaeological site, the Idlewild Plantation Site (16PL115) were identified during recent reconnaissance and Phase 1 investigations (Wells 2008). Both sites are located adjacent to, but well outside of the proposed action alignment and would not be indirectly impacted by the proposed action.

The Sarpy House (38-0008) is located north of the alignment on East St. Peter Street in the Community of Oakville. The house is a one and one half story, central hall, cottage built around 1875 and is one of only two surviving structures from the early settlement of Oakville. Researchers believe the house is eligible for listing on the NRHP under Criterion B for its association with Rene Sarpy, the founder of Oakville. Oakville is an African-American community founded in 1869 and many present day residents are descended from Live Oak Plantation slaves who lived just a few miles down river.

The Idlewild Plantation Site (16PL115) exhibits a primary collection of mid-nineteenth century artifacts with a modest late eighteenth century component. Although recent subsurface shovel testing did not identify any intact deposits, researchers surmise that potentially significant buried features could still be present at the site and recommended Phase 2 subsurface testing if the site could not be avoided. Phase 1 testing clearly delineated site boundaries and confirmed the site is not located in the proposed action alignment. The Idlewild Plantation Site (16PL115) would not be indirectly impacted by the proposed action and Phase 2 investigations at the site are not warranted.

Cumulative Impacts. Implementation of the proposed action would have beneficial cumulative impacts on historic properties in the West Bank area. This proposed action is part of the ongoing Federal effort to reduce the threat to property posed by flooding. The combined effects from construction of the multiple projects underway and planned for the HSDRRS would reduce flood risk and storm damage to significant cultural resources including archaeological sites, individual historic properties, engineering structures and historic districts.

3.2.7.2.3 Alternatives to the Proposed Action

Direct Impacts. Implementation of alternative 3 would have the same direct impacts as those described for the proposed action.

Recent reconnaissance, Phase 1 and Phase 2 cultural resources investigations in the alternative 5 alignment identified two historic period archaeological sites, the Oakville Site (16PL168) and the Mahoney-Crouere Site (16PL169). The boundaries of the Oakville Site (16PL168) were initially delineated as the area in the Oakville Community that would most likely be impacted by the proposed construction of the alternative 5 alignment. Archaeological investigations within this

section of the community identified a late-nineteenth century trash pit, an early twentieth century midden, and at least one intact privy pit. Researchers conclude that these features and deposits offer an unusual opportunity to study the material culture of newly freed African-American slaves and believe the site is eligible for listing on the HRHP under Criterion D. Implementation of the alternative 5 alignment would have a direct impact on this NRHP eligible archaeological site. Further consultation with the SHPO, Indian Tribes, and possibly the Advisory Council on Historic Preservation would be required to determine appropriate measures to avoid or mitigate adverse impacts.

Implementation of alternative 5 would have the same direct impacts on the Mahoney-Crouere Site (16PL169) as those described for the proposed action.

Indirect Impacts. Implementation of alternatives 3 and 5 would have the same indirect impacts as those described for the proposed action.

Cumulative Impacts. Implementation of alternatives 3 and 5 would have the same cumulative impacts as those described for the proposed action.

3.2.8 Recreational Resources

3.2.8.1 Existing Conditions

The recreational sites within the project area include the Hero Canal and the GIWW, which are used infrequently for recreational fishing, boating, water skiing, crabbing and swimming, and a community park at Oakville. The park contains a ball field and tot playground with swings, slides, and other children's play facilities. Recreational opportunities include jogging, field sports and picnicking. Finally, the Walker Road Boat Launch is located along the Hero Canal. An unimproved area, the dirt boat ramp has no lighting but is open to the public.

3.2.8.2 Discussion of Impacts

3.2.8.2.1 No Action

Direct Impacts. With the no action alternative, the 100-year level of risk reduction would not occur and the HSDRRS would be built only to the levels authorized prior to Hurricane Katrina. There is the potential for erosion escaping mandatory controls; however, effects on the waterways in the project area would be expected to be temporary and short-term. Temporary construction-related impacts during construction might affect recreation at the Walker Road Boat Launch area.

With the no action alternative, no direct impacts would occur to recreational uses or facilities in the project area. With the level of risk reduction improved to the authorized level, the park could be expected to have less flooding incidences than previously, but would still be susceptible to 100-year frequency storm flooding.

Indirect and Cumulative Impacts. No indirect or cumulative impacts would be likely.

3.2.8.2.2 Proposed Action

Direct Impacts. Alternative 1 would cross the Hero Canal with a floodgate and other associated facilities. There is potential for sediments to escape erosion controls that would be required for the project. These would be temporary and have little or no long term effect on recreational fishing or uses made of the Hero Canal or the GIWW. Temporary impacts during construction might also affect the Walker Road Boat Launch area, but this would be short-term. The road leading to the Walker Road Boat Launch could be used for access to the construction site.

Alignment 1 is removed from the location of the Oakville Park and would not directly affect the park, its access, or park uses.

Indirect Impacts. No indirect impacts would be likely for the proposed action.

Cumulative Impacts. Implementation of the proposed action could be expected to have beneficial cumulative impacts on recreational resources in the greater New Orleans metropolitan area. This proposed action is part of the ongoing Federal effort to reduce the threat to property posed by flooding. The combined effects from construction of the multiple projects underway and planned for the LPV and WBV reduce risk of flood and storm damage to recreation facilities and infrastructure. On the other hand, construction of the HSDRRS could have adverse impacts on recreation infrastructure by impeding use of land for recreation or by forcing the removal of recreational structures such as volleyball courts, picnic tables, and shelters. Additionally, some proposed actions could also affect fisheries, which would impact recreational fishing opportunities.

3.2.8.2.3 Alternatives to the Proposed Action

Direct Impacts. Alternative 3 would also cross the Hero Canal with a floodgate and other associated facilities. The effects would be similar to the proposed action. There is potential for sediments to escape erosion controls that would be required. These would be temporary and have little or no long term effect on recreational fishing or uses made of the Hero Canal or the GIWW. Temporary impacts during construction might also affect the Walker Road Boat Launch area, but this would be short-term. The road leading to the Walker Road Boat Launch could be used for access to the construction site. Alignment 3 is removed from the location of the Oakville Park and would not directly affect the park, its access, or park uses.

Alternative 5 remains on the north side of the Hero Canal passing south around the end of the canal and does not cross the canal. Thus the potential for erosion escaping mandatory controls is less than for alternatives 1 and 3. Effects on the waterways in the project area would be expected to be temporary and short-term. Temporary impacts during construction might affect the Walker Road Boat Launch area, the same as for the proposed action.

However, the centerline for Alignment 5 is located adjacent to the community park and the alignment requires park property for ROW. Construction of this alignment would directly affect the park and park uses, requiring approximately 1.73 acres of park land. Of this, approximately 0.92 acres are forested while 0.81 acres are cleared land, most used as a baseball field. Some uses of the park, possibly including the baseball field, would be eliminated under alternative 5.

Indirect and Cumulative Impacts. No indirect impacts would be likely for alternatives 3 and 5. Cumulative impacts would be similar to the proposed action.

3.2.9 Air Quality

3.2.9.1 Existing Conditions

Through the Federal Clean Air Act, National Ambient Air Quality Standards (NAAQS) have been established for seven pollutants: nitrogen dioxide (NO₂), carbon monoxide (CO), ozone (O₃), sulfur dioxide (SO₂), lead (Pb), and two sizes of particulates (those with a diameter of 10 micrometers (Particulate Matter [PM] 10) or less and those with a diameter of 2.5 micrometers (PM 2.5) or less). If one or more of the NAAQS parameters is exceeded (called non-attainment) in an area, then Federal and state governments must implement an air quality management plan for the air shed. The state must prepare a State Implementation Plan (SIP) designed to attain ambient NAAQS for those air sheds not “in attainment.” All Federal actions in those managed

areas are subject to an air “Conformity Determination.” The Conformity Determination must show that the Federal action in the non-attainment area conforms to the SIP and conforms to the state’s plan to achieve its air quality goals.

Air quality in the project area is generally good. There are few nearby industrial facilities, other than a landfill at the eastern end near Oakville, and several nearby construction firms that have offices and construction equipment on their lots. A gas pumping station is located in the project’s vicinity along Walker Road, with a burning gas vent. The Belle Chasse Naval Air Station adjacent to the project area also adds to the ambient air pollution load. Impacts, both long-term and short-term, have been evaluated for this proposed action. The proposed construction of levees and floodwalls, by their nature, would have no long term effects. Construction impacts would be of short duration and are considered minor.

3.2.9.2 Discussion of Impacts

3.2.9.2.1 No Action

Direct Impacts. With the no action alternative, the 100-year level of risk reduction would not occur and the HSDRRS would be built only to the levels authorized prior to Hurricane Katrina. Generally this would mean raising the Hero Canal levee to approximately a 10-foot elevation. This construction action would lead to minor temporary, direct air quality impacts. Any associated air impacts have largely been considered in the environmental clearance for previously authorized actions. Any additional work done to meet current design standards would not greatly increase the air quality impacts.

Indirect and Cumulative Impacts. Long term, there would be a few indirect and cumulative impacts. Flooding could be more frequent than if the 100-year level of risk reduction is achieved. This flooding could result in the contamination of land and water with sewage and other contaminants such as debris from the unprotected landfill. This could lead to temporary indirect fugitive dust from street sweeping and other clean-up actions. Also, the transportation of debris and rubble from storm clean-up could contribute to local air quality emissions and result in a temporary decrease in air quality. These total actions in the New Orleans metropolitan area would constitute the cumulative impacts from no action.

3.2.9.2.2 Proposed Action

Direct Impacts. Direct impacts include minor increases in air pollution that would occur for a short duration from the use of construction equipment and vehicles including: bulldozers, haul trucks, cranes, pile divers, excavators, and the possible use of clamshells and tug boats. Construction of levees and flood walls could temporarily be a source of fugitive dust including PM 10 and PM 2.5 particulates. Local weather patterns and mandatory dust controls implemented during construction would determine the extent of this temporary condition. An estimate of annual project emissions is shown in table 8. This estimate includes both emissions from diesel equipment, as well as fugitive emissions. Long term, there is no anticipated effect to air quality. Regional air quality standards would not be violated. The proposed project would be in conformance with NAAQS.

Construction vehicles using Walker Road could generate fugitive dust during levee work. The fact that the construction period for these improvements would be short and a possible borrow pit for material for the levee construction is just across Walker Road at the mid-point in the project corridor would tend to lessen potential for particulate generation. EPA’s NONROAD2005 Model was used to calculate the emissions due to use of construction equipment for the proposed project. The emissions for each pollutant are listed in table 8. These indicate that no parameters requiring abatement action would be violated.

Plaquemines Parish is currently in attainment of all NAAQS. This classification is the result of area-wide air quality modeling studies. Thus, no Conformity Determination or other effort is required of this proposed action.

Indirect and Cumulative Impacts. No permanent indirect or cumulative impacts would occur. However, this proposed action in combination with other HSDRRS actions could contribute to a temporary cumulative effect in the HSDRRS area. Temporary indirect fugitive dust from construction operations and small amounts of NO₂, CO, O₃ and SO₂ from engine combustion could occur. This could result in a temporary and minor decrease in air quality in the region.

Table 8: Estimated Project Air Emissions

Pollutant	Acronym	Emissions (tons/yr)	Emissions (total tons)
Volatile Organic Compounds	VOCs	6.17 tpy	11.63 tons
Particulate Matter	PM	81.56 tpy	153.73 tons
Carbon Monoxide	CO	24.04 tpy	45.31 tons
Nitrous Oxides	NO _x	71.61 tpy	134.97 tons

Notes:

1. Emissions totals for each activity taken from appendix K. Total project emissions based on 688 total working days.
2. Equipment usage estimates based on a twelve-month construction period, however, not all equipment would operate every day of the construction period (see appendix K).
3. The project is located in Plaquemines Parish, LA. Plaquemines Parish is in attainment for all criteria pollutants, thus Conformity Thresholds (available from 40 CFR 51) are not applicable.

3.2.9.2.3 Alternatives to the Proposed Action

Direct Impacts. With implementation of either of the available alternatives, the direct, indirect and cumulative impacts to air quality would be approximately the same. Temporary impacts would occur in generally the same amount as identified for the proposed action, but no long-term impacts to air quality would occur. Alternative 5 would tend to have slightly greater impact on urban areas owing to a reach of construction along West Oakville Street in Oakville. Still, this would be minor.

Indirect and Cumulative Impacts. No permanent indirect or cumulative impacts would occur. However, construction of any of these alternatives in combination with other HSDRRS actions could contribute to a temporary cumulative effect in the HSDRRS area. Temporary indirect fugitive dust from construction operations and small amounts of NO₂, CO, O₃ and SO₂ from engine combustion could occur. This could result in a temporary and minor decrease in air quality in the region.

3.2.10 Water Quality

Water Quality affects the physical, chemical, geological and biological processes throughout the estuary system including the Hero Canal, the Intracoastal Waterway, and adjacent marshes and bayous in the project area. The Louisiana Department of Environmental Quality (LDEQ) has prescribed standards for surface waters in order to protect the quality of these water bodies.

3.2.10.1 Existing Conditions

The Hero Canal study area is located within the East Central Louisiana Coastal Watershed, U.S. Geological Survey Cataloging Unit 08090301 (USEPA 2008). Three water bodies in that unit with identification numbers (ID) are pertinent to the IER 13 project area. The State of Louisiana regularly evaluates and reports water quality in the watershed for inclusion in the EPA’s National Assessment Database. Typically five types of monitored data are presented: biological integrity, and chemical, physical, habitat, and toxicity factors. Based on these parameters, a water body is listed by the USEPA as either Good or Impaired. (If Impaired, a Total Maximum Daily Load [TMDL] for the offending parameter(s) would be developed to help resolve the impairment.) Table 9 provides water quality data for the IER 13 project area.

Table 9: Water Quality Data for Project Area

<u>Waterbody Name</u>	<u>Waterbody ID</u>	<u>Most Current Data Available</u>	<u>Location</u>	<u>Size</u>	<u>Unit</u>	<u>Status</u>
Intracoastal Waterway – Larose To Bayou Villars & Barataria	LA020801_00	2006	Intracoastal Waterway – Larose to Bayou Villars and Bayou Barataria	34.0	Miles	Good
Bayou Barataria/Barataria Waterway	LA020802_00	2006	Bayou Barataria/Barataria Watercourse- Intracoastal Waterway to Bayou Rigolettes (Estuarine)	6.0	Miles	Good
Barataria Waterway	LA020903_00	2006	Barataria Waterway (Estuarine)	1.0	Square Miles	Good

Source: USEPA, *Watershed Assessment Results*

Within the IER project area there are water quality resources such as cypress-tupelo swamps, BLHs, and borrow sites on the protected side of the existing Hero Canal levee. Area wetlands, including cypress-tupelo swamps and BLHs perform important functions by removing and /or transforming nutrients such as nitrogen and phosphorus. The mechanism by which wetlands perform this function include the storage of nutrients within the sediment or plant material, the transformation of inorganic nutrients to their organic forms, and strategic transformation and subsequent removal of nitrogen as a gas. The ability of wetland vascular plants to remove nutrients from water and sediments during the growing season and release then later when light or temperatures would not support profuse algae growth is a general phenomenon, and important in maintaining water quality in adjoining systems.

3.2.10.2 Discussion of Impacts

Key factors for the assessment of alternatives involve the potential for changes in regional salinity values, changes in dissolved oxygen (DO), and sediments/turbidity from water scour. Salinity is the dissolved salt content of a body of water and is an ecologically important factor because it influences the types of organisms that exist in a body of water. Salinity measurement is utilized for evaluating estuarine hydrology and habitat potential (Orlando et al. 1993) because it is the predominate factor responsible for change of freshwater, intermediate, brackish, and saline habitats. Increases in salinities have been documented as leading to the conversion of

fresh and intermediate marshes to open water, leading to less wetland protection from Hurricane surge flooding. According to Orlando et al. (1993), the salinity patterns throughout the major basins of coastal Louisiana may be influenced by changes in the following mechanisms: freshwater inflow, tides, wind, and coastal shelf processes (wetland changes, etc.).

DO is a good measure of the health of the water body being evaluated. Low DO can be indicative of nutrient, chemical, and/or temperature impacts. Hypoxia is a phenomenon that occurs in aquatic environments as dissolved oxygen becomes reduced in concentration to a point detrimental to aquatic organisms.

Sediments can cover spawning areas leading to mortality and can lead to turbidity interfering with sunlight transmission to aquatic animal and vegetative organisms.

The ambient values of key factors in the project area are currently identified as Good (Not Impaired) by the USEPA (table 9).

3.2.10.2.1 *No Action*

Direct, Indirect, and Cumulative Impacts. With the no action alternative, the 100-year level of risk reduction work would not occur and the HSDRRS system would only be built to the levels authorized prior to Hurricane Katrina. This would generally mean that the existing levee embankments and floodwalls would be raised to approximately 10-foot elevation. The associated access gates and pump stations would also be modified to the appropriate higher levels. Any associated water quality impacts have largely been considered in the environmental clearance for previously authorized actions. Any additional work done to meet current design standards would not greatly increase any direct, indirect, or cumulative water quality impacts.

3.2.10.2.2 *Proposed Action*

Direct Impacts. The proposed action would not permanently impact any of the factors for assessing water quality; however, temporary impacts could occur. Most of the project improvements would occur to existing levees or in the vicinity of existing levees which have already established local runoff characteristics. The flow of surface water during normal runoff periods would be little changed, and local salinity long-term is not expected to change as a result of the construction of the project. Similarly, the proposed action should not change the oxygen levels long-term in local waterways and water bodies for the same reasons: surface runoff and storage would be little changed by the project.

The potential for scouring in the vicinity of proposed floodwalls and the Hero Canal closure complex exists. Proper sediment control and scour protection would be included as part of the design criteria for the structures to prevent the project from having significant impact on water quality. After construction is complete, no lasting impacts from scouring or from fugitive sediments is expected.

It is expected that both fill and excavation would be required for levee and floodwall construction, and for erecting gates, pump stations and associated facilities. The operation of the pump stations could also affect water quality. These construction and operation activities could result in localized, temporary turbidity from fugitive sediments. These suspended sediments could be released into surrounding waters and wetlands. It is expected that the majority of the earth-moving activities would occur in the first few months of project construction; minimal dredging and filling would occur after that time. Operation of the pump stations would occur during a storm event and the impacts (suspended sediments, turbidity, etc.) would be similar to those of storm surge. These temporary water quality impacts would be minimized by using the required BMPs to the extent practicable.

It may be necessary to dredge reaches of the Hero Canal in the vicinity of the proposed gate to establish the designed depth for ship passage. Dredged materials would, if suitable, be used as borrow or, if not, disposed of in the designated disposal areas identified for the WBV HSDRRS projects. This activity would increase the potential for the release of suspended sediments into the water column.

The release of sediments into the water column associated with project construction activities could temporarily decrease oxygen levels by inhibiting photosynthesis or promoting solar heating. This phenomenon would occur only in the vicinity of the construction activity. The crossing of the Industrial Pipe Landfill property poses additional concerns. Some sediment particles emanating from that site could include chemically reduced substances which have high chemical oxygen demand (COD). Other particles could have microorganisms attached which could decompose organic matter and create a biological oxygen demand (BOD). A temporary decrease in DO could occur because of these factors in the immediate area of discharge. It is expected that oxygen levels would return to normal after construction is complete. The Industrial Pipe Landfill does not accept municipal wastes and this factor would moderate biological impacts.

Water temperature increases could result from increased turbidity. The suspended solids that would be produced during construction could absorb sunlight and slightly increase the temperature of water bodies, depending on the severity of the turbidity. Again, these impacts would be temporal and would abate soon after construction is complete.

Indirect and Cumulative Impacts. Indirect negative impacts might occur during ship passage through the gates during normal operations. The Hero Canal gate structures would present a more restrictive opening than currently exists. The Boomtown Belle which is docked near the eastern end of the Hero Canal draws more draft than would be available according to current gate designs. It might be necessary to dredge several feet of silt from the bottom of the canal to allow boat passage if that is required. Sediments would result; these would be temporary. There is also a slight risk with a constricted gate opening that damage might occur to vessels passing through the gates, which could result in releases of oils and fuels into the waterway. This potential would be minimized through design parameters that require structures to allow for the “safe” passage velocities, and navigation aids including fendering, guidewalls, dolphins, and Coast Guard signage.

A positive impact from the proposed action is to provide long-term risk reduction to the Industrial Pipe Landfill, which it currently lacks. This indirect and cumulative impact would safeguard the landfill from hurricane surge flooding up to a 100-year frequency storm helping prevent local water quality degradation.

None of the incremental effects of the proposed action are expected to have negative long-term consequences or have large-scale water quality impacts. Other concurrent construction of 100-year HSDRRS projects would themselves have short-term impacts that could exceed LADEQ’s water quality standards. The cumulative construction impacts of the proposed action would be additive to similar impacts caused by other HSDRRS planned projects. This could lead to temporary increased turbidity and reduction in oxygen in downstream areas. However, this is infrequently expected to occur. Implementation of BMPs and Stormwater Pollution Prevention Plans (SWPPPs) would minimize any cumulative impacts

State and Federal programs are in place to regulate and improve water quality; therefore, the net cumulative impacts in the region could be the improvement of water quality. The proposed action for this project would not be expected to detract from these state and Federal programs.

3.2.10.2.3 Alternatives to Proposed Action

Direct Impacts. Alternative 3 is similar to the proposed action in that it follows the Hero Canal levee from the GIWW, crosses the Hero Canal with a gated structure, would generate new levee construction in wetlands near the Industrial Pipe Landfill, and would follow the same alignment south of the landfill. It presents similar water quality impacts as a result of scour, salinity changes, and long-term DO demand. It also would protect the Industrial Pipe Landfill and provides a positive impact for this facility. Similar to the proposed action, temporary increases of suspended sediment and velocities would occur during a storm event due to operation of the pump stations.

Alternative 5 presents less temporary water quality construction impacts in that it does not cross the Hero Canal, but extends around the eastern end of the canal. It then winds through Industrial Pipe Landfill property, but does not provide risk reduction for the landfill. It assumes the same alignment as the proposed action south of the landfill property. Alternative 5 presents similar potential for water quality impacts from erosion for improvements to the Hero Canal levee, and for improvements south of the landfill. However, since no crossing of the Hero Canal is needed, this alternative presents the least short-term water quality impacts. Conversely, by not providing risk reduction to the landfill, its long-term impacts are considered greatest. Temporary increases of suspended sediment and velocities would occur during a storm event due to operation of the pump stations.

Indirect and Cumulative Impacts. The indirect and cumulative impacts for alternative 3 to water quality would be similar to those described for the proposed action. Both negative and positive impacts would apply. Alternative 5 presents the least temporary indirect impacts but has the greatest cumulative impact potential in that no risk reduction is provided for the Industrial Pipe Landfill property. However, both the proposed action and alternative 3 provide the greatest potential for positive cumulative impacts.

3.2.11 Noise

3.2.11.1 Existing Conditions

Noise can be identified as unwanted sound. Noise in the study area is sourced from various forms of traffic on LA 23 and Walker Road, and from vehicles using the commercial development in the area. Heavy equipment operating at the landfill and sand excavation pit also contributes to noise levels. Periodic high noise levels are generated and impact a large zone around the study area by aircraft as they approach and depart the U.S. Naval Air Station at Belle Chasse (photograph 4). Infrequent boat traffic in the Hero Canal is another source of noise.

Objective noise measurements are used by the Federal Highway Administration (FHWA), among others, and usually involve a logarithmic scale with a unit of decibels. Noise is computed over a 24-hour period and adjusted for nighttime when noise can be more of an annoyance to produce a day-night sound level (DNL). DNL is the method recommended by the EPA for community planning and has been adopted by most Federal Agencies. A DNL of 65 dBA (decibels A-weighted) as an upper limit for most commonly used noise planning represents a compromise between community interests and the need for noise generating human activity (highway sounds, industrial noise, etc.). Areas regularly exposed to a DNL of over 65 dBA are generally not recommended for residential use. A DNL of 55 dBA and below is usually identified by EPA as a level below which there is no adverse impact. For the proposed project, noise is only a consideration during construction. Other than mowing and other periodic maintenance, there are no residual noise implications with levees or floodwalls. The operation of pump stations, other than during tests, is normally done when the region is under duress and noise is not a factor.



Photograph 4: U.S. Naval Air Station

3.2.11.2 Discussion of Impacts

3.2.11.2.1 No Action

Direct Impacts. With the no action alternative, the 100-year level of risk reduction would not occur and the HSDRRS would be built only to the levels authorized prior to Hurricane Katrina. Generally this would mean raising the Hero Canal levee to approximately 10 feet elevation. Any associated noise impacts from temporary construction equipment and truck operation have already been considered in the EIS for the previously authorized work. These noise levels would be similar to those identified in table 10. Because all of the alternatives, including the No Action alternative, would use similar construction equipment, the noise produced could be expected to be similar among alternatives. With less construction involved, the No Action alternative could be expected to be of shorter duration.

Ambient noise levels in the area could be expected to grow slowly in line with anticipated urban development in the delta area. Aircraft noise would continue to occur, possibly near current levels which often exceed the 65 dBA threshold.

Indirect and Cumulative Impacts. Long term, there would be no negative indirect or cumulative impacts from these temporary impacts. However, the increase in levee height would incrementally absorb or deflect existing noise, improving conditions for sensitive receptors over the life of the project.

3.2.11.2.2 Proposed Action

Direct Impacts. With implementation of the proposed action, there would be a temporary direct increase of noise associated with construction. Table 10 is a listing of noise generating equipment typically used for construction of levees and floodwalls, using data from the FHWA. Ambient noise levels are often affected by jet aircraft use taking off and landing at a nearby naval air station.

Table 10: FHWA Noise Levels at Distance from the Source (dBA)

Noise Generator	50 feet*	100 feet*	200 feet*	500 feet*	1000 feet*
Dump Truck	76	70	64	56	50
Backhoe	78	72	68	58	52
Front End Loader	79	73	67	59	53
Concrete Mixer	79	73	67	59	53
Crane	81	75	69	61	55
Bull Dozer	82	76	70	62	56
Auger Drill	84	78	72	64	58
Pile Driver	91	85	79	71	65

* Distance from receptor. Source: FHWA 2007. The dBA at 50 feet is measured; the others are model estimates.

Construction noise impacts are judged as “low” for the proposed action. With implementation of alternative 1, little noise impacts would occur since much of the construction would be in remote areas. There would be few sensitive receptors in the vicinity, except near the FEMA Park and near the LA 23 crossing. There is one sensitive receptor in the Hero Canal area (a house). No long-term impacts would be expected. Restricting hours of operation could limit the impact to normal working hours. Minor and temporary maintenance noise would also be expected.

Indirect and Cumulative Impacts. Long term, there would be no negative indirect or cumulative impacts from these temporary impacts. Conversely the increase in levee height and new levees would incrementally absorb or deflect existing noise, improving conditions for sensitive receptors over the life of the project.

3.2.11.2.3 Alternatives to the Proposed Action

Direct Impacts. With implementation of alternative 3, little noise impacts would occur since few sensitive receptors are in the vicinity (except near the former FEMA Park and LA 23). The impact analysis that was made for the proposed action applies to alternative 3, which is very similar.

Alignment 5 presents the most noise impacts and would impact residents along West Oakville Street in Oakville with houses and trailers located within 50 LF of construction. Construction noise could be expected to temporarily exceed 65 dBA for the proposed action at several residential receptors along West Oakville Street and in the temporary FEMA Park. The noise would be attenuated within the trailers and houses and the short duration required for construction lessens the overall impact. Restricting hours of operation could limit the impacts to normal working hours.

Indirect and Cumulative Impacts. Long term, there would be no negative indirect or cumulative impacts from these temporary impacts. Conversely the increase in levee height and new levees would incrementally absorb or deflect existing noise, improving conditions for sensitive receptors over the life of the project.

3.2.12 Aesthetic Resources

3.2.12.1 Existing Conditions

Visually, the project area exhibits a natural landscape altered by rural and urban development. The western project area’s landscape is one of rural attributes; its natural landscape highlights freshwater marsh, low lying natural levees topped with BLH tree species and bayous and other waterways. The natural landscape is contrasted by the straightness of the Hero Canal and its

adjacent earthen-berm levee, which cuts through the marsh and natural ridges of bayous in the western portion of the project area. Also evident in the western project area adjacent to Walker Road and the Hero Canal are agricultural areas, debris disposal areas, and borrow sites for levee building material or fill for other projects. The project area's eastern end contains the urban development of Oakville bounded by the Mississippi River and its earthen berm levee. Land development in the Oakville area includes railroad corridors, salvage and debris disposal areas along the Hero Canal and Walker Rd, and residential and commercial development. Highway 23 proceeds in a north south direction through Oakville at the eastern portion of the project area, along with the adjacent NOGCR (photograph 5).



Photograph 5: Highway 23 through Oakville.

Along the Hero Canal, the project area is one of rural attributes with waterways and canals, bordered by levees, marshes, bayous, forests and farm fields. Waterways, canals, and roadways act as corridors containing varying textures, colors, and wildlife. These corridors are often banked by vegetation. Intermittent open pasture settings are found where cattle grazing occurs. A few houses are located in the mid-reach of the project area along Walker Road, as well as a gas pumping station and several oil storage tanks.

The eastern end of the project area contains the urban development of Oakville. It exhibits a mix of single family houses, trailers, churches, and a small park. Adjacent and south is a former FEMA trailer park site where the landowner is currently allowing recreational vehicles to park. The land around the Hero Canal just north of Oakville presents a jumbled appearance with a landfill, several industrial and commercial firms (with stored construction equipment), and scattered debris sourced primarily from destroyed houses and facilities from Hurricane Katrina.

The Hero Canal contains a number of derelict vessels including the Boomtown Belle, barges and fishing boats.

The primary views in the study area are from the community of Oakville, the FEMA trailer park, LA 23 and views from Walker Road.

3.2.12.2 Discussion of Impacts

3.2.12.2.1 No Action

Direct Impacts. With the no action alternative, the 100-year level of risk reduction would not occur and the HSDRRS would be built only to the levels authorized prior to Hurricane Katrina. Generally this would mean raising the Hero Canal levee to approximately 10 feet elevation. Any associated aesthetic impacts have already been considered. Visual resources would either (1) change due to future land use, or (2) change as dictated by HSDRRS system maintenance.

Indirect and Cumulative Impacts. Few indirect or cumulative impacts would be likely. Flood control facilities are common in the WBV.

3.2.12.2.2 Proposed Action

Direct Impacts. North of the Hero Canal, alternative 1 would have little change on the aesthetic resources where the raising of existing levees about four feet is required. From Walker Road approximately 500 LF away, this would be little noticed. At the canal and south of the Hero Canal, direct impacts from alternative 1 would include a new floodgate and levee north-south from the existing Hero Canal in an area removed from development. However, floodgates and a new corridor through continuous BLHs could be observed from Walker Road.

Levee construction thereafter would proceed adjacent to a landfill, and finally along a parish levee. Then the earthen levee continues eastward with floodgates across and T-wall transitions near LA 23. The floodgates across LA 23 and the floodwall to levee transitions would be new visual features in the Oakville area. The floodgates would be conspicuous visual features that would change the existing visual landscape. All proposed alternatives would have the same visual impacts. Alternative 1 would then cross a railroad track with a floodgate, T-wall transition and levee to the MRL. Except near LA 23, few viewing points would allow observing these changes. Most of the proposed construction would be in remote areas, except for the construction in the vicinity of LA 23. Levees, floodwalls and floodgates are common features in the WBV and would not be considered out of place in the prescribed locations.

Indirect and Cumulative Impacts. There would be no indirect impacts. Levees are common throughout the region and are accepted as necessary and often provide a feeling of security. Cumulative impacts include the totality of constructing or upgrading levee systems, pumps stations, and vehicular floodgates in the New Orleans area associated with the 100-year level of risk reduction improvements provided for by federal statute.

3.2.12.2.3 Alternatives to the Proposed Action

Direct Impacts. Alternative 3 is almost the same as the proposed action in aesthetic impacts. Except along Walker Road, near the former FEMA Park and at the LA 23 road crossing, the remainder of this alignment would be removed from viewpoints. In the vicinity of the FEMA Park, near the LA 23 crossing, and extending to the MRL, the impacts would be the same as for the proposed action.

With implementation of alternative 5, the existing levee would be raised along the length of the Hero Canal. The main viewing area is from Walker Road which runs parallel to the levee

approximately 500 LF away. At this distance, once the levee is re-vegetated, the viewshed would be little changed by a 2-foot to 4-foot rise in the levee. South of the canal, the alternative 5 earthen levee would transition to a T-wall running north-south through a landfill, and then east-west through an urban section of Oakville. Flood risk reduction improvements would then extend eastward to connect with the Mississippi River levee system generating the same visual impacts as for alternative 1. The levee/floodwall near the landfill would cross areas that might better be screened than observed. The screening would somewhat hide the landfill from sections of the Oakville community. The floodwalls near Oakville would be the most conspicuous features of alternative 5, along with the floodgate at the LA 23 crossing. Levees floodwalls and floodgates are common features in the WBV and would not be considered out of place in the prescribed locations.

Indirect and Cumulative Impacts. There would be few indirect impacts with any of the alternatives to the proposed action. Cumulative impacts for all alignments include the totality of constructing or upgrading levee systems and vehicular floodgates in the WBV project area associated with the 100-year level of risk reduction improvements provided for by federal statutory authority.

3.3 SOCIOECONOMIC IMPACTS

This section evaluates the relative socioeconomic impacts of construction activities related to the proposed improvement to the levee and eastern terminus associated with the Hero Canal. The proposed project is located in Plaquemines Parish in the state of Louisiana, and is an upgrade of the authorized hurricane risk reduction levee alignment.

3.3.1 Impacts to Population and Housing

3.3.1.1 Existing Conditions

The area most immediately affected includes areas along the Hero Canal, between the GIWW and the west bank of the Mississippi River in Plaquemines Parish. The town of Oakville is within the project area and contains a mix of approximately 110 single family houses, 3 churches, and a small park. There was a temporary FEMA trailer park nearby that consisted of about 140 trailers. It has now been vacated.

The area of risk reduction for the proposed project is the area covered by the Belle Chasse IPET Polder, which in August 2007 had an estimated population of 15,900. Urban areas within the 100-year level of risk reduction provided by the project include Oakville, Cedar Grove, Augusta, and New Orleans. This area is comprised of the following geography, according to the 2000 U.S. Census:

- Orleans Parish: Tract 6.12, Group 1.
- Plaquemines Parish: Tracts 502; 503; 504, Group 2.

According to the 2000 U.S. Census, there were approximately 3,300 owner-occupied housing units in the census block groups. Preliminary 2010 Census data would be available in 2011 at the earliest. Intermediate estimates suggest decline in the overall population of Plaquemines Parish since the 2005 storm events, though the Belle Chasse area has grown due to migration of some families from lower Plaquemines.

3.3.1.2 Discussion of Impacts

3.3.1.2.1 No Action

Direct Impacts. Under the no action alternative, only the previously authorized hurricane risk reduction project would be constructed. The authorized levee system would include the Hero Canal levee, a new levee extending eastward and around the Hero Canal, westward between the Canal and landfill boundary, and then south to the non-Federal levee. This system provides development in the eastern area of the proposed project with approximately 50-year level of risk reduction.

Under this alternative, the Greater New Orleans HSDRRS would not be completed to the 100-year level. The eastern tie-in is integral to risk reduction on the West Bank, and without it the system providing risk reduction to the Belle Chasse, Gretna-Algiers, Harvey-Westwego, and Lake Cataouatche polders would be compromised.

There would be no direct impacts related to displacement of population or housing under the no action alternative.

Indirect and Cumulative Impacts. Since this alternative fails to provide the 100-year level of risk reduction as required under the NFIP, the actual and perceived flood risks to population in the protected area under this alternative would be higher than under the proposed action. Flooding occurring under the no action plan that would be avoided under the proposed action increases the potential for permanent displacement of population and housing.

Unless otherwise indicated, cumulative socioeconomic impacts to population and housing consist simply of the sum of the direct and indirect impact for this alternative and with all other activities associated with the construction of the HSDRRS.

Absent of action at the project site, direct cumulative impacts remain no greater than the sum of those impacts indicated individually for each project component.

3.3.1.2.2 Proposed Action

Direct Impacts. There would be minimal direct impacts to housing and population under this alternative. Most construction for this alignment would occur on vacant land. One residence north of Hero Canal would be acquired for the right-of-way. Construction activities would take place in the vicinity of Oakville, but no residences would be acquired. The community park would also not be impacted under this alternative.

The former FEMA trailer park, which contained about 140 trailers and is now vacant, would be displaced under the proposed action.

There may be temporary, construction-related impacts to residents in the area as a result of the proposed action. These may include increased noise, degraded air quality, and increased congestion on neighboring roadways. However these impacts to population would last only through the construction period.

Congestion impacts will be discussed further in the transportation section.

Indirect Impacts. No indirect impacts related to displacement of population and housing are expected to occur.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts for population and housing consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Cumulative impacts that include the proposed action are no greater than the sum of those impacts indicated individually for each project component.

The exception to the foregoing are the cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to much of the New Orleans metropolitan area upon completion of the HSDRRS may enhance the desirability of living within the protected areas. As a result, a shift in the dispersion of population within the New Orleans Metropolitan Statistical Area (MSA), or beyond, may occur. Also, to the extent that the completion of the HSDRRS encourages regional economic growth, any additional jobs thus created may manifest itself in either in-migration to the area or an increase in commuting activity.

3.3.1.2.3 Alternatives to the Proposed Action

Direct Impacts. There would be minimal direct impacts to housing and population under alternative 3. Most construction for this alignment would occur on vacant land. One residence north of Hero Canal would be acquired for the right-of-way. Construction activities would take place in the vicinity of Oakville, but no residences would be acquired. The community park would also not be impacted under this alternative.

There would be direct impacts to Oakville under alternative 5. Construction would be required within the community of Oakville. Approximately 16 residences along the north side of West Oakville Street would be acquired under this alternative, in addition to one house north of the Hero Canal.

The FEMA trailer park area would also be impacted under alternatives 3 and 5. However, the park is currently vacant.

There may be temporary, construction-related impacts to residents in the area under alternatives 3 and 5. These may include increased noise, degraded air quality, and increased congestion on neighboring roadways. Impacts may be moderate to severe under alternative 5, since under this alternative construction would occur 50 feet from some residences. However, these impacts to population would last only through the construction period.

Traffic congestion impacts will be discussed further in the transportation section.

Indirect Impacts. No indirect impacts related to displacement of population and housing are expected to occur.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts for population and housing consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Cumulative impacts that include alternatives 3 and 5 are no greater than the sum of those impacts indicated individually for each project component.

The exception to the foregoing are the cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to much of the New Orleans metropolitan area upon completion of the HSDRRS may enhance the desirability of living within the protected areas. As a result, a shift in the dispersion of population within the New Orleans MSA, or beyond, may occur. Also, to the extent that the completion of the

HSDRRS encourages regional economic growth, any additional jobs thus created may manifest itself in either in-migration to the area or an increase in commuting activity.

3.3.2 Impacts to Employment, Business, and Industry

3.3.2.1 Existing Conditions

The eastern end of the project area contains several mixed commercial and industrial facilities. Immediately north of Oakville is a salvage yard and landfill business, Industrial Pipe Inc, which fronts Hero Canal. It also includes a dredging operation that provides sand fill material to its customers. There are several other businesses that lie along the canal, including a Wall Company and Salvage Yard. Slightly north of the Industrial Pipe Inc. landfill, on the east side of Belle Chasse Highway, is the Chevron Oronite Company LLC, a chemical plant.

There is also a single restaurant/convenience store in the vicinity.

Additionally, there are prime farmland soils in the project area that are used for agricultural production of cattle and citrus.

3.3.2.2 Discussion of Impacts

3.3.2.2.1 No Action

Direct Impacts. Under the no action alternative, only the previously authorized hurricane risk reduction project would be constructed. . The authorized levee system would include the Hero Canal levee, a new levee extending eastward and around the Hero Canal, westward between the Canal and landfill boundary, and then south to the non-Federal levee. This system provides development in the eastern area of the proposed project with approximately 50-year level of risk reduction.

Under this alternative, the Greater New Orleans HSDRRS would not be completed to the 100-year level. The eastern tie-in is integral to risk reduction on the West Bank, and without it the system providing risk reduction to the Belle Chasse, Gretna-Algiers, Harvey-Westwego, and Lake Cataouatche polders would be compromised.

The no action alternative would require construction on land owned by the landfill. Additionally, under this alternative, construction would occur on land onto which the landfill owner has expressed desire to expand.

Indirect Impacts. Under the no action alternative, the storm surge risk reduction system would not comply with the minimum requirements of the National Flood Insurance Program (NFIP), and higher premiums within the larger hurricane risk reduction system could be expected as a result.

Since this alternative fails to provide the 100-year level of risk reduction as required under the NFIP, the actual and perceived flood risks to businesses in the project area under this alternative would be higher. Flooding occurring under the no action alternative that would have been avoided under the proposed action increases the potential for permanent displacement of business and industry.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to business, industry, and employment consist simply of the sum of the direct and indirect impact for this alternative and with all other activities associated with the construction of the HSDRRS.

Absent of action at the project site, direct cumulative impacts remain no greater than the sum of those impacts indicated individually for each project component.

3.3.2.1 Proposed Action

Direct Impacts. The Industrial Pipe Inc. landfill would be included within the flood risk reduction system under the proposed action. However, the landfill owner has expressed a desire to expand his business, and the construction of the alignment of the proposed action would enclose the existing landfill site, preventing future potential expansion of the landfill on the protected side of the levee. This is also the case under the no action alternative.

There may be potential adverse impacts to business under the proposed action due to the width of the sector gate that would be used within the canal. The proposed gate is 56 feet wide, and would hence restrict navigation within the canal to vessels 52 feet or less in width. During construction, the stoplog closure would be built in phases, allowing continuous passage of vessels through the canal.

Additionally, under the proposed action, 6.4 acres of prime farmland soil would be impacted. This land would be unavailable for further agricultural use under the proposed action.

Indirect Impacts. In addition to the direct impacts, there would be temporary indirect impacts to the area consisting of increased traffic, construction noise including pile driving noise, and increased road dust and dirt.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts for business, employment, and industry consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS. Cumulative impacts that include the proposed action are no greater than the sum of those impacts indicated individually for each project component.

The exception to the foregoing are the cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to much of the New Orleans metropolitan area upon completion of the HSDRRS may have the effect of spurring additional economic growth in the region than would otherwise occur. As a result, an increase in the number of firms and the output of business and industry would likely manifest itself in such growth.

3.3.2.2.3 Alternatives to the Proposed Action

Direct Impacts. The Industrial Pipe Inc. landfill would be completely within the flood risk reduction system under alternative 3. This alternative would not prevent future potential expansion of the landfill on the protected side of the levees. However, there may be potential adverse impacts to business under alternative 3 due to the width of the stoplog gate that would be used within the canal. The proposed gate is 56 feet wide, and would restrict navigation within the canal to vessels 52 feet or less in width. During construction, the stoplog closure would be built in phases, allowing continuous passage of vessels through the canal

Additionally, under alternative 3, 6.4 acres of prime farmland soil would be impacted. This land would be unavailable for further agricultural use under this alternative.

Alternative 5 would have direct impacts on business in the Oakville area. The T-wall would separate the landfill area from its office facilities, with a vehicular gate providing access. This

would cause both temporary impacts during construction, and permanent impacts. However, the landfill area would be provided with 100-year level of risk reduction.

Under alternative 5, 12 acres of prime farmland soil would be impacted. This land would be unavailable for further agricultural use under this alternative.

Indirect Impacts. There would be no indirect impacts to business, employment, and industry under alternatives 3 and 5.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts for business, employment, and industry consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Cumulative impacts that include alternatives 3 and 5 are no greater than the sum of those impacts indicated individually for each project component.

The exception to the foregoing are the cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to much of the New Orleans metropolitan area upon completion of the HSDRRS may have the effect of spurring additional economic growth in the region than would otherwise occur. As a result, an increase in the number of firms and the output of business and industry would likely manifest itself in such growth.

3.3.3 Availability of Public Facilities and Services

3.3.3.1 Existing Conditions

There are no public facilities or services in the project area, except for a community park in Oakville.

There is a wide range of public facilities within the protected area. As reported by the 2000 U.S. Census, within the Belle Chasse polder there is one police station, one fire station and the Parish government office. Two buildings function as nursing and assisted living facilities. There is one utilities facility, and one water transportation facility. Also within the protected area is the Naval Air Station, Joint Reserve Base. Lastly, there are four school buildings within the protected area. There may be significantly more public properties not captured by the census, such as churches, community centers, and parish administrative offices.

3.3.3.2 Discussion of Impacts

3.3.3.2.1 No Action

Direct Impacts. Under the no action alternative, only the previously authorized hurricane risk reduction project would be constructed. The authorized levee system would include the Hero Canal levee, a new levee extending eastward and around the Hero Canal, westward between the Canal and landfill boundary, and then south to the non-Federal levee. This system provides development in the eastern area of the proposed project with approximately 50-year level of risk reduction.

Under this alternative, the Greater New Orleans HSDRRS would not be completed to the 100-year level. The eastern tie-in is integral to risk reduction on the West Bank, and without it the system providing risk reduction to the Belle Chasse, Gretna-Algiers, Harvey-Westwego, and Lake Cataouatche polders would be compromised.

There would be no direct impacts to the availability of public facilities and services under the no action alternative.

Indirect Impacts. No indirect impacts to the availability of public facilities and services are expected under the no action alternative.

Cumulative Impacts. No cumulative impacts to this resource are expected.

3.3.3.2.2 Proposed Action

Direct Impacts. The proposed action would have no direct effect on the availability of public facilities and services.

Indirect Impacts. The proposed action would have no indirect effect on the availability of public facilities and services.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to public facilities and services consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Cumulative impacts that include the proposed action are no greater than the sum of those impacts indicated individually for each project component.

The exception to the foregoing are the cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to much of the New Orleans metropolitan area upon completion of the HSDRRS may enhance the desirability of living within the protected areas. As a result, a shift in the dispersion of population within the New Orleans MSA, or beyond, may occur. Also, to the extent that the completion of the HSDRRS encourages regional economic growth, any additional jobs thus created may manifest itself in either in-migration to the area or an increase in commuting activities. An increase in the demand for public facilities and services would follow the migration patterns of residents and workers in the region.

3.3.3.2.3 Alternatives to the Proposed Action

Direct Impacts. Alternative 3 would have no direct effect on the availability of public facilities and services.

Alternative 5 would directly impact 1.73 acres of the community park in Oakville, with 0.92 acres in forested land and 0.81 acres in open space, mostly used as a baseball field. Some uses at the park including the ball field would be eliminated with alternative 5.

Indirect Impacts. Alternatives 3 and 5 would have no indirect effect on the availability of public facilities and services.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to public facilities and services consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS. Cumulative impacts that include alternatives 3 and 5 are no greater than the sum of those impacts indicated individually for each project component.

The exception to the foregoing are the cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to the much of the New Orleans metropolitan area upon completion of the HSDRRS may enhance the desirability

of living within the protected areas. As a result, a shift in the dispersion of population within the New Orleans MSA, or beyond, may occur. Also, to the extent that the completion of the HSDRRS encourages regional economic growth, any additional jobs thus created may manifest itself in either in-migration to the area or an increase in commuting activities. An increase in the demand for public facilities and services would follow the migration patterns of residents and workers in the region.

3.3.4 Effects on Transportation

3.3.4.1 Existing Conditions

The transportation system in the project area consists of LA 23, which provides access from Venice in the lower delta to Highway 90 in Gretna. Walker Road is a local unpaved road that extends from LA 23 westward adjacent and parallel to the Hero Canal. There are a total of 133 miles of roads and highways within the protected area for this project.

The NOGCR passes through the project area alongside LA 23. There are 8 miles of railroad within the project area.

3.3.4.2 Discussion of Impacts

3.3.4.2.1 No Action

Direct Impacts. Under the no action alternative, only the previously authorized hurricane risk reduction project would be constructed. The authorized levee system would include the Hero Canal levee, a new levee extending eastward and around the Hero Canal, westward between the Canal and landfill boundary, and then south to the non-Federal levee. This system provides development in the eastern area of the proposed project with approximately 50-year level of risk reduction (level of risk reduction).

Under this alternative, the Greater New Orleans HSDRRS would not be completed to the 100-year level. The eastern tie-in is integral to risk reduction on the West Bank, and without it the system providing risk reduction to the Belle Chasse, Gretna-Algiers, Harvey-Westwego, and Lake Cataouatche polders would be compromised.

No direct impacts to transportation resources are expected under the no action alternative.

Indirect Impacts. Due to the increased flood risk under this alternative, the risk for damage to transportation resources under the no action alternative is also increased.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to transportation resources consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Absent of action at the project site, direct cumulative impacts remain no greater than the sum of those impacts indicated individually for each project component.

The potential exists that the cumulative indirect effects of the increased quantity of material hauling activity by truck for this and all other project areas may increase congestion within the transportation network that is greater than the congestion that would appear to be individually contributed by this and all other construction activities at project areas. However, the relatively disbursed locations of project areas tend to render the potential for such traffic congestion effects to a relatively low magnitude. However, wear and tear on roadways used to transport materials to construction sites are expected to remain proportionate to the quantity of traffic traveling to project sites.

3.3.4.2.2 Proposed Action

Direct Impacts. Construction of the proposed action would result in a temporary increase in the number of vehicles using LA 23 and Walker Road. While short delays on both roads would be experienced during construction, these would be temporary and original conditions would be restored after construction is complete.

Access for construction of the proposed action Reach 1 levee would be provided via staging areas and access roads in between the existing levee and Walker Road. These staging areas and access roads would be located in previously disturbed and cleared lands or existing public roads. Improvements to gravel or dirt roads may be necessary.

The option to build a floodwall and bridge across Hwy 23 was investigated, but due to public concerns for transportation impacts and safety the bridge option was not carried forward. Instead, vehicular and railroad gates with a bypass road option are included as part of the proposed action.

The alignment under the proposed action would cross LA 23 with vehicular gates. The gate at LA 23 would not impede traffic on LA 23 except when the gate is closed during a storm event. When the gate is closed during storm events, vehicles would have to use the emergency bypass road, which runs from LA 23 to the Mississippi River Levee. The bypass road reconnects to LA 23 on the other side of the gate.

The proposed alignment crosses the New Orleans and Gulf Coast Railway Company Railroad with a railroad gate. This should not impact rail usage, except temporarily during construction, because the gate would only be closed during storm events when no rail traffic should be occurring.

A 56-foot wide stoplog gate would be constructed across the Hero Canal. This gate would allow for commercial and recreational navigation in the canal. However, navigation within the canal would be restricted to vessels that could pass through the 56-foot wide gate. During construction, the stoplog closure would be built in phases, allowing continuous passage of vessels in the canal.

Indirect Impacts. There may be increased wear and tear on other major and local public roads throughout the Greater New Orleans area as large quantities of construction materials are transported to the construction site.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to transportation resources consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Cumulative direct impacts that include the proposed action are no greater than the sum of those impacts indicated individually for each project component.

The potential exists that the cumulative indirect effects of the increased quantity of material hauling activity by truck for this and all other project areas may increase congestion within the transportation network that is greater than the congestion that would appear to be individually contributed by this and all other construction activities at project areas. However, the relatively disbursed locations of project areas tend to render the potential for such traffic congestion effects to a relatively low magnitude. However, wear and tear on public roadways used to transport materials to construction sites are expected to remain proportionate to the quantity of traffic traveling to project sites.

Furthermore, there may emerge cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to the much of the New Orleans metropolitan area upon completion of the HSDRRS may have the effect of spurring additional economic growth in the region than would otherwise occur. An increase in the demand for transportation resources usually follows gains in economic activity and would thus be expected given any additional economic growth in the region.

3.3.4.2.3 Alternatives to the Proposed Action

Direct Impacts. Construction of alternative 3 would result in traffic impacts that are similar to the proposed action. Alternative 5 would most likely have more severe impacts to transportation since floodwall construction would occur along West Oakville Street.

Access for construction of the proposed action Reach 1 levee would be provided via staging areas and access roads in between the existing levee and Walker Road. These staging areas and access roads would be located in previously disturbed and cleared lands or existing public roads. Improvements to gravel or dirt roads may be necessary.

After concerns were raised by community members and parish officials about potential negative impacts due to raising Highway 23 over the floodwall, it has been decided that both alignments would instead cross LA 23 with vehicular gates. The gate at LA 23 would not impede traffic on LA 23 except when the gate is closed during a storm event. When the gate is closed during storm events, vehicles would have to use the emergency bypass road, which runs from LA 23 to the Mississippi River Levee. The bypass road reconnects to LA 23 on the other side of the gate.

Both alternatives would cross the NOGCR with a gate. This should not impact rail usage, except temporarily during construction, because the gate would only be closed during storm events.

Under alternative 3, a 56-foot wide stoplog gate for would be constructed across the Hero Canal. This gate would allow for commercial and recreational navigation in the canal. However, navigation within the canal would be restricted to vessels 52 feet or less in width. During construction, the stoplog closure would be built in phases, allowing continuous passage of vessels in the canal.

There would be no impacts to transportation within the Hero Canal under alternative 5 since no gate would be constructed under this alternative.

Indirect Impacts. There may be increased wear and tear on other major and local roads throughout the Greater New Orleans area as large quantities of construction materials are transported to the construction site.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to transportation resources consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Cumulative direct impacts that include alternatives 3 and 5 are no greater than the sum of those impacts indicated individually for each project component.

The potential exists that the cumulative indirect effects of the increased quantity of material hauling activity by truck for this and all other project areas may increase congestion within the transportation network that is greater than the congestion that would appear to be individually contributed by this and all other construction activities at project areas. However, the relatively disbursed locations of project areas tend to render the potential for such traffic congestion effects to a relatively low magnitude. Wear and tear on roadways used to transport materials to

construction sites are expected to remain proportionate to the quantity of traffic traveling to project sites.

Furthermore, there may emerge cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to the much of the New Orleans metropolitan area upon completion of the HSDRRS may have the effect of spurring additional economic growth in the region than would otherwise occur. An increase in the demand for transportation resources usually follows gains in economic activity and would thus be expected given any additional economic growth in the region.

3.3.5 Disruption of Community and Regional Growth

3.3.5.1 Existing Conditions

Community and regional growth are generally influenced by national trends, but otherwise depend significantly upon relatively local attributes that allow it to be evaluated apart from the national economy. For the purposes of socioeconomic impact analysis, the project area is first described in summary terms with respect to prevailing trends in the growth of population, housing, income, and employment, both under existing conditions and those that are expected to exist in the future. Against this baseline, the relative effects of the proposed and alternative actions are evaluated.

Under existing conditions, the project area can be characterized as a stable community that has shared in the long-term growth of the New Orleans metropolitan area. There is no indication that in the future there are factors at work that would suggest either a decline in growth with respect to the metropolitan area or a relatively more rapid expansion.

3.3.5.2 Discussion of Impacts

3.3.5.2.1 No Action

Direct Impacts. Under the no action alternative, only the previously authorized hurricane risk reduction project would be constructed. The authorized levee system would include the Hero Canal levee, a new levee extending eastward and around the Hero Canal, westward between the Canal and landfill boundary, and then south to the non-Federal levee. This system provides development in the eastern area of the proposed project with approximately 50-year level of risk reduction.

Under this alternative, the Greater New Orleans HSDRRS would not be completed to the 100-year level. The eastern tie-in is integral to risk reduction on the West Bank, and without it the system providing risk reduction to the Belle Chasse, Gretna-Algiers, Harvey-Westwego, and Lake Cataouatche polders would be compromised.

There would be no direct adverse impacts to community and regional growth under the no action alternative. Community growth would parallel the long-term growth patterns of the metropolitan area.

Indirect Impacts. Under the no action alternative, the storm surge risk reduction system would not comply with the minimum requirements of the National Flood Insurance Program (NFIP), and higher premiums within the larger hurricane risk reduction system could be expected as a result.

Since this alternative fails to provide the 100-year level of risk reduction as required under the NFIP, the actual and perceived flood risks to businesses and residences in the project area would be higher. Costs associated with business and residential development and sustainment would

likewise be impacted. The lack of enhanced flood protection could be a long-term detriment to the economic vitality of the area to be protected.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to community and regional growth consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Absent of action at the project site, direct cumulative impacts remain no greater than the sum of those impacts indicated individually for each project component.

3.3.5.2.2 Proposed Action

Direct Impacts. The project area can be characterized as a stable community that has shared in the long-term growth of the New Orleans metropolitan area. The proposed action would likely have no direct impact on community growth within the town of Oakville. Oakville's growth would likely remain stable under the proposed action.

Indirect Impacts. The proposed action would provide a 100-year level of risk reduction to Oakville and the Belle Chasse basin, and also complete the West Bank and Vicinity project. This area is a growing one, and the proposed action would certainly not diminish, and likely accommodate such growth.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to community and regional growth consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Cumulative impacts that include the proposed action are no greater than the sum of those impacts indicated individually for each project component.

The exception to the foregoing are the cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to the much of the New Orleans metropolitan area upon completion of the HSDRRS may have the effect of spurring additional economic growth in the region than would otherwise occur. In addition, the lower incidence of flooding that the HSDRRS is designed to achieve would reduce the propensity for disruption of community life.

3.3.5.2.3 Alternatives to the Proposed Action

Direct Impacts. The project area can be characterized as a stable community that has shared in the long-term growth of the New Orleans metropolitan area. Alternative 3 would most likely have no direct effects on community growth within the town of Oakville. Alternative 5, on the other hand, would most likely adversely impact community growth within Oakville, since it would involve acquiring or relocating 16 homes within a small, tight-knit community.

Indirect Impacts. Alternative 3 would provide a 100-year level of risk reduction to Oakville and the Belle Chasse basin, and also complete the West Bank and Vicinity project. This area is a growing one, and these alternatives would certainly not diminish, but likely accommodate such growth. Alternative 5 may indirectly stimulate regional growth due to the relocation of 16 homes. Displaced persons are likely to desire relocation nearby since Oakville is a close-knit community. It is expected that residents would want to relocate in close proximity to their present locations in the Belle Chasse polder.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to community and regional growth consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Cumulative impacts that include the alternatives 3 and 5 are no greater than the sum of those impacts indicated individually for each project component.

The exception to the foregoing are the cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to the much of the New Orleans metropolitan area upon completion of the HSDRRS may have the effect of spurring additional economic growth in the region than would otherwise occur. In addition, the lower incidence of flooding that the HSDRRS is designed to achieve would reduce the propensity for disruption of community life.

3.3.6 Impacts to Tax Revenues and Property Values

3.3.6.1 Existing Conditions

The project area includes the area along north and south banks of the Hero Canal and the town of Oakville. The Belle Chasse polder is also included since it would also benefit from the decreased flood risk that the project would provide. According to the 2000 U.S. Census map, the project area includes the following:

- Orleans Parish: Tract 6.12, Group 1.
- Plaquemines Parish: Tracts 502; 503; 504, Group 2.

Values for housing units within protected area ranged from less than \$10,000 to over \$1,000,000. Median values for owner-occupied housing units ranged from \$76,300 to \$434,000.

These values provide a stable base for the collection of property taxes. Commercial activities provide a base for the collection of sales tax revenues.

3.3.6.2 Discussion of Impacts

3.3.6.2.1 No Action

Direct Impacts. Under this alternative, the Greater New Orleans HSDRRS would not be completed to the 100-year level. The eastern tie-in is integral to risk reduction on the West Bank, and without it the system providing risk reduction to the Belle Chasse, Gretna-Algiers, Harvey-Westwego, and Lake Cataouatche polders would be compromised.

There would be no direct impacts to tax revenues and property values under the no action alternative.

Indirect Impacts. Under the no action alternative the storm surge risk reduction system would not comply with the minimum requirements of the NFIP, and higher premiums within the larger hurricane risk reduction system could be expected as a result. This may prove detrimental to community growth, which may also in turn affect property values and consequently tax revenues.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to tax revenues and property values consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Absent of action at the project site, direct cumulative impacts remain no greater than the sum of those impacts indicated individually for each project component.

3.3.6.2.2 Proposed Action

Direct Impacts. No direct impacts to property values and tax revenues are expected as a result of the proposed action.

Indirect Impacts. Growth in property values and tax receipts tend to parallel that of community and regional growth.

The proposed action may tend to increase property values in the project area and throughout the area. Increased confidence in the HSDRRS providing storm surge risk reduction in the area may have a positive effect on property values in the vicinity. As a result of higher property values, tax revenues would increase as well.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to tax revenues and property values consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Cumulative impacts that include the proposed action are no greater than the sum of those impacts indicated individually for each project component.

The exception to the foregoing are the cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to the much of the New Orleans metropolitan area upon completion of the HSDRRS may have the effect of spurring additional economic growth in the region than would otherwise occur. It follows that increases in tax revenues would ensue given additional economic growth. In addition, the lower incidence of flooding that the HSDRRS is designed to achieve would have the effect of preserving, if not enhancing, property values within the protected areas.

3.3.6.2.3 Alternatives to the Proposed Action

Direct Impacts. No direct impacts to property values and tax revenues are expected as a result of alternative 3. Alternative 5, however, may have an adverse impact on property values within the immediate vicinity of the project area and Oakville. This alternative would entail constructing a floodwall along the town's main street, West Oakville Street, which would likely have a negative effect on property values in the vicinity.

Indirect Impacts. Growth in property values and tax receipts tend to parallel that of community and regional growth.

Both alternatives 3 and 5 may tend to increase property values throughout the protected area. Increased confidence in the HSDRRS providing storm surge risk reduction in the area may have a positive effect on property values in the vicinity. As a result of higher property values, tax revenues would increase as well. Alternative 5 may decrease property values in the Oakville area due to impacts to the local park and the relocation of 16 homes in that neighborhood.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to tax revenues and property values consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Cumulative impacts that include alternatives 3 and 5 are no greater than the sum of those impacts indicated individually for each project component.

The exception to the foregoing are the cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to the much of the New Orleans metropolitan area upon completion of the HSDRRS may have the effect of spurring additional economic growth in the region than would otherwise occur. It follows that increases in tax revenues would ensue given additional economic growth. In addition, the lower incidence of flooding that the HSDRRS is designed to achieve would have the effect of preserving, if not enhancing, property values within the protected areas.

3.3.7 Changes in Community Cohesion

3.3.7.1 Existing Conditions

Community cohesion refers to the common vision and sense of belonging within a community that is created and sustained by the extensive development of individual relationships that are social, economic, cultural, and historical in nature. The degree to which these relationships are facilitated and made effective is contingent upon the spatial configuration of the community itself. The functionality of the community owes much to the physical landscape within which it is set. The viability of community cohesion is compromised by the extent to which these physical features are exposed to interference from outside sources.

Oakville is a community that was established shortly after the Civil War. With approximately 300 people, 100 of them children, it is a tightly-knit community, where many residents are related to each other. The community includes three churches, the Mount Zion Baptist Church St. Peter's Baptist Church, and the Oakville Missionary Baptist Church, as well as a playground and picnic area on the western end of the neighborhood. Adjacent to the playground is a cemetery.

3.3.7.2 Discussion of Impacts

3.3.7.2.1 No Action

Direct Impacts. Under the no action alternative, only the previously authorized hurricane risk reduction project would be constructed. The authorized levee system would include the Hero Canal levee, a new levee extending eastward and around the Hero Canal, westward between the Canal and landfill boundary, and then south to the non-Federal levee. This system provides development in the eastern area of the proposed project with approximately 50-year level of risk reduction.

Under this alternative, the Greater New Orleans HSDRRS would not be completed. The eastern tie-in is integral to risk reduction on the West Bank, and without it the system providing risk reduction to the Belle Chasse Gretna-Algiers, Harvey-Westwego, and Lake Cataouatche polders would be compromised.

There would be no adverse direct impacts to community cohesion under the no action alternative.

Indirect Impacts. Under the no action alternative, the higher risk of flooding increases the likelihood that patterns of social interaction and communication within the community of Oakville, and the entire west bank and vicinity, may be interrupted or permanently altered.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to community cohesion consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Absent of action at the project site, direct cumulative impacts remain no greater than the sum of those impacts indicated individually for each project component.

3.3.7.2.2 Proposed Action

Direct Impacts. No direct impacts to community cohesion are expected as a result of the proposed action.

Indirect Impacts. The intended purpose of the proposed action is to reduce the incidence of flooding associated with storm surge for the entire protected area, which is beyond the boundaries of the project area. Therefore, included in the beneficial effects of this alternative is broadly reducing the frequency and scope of disruption to activities associated with this socioeconomic resource and to the physical facilities upon which they depend.

The proposed action would increase the level of community cohesion because the entire project area would be included in the HSDRRS and as a result would benefit from its advancement.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to community cohesion consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Cumulative impacts that include the proposed action are no greater than the sum of those impacts indicated individually for each project component.

The exception to the foregoing are the cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to the much of the New Orleans metropolitan area upon completion of the HSDRRS may have the effect of enhancing community cohesion. The reason for this is that the lower incidence of flooding reduces the likelihood that patterns of social interaction and communication within the community are interrupted or permanently altered.

3.3.7.2.3 Alternatives to the Proposed Action

Direct Impacts. Alternative 3 would have no direct impact on community cohesion. Alternative 5 would have adverse impacts on community cohesion. This alternative would require the relocation of 16 homes within a small, tight-knit community. It would also require the relocation of the playground within the community, which would create an additional detriment to community cohesion.

Indirect Impacts. The intended purpose of alternatives 3 and 5 is to reduce the incidence of flooding associated with storm surge for the entire protected area, which is beyond the boundaries of the project area. Therefore, included in the beneficial effects of these alternatives is broadly reducing the frequency and scope of disruption to activities associated with this socioeconomic resource and to the physical facilities upon which they depend.

Since alternative 3 is almost identical to the proposed action, its effects on community cohesion are likewise similar. The level of community cohesion would be increased because the entire project area would be included in the HSDRRS and as a result would benefit from its advancement.

Alternative 5 would also have positive effects on community cohesion, but combined with the adverse impacts on the town of Oakville, this may be a net decrease in the level of community cohesion.

Cumulative Impacts. Unless otherwise indicated, cumulative socioeconomic impacts to community cohesion consist simply of the sum of the direct and indirect impacts for this alternative and with all other activities associated with the construction of the HSDRRS.

Cumulative impacts that include alternatives 3 and 5 are no greater than the sum of those impacts indicated individually for each project component.

The exception to the foregoing are the cumulative indirect impacts associated with the completion of the HSDRRS in its entirety. The lower flood risk that accrues to the much of the New Orleans metropolitan area upon completion of the HSDRRS may have the effect of enhancing community cohesion. The reason for this is that the lower incidence of flooding reduces the likelihood that patterns of social interaction and communication within the community are interrupted or permanently altered.

3.4 ENVIRONMENTAL JUSTICE

3.4.1 General

Executive Order 12898 focuses Federal attention on the environmental and human health conditions in the minority and low-income communities, enhances the provisions of nondiscrimination in Federal programs affecting human health and the environment, and promotes meaningful opportunities to the access of public information and participation in matters relating to minority and low-income communities and their environment. The Executive Order is directed internally to all Federal departments and federal agency heads to take the appropriate steps to identify and address any disproportionately high and adverse human health or environmental effects of Federal programs, policies, and activities on minority and low-income populations.

According to the U.S. Department of Defense's (DoD) Environmental Justice Strategy (March 24, 1995), DoD will, "...evaluate the potential environmental effects (including human health, economic and social) of its actions on minority and/or low income populations." In order to determine the impacts on low income and minority communities, the project must first identify where low income and minority communities are located.

Executive Order 12898 and the Department of Defense's Strategy on Environmental Justice, USACE must take several steps to determine whether the project would have disproportionately high and adverse effect on minority and low-income populations. "Disproportionately high and adverse effects" are defined as adverse effects that are predominately borne by a minority and/or low-income population; or will be suffered by the minority and/or low income population and are appreciably more severe or greater in magnitude than the adverse effect that will be suffered by non minority and/or non low-income population.

In accordance with these directives, EJ analysis identifies and addresses, as appropriate, disproportionately high, and adverse human health or environmental effects of the IER proposed action on minority and low-income populations. Minority groups include: African American, Hispanic, Asian American, American Indian/Alaskan Native, and Pacific Islander. The methodology to accomplish this includes identifying low-income and minority populations within the study area using up to date economic statistics, aerial photographs, the 2000 Census, Environmental Systems Research Institute (ESRI) estimates, as well as conducting community outreach activities such as small neighborhood focus meetings.

In order to identify low-income areas, DOD and USACE use the Department of Health and Human Services (DHHS) poverty guidelines. In 2000, this was \$17,050 for a family of four. This is updated annually at <http://aspe.hhs.gov/poverty/poverty.htm>. While the poverty guidelines are

updated annually, the poverty data, i.e. Census data, is updated only decennially, of which the Census 2000 data is the latest version. Further discussion on the use of Census 2000 data is presented below. For analyzing disproportionate impacts to minority and/or low income population, the smallest political unit(s) containing an EJ project area is/are considered the reference community of comparison, whose population is therefore considered the reference population for comparison purposes. Disproportionate impact is determined to occur when the percent minority and/or percent low income population in an EJ project area are greater than those in the reference community. Sources explaining this rationale in detail are listed in the References section of this document.

The sources for the data used in the analysis include the 2000 U.S. Census and estimates from Environmental Systems Research Institute, Inc. (ESRI). Despite the 2000 U.S. Census being eight years old, it serves as a logical baseline of information for the following reasons:

- 1 Census 2000 data is the most accurate source of data available due to the sample size of the Census decennial surveys. With one of every six households surveyed, the margin of error is negligible.
- 2 The Census reports data at a much smaller geographic level than other survey sources, providing a more defined and versatile option for data reporting.
- 3 Census information sheds light upon the demographic and economic framework of the area pre-Hurricane Katrina. By accounting for the absent population, the analysis does not exclude potentially low income and minority families that wish to return home.

Due to the considerable impact of Hurricane Katrina upon the New Orleans metro area, and the likely shift in demographics and income, the 2000 Census data is supplemented with more current data, including 2008 estimates and 2013 projections provided by ESRI.

For purposes of environmental justice analysis, all Census Block Groups within a one-mile radius of the IER 13 footprint, are defined as the IER 13 EJ project area. The IER 13 project is located along the Hero Canal, south of Belle Chasse, on the west bank of Plaquemines Parish, LA. It includes the small, African-American community of Oakville, and the Industrial Pipe landfill. Photographs of selected locations are appended at the conclusion of this section.

According to the U.S. Census, 73.4% of the residents in the IER 13 EJ analysis area were minority and 31.1% of the residents were considered low income. These figures are significantly higher than the comparable parish and state figures. Per the U.S. Census data, the IER 13 project area was a minority and/or low income community in 2000.

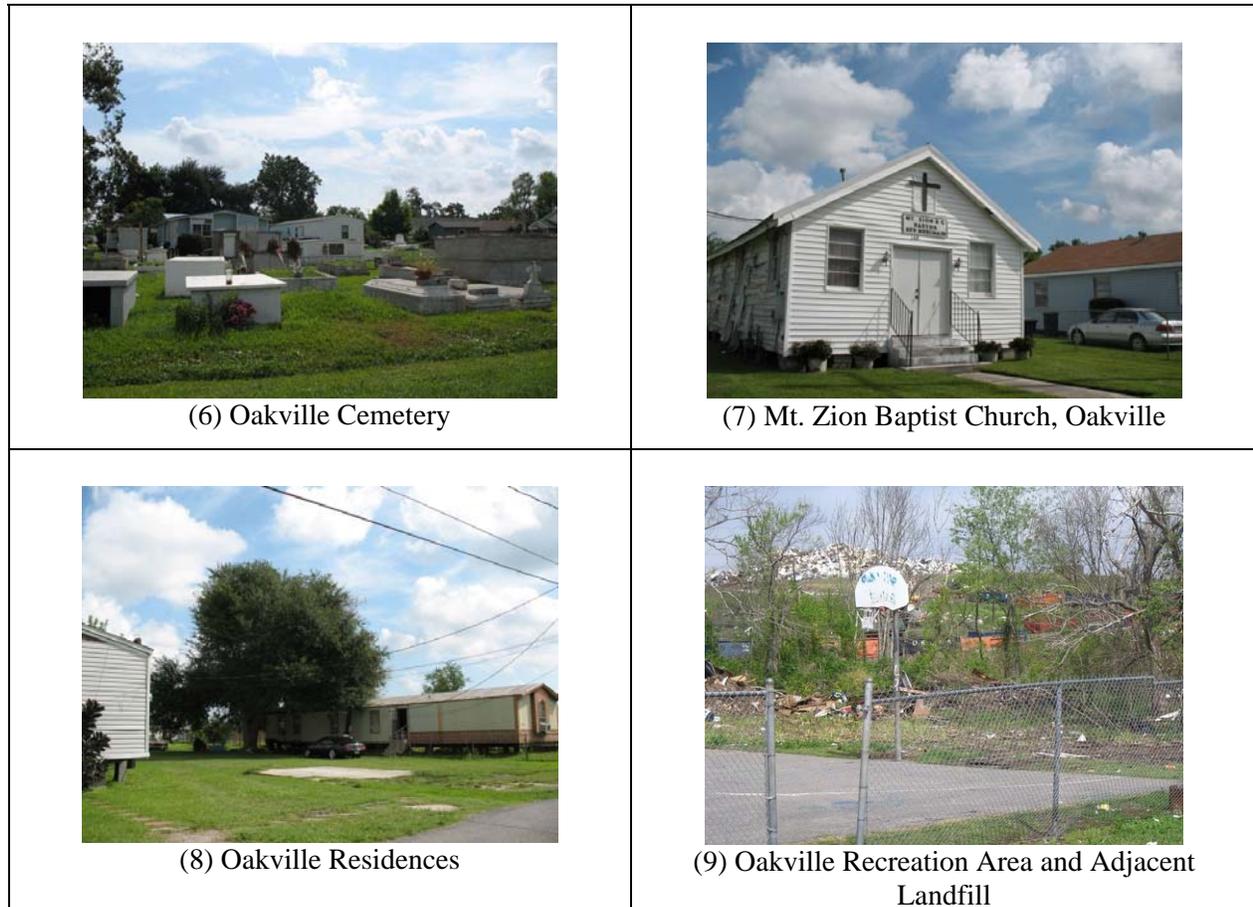
According to ESRI estimates, 75.2% of the population was minority and 33.6% of the population was low income in 2008. Again, this is significantly higher than the parish and state figures. Therefore, IER 13 project area continues to be a minority and/or low income community. A summary of this data is provided below and detailed data sets are provided at the conclusion of this section.

The Belle Chasse area in Plaquemines Parish is considered the reference community for disproportionate impact analysis. This is reflected in the data in the summary table above as well as in the detailed data sets presented in the appendices. The 2008 population data are utilized as the primary deciding variable per data accuracy and reliability as described above. The 2008 estimates are utilized for reference purposes only. Maps depicting low income and minority Block Groups in 2000 and 2007, respectively in the IER 13 EJ project area have been prepared and are available for review.

Table 11: Summary Demographic Data

	IER 13 EJ Project Area		Belle Chasse		Plaquemines and Jefferson Parishes		Louisiana	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Minority Population 2000	855	73.4%	779	7.9%	168,988	35.0%	1,689,422	37.8%
Estimated Minority Population, 2008	1,142	75.2%	N/A	N/A	175,576	36.9%	1,708,852	38.0%
Low Income Population, 2000	352	31.1%	758	7.7%	66,290	13.9%	851,113	19.6%
*Estimated Low Income Pop., 2008	182	33.6%	N/A	N/A	26,983	14.8%	345,777	20.5%

*Note: 2008 does not use the equivalent definition for “low income” due to the limited information available in 2008 at the Block Group Level. In 2000, the definition is equivalent to all populations living below the poverty line, whereas in 2008, the definition uses all households earning less than \$15,000 per year.



Photographs 6-9: Areas in and Around the Oakville Community

3.4.2 Discussion of Impacts

3.4.2.1 No Action

With the no action alternative, the proposed 100-year level of risk reduction would not occur, thus continuing the potential occurrence of adverse impacts affecting property, public safety, and local economic stability from 100-year storm surge events in the IER 13 EJ project area. This area does not currently have 100-year level of risk reduction. The approved No Action project would build a levee around the existing landfill and behind Oakville, although not to 100-year level of risk reduction. Therefore, 100-year level of risk reduction would continue to be absent under the No Action alternative. Under the No Action alternative, there would not be a disproportionate impact on the minority and/or low income communities in the IER 13 project area.

3.4.2.2 Proposed Action

Following are the demographic and EJ impacts along alternative 1 (Proposed Actions):

Direct Impacts. Direct impacts from the proposed action would include acquisition of a residential property to the north of Hero Canal. The relocated residents would experience inconvenience as a result. However, this relocation would not be a disproportionate impact since other residents and businesses are being required to relocate for construction of other parts of the HSDRRS. Direct impacts from construction activities on air quality, noise, traffic, etc. would be exerted on the community of Oakville. However, these construction related adverse impacts would be temporary in nature, and would be associated with providing a greater level of storm damage risk reduction to an area that currently lacks that protection. Therefore, adverse human health and environmental impacts would not be disproportionately high on minority and/or low income population. Thus, this alignment would not exert direct adverse environmental justice impact.

Indirect Impacts. This proposed action would enhance federal hurricane protection in an area with existing lower level risk reduction. Indirect impacts from this action may include residential and commercial growth within the protected area. This indirect impact is not anticipated to exert disproportionately high indirect, adverse human health and environmental impacts on minority and/or low-income communities from the proposed action.

Cumulative Impacts. The proposed action would enhance federal hurricane protection in the project via construction of features in the general vicinity of existing hurricane protection features. Therefore, no incremental adverse impact is anticipated from the completion of this proposed action. Thus, disproportionate adverse cumulative human health and environmental impacts are not anticipated on minority and/or low income communities from the proposed action.

3.4.2.3 Alternatives to the Proposed Action

Environmental Justice Impact – Alternative 3

This alternative is similar to alternative 1, with the exception that the western end of this alignment is located further west than the end of alternative 1. Therefore, the demographic and land use characteristics along this alternative are similar to that of alternative 1 and are presented below.

Direct Impacts. Direct impacts from the proposed action would include acquisition of a residential property to the north of Hero Canal. The relocated residents would experience

inconvenience as a result. However, this relocation would not be a disproportionate impact since other residents and businesses are being required to relocate for construction of other parts of the HSDRRS.

Direct adverse impact from construction activities such as air quality, noise, traffic, etc. would be exerted on the minority and/or low income community of Oakville within one mile of project area. These construction related direct adverse impacts would occur on a minority and/or low-income population whose percentage presence is higher in the IER 13 project area than in the reference community. However, these construction related adverse impacts are happening system wide and would be temporary in nature, and associated with providing a greater level of risk reduction to an area that currently lacks similar protection. Therefore, adverse human health and environmental impacts would not be disproportionately high on minority and/or low income population. Thus, this alternative would not exert direct adverse environmental justice impact.

Indirect Impacts. Alternative 3 would enhance federal hurricane protection in an area with existing lower level protection. Indirect impacts from this action may include residential and commercial growth within the protected area. This indirect impact is not anticipated to exert disproportionately high indirect, adverse human health and environmental impacts on minority and/or low-income communities from the proposed action.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions for the HSDRRS system include construction of water control structures, levees, and floodwalls. Alternative 3 would provide risk reduction in the project area via construction of similar features. The minority and/or low income population within the project area would benefit from this enhanced level of risk reduction. When added to other past, present and reasonably foreseeable future actions in this regard, no incremental adverse impact is anticipated from the completion of this proposed action. Thus, disproportionate adverse cumulative human health and environmental impacts are not anticipated on minority and/or low income communities from the proposed action.

Environmental Justice Impact – Alternative 5

Following are the demographic and land use characteristics along this alternative:

- 1 The northern reach runs near the eastern edge of the Industrial Pipe Landfill facility, leaving the landfill area outside of risk reduction system and including the office building of the landfill within system. The predominately minority and/or low income community of Oakville is located within the risk reduction system. Construction in this reach would require additional right-of-way.
- 2 The east-west running floodwall each to the north of Oakville Street is located along the rear of 16 residential structures of the Oakville community, which is predominately minority and/or low income in character. Construction of the floodwall would require the relocation of 16 residential structures.
- 3 The western and southern reaches of the levee/floodwall to the west of LA Highway 23 are located mostly along uninhabited area and along the former FEMA temporary housing development. The predominately minority and/or low income community of Oakville is located within one mile. Construction in this reach would require acquisition of additional right-of-way. This acquisition would occur in an uninhabited area with the exception of the former FEMA temporary housing development where a few recreational vehicles have been placed to temporarily house workers at nearby industrial facilities.

- 4 The eastern reach (east of LA Highway 23) is located on a property with an existing residential structure. Construction in this reach would require acquisition of additional right-of-way. This acquisition would occur in minority and/or low income area, but it would not require any relocation.

Direct Impacts. Direct impacts from the proposed action would include acquisition of a residential property to the north of Hero Canal. The relocated residents would experience inconvenience as a result. However, this relocation would not be a disproportionate impact since other residents and businesses are being required to relocate for construction of other parts of the HSDRRS.

Additional direct adverse impact from the proposed action would include the acquisition of additional right of way and relocation of 16 of the 134 residential properties in Oakville. This represents 12% of the residential properties within the Oakville community. These actions would not be disproportionate impact on the minority and/or low income community since other residents and businesses could be relocated for construction of other parts of the HSDRRS.

Direct adverse impact from construction activities such as air quality, noise, traffic, etc. would be exerted across the system including the predominately minority and/or low income community of Oakville. These construction related direct adverse impacts would occur system wide and would include the minority and/or low-income population of Oakville whose percentage presence is higher in the IER # 13 EJ project area than in the reference community as shown in the summary table previously. However, these construction related adverse impacts (i) would be temporary in nature, and (ii) would be associated with providing a greater level of protection to an area that currently lacks similar protection. Therefore, adverse human health and environmental impacts would not be disproportionately high on minority and/or low income population. Thus, this alignment would not exert direct adverse environmental justice impacts.

Indirect Impacts. Since this alignment proposes to provide federal hurricane risk reduction to an area without such protection currently, completion of the project may induce residential and commercial growth within the newly protected area. This indirect effect is not anticipated to exert disproportionately high indirect, adverse human health and environmental impacts on the minority or low-income communities in the area.

Cumulative Impacts. This alternative would provide federal hurricane risk reduction via construction of similar features in an area that has been without similar protection in the past. The minority and/or low income population within the project area would benefit from this enhanced level of risk reduction. Adverse impacts from acquisition of properties may be exerted. However, when added to other past, present and reasonably foreseeable future actions in this regard, no incremental adverse impact is anticipated from the completion of this proposed action. Thus, disproportionate adverse cumulative human health and environmental impacts are not anticipated on minority and/or low income communities from the proposed action.

3.4.3 Detailed Data

Detailed demographic and census data can be found tables 12-16 (See appendix L).

3.5 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

3.5.1 Existing Conditions

Under ER 1165-2-132 the reasonable identification and evaluation of Hazardous, Toxic, and Radioactive Waste (HTRW) contamination within a proposed area of construction is required. ER 1165-2-132 identifies the CEMVN HTRW policy to avoid the use of project funds for HTRW removal and remediation activities. Costs for necessary special handling or remediation

of wastes (e.g., Resource Conservation and Recovery Act [RCRA] regulated), pollutants and other contaminants, which are not regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), will be treated as project costs if the requirement is the result of a validly promulgated Federal, state or local regulation.

An American Society of Testing Materials (ASTM) E 1527-05 Phase I Environmental Site Assessment (ESA) was completed for the proposed project area in July 2006. It is entitled *Phase I Environmental Sites Assessment Report, West Bank Hurricane Protection Project - East of Harvey Canal in the Vicinity of Hero Canal (Oakville Levee Extension), Plaquemines Parish, Louisiana*. This report was written by Dr. George Bacuta of CEMVN-ED-F. A copy of the Phase I ESA will be maintained on file at the CEMVN office in New Orleans, and incorporated herein by reference.

An additional Phase I ESA was prepared by Aerostar Environmental Services, Inc. on 25 January 2008, entitled *Final - Phase I Environmental Site Assessment: IER 13 -- Walker Road and Highway 23, Oakville, Plaquemines Parish, Louisiana*. It is also incorporated herein by reference and is being maintained on file at the CEMNVN office in New Orleans. Copies of both Phase I ESA reports are available by requesting them from the CEMVN, or accessing them at www.nolaenvironmental.gov.

The following RECs were found north of the Hero Canal in the vicinity of the project area by the Phase I ESAs:

- Historic areas and an active landfill exist in the vicinity of the project area and a potential exists for landfill materials to lie within the alternative 5 levee/floodwall alignment.
- Numerous discarded (or staged) containers with and without contents exist in the vicinity of the project area, including large and small storage tanks, automobiles, drums, 5-gallon buckets and other miscellaneous containers.
- Large piles of creosote treated timbers exist in the vicinity of the project area.
- An unidentified granular material exists on the ground surface in the vicinity of the treated timber piles.
- Indiscriminate dumping of cars (2), household appliances, and construction debris have been observed along the boat launch access road south of Walker Road.

A Phase II ESA dated 10 October 2006 was conducted by Materials Management Group, Inc., in the vicinity of the landfill area to investigate alternative 5 impacts. This study is entitled *Final Site Activities and Soil Classification Report, Phase II Environmental Site Assessment, Oakville Levee Extension, Plaquemines Parish, Louisiana*. According to that study, it may be necessary to conduct further investigations (such as sampling) to fully determine the extent and characteristic of any landfill material impacted by alternative 5.

A copy of the Phase II ESA will be maintained on file at the CEMVN office in New Orleans, and is incorporated herein by reference. Copies of the report are available by requesting them from the CEMVN, or accessing them at www.nolaenvironmental.gov.

If a REC cannot be avoided, due to construction requirements, the Coastal Protection and Restoration Authority, acting as the non-Federal sponsor for this project, may further investigate the REC to confirm the presence or absence of contaminants, and may recommend actions to avoid, sequester, or remove possible contaminants. Federal, state, or local coordination may be required.

3.5.2 Discussion of Impacts

3.5.2.1 No Action

Direct, Indirect and Cumulative Impacts on Hazardous Wastes. Under the no action alternative, an earthen levee would be built directly through the Industrial Pipe landfill. This alternative is considered environmentally unacceptable, due to the possible presence of HTRW.

3.5.2.2 Proposed Action

Direct Impacts. The proposed action is removed from both the area of the active landfill and the industrial sites along Walker Road. None of the identified RECs lie within the project footprint for the proposed action. Therefore, no direct impacts are expected based on the Phase I ESAs.

There are two barges in the Hero Canal that would be removed in order to construct the Reach 1 levee and Reach 2 closure structure. These barges have been investigated and are open to the canal current. As such, the sediment testing done in and along Hero Canal would have indicated any constituents of concern.

Indirect and Cumulative Impacts. The proposed action provides 100-year level of risk reduction for the landfill and no indirect or cumulative impacts are projected.

3.5.2.3 Alternatives to the Proposed Action

Direct Impacts. Alternative 3 is removed from the active landfill area and no direct impacts would be expected. None of the identified RECs lie within the project footprint for alternative 3. It would have the same impact considerations for HTRW as the proposed action.

Alternative 5 would impact the Industrial Pipe, Inc. landfill. A limited Phase II ESA was conducted in October 2006 to determine if there was potential for impacts by landfill material: the Phase II ESA was “limited” and designed to determine if landfill material exists along this alignment (only limited screening for contaminants was done). Four soil borings to 25 feet below ground surface were used for soil sampling and analysis. In two samples no inorganic landfill waste was visible in the boreholes. The other two bore holes revealed inorganic landfill wastes (plastic household material, construction material, etc.) in the 1 to 4.5 feet interval. All material in the boreholes below 4.5 feet consisted of clay or sand native to this geological setting. The conclusion was reached in the Phase II ESA that the observed material appears to be isolated occurrences of debris that may have been dropped or pushed onto the alignment by machinery traveling to the landfill area, or during maintenance of the roadway or landfill. A Certification from the LDEQ may be needed for construction of a levee or floodwall if this alternative were to be used as the proposed action. Further investigations may be needed to fully determine the extent and characteristic of any landfill material impacted if this option were to be proposed for construction.

Indirect and Cumulative Impacts. Alternative 3 provides 100-year level of risk reduction for the landfill and no indirect or cumulative impacts are projected.

For alternative 5, while the alternative would safeguard urban areas in the vicinity from landfill impacts, the landfill would still be exposed to hurricane effects that might impact the natural terrain. Indirect impacts might include debris and hazardous materials that might be dispersed into nearby terrestrial and aquatic environments if large-scale flooding occurs. Cumulative impacts might include a tabulation of similar occurrences floodside of the HSDRRS.

CHAPTER 4 CUMULATIVE IMPACTS

NEPA requires a Federal agency to consider not only the direct and indirect impacts of a proposed action, but also the cumulative impacts of the action. A cumulative impact is 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 impacts can result from individually minor but collectively significant actions taking place over a period of time. These actions include on- or off-site projects conducted by government agencies, businesses, or individuals that are within the spatial and temporal boundaries of the actions that are considered in this IER

As indicated previously, in addition to this IER, the CEMVN is preparing a draft CED that will describe the work completed and the work remaining to be constructed for the Greater New Orleans HSDRRS. The purpose of the draft CED will be to document the work completed by the USACE on a system-wide scale. The draft CED will describe the integration of individual IERs into a systematic planning effort. Additionally, the draft CED will contain updated information for any IER that had incomplete or unavailable data at the time it was posted for public review. Overall cumulative impacts and future operations and maintenance requirements will also be included. The discussion provided below describes an overview of other actions, projects, and occurrences that may contribute to the cumulative impacts previously discussed.

4.1 STUDY METHOD AND BACKGROUND INFORMATION

Cumulative impact analyses require defining the area of impact, the range of activities that are “cumulative,” and a time period. The following items were guidelines for the cumulative impact analyses in this document (Klein and Kingsley 1994):

- Proximity – the proximity of the projects to each other either geographically or temporally.
- Effect on resources – the probability of other actions affecting the same environmental resource as the proposed action, especially systems susceptible to development pressure.
- Timeliness – the actions would likely occur within the selected time period.
- Progression – the proposed action and other similar actions could lead to other associated projects (land development) that could affect the same resources.
- Reasonableness – are future actions likely to occur and are they reasonably foreseeable.

Following Hurricanes Katrina and Rita, it was recognized that the existing levees, floodwalls, and other facilities comprising hurricane storm risk reduction were often not to authorized levels. This left areas vulnerable to hurricane-induced flooding for facilities that were already authorized and approved. CEMVN is currently implementing construction projects to raise hurricane risk reduction to authorized levels. Congress subsequently granted a series of supplemental appropriations acts to upgrade systems damaged by the Katrina and Rita storms, and additional authority was given to the USACE to construct system-wide 100-year HSDRRS projects throughout the metropolitan New Orleans area. All of these actions would contribute to potential cumulative impacts.

The HSDRRS is divided into three USACE authorized project areas: the West Bank and Vicinity (WBV), the Lake Pontchartrain and Vicinity (LPV), and the New Orleans to Venice (NOV) project areas. The Hero Canal project is in the WBV area. Cumulative effects of the system-wide improvements could be specific to the WBV or throughout the metropolitan area.

Natural systems impacts including those to wetlands, BLH forests, cypress-tupelo swamps, wildlife habitat, among others, have been studied in detail. Cumulative Impacts to some of the most important of these natural systems from CEMVN projects in the WBV and the LPV and NOV areas are identified in table 17. Other effects including noise, air quality, wildlife impacts, local traffic issues, and water quality are essentially temporary in nature and cumulative impacts would abate when construction ceases. Regional resources such as the transportation system, medical and other regional human-service facilities, residential and commercial displacements, and the effects on the economy are regional and effects throughout metropolitan New Orleans could be considered. While these cumulative effects are more difficult to quantify, long-range planners for these facilities would need to know trends and projections, when this is possible.

Details on all CEMVN project IERs will be reported in a CED for the entire HSDRRS. A summary of cumulative impacts will be included. Also, the CEMVN anticipates generating and implementing two large-scale IERs to provide for mitigation of impacts caused by the improvements to the HSDRRS for metropolitan New Orleans. These will be a compilation of the mitigation found in the individual IERs, including IER # 13.

Table 17: HSDRRS Impacts and Compensatory Mitigation to be Completed

IER	Parish		Non-wet	Non-wet	BLH	BLH	Swamp	Swamp	Marsh	Marsh	EFH
			acres	AAHUs	acres	AAHUs	acres	AAHUs	acres	AAHUs	acres
1 LPV, La Branch Wetlands Levee	St. Charles	Protected Side	-	-	-	-	137.05	73.99	-	-	-
		Flood Side	-	-	11.33	8.09	143.57	110.97	-	-	-
2 LPV, West Return Floodwall	St. Charles, Jefferson	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	33.40	9.00	-	-	-
3 LPV, Jefferson Lakefront Levee	Jefferson	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	26.00
4 LPV, Orleans Lakefront Levee	Orleans	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-
11 Tier 2 Borgne IHNC Protection	Orleans, St. Bernard	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	15.00	2.59	-	-	186.00	24.33	-
12 GIWW, Harvey, Algiers	Jefferson, Orleans, Plaquemines	Protected Side	-	-	251.70	177.3	-	-	-	-	-
		Flood Side	-	-	2.30	1.90	74.90	38.50	-	-	-
14 WBV, Westwego to Harvey Levee	Jefferson	Protected Side	-	-	45.00	30.00	-	-	-	-	-
		Flood Side	-	-	45.50	18.58	29.75	17.02	-	-	-
15 WBV, Lake Cataouatche Levee	Jefferson	Protected Side	-	-	23.50	6.13	-	-	-	-	-
		Flood Side	-	-	3.60	1.35	-	-	-	-	-
17 Company Canal Floodwall	Jefferson	Protected Side	-	-	5.50	2.69	-	-	-	-	-
		Flood Side	-	-	-	-	19.00	17.09	-	-	-
18 GFBM	Jefferson, Plaquemines, St. Charles	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-
18 GFBM	Orleans	Protected Side	226.00	68.79	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-
18 GFBM	St. Bernard	Protected Side	74.30	43.59	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-
19 CFBM	Hancock County, MS; Iberville, Orleans, Plaquemines, St. Bernard	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-

- Not applicable to the IER or number impacted is 0, Government Furnished Borrow Material (GFBM), Contractor Furnished Borrow Material (CFBM)

Table 17 (cont.): HSDRRS Impacts and Compensatory Mitigation to be Completed

IER	Parish		Non-wet	Non-wet	BLH	BLH	Swamp	Swamp	Marsh	Marsh	EFH
			<i>acres</i>	<i>AAHUs</i>	<i>acres</i>	<i>AAHUs</i>	<i>acres</i>	<i>AAHUs</i>	<i>acres</i>	<i>AAHUs</i>	<i>acres</i>
19 CFBM	Jefferson	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-
22 GFBM	Jefferson	Protected Side	157.76	89.64	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-
22 GFBM	Plaquemines	Protected Side	86.93	28.90	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-
23 CFBM	Hancock County, MS; Plaquemines, St. Bernard, St. Charles	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-
25 GFBM	Jefferson	Protected Side	78.30	40.90	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-
25 GFBM	Orleans	Protected Side	873.00	231.00	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-
25 GFBM	Plaquemines	Protected Side	17.70	12.10	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-
26 CFBM	Jefferson, Plaquemines, St. John the Baptist; Hancock County, MS	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	-
		Protected Side									
		Flood Side									
Totals		Protected Side	1473.09	514.92	325.7	216.12	137.05	73.99	-	-	00.00
		Flood Side	-	-	77.73	32.51	300.62	192.58	186.00	24.33	26.00
		Both	1473.09	514.92	403.43	248.63	437.67	266.57	-	-	26.00

- Not applicable to the IER or number impacted is 0, Government Furnished Borrow Material (GFBM), Contractor Furnished Borrow Material (CFBM)

4.2 PROJECTS WITH CUMULATIVE IMPACT POTENTIAL

4.2.1 IER Projects

Following is a summary of HSDRRS projects authorized to the 100-year level of risk reduction and other anticipated private and public projects in the WBV that have cumulative impact potential. Other projects that may have cumulative aspects are detailed in IERs for the LPV and NOV areas. With detailed environmental studies performed for these projects, the cumulative impact data will be well documented.

- *IER #12 – GIWW, Harvey, and Algiers Levees and Floodwalls, Jefferson, Orleans and Plaquemines Parish, LA.* Includes a sector gate across the GIWW and levee tie-ins to the adjacent Hero Canal levee to the east and the V-line levee to the west. Approximately 3 miles of levee and floodwall would be constructed, along with a closure complex across the GIWW, a pump station, fronting protection, and a bypass channel. Levees would generally be raised to 14 feet requiring 3.1 million cubic yards of earthen material and 310,000 tons of stone.
- *IER #14 - Harvey to Westwego Levee, Jefferson Parish, LA.* Includes improvements extending from the old Westwego Pumping Station to the line levee east of Vertex (near the Estelle Pump Station). It will incorporate approximately 12 miles of levee, construction of 7,013 LF of floodwalls, and modifications to three pump stations.
- *IER #15 - WBV, Lake Cataouatche Levee, Jefferson Parish, LA.* Includes improvements extending from Highway 90 to near Segnette State Park and incorporates approximately 8 miles of levee and fronting protection and modifications for one pump station.
- *IER #16 – Western Terminus Levee, Jefferson Parish, LA.* Includes improvements extending to connect to IER 17 near Segnette State Park. It will incorporate construction of a new levee reach to complete the western terminus of the WBV Hurricane Storm Damage Risk Reduction System.
- *IER #17 – Company Canal Floodwall, Jefferson Parish, LA.* Includes improvements extending from near the Company Canal to Segnette State Park, and incorporates approximately 133,442 LF of floodwalls and fronting protection and modifications to two pump stations. Exact alignments will be determined as part of the NEPA documentation process and the public coordination process.
- *IER #18 – Government Furnished Borrow Material, Jefferson, Orleans, Plaquemines, St. Charles, and St. Bernard Parishes, LA.* On 21 February 2008, the CEMVN signed a Decision Record on IER # 18. A total of 12 potential Government Furnished borrow areas were investigated and discussed in this IER. These borrow areas would provide approximately 26,511,000 cubic yards of suitable material.
- *IER #19 – Pre-Approved Contractor Furnished Borrow Material, Jefferson, Orleans, St. Bernard, Iberville, and Plaquemines Parishes, LA, and Hancock County, MS.* On 14 February 2008, the CEMVN signed a Decision Record on IER # 19. The document was prepared to evaluate the potential impacts associated with the actions taken by commercial contractors as a result of excavating borrow areas for use in construction of the HSDRRS.

- *IER #22 - Government Furnished Borrow Material, Jefferson and Plaquemines Parishes, LA.* On 30 May 2008, the CEMVN signed a Decision of Record on IER 22. The document was prepared to evaluate the potential impacts associated with the actions taken to excavate borrow material for use in construction of the HSDRRS.
- *IER #23 - Government Furnished Borrow Material, St. Bernard, St Charles, and Plaquemines Parishes, LA.* On 6 May 2008, the CEMVN signed a Decision of Record on IER 23. The document was prepared to evaluate the potential impacts associated with the actions taken to excavate borrow material for use in construction of the HSDRRS.
- *IER #25 - Government Furnished Borrow Material, Orleans, Jefferson, and Plaquemines Parishes, LA.* Four potential borrow areas could provide approximately 14 million cubic yards of suitable material for levee and floodwall projects.
- *IER #26 - Pre-Approved Contractor Furnished Borrow Material #3, Jefferson, Plaquemines and St. John Parishes, LA, and Hancock County, MS.* On 20 October 2008, the CEMVN signed a Decision of Record on IER 26. The document was prepared to evaluate the potential impacts associated with the actions taken to excavate borrow material for use in construction of the HSDRRS.

4.2.2 Additional Previously Authorized Projects - Jefferson Parish

The following projects had Federal authorization prior to Hurricane Katrina or are in the planning stage as recovery projects and are located in Jefferson Parish. (Some of these impacts may also be included in the IERs listed in Section 4.2.1.) Environmental data generated for these improvements would have a high reliability for inclusion in cumulative impacts analyses.

- **Harvey Canal Floodgate/Cousins Pump Station** - A 2,000 cfs pumping station has been constructed to direct interior drainage requirements to a point south of the gate. A gate has been constructed in the Harvey Canal to halt potential flood waters from encroaching into the canal north of Lapalco Boulevard. The pump station is scheduled for completion in April 2009.
- **Harvey Canal New Estelle to Cousins** - An earthen levee segment approximately 2.6 miles long will be built to + 9.5 feet.
- **Old to New Estelle Pump Station Floodwall** - The existing floodwall will be reconstructed as an earthen levee to an elevation of approximately 9.5 feet. Project completion is scheduled for May 2008.
- **V-Line East of the Vertex** - This earthen levee reach will be raised to the authorized elevation of 9.5-feet along this 4.0 mile segment.
- **Orleans Village to Highway 45** - This 3.4 mile earthen levee segment is being raised to the authorized elevation of 9.5 feet by adding about 1 to 1½ feet of earthen material from a levee district borrow pit.
- **Westwego Floodwall** - This 2,800 LF floodwall has been determined to be deficient and will be replaced or strengthened at a later date. Interim measures include a seepage cut-off wall at the two gas pipelines.

- Company Canal Floodwall - Approximately 1,600 LF of this concrete capped I-wall has been determined deficient. The project is currently under planning as a navigable gate and ancillary pump station to handle interior drainage.
- Bayou Segnette State Park - The flood risk reduction along this 1.5 mile segment of I-wall/earthen levee has experienced separation at the floodgate transitions. Interim risk reduction measures are currently underway that will strengthen the system until permanent corrections can be installed.
- Lake Cataouatche Pump Station - Approximately 3.9 miles of the earthen levee from the pump station to Bayou Segnette State Park is under construction to raise the elevation to authorized levels. The levee district performed emergency repair work in 2005 and the USACE awarded a new contract in 2007.
- Pump Station to Highway 90 - Approximately 2.7 miles of earthen levee from the pump station to Highway 90 is currently being raised to authorized elevations. Approximately 3,500 feet of earthen levee from Lake Cataouatche Station 160+00 to Highway 90 will be stabilized by the installation of a tandem culvert to adjacent to the levee.

4.2.3 Additional Previously Authorized Projects - Orleans Parish (West of Mississippi River)

The following project had Federal authorized prior to Hurricane Katrina and is located in Orleans Parish, south of the Mississippi River. Environmental data generated for this improvement would be well documented for inclusion in cumulative impacts analyses.

- Algiers Canal - Fronting Protection and Modifications - This project involves the installation of fronting protection for the pumping station and modification to the existing facilities upgrade them to the 100-year level of risk reduction. The fronting protection will include the installation of sluice gates and modifications will include the construction of higher floodwalls at the discharge point.

4.2.4 Additional Previously Authorized Projects - Plaquemines Parish

The following projects had Federal authorization prior to Hurricane Katrina or are in the planning stage as recovery projects and are located in Plaquemines Parish. The Plaquemines Parish includes long, narrow strips of land on both sides of the Mississippi River between New Orleans and the Gulf of Mexico. The parish has a total of 169 miles of levees and floodwalls and 18 pump stations. A total of 150 miles of levees and floodwalls were damaged along with 18 pump stations. Currently there are 26 authorized projects to repair and rebuild levees and floodwalls damaged by Hurricane Katrina in Plaquemines Parish. Environmental data generated for these improvements would be well documented for inclusion in cumulative impacts analyses.

These include:

- Fort Jackson Borrow Pit – Clearing and grubbing
- Walker Road Borrow Pit – Clearing and grubbing
- New Orleans to Venice East Bank - Levee repairs
- Mississippi River Levee East Bank – Levee repairs
- Mississippi River Levee, City Price to Port Sulphur – Levee repairs
- Mississippi River Levee, Port Sulphur to Fort Jackson – Levee and floodwall repairs
- Mississippi River Levee, Fort Jackson to Venice – Levee repairs
- New Orleans to Venice Levee, Port Sulphur Area – Levee enlargement
- New Orleans to Venice Levee, Empire/Buras Area – Levee enlargement

- New Orleans to Venice Levee, Empire Floodgate – Floodgate repairs
- New Orleans to Venice Back Levee – Levee repairs
- New Orleans to Venice Levee, Buras Area – Levee enlargement
- New Orleans to Venice Back Levee – Levee repairs
- New Orleans to Venice Levee, West Back Levee – Floodwall repairs
- New Orleans to Venice Levee, West Back Levee – Scour and miscellaneous repairs
- Mississippi River Levee, Woodland – Levee repairs
- New Orleans to Venice Levee, Port Sulphur Area – Levee enlargement
- Mississippi River Levee, West Pointe A La Hache – Levee repairs
- Mississippi River Levee – Slope pavement repair Recovery Projects

4.3 SUMMARY OF CUMULATIVE IMPACTS

This cumulative impact analysis is meant to establish a general magnitude and extent of cumulative impacts resulting from the proposed action in combination with other anticipated federal, state and local public and private actions over the next 50 years (years 2007 to 2057).

In addition to ongoing construction to raise levees and floodwalls to authorized elevations, the CEMVN has been authorized to provide system-wide 100-year level of risk reduction. This would entail enlarging and raising levees, elevating or replacing floodwalls, adding pump stations where necessary, adding or improving frontal protection at pump stations, and constructing other facilities. Marshes, wetlands and BLHs would be expected to show substantial cumulative impacts since much of the levee and floodwall work for the HSDRRS in the WBV could be expected in these land-use areas. To understand impacts, the USACE is generating six (6) IERs for levee, floodwall and other flood risk reduction in the WBV and 11 other IERs for flood risk reduction in other areas of metropolitan New Orleans. Also, six (6) IERs for new borrow pits for soil to build the levees are being prepared. The impacts in these IERs will be documented in a CED, including cumulative impacts to resources. Table 17 is a compilation to-date of key impacts. This table will be updated as potential impacts are assessed in forthcoming IERs.

To resolve impacts, including cumulative impacts, two mitigation reports will serve all of the anticipated USACE work, with replacement wetlands and other resources expected to be placed in locations that best serve as wildlife habitat, and where hurricane surge can be positively affected. Other projects with which the CEMVN is involved, in related flood risk reduction and coastal restoration planning efforts, includes the Louisiana Coastal Protection and Restoration (LACPR). This includes comprehensive planning for the protection and restoration for all of coastal Louisiana. The CEMVN, along with other Federal and state agencies, participates in coastal restoration projects through the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA). This Act includes specific prioritized restoration projects implemented coast-wide by the LDNR, Coastal Restoration Division in cooperation with Federal agencies.

The main hydrological impact from the HSDRRS on the WBV is that protected low-lying areas would experience reduced storm surge inundation, protecting life and property. Some temporary sedimentation could result during the construction period from fugitive sediments that escape the erosion and sedimentation control measures for each project. These are expected to be minor, and adjacent water quality should remain as it had been prior to project construction. No recognizable effect on salinity is expected as water levels will remain as they are today and no large-scale flow diversions are anticipated that might have cumulative impact associations.

The extent of private development that will add to cumulative impacts is difficult to anticipate due to the fluid investment situation brought about by Hurricane Katrina reclamation. Rebuilding efforts, including the region around the study area, are taking place throughout southeastern Louisiana, and along the Mississippi and Alabama Gulf Coast. In Louisiana, the

Insurance Information Institute has estimated that the total insured losses from Hurricane Katrina are estimated at \$25.3 billion (Insurance Information Institute 2007). Although it is unknown how much will affect the region of the proposed action, clearly a large-scale effort is underway in Plaquemines, Jefferson and Orleans Parishes. Replacement of insured losses will be a major component of regional growth over the next decade and beyond. Associated private sector impacts to resources will add to the cumulative effect of CEMVN projects.

Some cumulative adverse impacts to the human population in the WBV are not expected to be permanent. However, temporary impacts would be expected from noise and air pollution associated with construction activity, and from detours, road closures and increased traffic that could occur almost continuously for several years while HSDRRS improvements in the WBV are underway. It would be expected that temporary impacts would return to pre-construction conditions shortly after construction is completed on the HSDRRS. There are no long-term HTRW cumulative impacts anticipated, since any HTRW issues encountered in any public or private projects would be expected to be addressed and resolved as they are encountered. None are expected in the proposed action. Any impacts to utilities or community facilities would also be resolved upon completion of construction. Environmental justice issues are protected by federal statute and cumulative effects are not expected.

Conversely, the proposed action would have a cumulative beneficial impact on socioeconomic elements. The proposed action would provide additional hurricane surge and flood damage reduction, reducing the threat of inundation and providing a sense of security to residents. This provides a benefit to all residents, regardless of income or race, increasing the feeling of well-being, providing optimism, reducing insurance rates, and allowing for redevelopment and development of the study area and region. It is expected that the accumulated projects would provide long-term and sustainable cumulative benefits to the communities within the WBV by reducing the risk of damage within flood-prone areas and by generating economic growth that could attract displaced residents and new workers, and encourage repopulation within metropolitan New Orleans.

CHAPTER 5 SELECTION RATIONALE

On the basis of the assessment of potential environmental impacts presented in this IER and the evaluation of project feasibility based on the engineering effectiveness, economic efficiency, and environmental and social acceptability criteria, the proposed action is selected and is environmentally preferred. None of the proposed actions preclude any future enhancements to the HSDRRS

The CEQ regulations for implementing NEPA require that the ROD for an EIS specify "the alternative or alternatives which were considered to be environmentally preferable" (40 CFR §1505.2(b)). This alternative has generally been interpreted to be the alternative that would promote the national environmental policy as expressed in NEPA's Section 101 (CEQ's "Forty Most-Asked Questions," 46 Federal Register, 18026, March 23, 1981). Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources.

The planning objective of this proposed action is to provide 100-year level of risk reduction to the IER # 13 project area, part of the WBV hurricane and storm damage risk reduction system. Another planning objective is to minimize environmental impacts while providing improvements that generate the most satisfactory risk reduction to the residents, communities, commercial interest, and industrial enterprises in and near the study area. Alternative 1 was selected for construction because it simultaneously (1) minimizes impacts to residential, commercial, and

industrial properties with no disproportionate impacts to low income or minority communities; and (2) requires the least residential displacements along with alternative 3.

In order to clearly demonstrate the selection rationale for the IER 13 project, evaluations of the preferred alternative alignment along with the two other alternative alignments considered for construction are provided. Each alternative for the area south of the Hero Canal was evaluated with respect to risk and reliability, environmental impacts (both human and natural), time to complete construction and constructability, cost and operability, and maintenance.

Impacts north of the Hero Canal due to raising the existing Hero Canal Levee to the 100-year level of risk reduction are consistent among all alternatives and, therefore, not discussed here. Impacts discussed below are required to extend the eastern terminus of the Hero Canal Levee to tie-in with the existing MRL south of the Hero Canal.

Proposed Action – Alternative 1. A total of four alternative alignments have been carried through the environmental evaluation process. Alternative 1 was selected as the proposed action for construction considering environmental impacts, construction time, and impacts to Oakville and the landfill. This alignment would protect all of Oakville and the existing area of the Industrial Pipe Incorporated landfill area. However, the construction of the proposed action would enclose the existing landfill site, preventing future potential expansion of the landfill on the protected side of the levee. Only one residential displacement would occur, and that is located along the existing Hero Canal Levee; this displacement is common to all three alignments analyzed in detail. No barges larger than 52 feet would be able to pass through the 56-foot wide stoplog closure structure that would be constructed on the Hero Canal as part of this alternative. Alternative 1 has only minor impact to socioeconomic features, with no business impacts through acquisitions or from effects of floodwall, bridge or levee construction. Unlike alternative 5, Oakville residences would not be displaced. Also, the majority of alternative 1 was the proposed action approved for construction in the *West Bank of the Mississippi River in the Vicinity of New Orleans, La. (East of the Harvey Canal) EIS* (August 1994).

This alignment would not enclose as much wetland as would occur if alternative 3 were selected, and the impacts that would result would be on the edge of the wetlands and would not bisect pristine cypress swamp. (However, alternative 1 does impact more wetlands than alternative 5, which utilizes considerable landfill property free of wetland.) Alternative 1 also avoids many of the serious environmental, social, and geotechnical issues that would occur due to the implementation of alternative 5. All of the potential alignments have the same impacts at the LA 23 crossing.

Construction would take approximately 225 calendar days, which is less than that required for alternative 3 (837 days), and alternative 5. The planning objectives of providing 100-year level of risk reduction would be attained with construction of the proposed alternative.

Alternative 3. When Alignment 3 was analyzed for environmental impacts, it did not compare favorably with the alternative 1 alignment. This alignment would also move the levee further away from the existing landfill operation that poses threats of encroachments that could impact the risk reduction system. It is virtually the same alignment as alternative 1 except for the starting point west of the alternative 1 crossing of the Hero Canal, and its extension southwest into pristine cypress swamp. It would then turn east and run similarly to the alternative 1 alignment. It was not selected as the proposed action because of impacts to wetlands and wildlife. This alignment would impact 53 acres more wetland habitat and would have greater indirect effects to adjacent habitat through hydrological isolation and increased habitat fragmentation than alternative 1. Also, it was not selected based on engineering considerations including construction difficulty and potential settling/subsidence issues.

Alternative 5. This alignment was not chosen as the proposed action because of several potential impacts, including that it would dislocate 16 or more residences along West Oakville Street in Oakville, and because it would impact the Oakville community park. Other negative impacts for alignment 5 include affecting operation of the landfill during the construction period; unknown underground conditions could present challenges for construction; placing the alignment through an active industrial facility incurs risks from vehicular and equipment contact; and subsurface impacts could occur from surcharging due to landfill stockpiling. The T-wall construction in the landfill area could be demanding and the reliability could be in question, depending on geotechnical conditions specific to the T-wall footprint. It is the least environmentally damaging alternative to the natural environment.

Oakville is a community established shortly after the Civil War by freed slaves. With approximately 300 people, 100 of which are children, it is a tightly knit community, where many of its residents are related to one another. Displacement of 16 residential units would be a disruption of the fabric of this community and was one of the many factors considered.

Conclusions. In summary of the documentation provided in this IER regarding the process of developing this unique project, the USACE has determined that alternative 1 is the government's proposed action for this segment of the HSDRRS because this alternative would provide the best combination of least environmental impact, adequate construction timetable, and risk reduction to Oakville and the Industrial Pipe landfill (table 18 is a summary of the alternative alignment analysis). Though this alignment would generate substantial wetland impacts, these are on the edge of a cypress swamp and would not fragment vegetation or disrupt hydrology. The USACE would use construction methods that would minimize wetland impacts to the extent possible. In addition, the majority of alternative 1 was the proposed action approved for construction in the EIS (August 1994) for the WBVNO east of the Harvey Canal. Enlarging the Hero Canal levee, a parish levee extending south of the landfill, and the South Levee were identified in that EIS. Most of the wetland area impacted by alternative 1 is along the project's previously authorized alignment and the impacts associated with that alignment were described in the 1994 EIS.

The USACE further agrees to work in collaboration with the Interagency team to monitor the area to ensure mitigation is successful in reaching its targeted goal and to utilize adaptive management efforts to ensure the project feature augmentations assisting to minimize adverse impact within the affected wetlands. The total funding required for the entire HSDRRS, \$16.8 billion dollars, has been appropriated by Congress. This funding includes funds for the design and construction of all HSDRRS mitigation measures. The proposed action would have the greatest adaptability to accommodate an enlargement associated with any future system upgrades such as the LACPR.

While new ROW would be required, the proposed action would maximize use of existing ROW, be directly adjacent to existing ROW corridors, or be in areas previously authorized in the 1994 EIS. Utilizing existing ROW corridors limits habitat fragmentation and generally concentrates the areas of direct environmental impact, which in turn limits the potential indirect negative impacts that may occur. Wetland acreage would be directly impacted by the proposed action; however, there are no wetland areas that would be indirectly hydrologically isolated. There are no current problems that would prohibit the construction of the proposed action. The project is in compliance with the Coastal Zone Management Plan and 401 Certification requirements. The proposed action would provide the opportunity for future enhancement of the hurricane risk reduction system, should this be desired.

Table 18: Summary of Alternative Alignment Analysis, from Hero Canal levee to MRL

Factor	Alternative Alignment 1	Alternative Alignment 3	Alternative Alignment 5
<i>Construction Time</i>			
Construction Time	225 Calendar Days	837 Calendar Days	544 Calendar Days
<i>System Features</i>			
Hero Canal Closure Structure	Stoplog Gate	Stoplog Gate	No Hero Canal Gate
Railroad Gate	NOGCR Crossing	NOGCR Crossing	NOGCR Crossing
Vehicular Gates	At LA 23 Crossing	At LA 23 Crossing	LA 23 Crossing, at Landfill Road
Pump Station	70 cfs at Hero Canal 150 cfs at Oakville drainage canal	70 cfs at Hero Canal 150 cfs at Oakville drainage canal	150 at Oakville drainage canal
Levee Construction in Linear Feet	5,000 LF	6,900 LF	5,100 LF
Flood Wall Construction	500 LF	1,000 LF	2,200 LF
Length of Alignment	5,500 LF	7,900 LF	7,300 LF
<i>Key Environmental Issues</i>			
Wetlands Displaced	71 acres	78 acres	45 acres
Quality of Wetlands	High Quality	High Quality	High Quality
<i>Key Human Environmental Impacts</i>			
Residential Relocations	None	None	16 in Oakville
Community Park	None	None	Playground and Property
Oakville Community	Minimal Impact	Minimal Impact	Construction in Oakville
Vessels using Hero Canal	Restricted to 52 feet in width	Restricted to 52 feet in width	No restriction
Potential Cultural Resources	Site East of LA 23	Site East of LA 23	Site East of LA 23 Site in Oakville

(Note: Does not include Existing Hero Canal levee Improvements which are Similar for all alternatives. Distances and acreages are approximations.)

CHAPTER 6 COORDINATION AND CONSULTATION

6.1 PUBLIC INVOLVEMENT

Extensive public involvement has been sought in preparing this IER. Both formal presentations and question-and-answer sessions have been used to give and receive information. Local groups have been provided the opportunity to be heard. Among these are the Oakville Community Action Group, local parish representatives, other non-governmental groups, and private citizens. Non-governmental and focus group meetings were held to understand concerns and obtain local advice. Meetings occurred with owners of the Industrial Pipe landfill in order to assess potential impacts on the landfill, and with the owner of the Hero Canal to discuss operation of the canal. The landfill owner stated that alternative 1 did not provide for future expansion of the landfill and he would like that considered. Subsequently an alternative was added in order to accommodate this future landfill area.

Administrators of the NOGCR were contacted in order to facilitate the crossing of the railroad. The Louisiana Department of Transportation was included in planning for the LA 23 crossing. Numerous coordination meetings have taken place with the Southeast LA Flood Protection Authority - West, the LA Office of Coastal Protection and Restoration and Plaquemines Parish Government representatives. Meetings with Plaquemines Parish Council and the Parish President were used to receive their input.

The project analyzed in this IER was publicly disclosed and described in the Federal Register on 13 March 2007 and on the website www.nolaenvironmental.gov. Scoping for this project was initiated on 12 March 2007 through placing advertisements and public notices in *USA Today* and the New Orleans *Times-Picayune*. Nine public scoping meetings were held throughout the New Orleans metropolitan area to explain scope and process of the Alternative Arrangements for implementing NEPA between 27 March and 12 April 2007, after which a 30-day scoping period was open for public comment submission. Additionally, the CEMVN is hosting regular public meetings to keep the stakeholders advised of project status. The public is able to provide verbal comments during the meetings and written comments after each meeting in person, by mail, and via www.nolaenvironmental.gov.

The following public meetings were held to discuss scoping, planning, alternatives, project issues, scheduling, and borrow areas for IER 13 (the meetings often included information on other IERs):

- June 5, 2007 at Our Lady of Holy Cross College in New Orleans
- July 17, 2007 at the Belle Chasse Auditorium in Belle Chasse
- October 23, 2007 at the Belle Chasse Auditorium in Belle Chasse
- March 13, 2008 at Our Lady of Holy Cross College in New Orleans
- May 22, 2008 at Our Lady of Holy Cross College in New Orleans
- August 21, 2008 at Our Lady of Holy Cross College in New Orleans
- January 8, 2009 at St. Paul's Benevolent Association Hall in Oakville

June 5, 2007 at Our Lady of Holy Cross College in New Orleans. This meeting was used to inform the public (in the Hero Canal area) about the status of the hurricane risk reduction projects in the New Orleans area. It identified that Congress and the Administration have authorized the Corps to research, design and construct a 100-year hurricane risk reduction system in the New Orleans area. Over the next 12 months the Corps would be completing a series of environmental compliance documents as mandated in the alternative NEPA arrangements implemented in March 2007 by the Corps.

July 17, 2007 at the Belle Chasse Auditorium in Belle Chasse. This meeting was used to comprehensively identify the hurricane risk reduction system, the environmental report process, public comment start dates, borrow areas for the West Back and Vicinity projects, and details on the Hero Canal levee future construction.

October 23, 2007 at the Belle Chasse Auditorium in Belle Chasse. This public meeting identified the Hero Canal hurricane risk reduction project and four of the alternatives then under consideration.

March 13, 2008 at Our Lady of Holy Cross College in New Orleans. A detailed account of project progress was made and seven alternatives for the eastern end of the Hero Canal near the Oakville community were described. A long question and answer session followed. Questions from interest groups such as the Oakville Community Action Group and LA Environmental Action Group, were answered.

May 22, 2008 at Our Lady of Holy Cross College in New Orleans. This update meeting was attended by a member of the New Orleans City Council and two Plaquemines Parish councilmen, who were involved in the later question-and-answer session. Discussion ensued on the seven alternatives proposed for construction, identifying construction aspects of each. An extensive question and answer session followed.

August 21, 2008 at Our Lady of Holy Cross College in New Orleans. This meeting included presentations on IER 13 and borrow areas for the proposed project. Levee enlargement including floodside, straddle and protected side shifts were discussed. During this meeting, updates on ongoing risk reduction construction projects were given and descriptions of the proposed alternatives for IER 13 were provided, followed by a question-and-answer session.

January 8, 2009 at St. Paul's Benevolent Association Hall in Oakville. This meeting was used to identify the proposed action (alternative 1), the LA 23 crossing structures, the adjacent railroad crossing gate, and the results of cultural resources investigations. Connection to the proposed Plaquemines non-Federal levees and the borrow areas to serve the project were also presented, along with opportunities for public input by telephone, regular mail, or E-mail.

At these meetings, USACE presentations were made on the project and comments were received from the general public and local officials. The key concerns that were expressed during these meetings include the following:

- Including the Oakville community in the risk reduction plan.
- Scheduling of the IER 13 project work.
- Taking residences and businesses.
- Hazardous waste issues.
- Access across LA 23 and through the Floodwall.
- Navigation in the Hero Canal.
- Relationship between 100-year flood risk reduction and categories of storms (1-to-5) with respect to the level of risk reduction that needs to be provided.
- Criteria for 100-year flood risk reduction and recent storm data incorporation into the criteria and models.
- Risk reduction for other areas of the Delta.

In addition to the public meetings, local government and non-governmental stakeholders were identified:

- Congressional Delegation
- Louisiana Governor's Office
- Coastal Protection and Restoration Authority

- Louisiana Department of Transportation and Development
- New Orleans and Gulf Coast Railroad
- Plaquemines Parish and Parish President
- Oakville Neighborhood Groups
- Southeast Louisiana Flood Protection Authority - West
- New Orleans Mayor's Office
- US Coast Guard
- Federal Principles Group
- Navigation Industry
- Belle Chasse Naval Air Station
- Non-Governmental Organizations (NGO)

NGO meetings were held to give updates on IER #13 progress, milestones, and to receive input on alternative development, alternatives selection, and impacts of the proposed action. Meetings were held locally with Oakville neighborhood focus groups to understand concerns and impacts. NGO and Oakville neighborhood focus group meetings are continuing, as well as the stakeholder meetings in the CEMVN office.

The Hero Canal is used to move vessels to salvage operations and vessel storage. Coordination and collaboration with property owners and the navigation industry began over two years ago and continues today via regular stakeholder meetings, working group meetings, and telephone and e-mail correspondence to interested parties. These contacts have included major Hero Canal landowners, the Industrial Pipe Landfill owner, the United States Coast Guard (USCG), the GIWW user group, and other navigation interests.

Specific property owners who could substantially be impacted were contacted in order to discuss the project and receive their input. These include the owner of the Hero Canal who leases property along the canal to three salvage businesses. The proposed navigation opening of the gate in the Hero Canal was a discussion point. Two of the salvage businesses were satisfied with a 56-foot gate opening, but the other, owner of the Boomtown Belle which is docked in the eastern end of the canal, indicates he requires a 75-foot opening. All of the businesses would require canal access during construction. The operating plan for the gate construction and operation would be developed during construction with primary emphasis on hurricane risk reduction and consideration of the use of the Hero Canal.

The Industrial Pipe Landfill owner has indicated that he is operating his active landfill area on land identified as "Phase 1." The proposed action would protect this "Phase 1" land. However, the landowner's Phase 2 potential expansion would not be on the protected side of the levee under the proposed action.

Since this project includes unavoidable adverse impacts to jurisdictional wetlands under Section 404 of the Clean Water Act, a 404(b)(1) public notice will be made available to the public and other interested parties on the www.nolaenvironmental.gov website. The 404(b)(1) public notice will be advertised for the 30-day period concurrent to the public review of this IER #13.

This draft IER will be distributed for a 30-day public review and comment period. A public meeting specific to the proposed action will be held if requested by a stakeholder during the review period. Any comments received during this public meeting will be considered part of official record.

After the 30-day comment period for the IER, and a public hearing if requested, the CEMVN Commander will review all comments received during the review period and make a determination if they rise to the level of being substantive in nature. If comments are not

considered to be substantive, the CEMVN Commander will make a decision on the proposed action. This decision will be documented in an IER Decision Record.

If a comment(s) is determined to be substantive in nature, an Addendum to the IER would be prepared and published for an additional 30-day public review and comment period. After the expiration of the public comment period the CEMVN Commander would make a decision on the proposed action. The decision will be documented in an IER Decision Record.

6.2 AGENCY COORDINATION

Preparation of this IER has been coordinated with appropriate Congressional, Federal, state, and local interests, as well as environmental groups and other interested parties. An interagency environmental team was established for this project in which Federal and State agency staff played an integral part in the project planning and alternative analysis phases of the project (members of this team are listed in appendix C). This interagency environmental team was integrated with the CEMVN PDT to assist in the planning of this project and to complete a mitigation determination of the potential direct and indirect impacts of the proposed action. Monthly meetings with resource agencies were also held concerning this and other IER projects. The following agencies, as well as other interested parties, are receiving copies of this draft IER:

U.S. Department of the Interior, Fish and Wildlife Service
U.S. Department of the Interior, National Park Service
U.S. Environmental Protection Agency, Region VI
U.S. Department of Commerce, NOAA National Marine Fisheries Service
U.S. Natural Resources Conservation Service
Governor's Executive Assistant for Coastal Activities
Louisiana Department of Wildlife and Fisheries
Louisiana Department of Natural Resources, Coastal Management Division
Louisiana Department of Natural Resources, Coastal Restoration Division
Louisiana Department of Environmental Quality
Louisiana State Historic Preservation Officer

The LADEQ reviewed the proposed action. CEMVN received Water Quality Certification by letter dated 6 March 2009.

A Section 404(b)(1) evaluation is being released for public comment concurrently with this draft IER #13.

The USFWS reviewed the proposed action to see if it would affect any T&E species under its jurisdiction, or their critical habitat. The USFWS concurred with the CEMVN in a letter dated 9 March 2009 that the proposed action would not have adverse impacts on T&E species under its jurisdiction (appendix D).

Consultation with the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) was initiated to ensure compliance with Section 305 of the Magnuson-Stevens Fishery Conservation and Management Act and the Fish and Wildlife Coordination Act.

The LADNR reviewed the proposed action for consistency with the Louisiana Coastal Resource Program (LCRP) as required by Section 307 of the Coastal Zone Management Act of 1972, as amended. The proposed action was found to be consistent with the LCRP, as per a letter dated 13 March 2009 (appendix E).

Section 106 of the National Historic Preservation Act, as amended, requires consultation with the LASHPO and Native American tribes. Both a Phase I Survey, which identified results showing high potential for encountering cultural resources from the late 1800s, and Phase II testing of two archaeological sites (the River Site and Oakville Site) were completed. LASHPO reviewed the proposed action and determined that it would not adversely affect any cultural resources in a letter dated 30 March 2009 (appendix H). Eleven Federally recognized tribes that have an interest in the region were given the opportunity to review the proposed action.

The USFWS reviewed the proposed action in accordance with the Fish and Wildlife Coordination Act and prepared a draft Coordination Act Report for IER # 13 dated 20 March 2009. The USFWS also provided programmatic recommendations, in the “Draft Fish and Wildlife Coordination Act Report for the Individual Environmental Reports (IER), Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4)” in November 2007. The uncertainties in the design of several projects prohibited a complete evaluation of the impacts to fish and wildlife species and the reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended: 16 U.S.C. 661 et seq.). Therefore, a subsequent final supplemental report would be provided by the USFWS at a later date. The draft (programmatic) Fish and Wildlife Coordination Act Report for the IERs dated November 2007 can be accessed through the www.nolaenvironmental.gov website.

The CEMVN received a draft programmatic Coordination Act Report from the USFWS on 26 November 2007. The USFWS’ programmatic recommendations applicable to this project would be incorporated into project design studies to the extent practicable, consistent with engineering and public safety requirements. The USFWS’ programmatic recommendations, and the CEMVN’s response to them, are listed below:

Recommendation 1: To the greatest extent possible, situate flood risk reduction so that destruction of wetlands and non-wet BLHs are avoided or minimized.

CEMVN Response 1: The project will utilize the authorized level of risk reduction footprint and minimize impacts to wetlands.

Recommendation 2: Minimize enclosure of wetlands with new levee alignments. When enclosing wetlands is unavoidable, acquire non-development easements on those wetlands, or maintain hydrologic connections with adjacent, un-enclosed wetlands to minimize secondary impacts from development and hydrologic alteration.

CEMVN Response 2: Concur

Recommendation 3: Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design project features and timing of construction.

CEMVN Response 3: Concur

Recommendation 4: Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.

CEMVN Response 4: This recommendation will be considered in the design of the project to the greatest extent practicable.

Recommendation 5: The project's first Project Cooperation Agreement (or similar document) should include language that includes the responsibility of the local-cost sharer to provide operational, monitoring, and maintenance funds for mitigation features.

CEMVN Response 5: Corps Project Partnering Agreements (PPA) do not contain language mandating the availability of funds for specific project features, but require the non-Federal Sponsor to provide certification of sufficient funding for the entire project. Further, mitigation components are considered a feature of the entire project. The non-Federal Sponsor is responsible for Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) of all project features accordance with the OMRR&R manual that the Corps provides upon completion of the project.

Recommendation 6: Further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, or other similar documents) should be coordinated with the USFWS, NMFS, Louisiana Department of Wildlife and Fisheries (LDWF), U.S. EPA, and LDNR. The USFWS shall be provided an opportunity to review and submit recommendations on all the work addressed in those reports.

CEMVN Response 6: Concur.

Recommendation 7: The CEMVN should avoid impacts to public lands, if feasible. If not feasible, the CEMVN should establish and continue coordination with agencies managing public lands that may be impacted by a project feature until construction of that feature is complete and prior to any subsequent maintenance. Points of contacts for the agencies overseeing public lands potentially impacted by project features are: Kenneth Litzenberger, Project Leader for the USFWS' Southeast National Wildlife Refuges, and Jack Bohannon (985) 822-2000, Refuge Manager for the Bayou Sauvage National Wildlife Refuge (NWR), Office of State Parks contact Mr. John Lavin at 1-888-677-1400, National Park Service (NPS) contact Superintendent David Luchsinger, (504) 589-3882, extension 137 (david_luchsinger@nps.gov), or Chief of Resource Management David Muth (504) 589-3882, extension 128 (david_muth@nps.gov) and for the 404(c) area contact the previously mentioned NPS personnel and Ms. Barbara Keeler (214) 665-6698 with the USEPA.

CEMVN Response 7: Concur.

Recommendation 8: If applicable, a General Plan should be developed by the CEMVN, the USFWS, and the managing natural resource agency in accordance with Section 3(b) of the Fish and Wildlife Coordination Act (FWCA) for mitigation lands.

CEMVN Response 8: Concur.

Recommendation 9: If mitigation lands are purchased for inclusion within a NWR, those lands must meet certain requirements; a summary of some of those requirements is provided in appendix I (to the draft Fish and Wildlife Coordination Act Report.) Other land-managing natural resource agencies may have similar requirements that must be met prior to accepting mitigation lands; therefore, if they are proposed as a manager of a mitigation site, they should be contacted early in the planning phase regarding such requirements.

CEMVN Response 9: Concur.

Recommendation 10: If a proposed project feature is changed significantly or is not implemented within one year of the date of the Endangered Species Act consultation letter, the USFWS recommended that the Corps reinitiate coordination to ensure that the proposed project would not adversely affect any federally-listed threatened or endangered species or their habitat.

CEMVN Response 10: Concur.

Recommendation 11: In general, larger and more numerous openings in a risk reduction levee better maintain estuarine-dependent fishery migration. Therefore, as many openings as practicable, in number, size, and diversity of locations should be incorporated into project levees.

CEMVN Response 11: Concur

Recommendation 12: Flood risk reduction water control structures in any watercourse should maintain pre-project cross-sections in width and depth to the maximum extent practicable, especially structures located in tidal passes.

CEMVN Response 12: Concur

Recommendation 13: Flood risk reduction water control structures should remain completely open except during storm events. Management of those structures should be developed in coordination with the USFWS, NMFS, LDWF, and LDNR.

CEMVN Response 13: Concur

Recommendation 14: Any flood risk reduction water control structure sited in canals, bayous, or a navigation channel which does not maintain the pre-project cross-section should be designed and operated with multiple openings within the structure. This should include openings near both sides of the channel as well as an opening in the center of the channel that extends to the bottom.

CEMVN Response 14: Concur

Recommendation 15: The number and siting of openings in flood risk reduction levees should be optimized to minimize the migratory distance from the opening to enclosed wetland habitats.

CEMVN Response 15: Concur

Recommendation 16: Flood risk reduction structures within a waterway should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure invert to enhance organism passage. Various ramp designs should be considered.

CEMVN Response 16: Concur

Recommendation 17: To the maximum extent practicable, structures should be designed and/or selected and installed such that average flow velocities during peak flood or ebb tides do not exceed 2.6 ft per second. However, this may not necessarily be applicable to tidal passes or other similar major exchange points.

CEMVN Response 17: Concur

Recommendation 18: To the maximum extent practicable, culverts (round or box) should be designed, selected, and installed such that the invert elevation is equal to the existing water depth. The size of the culverts selected should maintain sufficient flow to prevent siltation.

CEMVN Response 18: Concur

Recommendation 19: Culverts should be installed in construction access roads unless otherwise recommended by the natural resource agencies. At a minimum, there should be one 24-inch culvert placed every 500 ft and one at natural stream crossings. If the depth of water crossings allow, larger-sized culverts should be used. Culvert spacing should be optimized on a case-by-case basis. A culvert may be necessary if the road is less than 500 ft long and an area would hydrologically be isolated without that culvert.

CEMVN Response 19: Concur

Recommendation 20: Water control structures should be designed to allow rapid opening in the absence of an offsite power source after a storm passes and water levels return to normal.

CEMVN Response 20: Concur

Recommendation 21: Levee alignments and water control structure alternatives should be selected to avoid the need for fishery organisms to pass through multiple structures (i.e., structures behind structures) to access an area.

CEMVN Response 21: Concur

Recommendation 22: Operational plans for water control structures should be developed to maximize the cross-sectional area open for as long as possible. Operations to maximize freshwater retention or redirect freshwater flows could be considered if hydraulic modeling demonstrates that is possible and such actions are recommended by the natural resource agencies.

CEMVN Response 22: Concur

Recommendation 23: CEMVN shall fully compensate for any unavoidable losses of wetland habitat or non-wet BLHs caused by project features.

CEMVN Response 23: Concur.

Recommendation 24: Acquisition, habitat development, maintenance and management of mitigation lands should be allocated as first-cost expenses of the project, and the local project-sponsor should be responsible for operational costs. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation, then the CEMVN shall provide the necessary funding to ensure mitigation obligations are met on behalf of the public interest.

CEMVN Response 24: Construction of the project features are cost shared between the Government and non-Federal sponsor. However, costs for operation, maintenance, repair, replacement, and rehabilitation will be the responsibility of the non-Federal sponsor.

Recommendation 25: Any proposed change in mitigation features or plans should be coordinated in advance with the USFWS, NMFS, LDWF, USEPA, and LDNR.

CEMVN Response 25: Mitigation for the impacts caused by this project will be coordinated through a mitigation IER. Any material changes to the mitigation plan in this IER would be coordinated in advance.

Recommendation 26: A report documenting the status of mitigation implementation and maintenance should be prepared every three years by the managing agency and provided to the CEMVN, USFWS, NMFS, USEPA, LDNR, and LDWF. That report should also describe future management activities, and identify any proposed changes to the existing management plan.

CEMVN Response 26: Concur.

The CEMVN received a draft Coordination Act Report from the USFWS for IER # 13 on 20 March 2009 (appendix I). The USFWS' recommendations applicable to this project would be incorporated into project design studies to the extent practicable, consistent with engineering and public safety requirements. The USFWS' project specific recommendations, and the CEMVN's response to them, are listed below:

Recommendation 1: To the greatest extent possible, design and position flood protection features so that destruction of wetlands and non-wet BLHs are avoided or minimized.

CEMVN Response 1: The CEMVN will take all measures to ensure all risk reduction features are constructed within pre-existing ROW before acquiring additional ROW within adjacent wetlands and non-wet BLHs. In addition, the engineering and design of the new construction risk reduction components within the proposed action will avoid or minimize wetland impacts.

Recommendation 2: The proposed Oakville pump station should be redesigned to pump stormwater into the adjacent forested wetlands as a stormwater treatment measure and to enhance those degraded wetlands.

CEMVN Response 2: Concur.

Recommendation 3: The USACE shall fully compensate for any unavoidable losses of wet or non-wet BLH habitat (18.39 AAHUs) and swamp habitat (28.27 AAHUs) caused by project features.

CEMVN Response 3: The CEMVN will fully mitigate for any unavoidable losses of wetlands or non-wet BLHs incurred due to the proposed action.

Recommendation 4: Minimize enclosure of wetlands with new levee alignments. When enclosing wetlands is unavoidable, acquire non-development easements on those wetlands, or maintain hydrologic connections with adjacent, un-enclosed wetlands to minimize secondary impacts from development and hydrologic alteration.

CEMVN Response 4: Acknowledged. The CEMVN selected against alternative 3 to avoid enclosing approximately 53 acres of BLH and cypress swamp wetlands.

Recommendation 5: If a proposed project feature is changed significantly or is not implemented within one year of the date of the March 10, 2009 ESA consultation letter, we recommend that the USACE reinstate coordination with each office to ensure that the proposed project would not adversely affect any Federally listed threatened or endangered species or their habitat.

CEMVN Response 5: Concur. The USACE has reinstated coordination and received an updated consultation letter dated 9 March 2009.

Recommendation 6: Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design of project features and timing of construction. A qualified biologist should inspect the proposed work site for the presence of undocumented wading bird nesting colonies and bald eagles during the nesting season (i.e., 16 February through 31 October for wading bird nesting colonies, and October through mid-May for bald eagles).

CEMVN Response 6: Concur.

Recommendation 7: To minimize disturbance to colonies containing nesting wading birds (i.e., herons, egrets, night-herons, ibis, and roseate spoonbills), anhingas, and/or cormorants, all activity occurring within 1,000 ft of a rookery should be restricted to the non-nesting period (i.e., 1 September through 15 February, exact dates may vary within this window depending on species present). In addition, we recommend that on-site contract

personnel be informed of the need to identify colonial nesting birds and their nests, and should avoid affecting them during the breeding season.

CEMVN Response 7: Concur.

Recommendation 8: If a bald eagle nest is discovered within or adjacent to the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: <http://www.USFWS.gov/southeast/es/baldeagle>. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary and those results should be forwarded to this office.

CEMVN Response 8: Concur.

Recommendation 9: Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.

CEMVN Response 9: Concur.

Recommendation 10: Acquisition, habitat development, maintenance and management of mitigation lands should be allocated as first-cost expenses of the project, and the local project-sponsor should be responsible for operational costs. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation, then the USACE should provide the necessary funding to ensure mitigation obligations are met on behalf of the public interest.

CEMVN Response 10: Construction of the project features are cost shared between the Government and the non-Federal sponsor. However, costs for operation, maintenance, repair, replacement, and rehabilitation will be the responsibility of the non-Federal sponsor.

Recommendation 11: Further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, or other similar documents) should be coordinated with the Service, NMFS, LADWF, EPA, NPS, and LADNR. The Service shall be provided an opportunity to review and submit recommendations on the all work addressed in those reports.

CEMVN Response 11: Concur.

Recommendation 12: If mitigation lands are purchased for inclusion within Federally or State managed lands, those lands must meet certain requirements; therefore the land manager of that management area should be contacted early in the planning phase regarding such requirements.

CEMVN Response 12: Concur.

Recommendation 13: If applicable, a General Plan should be developed by the USACE, the Service, and the managing natural resource agency in accordance with Section 3(b) of the FWCA for mitigation lands.

CEMVN Response 13: Concur.

Recommendation 14: Flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable.

CEMVN Response 14: Concur.

Recommendation 15: Any flood protection water control structure sited in a canal, bayou, or navigation channel that does not maintain the pre-project cross section should be designed and operated with multiple openings within the structure. This should include openings near both sides of the channel as well as an opening in the center of the channel that extends to the bottom.

CEMVN Response 15: The CEMVN proposes to construct a closure structure in the Hero Canal. This complex would include a 56-ft stoplog gate, and a 70-150 cfs pump station. Hydrologic modeling, navigation simulation modeling, and engineering design efforts are still underway to determine the exact specification of the closure. This comment will be considered during the final engineering and design efforts.

Recommendation 16: Flood protection water control structures should remain completely open except during storm events, unless otherwise determined by the natural resource agencies.

CEMVN Response 16: Concur. This comment will be considered during the final engineering and design efforts for the 56-ft stoplog closure, and pump station to be constructed in Hero Canal.

Recommendation 17: Flood protection structures within a waterway should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure invert to enhance organism passage. Various

ramp designs should be considered, and coordination should continue with the natural resource agencies to ensure fish passage features are incorporated to the fullest extent practicable.

CEMVN Response 17: Concur. This comment will be considered during the final engineering and design efforts for the 56-ft stoplog closure, and pump station to be constructed in Hero Canal.

Recommendation 18: A report documenting the status of mitigation implementation and maintenance should be prepared every three years by the managing agency and provided to the USACE, the Service, NMFS, EPA, LADNR, and LADWF. That report should also describe future management activities, and identify any proposed changes to the existing management plan.

CEMVN Response 18: Concur.

CHAPTER 7 MITIGATION

Mitigation for unavoidable impacts to the human and natural environment described in this and other IERs will be addressed in separate mitigation IERs. The CEMVN has partnered with Federal and state resource agencies to form an interagency mitigation team that is working to assess and verify these impacts, and to look for potential mitigation sites in the appropriate hydrologic basin. This effort is occurring concurrently with the IER planning process in an effort to complete mitigation work and construct mitigation projects expeditiously. As with the planning process of all other IERs, the public will have the opportunity to give input about the proposed work. These mitigation IERs will, as described in section 1 of this IER, be available for a 30-day public review and comment period.

Quantitative analysis utilizing existing methodologies for water resource planning has identified the acreages and habitat type for the direct or indirect impacts of implementing the proposed action. Any mitigation needs will be detailed by the proposed action's design-build project delivery contractor and will be reported in the NEPA compliance document covering all WBV IERs.

Mitigation would be required for impacted wetland acreage. The proposed action would impact a total of 45.8 acres of wetland requiring mitigation. Approximately 36.6 acres of impacted wetland acreage is forested. Impacted forested wetland acreage would require in-kind mitigation.

Interagency field trips were conducted to obtain raw field data for the IER # 13 project on 26 July 2006, 27 July 2007, 8 August 2007, and 3 March 2008. The methodology being utilized in determining appropriate mitigation, which would include no net loss of wetland values, is the interagency Wetland Value Assessment (WVA). The WVA computes the Average Annualized Habitat Units (AAHUs) lost by project implementation. The AAHUs (table 6) are converted to acres needed to meet the nation's no-net-loss of wetlands policy once the mitigation site is selected. Approximately 10.59 AAHUs of BLHs, 7.80 AAHUs of altered BLHs, and 28.28

AAHUs of cypress-tupelo swamp have been computed by the interagency team as appropriate mitigation requirements for IER # 13.

Distinct habitats are represented within the boundaries of proposed construction impacts within IER # 13, namely BLH forests, and cypress-tupelo swamps. Proposed actions within the existing ROW avoids and minimizes wetland impacts to the greatest extent practicable. Existing ROW areas are generally previously impacted, mowed, and maintained grassy areas that provide minimal food or shelter for fish and wildlife resources. Because the 100-year level of risk reduction would also require new construction, some impacts to BLHs and swamp areas are unavoidable. The proposed levee and floodwall construction project would require a footprint that provides engineering effectiveness and safety.

A complementary comprehensive mitigation IER or IERs will be prepared documenting and compiling these unavoidable impacts and those for all other proposed actions within the HSDRRS that are being analyzed through other IERs. Mitigation planning is being carried out for groups of IERs, rather than within each IER, so that large mitigation efforts could be taken rather than several smaller efforts, increasing the relative economic and ecological benefits of the mitigation effort.

This forthcoming mitigation IER will implement compensatory mitigation as early as possible. All mitigation activities will be consistent with standards and policies established in appropriate Federal and state laws, and CEMVN policies and regulations.

Table 17 shows the cumulative compensatory mitigation that will be completed by the CEMVN. This table will be updated as potential impacts are assessed in forthcoming IERs.

CHAPTER 8 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Construction of the proposed action would not commence until the proposed action achieves environmental compliance with all applicable laws and regulations, as described below.

Environmental compliance for the proposed action will be achieved upon coordination of this IER with appropriate agencies, organizations, and individuals for their review and comments; USFWS confirmation that the proposed action would not be likely to adversely affect any T&E species, or completion of Endangered Species Act Section 7 consultation (appendix D); LDNR concurrence with the determination that the proposed action is consistent, to the maximum extent practicable, with the LCRP (appendix E); coordination with the LASHPO (appendix H); receipt and acceptance or resolution of all Fish and Wildlife Coordination Act recommendations (appendix I); and receipt and acceptance or resolution of all (Louisiana Department of Environmental Quality) LDEQ comments on the water quality and air quality impact analysis documented in the IER (appendix F and G).

Executive Order (EO) 11988. EO 11988, Floodplain Management, addresses minimizing or avoiding adverse impacts associated with the base floodplain unless there are no practicable alternatives. It also involves giving public notice of proposed actions that may affect the base floodplain. The proposed action would not accelerate development of the floodplain for the following reasons: development of the study area is more closely related to access routes and the need for affordable housing space than flooding potential and conditions conducive for development were established initially when the area was leveed and forced drainage was initiated in the middle 1960s.

Executive Order 11990. EO 11990, Protection of Wetlands, has been important in project planning. It is acknowledged that a portion of the area enclosed by the existing levee consists of wetlands. However, by following the existing alignments and working in developed areas, there would be minimal direct adverse impacts to wetlands for this project. Any increased size of the interior borrow/drainage canal as a result of levee enlargement would result in increased capacity; however, this would have essentially no indirect effect on the rate of drainage from the basin.

Executive Order 12898. EO 12898 of February 1994 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*) makes provisions such that each Federal agency "identifies and addresses disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations." The community of Oakville is a minority and/or low income neighborhood. All of the alternatives affect the community to some extent, with the proposed action exhibiting minimal effect. No residential or commercial structures in Oakville would be impacted. Only temporary air and noise impacts during construction would occur. These would abate after construction is complete. In return, the proposed action would provide Oakville with 100-year level of risk reduction from hurricane surge flooding. There would be no high or disproportionate impacts to minority or low income groups from the proposed action.

Consistency with Coastal Zone Management (CZM) Program. CEMVN has determined that construction and maintenance of 100-year level of risk reduction along the Hero Canal levee Project is consistent, to the maximum extent practicable, with the guidelines of the State of Louisiana's approved Coastal Zone Management Program. A CZM consistency determination was dated 13 March 2009. The consistency letter of approval from the LDNR completes the consistency requirements.

Clean Air Act. The original 1970 Clean Air Act (CAA) authorized USEPA to establish NAAQS to limit levels of pollutants in the air. The USEPA has promulgated NAAQS for six criterion pollutants: sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), ozone, lead, and particulate matter (PM-10). All areas of the United States must maintain ambient levels of these pollutants below the ceilings established by the NAAQS; any area that does not meet these standards is considered a "non-attainment" area (NAA). The 1990 Amendments require that the boundaries of serious, severe, or extreme ozone or CO non-attainment areas located within Metropolitan Statistical Areas (MSAs) or Consolidated Metropolitan Statistical Areas (CMSAs) be expanded to include the entire MSA or CMSA unless the governor makes certain findings and the Administrator of the USEPA concurs. Consequently, all urban counties included in an affected MSA or CMSA, regardless of their attainment status, would become part of the NAA. The project is located in Plaquemines Parish, which is classified as an attainment area; therefore NAAQS are not applicable to this project.

Clean Water Act. The Clean Water Act (CWA; 33 U.S.C. 1251-1387; Act of June 30, 1972, as amended) is a very broad statute with the goal of maintaining and restoring waters of the United States. The CWA authorizes water quality and pollution research, provides grants for sewage treatment facilities, sets pollution discharge and water quality standards, addresses oil and hazardous substances liability, and establishes permit programs for water quality, point source pollutant discharges, ocean pollution discharges, and dredging or filling of wetlands. The intent of the CWA's §404 program and its §404(b)(1) "Guidelines" is to prevent destruction of aquatic ecosystems including wetlands, unless the action would not individually or cumulatively adversely affect the ecosystem.

Section 404(b)(1) guidelines were used to evaluate the discharge of dredged or fill material for adverse impacts to the aquatic ecosystem. The following actions would be taken to minimize the potential for adverse environmental impacts. The existing levee alignment would be followed in

construction of the proposed levee. All sloped areas would be seeded. Non-forested wetlands, consisting of mown levee grasses or grazed pasture, were not mitigated because of their low value to fish and wildlife resources. The proposed project complies with the requirements of the guidelines. The LDEQ Water Quality Certification letter, WQC 090128-01, dated 6 March 2009, completes the certification process.

Endangered Species Act. The Endangered Species Act (16 U.S.C. 1531-1543; Pub. L. 93-205, as amended) was enacted in 1973 for the purpose of providing for the conservation of species which are in danger of extinction throughout all or a significant portion of their range. "Species" is defined by the Endangered Species Act to mean either a species, a subspecies, or, for vertebrates (*i.e.*, fish, reptiles, mammals, etc.) only, a distinct population. No threatened or endangered species or their critical habitat would be impacted by the proposed action. The USFWS concurred with our determination in their letter dated 9 March 2009.

Fish and Wildlife Coordination Act. The Fish and Wildlife Coordination Act (16 U.S.C. 661-666c; Act of March 10, 1934, as amended) requires that wildlife, including fish, receive equal consideration and be coordinated with other aspects of water resource development. This is accomplished by requiring consultation with the USFWS and NMFS whenever modifications are proposed to a body of water and a Federal permit or license is required. This consultation determines the possible harm to fish and wildlife resources, as well as the measures that are needed to prevent the damage to and loss of these resources and to develop and improve the resources, in connection with water resource development. NMFS submits comments and recommendations to Federal licensing and permitting agencies and to Federal agencies conducting construction projects on the potential harm to living marine resources caused by the proposed water development projects, and submits recommendations to prevent harm. The USFWS provided the "Draft Fish and Wildlife Coordination Act Report for the Individual Environmental Reports (IER), Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4)" in November 2007. To fulfill the responsibilities of the Fish and Wildlife Coordination Act, the USFWS will provide a post-authorization final supplemental 2(b) report to the draft programmatic report. A draft project-specific Coordination Act Report was received from USFWS by letter dated 20 March 2009. A final report would be prepared after the 30-day public review period and all comments regarding USFWS trust resources have been resolved, and before a final IER has been completed.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act of 1918 (MBTA) is the domestic law that affirms, or implements, the United States' commitment to four international conventions with Canada, Japan, Mexico, and Russia for the protection of shared migratory bird resources. The MBTA governs the taking, killing, possessing, transporting, and importing of migratory birds, their eggs, parts, and nests. The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent over-utilization. Section 704 of the MBTA states that the Secretary of the Interior is authorized and directed to determine if, and by what means, the take of migratory birds should be allowed and to adopt suitable regulations permitting and governing take. The MBTA prohibits the take, possession, import, export, transport, sale, purchase, barter, or offer for sale, purchase or barter, of any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit (50 CFR §21.11). The USFWS addressed compliance with this Act in the "Draft Fish and Wildlife Coordination Act Report for the Individual Environmental Reports (IER), Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4)" in November 2007. To fulfill the responsibilities of the Fish and Wildlife Coordination Act, the USFWS will provide a post-authorization final supplemental 2(b) report to the draft programmatic report.

National Environmental Policy Act. The National Environmental Policy Act (NEPA; 42 U.S.C. 4321-4347; Pub. L. 91-190, as amended) requires Federal agencies to analyze the potential effects of a proposed Federal action that would significantly affect historical, cultural, or natural aspects of the environment. It specifically requires agencies to use a systematic, interdisciplinary approach in planning and decision-making, to insure that environmental values may be given appropriate consideration, and to provide detailed statements on the environmental impacts of proposed actions including: (1) any adverse impacts; (2) alternatives to the proposed action; and (3) the relationship between short-term uses and long-term productivity. The agencies use the results of this analysis in their decision-making process. The preparation of this IER is a part of complying with NEPA.

National Historic Preservation Act. Congress established the most comprehensive national policy on historic preservation with the passage of the National Historic Preservation Act of 1966 (NHPA). In this Act, historic preservation was defined to include "the protection, rehabilitation, restoration and reconstruction of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, or culture." The Act led to the creation of the National Register of Historic Places, a file of cultural resources of national, regional, state, and local significance. The act also established the Advisory Council on Historic Preservation (the Council), an independent Federal agency responsible for administering the protective provisions of the act. The major provisions of the NHPA are Sections 106 and 110. Both sections aim to ensure that historic properties are appropriately considered in planning Federal initiatives and actions. Section 106 is a specific, issue-related mandate to which Federal agencies must adhere. It is a reactive mechanism that is driven by a Federal action. Section 110, in contrast, sets out broad Federal agency responsibilities with respect to historic properties. It is a proactive mechanism with emphasis on ongoing management of historic preservation sites and activities at Federal facilities. Both a Phase I survey and Phase II testing were completed for this project. Coordination of this project with the LASHPO fulfills the requirements to comply with the NHPA, and the LASHPO letter dated 30 March 2009 concludes this process.

CHAPTER 9 CONCLUSION

9.1 INTERIM DECISION

The primary elements of the proposed action consist of:

1. Expansion of the existing Hero Canal levee involving a protected-side shift from the GIWW to just west of the Industrial Pipe landfill to provide 100-year level of risk reduction.
2. Construction of a 56-foot wide stoplog gate, a 70 cfs pump station, two monoliths for support, and adjacent T-wall to cross the Hero Canal just west of the landfill.
3. Construction of approximately 2,760 LF of levee extending first south, then east adjacent to the landfill.
4. Construction of approximately 400 LF of earthen levee south to the existing non-Federal levee.
5. A new 150 cfs pump station at the Oakville drainage canal.
6. Reconstruction of approximately 1,770 LF of existing levee east of the Oakville drainage canal pump station to near LA 23.

7. Construction of a vehicular floodgate(s) across LA 23, a railroad floodgate across the adjacent railroad track, with T-wall connectors and T-wall transition to levee.
8. Construction of new earthen levee (approximately 550 LF) to the MRL.
9. Construction of a bypass road extending from LA 23 south of the vehicular gates, to the Mississippi River Levee and proceeding on top of that levee, then returning to LA 23 north of the gates. This is to provide for hurricane emergency evacuation when the gates are closed.

The CEMVN has assessed the environmental impacts of the proposed action and has determined that the proposed action would have the following impacts:

1. Wetlands: Permanent impact to 71 acres of wetlands would be projected to occur, including 32 acres of BLH forest (19 acres high quality Tidal BLH, 13 acres impounded BLH).
2. Non-Wetland Resources/Upland Resources: There are no non-wetland or upland resources occurring within the study area.
3. Prime Farmland: A total of 6.4 acres of prime farmland soils would be impacted for levee and ROW expansion.
4. Threatened and Endangered (T&E) Species: There are no known T&E species in the study area according to the USFWS.
5. Fisheries: Minor and temporary localized impacts to fisheries and aquatic organisms within the Hero Canal would be likely to occur during the construction phase.
6. Wildlife: Minor and temporary localized impacts to wildlife would be likely to occur due to habitat loss including BLH wetland habitat.
7. Cultural Resources: The proposed action would not impact historical or archeological resources.
8. Recreational Resources: No recreational land would be lost, but temporary sediment loads could be felt in the Hero Canal during construction affecting some recreational endeavors.
9. Air Quality: Minor and temporary air quality impacts would occur during construction.
10. Water Quality: Except for temporary sediment impacts during construction, no impacts to water quality would be anticipated.
11. Noise: Minor and temporary localized impacts to ambient noise would occur during the construction phase due to heavy equipment use and transport of materials.
12. Aesthetics: Permanent impacts to aesthetics and viewsheds would occur due to gates and other project elements near the LA 23 crossing.
13. Socio-economics: One house adjacent to the Hero Canal levee would be displaced, requiring relocation of its inhabitants to new lodging. No vessels larger than 52 feet would be able to pass through the 56-foot wide stoplog closure structure that would be constructed on the Hero Canal.

14. Environmental Justice: No disproportionate impacts to low income or minority populations were identified.
15. Hazardous, Toxic and Radioactive Waste. No direct impacts would be expected based on a Phase I ESA.
16. Cumulative Impacts. Cumulative impacts would be primarily positive.

9.2 PREPARED BY

The point of contact and responsible manager for the preparation of IER 13 is Getrisc Coulson, CEMVN. The address of the preparers is: U.S. Army Corps of Engineers, New Orleans District; Planning, Programs, and Project Management Division, CEMVN-PM; P.O. Box 60267; New Orleans, Louisiana 70160-0267.

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CHAPTER 10 APPENDICES

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