Mississippi River, Baton Rouge to the Gulf of Mexico
Mississippi River-Gulf Outlet, Louisiana,
New Industrial Canal Lock and Connecting Channels Project

Draft General Reevaluation Report and
Draft Supplemental Environmental Impact Statement

US Army Corps
of Engineers®

U.S. Army Corps of Engineers
Mississippi Valley Division
New Orleans District
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ABSTRACT. This draft general reevaluation report (GRR) documents the significant changes that have occurred in the study area since the feasibility study-level Evaluation Report and environmental impact statement (EIS) were prepared in 1997, and proposes a new lock replacement project. The recommended plan in the 1997 Evaluation Report was the locally preferred plan of the non-Federal sponsor at that time (the Port of New Orleans), which was a new 1,200 feet long by 110 feet wide by 36 feet deep navigation lock located within the Industrial Canal, also known as the Inner Harbor Navigation Canal or IHNC, between the Claiborne and Florida Avenue Bridges in Orleans Parish. Initial construction activities for the locally preferred plan were underway in August 2005 when Hurricane Katrina caused catastrophic impacts within the study area. In the aftermath of Hurricane Katrina, a portion of the Mississippi River-Gulf Outlet (MR-GO) was deauthorized and a physical rock barrier was constructed in 2009 effectively eliminating any deep draft navigation in the deauthorized portion of the MR-GO. With the loss of deep draft navigation on the MR-GO, the locally preferred plan to construct a deep draft navigation lock was no longer considered a viable option, and the Port of New Orleans withdrew as the non-Federal sponsor for the deep-draft increment of a new lock. Therefore, the deep draft navigation lock alternative is no longer being considered as there is no non-Federal sponsor to cost-share in its construction. Also during this time period, a legal challenge resulted in a Federal court ruling that the USACE was not compliant with the National Environmental Policy Act and Clean Water Act generally because a shallow draft lock alternative had not been evaluated in a supplemental EIS that was prepared in 2009. Before any construction can begin on a new lock, a supplemental EIS and record of decision will need to be completed.

This draft GRR evaluates four shallow draft lock configurations in detail, as well as a no-action alternative. Previous studies have determined that the only feasible location for constructing a new lock is within the IHNC at a site between the Claiborne Avenue and Florida Avenue Bridges. No new information has been found to alter this determination. The Tentatively Selected Plan (TSP), which is also the National Economic Development plan, is construction of a 900 feet long by 110 feet wide by -22 feet (North American Vertical Datum 1988) lock. The TSP includes construction of a cast-in-place concrete lock; replacement of the St. Claude Avenue bridge with a new, low-level double bascule bridge; construction of a temporary by-pass bridge at St. Claude Avenue that will provide vehicular use of that canal crossing during construction of the new bridge; by-pass channels around the new lock construction site and the existing lock during its demolition; disposal of dredged material suitable for aquatic disposal into the Mississippi River and disposal of material that is not suitable for aquatic disposal in an approved solid waste landfill site outside of the project area; extension of the Mississippi River flood protection along the banks of the IHNC to the site of the new lock; and implementation of a community impact mitigation plan to offset and or compensate for impacts the project will have on the surrounding communities. Authorization for a community impact mitigation plan, to be implemented in conjunction with the replacement of the lock, was provided in the Water Resources Development Act of 1996. This Act required that a comprehensive plan be implemented that will mitigate or compensate or both for the direct and indirect social and cultural impacts that this project will have on the affected areas. A community impact mitigation plan, which was developed with recommendations of the Neighborhood Working Group, was an integral component of the recommended plan in the 1997 Evaluation Report. Specific features of the mitigation plan, as described in previous documents, are subject to revision, based on local community input that will be obtained during public review of this draft report and subsequent meetings and discussions. A revised mitigation plan will be included in the final version of this report/SEIS.

Comments: The comment period for the draft SEIS ends on February 20, 2017. Please send comments to the District Engineer, 7400 Leake Avenue, New Orleans, LA 70118. Comments may also be sent to the District Engineer through Mr. Mark Lahare, via email at Mark.H.Lahare@usace.army.mil. For further information please contact Mr. Lahare, via e-mail or telephone at (504) 862-1344.

Executive Summary

The U.S. Army Corps of Engineers (USACE) has prepared this draft integrated General Reevaluation Report (GRR) and Supplemental Environmental Impact Statement (SEIS) for the Mississippi River, Baton Rouge to the Gulf of Mexico Mississippi River-Gulf Outlet, Louisiana, New Industrial Canal Lock and Connecting Channels Project. Throughout the lengthy history of this Project, it had been sometimes referred to as the "Inner Harbor Navigation Canal (Industrial Canal) Lock Replacement Project". The Tentatively Selected Plan (TSP) is to replace the existing Industrial Canal Lock, also referred to as the Inner Harbor Navigation Canal or IHNC Lock, with a 900 feet long by 110 feet wide by -22 feet North American Vertical Datum (NAVD88) navigation lock. The depth of the replacement lock is designed to safely and efficiently accommodate shallow-draft vessels plying the Gulf Intracoastal Waterway (GIWW), along with a limited number of deep-draft vessels currently using the IHNC that could safely navigate the new sill depth of 22 feet. Since the project is designed to accommodate shallow-draft, inland navigation, the cost of the project would be allocated between an appropriation of monies from the General Fund of the United States Treasury and an appropriation of monies from the Inland Waterways Trust Fund. In accordance with the requirements of the Water Resources Development Act of 1986 (WRDA 1986), as amended, implementation of the TSP does not require the cost-sharing participation of non-Federal sponsor (NFS). This GRR briefly and concisely presents the results of prior studies as well as additional analysis undertaken to address the feasibility of improving navigation between the Mississippi River in New Orleans, Louisiana, and the eastern segment of the GIWW.

Figure ES-1. Dedication of the IHNC Lock in 1923.

Figure ES-2. IHNC Lock in 1945.

Significant changes have occurred in the study area since the feasibility study-level Evaluation Report and environmental impact statement (EIS) was prepared is 1997 (hereinafter referred to as the 1997 Evaluation Report). The recommended plan in the 1997 Evaluation Report was the locally preferred plan of the non-federal sponsor at that time (the Port of New Orleans), which was a new 1,200 feet long by 110 feet wide by 36 feet deep navigation lock located within the IHNC between the Claiborne and Florida Avenue Bridges. The National Economic Development (NED) plan was a new 900 feet long by 110 feet wide by 22 feet deep (NAVD88) lock which would have primarily served shallow draft navigation using the GIWW. Subsequent to the 1997 Evaluation Report and EIS, a 2000 recommendation concluded the federal government had an interest in the deep draft lock increment that was part of the locally preferred plan. The recommendation resulted in a

change in cost sharing responsibilities between the federal government and the non-federal sponsor in terms related to inland navigation and deep draft (general cargo) navigation.

Navigation between the Mississippi River and waterways east of the river is via the IHNC and Lock. Construction of the IHNC and Lock was completed by the Port of New Orleans in 1923 to provide navigation between the Mississippi River and Lake Pontchartrain and to provide areas away from the Mississippi River for industrial development. The lock is 640 feet long by 75 feet wide, has a sill depth of 31.5 feet NAVD88, and is located at Mississippi River Mile 92.6 Above Head of Passes. Beginning on April 1, 1944, the Corps leased the Lock and a 2.1-mile reach of the IHNC, and assumed its operation and maintenance (until purchasing the same facility and reach in fee in 1986). The replacement of the existing lock was conditionally authorized by an Act entitled "Mississippi River—Gulf Outlet—Construction Chapter 112—Public Law 455, An Act to authorize construction of the Mississippi River—Gulf Outlet", Public Law 86-455 2nd Session, approved March 29, 1956 (1956 Act). The 1956 Act authorized funding and construction of the Mississippi River-Gulf Outlet (MR-GO), a navigation channel, which was completed in the mid-1960s. Additionally, the 1956 Act authorized replacement of the existing lock, or an additional lock with suitable connections when replacement was found by the Chief Engineer to be economically justified by obsolescence of the existing industrial canal lock, or by increased traffic through the lock. Type, dimensions and cost estimates were to be determined and approved by the Chief of Engineers. Studies were initiated in 1960 for a new lock and connecting channel because at that time it was estimated that the existing lock would become dimensionally obsolete by 1970. Subsequent legislation in the Water Resources Development Act (WRDA) of 1986, Section 844, Mississippi River–Gulf Outlet, modified the 1956 authorization language regarding the location of the new lock to read "…the Mississippi River -Gulf Outlet feature…is modified to provide that the replacement and expansion of the existing industrial canal lock…shall be in the area of the existing lock or at the Violet site…". The Water Resources Development Act of 1996 authorized implementation of the Community Impact Mitigation Plan described in Volume 2 (Appendix A) of the preliminary draft 1995 Evaluation Report. The 1997 Evaluation Report, as approved by the Chief of Engineers recommended the construction of the locally preferred plan, a deep draft lock in the vicinity of the existing lock, with dimensions of 1,200 foot long by 110 foot wide by 36 foot deep (NAVD88), with all cost of the deep draft increment being borne by the Port of New Orleans. The 2000 Supplemental Evaluation Report determined that a Federal interest existed in the implementation of the former deep draft increment (the locally preferred increment) and established the cost-sharing requirements for the Authorized Project, which was a composite of the deep draft increment and the NED Plan (the shallow draft increment).

The IHNC lock experiences greater transit times than anywhere else in the Nation. When comparing processing times, the IHNC lock ranks 74th, but a comparison of the transit times (delay time plus processing times) shows the IHNC Lock as having the longest average transit times in the Nation, averaging more than 16 hours per lockage. Many times these delays are between 24 and 36 hours during high Mississippi River stages. These delays are caused by the high volume of traffic relative to the lock's capacity. Navigation delays are also compounded by an increasing frequency of and more costly operation and maintenance repairs that render the lock unusable for lengthy periods of time.

Waterborne traffic through the lock is projected to increase; consequently, average delays will increase unless and until a new lock is constructed. While the number of barges in a tow varies, especially on the Mississippi River, the modal number of barges per tow transiting the IHNC Lock is two (overall the average is 2.25). Nearly 50% of tows consist of liquid (tanker) barges with dimensions of roughly 300 feet long by 54 feet wide. Tows on the GIWW typically are not larger than a two barge per tow configuration and the barges are typically configured end-to-end. This common two barge configuration with the towboat is nearly 700 feet long by 54 feet wide which has to be cut into single barge tows, causing further delays, in order to transit the existing lock. The existing lock will require extraordinary maintenance to continue its present level of service. Delays mean higher transportation costs for the waterborne conveyance of cargo being shipped through the lock, which in turn means higher costs to the general public. Major commodities shipped through the lock include petroleum

and petroleum products. The IHNC lock is the only lock with access to the Mississippi River that allows waterborne traffic to proceed east on the GIWW.

Initial construction activities for the recommended plan were underway in August 2005 when Hurricane Katrina caused catastrophic impacts within the study area, irreparably altering socioeconomic and environmental conditions. A legal challenge to the 1997 recommended plan and supporting EIS resulted in the preparation of a Supplemental Environmental Impact Statement in 2009 that examined the impacts of Hurricane Katrina on the recommended plan. In the aftermath of Hurricane Katrina, the MR-GO was deauthorized in the WRDA of 2007 from the Gulf of Mexico to Mile 60 at the southern bank of the GIWW. As part of that deauthorization, a physical rock barrier was constructed in 2009 effectively eliminating any deep draft navigation in the deauthorized portion of the MR-GO. Furthermore, the IHNC Lake Borgne Surge Barrier was constructed across the former channel of the MR-GO near the confluence of the GIWW (22 Miles north of the rock barrier on the MR-GO) as part of the Lake Pontchartrain and Vicinity Hurricane and Storm Damage Risk Reduction System. Since Hurricane Katrina, the New Orleans Metropolitan area has been in recovery. However, recovery of the IHNC has not been commensurate with recovery of the region. There have not been any additional deep draft facilities constructed on the IHNC or the MR-GO and deep draft users of the IHNC began to relocate to facilities along the Mississippi River. By 2011, the Port Of New Orleans had divested itself from deep draft navigation support by dismantling three gantry cranes at the France Road Terminal in the IHNC and installing two additional gantry cranes at the Napoleon Avenue Container Terminal located on the Mississippi River. Coinciding with the removal of the gantry cranes by the Port of New Orleans, the number of vessels drafting greater than 20 feet dropped from 53 in 2011 down to 18 in 2014. In addition to changed conditions in deep draft navigation and facility support (or lack thereof) as previously described, the non-federal sponsor withdrew its support of a deep draft lock and insisted a shallow draft lock be pursued in a September 2012 letter to the USACE. As a result of changed conditions, the previously recommended plan to construct a deep draft navigation lock is no longer being recommended. Furthermore, during this time period, a legal challenge resulted in a Federal court ruling that the USACE was not compliant with the National Environmental Policy Act and Clean Water Act because a shallow draft lock alternative had not been evaluated in a supplemental EIS that was prepared in 2009. Before any construction can begin on a replacement IHNC Lock, a supplemental EIS and record of decision will need to be completed.

Figure ES-3. IHNC Lock 2016.

This GRR evaluates five IHNC navigation lock configurations in detail, as well as a no-action plan. Previous studies have determined that the only feasible location for constructing a new lock is within the IHNC at a site between the Claiborne Avenue and Florida Avenue Bridges. The TSP, which is the NED plan, has been determined to be the 900 feet long by 110 feet wide by -22 feet NAVD88 lock configuration. The TSP includes construction of a cast-in-place concrete navigation lock; replacement of the St. Claude Avenue bridge with a new, low-level double bascule bridge; construction of a temporary by-pass bridge at St. Claude Avenue that will provide continuous use of that canal crossing during construction of the new bridge; provision of by-pass channels around the new lock construction site and the existing lock during its demolition, both of which will provide usage of the existing lock and canal during construction; disposal of dredged material that is not suitable for aquatic disposal in an approved landfill site outside of the study area; replacement of storm damage and risk reduction and flood risk reduction features impacted due to construction of the replacement lock; and

implementation of a Community Impact Mitigation Plan to offset and or compensate for impacts the project will have on the surrounding communities.

Authorization for a Community Impact Mitigation Plan, to be implemented in conjunction the replacement of the lock, was provided in the WRDA of 1996. This act required that a comprehensive plan be implemented that will mitigate or compensate, or both, for the direct and indirect social and cultural impacts that this project will have on the affected areas. A Community Impact Mitigation Plan was developed in 1995 and subsequently revised, within the discretionary authority of the Chief of Engineers, and included with the 1997 Evaluation Report. As part of this GRR, public input, gathered during the public comment period for this draft integrated document and from community outreach meetings, would be used in determining the disposition of the Community Impact Mitigation Plan in terms relative to the current TSP and existing conditions in the study area. Additionally, funds have been expended for some items listed in the 1997 Community Impact Mitigation Plan. The terms and agreements for those prior expenditures would be verified concurrently with development of an updated Community Impact Mitigation Plan.

The first cost of the TSP outlined in this GRR, including the Community Impact Mitigation Plan, is estimated to be $951,300,000. The total average annual cost is estimated at $44,200,000, with the average annual benefits estimated to be $217,900,000. The net excess benefits are estimated to be $172,400,000. The benefit-to-cost ratio is 4.78 to 1. The construction period for the project is estimated to be up to 13 years, assuming adequate future funding levels.

Cost allocations for the TSP described in this document are subject to the provisions of Section 102 and 844 of WRDA 1986. WRDA 1986 requires one-half of the Federal costs for the TSP to be appropriated from the Inland Waterways Trust Fund and one-half to be appropriated from the general fund of the Treasury as a part of the USACE appropriated budget. The first cost of the TSP described herein is estimated at $951,300,000 which cost would be allocated and derived from Federal appropriations as follows:

Inland Waterways Trust Fund:	$475,650,000
Corps of Engineers:	$475,650,000

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Mississippi River, Baton Rouge to the Gulf of Mexico, Mississippi River Gulf Outlet, Louisiana, New Industrial Canal Lock and Connecting Channels Integrated General Reevaluation Report & Supplemental EIS

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Abbreviations and Acronyms

ADT – average daily traffic
BMP – Best Management Practices
CBMC – Community Based Mitigation Committee
CDF – confined disposal facility
CEMVN – New Orleans District
CFR – Code of Federal Regulations
CAA -- Clean Air Act
CAR -- Coordination Act Report
CFR -- Code of Federal Regulations
CWA -- Clean Water Act
CO – carbon monoxide
CO2 – carbon dioxide
CoC – contaminants of concern
CPI – Consumer Price Index
cy – cubic yard
dB – decibel
dBA – A-weighted decibel
DMMU – dredged material management unit
DNL – day-night average sound level
DO – dissolved oxygen
DOTD – Louisiana Department of Transportation and Development
EIS – Environmental Impact Statement
EFH -- Essential Fish Habitat
EJ -- Environmental Justice
EMS – emergency medical services
EO – Executive Order
ESA -- Endangered Species Act
EPA – U.S. Environmental Protection Agency
F – fill
FEMA – Federal Emergency Management Agency
FHWA – Federal Highway Administration
FWCA -- Fish and Wildliffe Coordination Act
GIWW – Gulf Intracoastal Waterway
GNO – Greater New Orleans
GRR -- General Reevalution Report
HSDRRS – Greater New Orleans Hurricane and Storm Damage Risk Reduction System
HTRW -- Hazardous Toxic and Radioactive Waste
HUD – U.S. Department of Housing and Urban Development
Hz – Hertz
I-10 – Interstate 10
IWWTF – Inland Waterways Trust Fund
IWUB – Inland Waterways Users Board
IER – Individual Environmental Report
IHNC – Inner Harbor Navigation Canal
ITM – Inland Testing Manual
JRB – Joint Reserve Base
LA – Louisiana Highway
LDEQ – Louisiana Department of Environmental Quality
LDNR – Louisiana Department of Natural Resources
LDWF – Louisiana Department of Wildlife and Fisheries

LOS – level of service
LPV – Lake Pontchartrain and Vicinity Project
LSU – Louisiana State University
MMPA -- Marine Mammal Protection Act
MSA – Metropolitan Statistical Area
MRGO – Mississippi River - Gulf Outlet
MVN – New Orleans District
N – native material
NN – non-native surface material
NAVD88 – North American Vertical Datum, 1988
NAAQS – National Ambient Air Quality Standards
NAS – Naval Air Station
NED -- National Economic Development
NO2 – nitrous dioxide
NOx – nitrous oxides
NOPD – New Orleans Police Department
NORM -- Naturally Occurring Radioactive Materials
NPDES – National Pollutant Discharge Elimination System
NRCS – Natural Resources Conservation Service
NWG – neighborhood working group
NWR – National Wildlife Refuge
OMRR&R -- Operation Maitenance Repair Replacement and Rehabilitation
O3 – ozone
OSHA – Occupational Safety and Health Administration
PAH – polynuclear aromatic hydrocarbons
PCB - polychlorinated biphenyls
Pb - Lead
PK – Pre-kindergarten
PL – Public Law
PM-2.5 – particulate matter less than 2.5 microns in size
PM-10 – particulate matter less than 10 microns in size
REP – Real Estate Plan
RECAP – Risk Evaluation/Corrective Action Program
RTA – Regional Transit Authority
SEIS – Supplemental Environmental Impact Statement
SHPO – State Historic Preservation Officer
SWPPP – Stormwater Pollution Prevention Plan
TSP -- Tentatively Selected Plan
U.S. – United States of America
USPS – U.S. Postal Service
USACE – U.S. Army Corps of Engineers
USC – United States Code
USFDA – U.S. Food and Drug Administration
USFWS – U.S. Fish and Wildlife Service
VOC – volatile organic compounds
WBV – West Bank and Vicinity
WRDA – Water Resources Development Act
WVA – Wetland Valuation Assessment

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1.0 Introduction

This report (a combined General Evaluation Report and Supplemental Environmental Impact Statement (GRR/SEIS)) is a reanalysis of previously completed studies, using current planning criteria and policies, which is required due to changed conditions and/or assumptions. The results may affirm the previously selected plan; reformulate and modify it, as appropriate; or find that no plan is currently justified.

1.1 Authorization

Public Law 455, Chapter 112, 84th Congress, 2nd Session, approved March 29, 1956.

"*AN ACT*

To authorize construction of the Mississippi River-Gulf outlet.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the existing project for the Mississippi River, Baton Rouge to the Gulf of Mexico, is hereby modified to provide for the Mississippi River-Gulf Outlet to be prosecuted under the direction of the Secretary of the Army and supervision of the Chief of Engineers, substantially in accordance with the recommendation of the Chief of Engineers contained in House Document Numbered 245, Eighty-second Congress, at an estimated cost of $88,000,000: *Provided*, that when economically justified by obsolescence of the existing industrial canal lock or by increased traffic, replacement of the existing lock or an additional lock with suitable connections is hereby approved to be constructed in the vicinity of Meraux, Louisiana, with type, dimensions, and cost estimates to be approved by the Chief of Engineers: *Provided further,* That the conditions of local cooperation specified in House Document Numbered 245, Eighty-second Congress, shall likewise apply to the construction of said lock and connection channels."

Water Resources Development Act, 1986, Section 844. Mississippi River-Gulf Outlet.

" (a) Subject to section 903(a) of this Act, the Mississippi River-Gulf outlet feature of the project for Mississippi River, Baton Rouge to Gulf of Mexico, authorized by the Act of March 29, 1956 (Public Law 455 of the Eighty-fourth Congress, 70 Stat. 65), is modified to provide that the replacement and expansion of the existing industrial canal lock and connecting channels or the construction of an additional lock and connecting channels shall be in the area of the existing lock or at the Violet site, at a total cost of $714,300,000. Before selecting the site under the preceding sentence, the Secretary shall consult with affected local communities. The costs of such modification shall be allocated between general cargo navigation and inland navigation, based on use patterns determined by the Secretary. Of the costs allocated to inland navigation, one-half of the Federal costs shall be paid from the Inland Waterways Trust Fund and one-half of the Federal costs shall be paid from the general fund of the Treasury. With respect to the costs allocated to general cargo navigation, cost sharing provided in section 101 shall apply.

(b) The Secretary is directed to make a maximum effort to assure the full participation of members of minority groups, living in the affected areas, in the construction of the replacement or additional lock and connecting channels authorized by subsection (a) of this section, including actions to encourage the use, wherever possible, of minority-owned firms. The Secretary is directed to report on July 1 of each year to the Congress on the implementation of this section, together with recommendations for any legislation that may be needed to assure the fuller and more equitable participation of members of minority groups in this project or others under the direction of the Secretary."

Water Resources Development Act, 1996, SEC. 326, Mississippi River-Gulf Outlet, Louisiana.

> "Section 844 of the Water Resources Development Act of 1986 (100 Stat. 4177) is amended by adding at the end the following: "(c) COMMUNITY IMPACT MITIGATION PLAN.—Using funds made available under subsection (a), the Secretary shall implement a comprehensive community impact mitigation plan, as described in the evaluation report of the New Orleans District Engineer dated August 1995, that, to the maximum extent practicable, provides for mitigation or compensation, or both, for the direct and indirect social and cultural impacts that the project described in subsection (a) will have on the affected areas referred to in subsection (b)."

1.2 Description of the Authorized Project

The authorized project, as recommended in the 1997 Evaluation Report and 2000 Supplemental Report No. 1, is a deep draft navigation lock with dimensions of 1,200 feet long by 100 feet wide by 36 feet deep (NAVD88). The authorized project also includes a Community Impact Mitigation Plan required by the WRDA '96. Due to changed conditions, this GRR will re-evaluate plans for replacement of the existing navigation lock, looking at all reasonable plans, including the no-action plan, a replacement deep draft navigation lock and various configurations for a replacement shallow draft navigation lock.

1.3 Prior Studies, Reports, and Analysis

Construction authorization for this proposed lock replacement project has been in place since 1956 (see section 1.1 Authorization), subject to Congressional modification in 1986 and amendment in 1996. There have been numerous studies, reports, and analyses since the 1956 construction authorization was enacted by Congress. The following list summarizes the conclusions and recommended plans for each respective study or report. The referenced documents are included, in their entirety (except for the 1997 Evaluation Report), with this report in Appendix F. Only the Main Report, EIS, and associated ROD for the 1997 Evaluation Report are included as an appendix to this report. Remaining sections of the 1997 Evaluation Report are available for viewing or download at: http://www.mvn.usace.army.mil/About/Projects/IHNC-Lock-Replacement/

1.3.1 1975 Site Selection Report

The 1975 Site Selection Report summarizes the results of studies and investigation made by chronological review of available data from February 1960 to late 1972, and by reanalysis of old and additional sites with new parameters. Studies were made of 14 site plans at 7 locations. Comparative site plan analysis confirmed the superiority of the Lower Site (or the Violet location) as the best overall location, however, a detailed plan comparison was made with the IHNC Site because it is the existing corridor and because Lower Site opponents proposed it as a viable alternative. These two plans included proposals for the ultimate disposition of the old IHNC lock and canal, the utilization of a new barge canal as an extension of the Gulf Intracoastal Waterway (GIWW), comparative bridge studies, and provision of ecological mitigation. This comparison was evaluated on 28 points of the socio-economic-environmental spectrum, resulting in a recommendation of the 1974 Lower Site Plan, which includes the provision of a ship channel and lock just below Violet, Louisiana, a barge canal to connect the lock tail bay with the GIWW, mothballing of the old IHNC Lock and provision of ecological mitigation.

1.3.2 Mississippi River-Gulf Outlet, New Lock and Connecting Channels, Louisiana - Evaluation Study (first Mini-Report 1991)

" The purpose of this report is (1) to provide the rationale and documentation for eliminating a location near Violet, Louisiana, from further consideration as an alternative site in the evaluation study of a

replacement lock for the existing Inner Harbor Navigation Canal Lock in New Orleans, Louisiana, and (2) to present information on how the New Orleans District plans to implement and utilize an open planning process to achieve a consensus on a lock replacement plan at the site of the Inner Harbor Navigation Canal Lock.

The existing Inner Harbor Navigation Canal (IHNC) lock is a connecting link in the Gulf Intracoastal Waterway system for shallow-draft traffic and serves as a connecting link for deep-draft traffic between the Mississippi River and the Mississippi River-Gulf Outlet. The lock is dimensionally inadequate to handle existing traffic and delays averaging between 10 and 15 hours are common. Two alternative sites have been identified as suitable for a new lock and connecting channels, the Inner Harbor Navigation Canal site in New Orleans, Louisiana, and a site near Violet, Louisiana…"

1.3.3 Mississippi River-Gulf Outlet, New Lock and Connecting Channels, Louisiana - Evaluation Study (second Mini-Report 1992)

"**PURPOSE**

This report presents the information and rationale supporting selection of the North of Claiborne Avenue location for a replacement lock for the Inner Harbor Navigation Canal (IHNC) Lock in New Orleans, Louisiana.

SCOPE

The report presents the results of an analysis of alternative locations for replacement of the IHNC Lock near the site of the existing lock in New Orleans, Louisiana. Only alternative locations in the vicinity of the existing lock were considered in this analysis. The IHNC site was selected over an alternative site near Violet, Louisiana, for the replacement lock as the result of a previous analysis. In a CELMN-PD-FG report dated January 1991, the Commander, New Orleans District, recommended the IHNC site for the location of a replacement lock. Headquarters, U.S. Army Corps of Engineers, concurred in the recommendation by CECW-PC second endorsement dated 26 June 1991. Other alternative sites for the replacement of the IHNC lock are not being considered further.

Alternative plans for providing a replacement lock for shallow-draft traffic only and for shallow- and deep-draft traffic are being developed in the overall study. For the purposes of this report, all alternatives are evaluated based on a shallow-draft lock. Most of the cost of a replacement lock and the social impacts would accrue to the implementation of the shallow-draft increment of a deep-draft lock. Adding the deep-draft increment to any of the alternative plans would not affect its relative economic standing or its relative implementability as a result of associated social impacts."

1.3.4 1995 Evaluation Report

In August 1995, the USACE produced a preliminary-draft evaluation report with an associated EIS for internal review and comment. The TSP in that report was a deep draft lock replacement project similar to the project recommended in the final version of the report dated March 1997. The 1995 report also described a Community Impact Mitigation Plan. In Section 326 of the Water Resources Development Act of 1996 (Public Law 104-303), Congress authorized the CIMP in accordance with the District Engineer's August 1995 Evaluation Report. At the time of the Congressional action, the 1995 report had not been released for review or comment outside of the USACE. The 1995 report continued to be reviewed within USACE and in March 1997 an Evaluation Report and EIS was released and was ultimately approved by higher USACE authority. The approved 1997 report contained, among other things, a revised CIMP that differed from the CIMP that was described in the 1995 report that serves as the basis for the CIMP authorization in WRDA 1996; however, the revisions were found to be within the discretionary authority of the Chief of Engineers to review without need

for further Congressional action. Under the 1997 report, the total cost of construction and implementation of the community impact mitigation plan remained $33,000,000, which was the authorized cost of the CIMP, as reflected in the WRDA 1996 authorization.

1.3.5 1997 Evaluation Report and EIS and Record of Decision

The information contained in this report, and the EIS and Record of Decision, included the evaluation of previously investigated and new plans along with a recommended plan that included the construction of a precast, floated-in, concrete lock to be constructed in four sections at an offsite construction yard located along the GIWW near the Paris Road Bridge in St. Bernard Parish; replacement of the St. Claude Avenue bridge with a new, low-level double bascule bridge; construction of a temporary by-pass bridge at St. Claude Avenue that was to provide continuous use of that canal crossing during construction of the new bridge; replacement of the center lift-span and raising of the towers on the Claiborne Avenue bridge by using innovative construction methods that were determined would reduce the closure at that bridge, for both marine and ground traffic, for very short durations (1 to 4 weeks); provision of by-pass channels around the new lock construction site and the existing lock during its demolition, both of which were to provide continuous usage of the existing lock and canal during construction; replacement of storm damage and risk reduction and flood risk reduction features impacted due to construction of the replacement lock; and implementation of a community impact mitigation plan to offset and/or compensate for impacts the project will have on the surrounding communities, even though no residents will be relocated.

As a result of plan optimization in the 1997 Evaluation Report, the National Economic Development (NED) plan was determined to be a shallow draft lock with dimensions of 900 feet long by 110 feet wide by 22 feet deep (NAVD88). Because a deep draft lock was not justified, the non-federal sponsor opted for a locally preferred plan and to fully pay the incremental cost for construction of a deep draft lock with dimensions of 1,200 feet long by 100 feet wide by 36 feet deep (NAVD88).

1.3.6 2000 Evaluation Report Supplement No.1

"The purpose of this supplemental report is to present the justification and rationale for determining the appropriate cost sharing requirements for the IHNC Lock Replacement Project, formerly entitled "MR-GO New Lock and Connection Channels.""

When a locally preferred plan is the recommended plan, any incremental cost (including costs of construction and OMRR&R) above and beyond the NED plan, is 100 percent the responsibility of the non-federal sponsor. However, the Assistant Secretary of the Army (Civil Works), in correspondence dated September 20, 2000, concurred with a USACE – New Orleans District recommendation that there was a federal interest in the non-NED plan and approved the recommendation that the cost share for construction of the recommended plan should be allocated as outlined in the WRDA '86, Sec. 844. Rather than the non-federal sponsor paying for 100 percent of the incremental cost of a replacement deep draft navigation lock, as approved in this report, the non-federal responsibility was defined as 6.5 percent of the total cost of construction of the authorized project (which is a composite of the deep and shallow draft lock increments). Furthermore, the non-federal sponsor would not be responsible for any costs of OMRR&R for any part of the entire lock replacement project. The shallow draft navigation lock replacement increment has always been designated as an Inland Waterway navigation feature with the cost of construction allocated 50/50 between the USACE and the Inland Waterways Trust Fund. OMRR&R of the entire project would be the responsibility of the USACE.

1.3.7 2009 Supplemental EIS and Record of Decision

The purpose of the 2009 Supplemental EIS and Record of Decision was to supplement the 1997 Evaluation Report and EIS, considering impacts of flooding, hurricanes, and Hurricane Katrina, in response to the 2006

injunction by the United States District Court, Eastern District of Louisiana.[1] In the 2006 decision, the Government was enjoined from continued construction of the Authorized Project for the IHNC lock replacement until such time as the agency prepared a supplemental EIS to address concerns identified in the court's decision. The SEIS was completed in March 2009 and on May 20, 2009 a Record of Decision (ROD) was signed.

The 2009 SEIS provided, among other things, an analysis of the Recommended Plan from the 1997 Evaluation Report in terms addressing concerns found in the 2006 court's decision. There were slight changes to the original Recommended Plan since some features had either been implemented prior to the 2006 enjoinment and new or supplemental information became available subsequent to the 2006 injunction.

1.4 USACE Civil Works Guidance and Initiatives

USACE planning is grounded in the 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Implementation Studies (Principles and Guidelines). The Principles and Guidelines provide for the formulation of reasonable plans responsive to National, state and local concerns. Within the framework of the Principles and Guidelines, the USACE seeks to balance economic development and environmental needs as it addresses water resources problems. The Federal objective of water and related land resources planning is to contribute to National Economic Development (NED) consistent with protecting the Nation's environment, in accordance with National environmental laws, Executive Orders and other Federal planning requirements. The Planning Guidance Notebook (ER 1105-2-100) provides the overall direction to formulate, evaluate and select projects for implementation. The study conforms to the USACE Campaign Plan goals, and the USACE Environmental Operating Principles. The Draft GRR has been prepared based upon the level of information and knowledge that was available at the point in time that the tentatively selected plan (TSP) was approved by HQUSACE in accordance with the provisions and requirements of the Planning Guidance Notebook (Engineering Regulation ER 1105-2-100) and of Section 1001 of the Water Resources Reform and Development Act of 2014 (WRRDA 2014), as well as the implementation guidance for Section 1001 of WRRDA 2014, as set forth in the memorandum from the Chief, Planning and Policy Directorate of Civil Works, dated 09 April 2015 SUBJECT: "Implementation Guidance for Section 1001 of the Water Resources Reform and Development Act of 2014 (WRRDA 2014) - Vertical Integration and Acceleration of Studies".

1.5 National Environmental Policy Act Compliance Requirements

The National Environmental Policy Act (NEPA), 43 U.S.C. 4321 *et seq*., is the Nation's charter legislation for protection of the environment. The Federal regulations for implementing NEPA are found in Title 40, Code of Federal Regulations (CFR) Parts 1500-1508. Other regulations, at 33 CFR §230 *et seq*., describe how USACE is to implement NEPA. The intent of NEPA is to ensure that information is made available to the public regarding major actions taken by Federal agencies that significantly affect the quality of the human environment, and to identify and consider concerns and issues raised by the public. Any environmental document in compliance with NEPA may be combined with any other agency document to reduce duplication and paperwork. 40 CFR §1506.4. NEPA provides for an early and open process, called scoping, to determine the scope of issues to be addressed and identify the significant issues related to a proposed action. A Notice of Intent to prepare a SEIS[2] was published in the Federal Register (Volume 80, No. 19) on January 29, 2015. The scoping period ended on February 18, 2015. Scoping identified concerns regarding the effect on the local community with construction of the new replacement lock within the IHNC. People are concerned about construction times, noise and vibration impacts. The scoping report is provided in Appendix A.

[1] Holy Cross, et al v. United States Army Corps of Engineers (Civil Action No. 03-370), 455 F.Supp.2d 523 (E.D. La. 2006).
[2] Preparation of this Supplemental Environmental Impact Statement was mandated by the United States District Court, Eastern District of Louisiana, in *Holy Cross Neighborhood Association v. United States Army Corps of Engineers*, consolidated with Civil Action No. 03-370, in an Order issued on 9 September 2011.

This document integrates discussions that normally would appear in an EIS (or in this case a SEIS) into the GRR. Sections in this report include NEPA-required discussions. Table 1-1 lists required EIS information and its location in this document.

Table 1-1. NEPA-required information in this report.

EIS Requirement	Location in this Document
Cover sheet	Cover page
Summary	Executive Summary
Table of Contents	Table of Contents
Affected Environment	Chapter 2
Purpose of and Need for Action	Chapter 3
Alternatives Including Proposed Action	Chapter 3
Environmental Consequences	Chapter 6
List of Report Recipients	Chapter 8
List of Preparers	Chapter 11
Index	Chapter 12
Appendices	Table of Contents

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2.0 Affected Environment

The resources described in this chapter were all previously described in both the March 1997 "Mississippi River-Gulf Outlet, New Lock and Connecting Channels, Louisiana Evaluation Report," accompanied by a signed Record of Decision (ROD) on December 18, 1998 by Major General Russell L. Fuhrman, USACE Director of Civil Works, and the March 2009 Final SEIS titled, "Inner Harbor Navigation Canal Lock Replacement Project, Orleans Parish, Louisiana," accompanied by a signed ROD on May 20, 2009 by Brigadier General Michael J. Walsh, USACE, Mississippi Valley Division Commander. These two documents are incorporated herein by reference, and are also provided in Appendix F – IHNC Lock Replacement Prior Reports, of this draft report. Topics in this chapter mirror Chapter 6, where the "future without-project" (no-action) and "future with-project" conditions are described for alternatives considered in detail.

Due to the highly developed nature of the project area, farmland and agricultural lands are not present. Prior coordination with the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), confirmed that no prime or unique farmland soils (subject to the provisions of the Farmland Protection Policy Act) are located in the project area. Likewise, there are no National parks, Federal wildlife refuges, state wildlife management areas, or state-designated scenic streams that would be affected by any of the project alternatives being considered in detail. The Bayou Sauvage National Wildlife Refuge is located approximately 10 miles to the northeast of the IHNC, and the state-designated scenic stream portion of Bayou Bienvenue is located about 9 miles to the east of the IHNC. These resources will not be further discussed in this report since they would not be affected by any of the alternatives considered in detail. There are two Federally-designated National Historic Neighborhoods, the Holy Cross Historic District and Bywater Historic District, located in the immediate vicinity of the project area, and effects on those neighborhoods are assessed in this GRR/SEIS. While previously included as part of the recommended alternative in the 1997 Evaluation Report and 2009 SEIS, a confined disposal facility for permanent containment of dredged material deemed unsuitable for aquatic disposal is no longer a project feature associated with this current evaluation. Important resources, such as fish and wildlife habitat, associated with the confined disposal facility are excluded from further discussion in this draft report. In lieu of a confined disposal facility, a landfill disposal option is recommended under the current evaluation. Additional discussion of the reasons for elimination of the confined disposal facility and the recommended landfill disposal option are included in Chapter 4 and Appendix B - Engineering, of this draft report. At property previously owned by the Port of New Orleans and occupied by the U.S. Coast Guard located on the west side of the IHNC, there are 2 sites that have been identified through prior HTRW environmental site assessment investigations where contamination is known to exist. Of these 2 contaminated sites sampling indicated that total petroleum hydrocarbons as diesel, total petroleum hydrocarbons as oil, and some polycyclic aromatic hydrocarbons (benz(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene) remained at elevated concentrations in both areas (including under a diesel aboveground storage tank). The property was acquired in fee by USACE for the lock replacement project in 2001. The Louisiana Department of Environmental Quality has determined that these sites must be remediated. Further investigations and remediation will be required and disclosed in the final report.

2.1 General Setting

Climate: The climate of Orleans Parish is humid subtropical. Warm, moist southeasterly winds from the Gulf of Mexico prevail throughout most of the year, with occasional cool, dry fronts dominated by northeast high pressure systems. The influx of cold air occurs less frequently in autumn and only rarely in summer. Tropical storms and hurricanes are likely to affect the parish three out of every ten years, with severe storm damage approximately once every two or three decades. The majority of these events occur between early June and November. Summer thunderstorms are common, and tornadoes strike occasionally. Average annual temperature in the area is 67°F, with monthly temperatures varying generally from high temperatures in the mid-90°'s F in July and August, to lows in the mid-30°'s F in January and February. Average annual precipitation is 57.0 inches, varying from a monthly average of 7.5 inches in July, to an average of 3.5 inches in October.

Physical Features: The near-surface geology of the area surrounding the project area is the result of a subsiding Mississippi River delta lobe that has been drained, diked and filled with various types and vintages of dredged material derived from Lake Pontchartrain and adjacent drainage canals. The deepest formations investigated in the area are Pleistocene deposits, consisting of somewhat hardened fluvial sands, silts and muds at a depth of -40 to -60 feet to depths around -180 feet. These sediments were exposed and weathered during low sea level periods as a result of Pleistocene glaciation, resulting in relatively higher cohesive strengths than would normally be expected. Above the Pleistocene, Holocene deposits are the result of gradual deposition of organic peat mixed with fluvial silt and mud deposited as overbank deposits and interdistributary bay deposits of the Mississippi River in cypress swamps around Lake Pontchartrain (Kolb *et al.* 1975).

Much of the project area was formerly wetlands (*e.g.*, cypress swamps and marshes) interspersed with natural ridges along the Mississippi River and its distributaries dominated by bottomland hardwood forest. As metropolitan New Orleans grew, water was drained from swamps and marshes by canals and pumping, and dredged material, including peat and mud, was used to elevate the area for habitation. Resulting surface soils are classified as dredged material or muck (NRCS 2015). Land continues to subside due to dewatering of peat deposits. For those subsiding lands that are situated inside the projects that were constructed for flood risk reduction and hurricane storm damage risk reduction purposes, the subsidence has resulted in surface elevations below sea level in some areas within the metropolitan area. Water content in soils is generally high. The near-surface groundwater table is connected to the water levels in Lake Pontchartrain and the Mississippi River, hence the need for numerous drainage canals and pumps to remove constant inflow and water from rainfall events.

Land Use and Land Loss: The project is located between Lake Pontchartrain and the Mississippi River in a highly urbanized area of Orleans Parish just west of the Orleans/St. Bernard Parish line. The City of New Orleans and Orleans Parish are conterminous. Several large natural water bodies, including Lake Pontchartrain and the Mississippi River, are located in the area, and several large, man-made navigation channels also occur, including the IHNC, GIWW, and the active and deauthorized portions of the MR-GO. Neighborhoods located adjacent to the project area (Holy Cross, Lower Ninth Ward, Bywater, Florida and St. Claude), as well as those that are located near the project area, such as New Orleans East, were heavily impacted by Hurricane Katrina in August of 2005, and recovery in some of these neighborhoods has been slow. To date, some of these neighborhoods are a mix of vacant lots, damaged and gutted houses, recently renovated homes, and homes in the process of being constructed or renovated. The neighborhoods in the project area vary considerably in the level of their rebuilding efforts, with the Bywater and Holy Cross neighborhoods in relatively good condition due in large part to their higher land elevation, being located closest to the Mississippi River.

The devastation of Hurricane Katrina, which made landfall to the south and east of New Orleans, has greatly altered the natural and human environment of the project area. Tropical storms are relatively common occurrences in the Gulf of Mexico. Tropical storms typically produce the highest wind speeds and greatest rainfall events along the Gulf Coast. Category 5 hurricanes, such as Hurricane Camille which made landfall just east of New Orleans on August 17, 1969, generated the highest sustained wind speeds in the region (greater than 155 miles per hour). High winds are typically accompanied by massive storm surge, and in the case of Category 5 storms, storm surge exceeds 18 feet in height (National Hurricane Center 2015). Between 1926 and 2015 a total of 10 hurricanes struck Orleans Parish (National Hurricane Center 2015). The frequency of hurricanes is greatest in August, September, and October; however, hurricane season extends from June through November (National Hurricane Center 2015). Prior to Hurricane Katrina, Hurricane Betsy, on September 9, 1965, was the most damaging tropical storm in metropolitan New Orleans. Hurricane Betsy caused a storm surge of 10 feet, flooding large parts of the city, claiming 81 lives and causing $1 billion (1965 dollars) in damage (NOAA 2007a).

The devastation caused by Hurricane Katrina classified it as one of the largest natural disasters in modern U.S.

history. The project area in Orleans Parish was especially devastated by the storm. Hurricane Katrina's storm surge opened seven major breaches in the metropolitan New Orleans area levee network, with four of the seven breaches occurring along the IHNC. Of those four breaches, one occurred on the west side of the channel at France Road, one on the west side of the channel south of France Road, and two on the east side of the channel along the Lower Ninth Ward levee. The breaches along the east side of the IHNC and the overtopping of the St. Bernard back levee resulted in the flooding of Orleans Parish's Lower Ninth Ward and St. Bernard Parish. Floodwaters covered approximately 22,000 acres of the east bank of Orleans Parish, including most of the Lower Ninth Ward. On September 24, 2005, less than a month after Hurricane Katrina made landfall southeast of New Orleans, Hurricane Rita, a Category 5 storm, passed to the south of the New Orleans area making landfall along the Louisiana – Texas border. While wind damage was minor, temporary levees along the IHNC were overtopped by the storm surge and parts of New Orleans were re-flooded.

The inundation of much of metropolitan New Orleans from these storms forced the displacement and relocation of hundreds of thousands of area residents. In 2005, New Orleans population was estimated to be upwards of 455,000 (U.S. Census 2013 data). Due to the extensive damage to residences and infrastructure, the population declined in 2006 to its lowest level at around 208,000 with many of these displaced residents having resettled elsewhere within the region, or outside of the New Orleans urbanized area entirely (U.S. Census 2013 data). It is anticipated that many will never return, and while the 2013 population estimates have risen upwards of 378,000, it is reasonably foreseeable that many residents may never return to their former neighborhoods.

Post-Katrina, numerous Federal, state and local agencies and government bodies have invested substantial funds in Orleans Parish for various building and construction permits, transportation infrastructure improvements such as road and bridge projects, flood risk reduction and storm damage reconstruction and overall redevelopment of the area. From 2005 to 2011, Orleans Parish City Government has issued upwards of 340,000 permits ranging from residential repairs to construction of single and two family units and commercial construction including renovations of existing structures, additions, and new buildings (HSDRRS Comprehensive Environmental Document Phase 1, Appendix L). The Louisiana Department of Transportation and Development (LADOTD) in cooperation with the Federal Emergency Management Agency has completed numerous road rehabilitation and reconstruction projects under the submerged roads program. Other improvements include minor widening of I-510 and various new signal lights, fencing and safety upgrades of roadways. The USACE has also completed several internal urban drainage improvements in Algiers and along Dwyer Road as part of the Orleans Southeast Louisiana (SELA) Urban Flood Control Program. Other Orleans SELA projects include Florida Avenue, Jefferson Avenue, Louisiana Avenue, Napoleon Avenue and South Claiborne Avenue Canal's drainage improvement projects to reduce the risk of urban flooding during heavy rain events. As part of the Lake Pontchartrain and Vicinity, HSDRRS project, major hurricane storm surge risk reduction features have been constructed throughout Orleans Parish including levee lifts and armoring of levees, construction of higher and stronger floodwalls, construction of the IHNC Surge Barrier, and construction of temporary and permanent pump stations at the mouths of the 17th Street, Orleans, and London Avenue Canals near Lake Pontchartrain.

2.2 Human Environment (Socioeconomics)

2.2.1 Waterborne Transportation

Louisiana is the top state in waterborne transportation by tonnage in the Nation. Four of the 10 largest ports by tonnage in the U.S. are located on the Mississippi River and account for over 437 million tons of cargo annually, with the Port of New Orleans handling over 77 million tons annually (Waterborne Commerce Statistic Center, 2013). In Louisiana, the Mississippi River provides for 236 miles of deep-draft navigation from the Gulf of Mexico to Baton Rouge. The Gulf Intracoastal Waterway (GIWW), located along the Gulf Coast of the United States, is a navigable inland waterway running approximately 1,050 miles from Carrabelle, Florida to Brownsville, Texas. Providing a navigable route along its length without many of the hazards of travel on the open sea, it was authorized as an element of the U.S. national defense. Within the jurisdictional boundary of the New Orleans District, the GIWW provides 310 miles of shallow-draft navigation extending from the

Mississippi to Texas state lines, including 270 miles to the west and 40 miles to the east of the Mississippi River.

Numerous coastal navigation channels also occur. The IHNC and existing lock connects the Mississippi River and Lake Pontchartrain, and provides a connection with the GIWW and remaining authorized portion of the MR-GO (Figure 2-2).

The existing IHNC lock, which is constructed to a depth of 31.5 feet, primarily serves shallow-draft barge traffic; however, a limited number of deep-draft vessels with a maximum draft of about 30 feet and width of about 74 feet are accommodated. Table 2-1 displays historic traffic levels and average delays per tow. With average transit time through the lock being more than 16 hours per lockage, the IHNC lock represents one of the most congested locks in the nation.

Table 2-1: IHNC Lock Operations (2004 – 2015)

Year	Average Delay Per Tow (Hours)	Total Tons (Millions)	# of Vessels	# of Barges	# of Lockages
2004	8.25	18.7	15,926	18,928	11,695
2005	8.01	16.3	13,252	15,756	10,088
2006	8.17	16.7	8,089	16,129	9,366
2007	7.13	17.4	13,058	16,766	11,349
2008	8.44	12.8	9,486	12,512	8,190
2009	7.78	14.2	11,453	14,207	10,237
2010	10.8	16.4	12,094	16,808	10,590
2011	11.93	15.1	9,607	14,873	9,212
2012	13.62	15.5	10,121	15,588	9,664
2013	12.42	15.7	8,441	14,329	8,365
2014	N/A	15.8	8,500	14,450	8,431
2015	16.7	15.3	7,733	13,262	8,184

Source: Lock Performance Monitoring System (LPMS 2016).

Water levels of the Mississippi River are higher than sea level in the New Orleans area except during very rare combinations of river stage and tidal stage, so any vessels navigating the GIWW and crossing the Mississippi River must use locks on the west and east bank of the river for the crossing. The IHNC Lock is the only lock that provides access to the eastern segment of the GIWW from the Mississippi River and from the GIWW to the west of the Mississippi River. Prior to Hurricane Katrina, vessels could utilize an alternate but substantially longer route that avoided the IHNC Lock to move from the Mississippi River to the eastern leg of the GIWW. This route required navigating the Mississippi River to near Venice, entering Baptiste Collette Bayou which provides navigable passage into Breton Sound, and then crossing Breton Sound until reaching the MR-GO. Vessels could then navigate the MR-GO north to the GIWW without negotiating any locks. As well as being a substantially longer route, it required vessels to enter the less protected waters of Breton Sound, which at times, for some vessels, is impassable due to rough seas.

However, following Hurricane Katrina, CEMVN no longer dredges the MR-GO south of its confluence with the GIWW in response to Congress's partial de-authorization of the MR-GO project. In July 2009, the MR-GO was closed to navigation, except for local small vessel traffic, with the construction of a rock dam placed across the MR-GO at the Bayou La Loutre ridge. With the closure of the MR-GO, the IHNC Lock provides the only viable route of navigation between the Mississippi River and the eastern leg of the GIWW for vessels designed for inland waterways and for small deep draft vessels that can physically fit within the existing lock.

Figure 2-2: Vicinity Map for the Inner Harbor Navigation Canal Lock Replacement Project

2.2.2 Lake Pontchartrain and Vicinity, (LPV), Mississippi River and Tributaries Flood Risk Reduction and Southeast, Louisiana Projects

The LPV project and the Mississippi River and Tributaries flood control projects, now referred to as risk reduction projects, are designed to provide the developed areas surrounding the IHNC Lock risk reduction from floods generated by tropical storms and hurricanes and river floods. In addition, the Southeast Louisiana Urban Flood Control Program provides the local interior storm water drainage systems in Jefferson and Orleans Parishes with additional drainage capacity. This complex series of levees, floodwalls, floodgates, pipes and pump stations is divided into separate polders by the IHNC and the GIWW/MR-GO. Each of these polders has its own system of risk reduction and drainage structures.

The Mississippi River levees in the vicinity of the IHNC provide flood risk reduction to an elevation of 20 feet North American Vertical Datum 88 (NAVD88), and are part of the larger Flood Control, Mississippi River and Tributaries Project. The floodwalls on either side of the IHNC north of the lock currently provide hurricane and storm damage risk reduction to an elevation of between 12.5 and 15.5 feet, and were repaired and substantially improved after some of them were damaged by Hurricane Katrina.

Substantial flooding in the project area has occurred twice in the past fifty or so years due to tropical storms - Hurricane Betsy in 1965 and Hurricane Katrina in 2005. Hurricane Betsy caused substantial flooding and damage to the neighborhoods located east of the IHNC, including the Lower Ninth Ward, Holy Cross, New Orleans East and nearly all of St. Bernard Parish, and also some areas on the west side of the IHNC. Hurricane Katrina devastated much of metropolitan New Orleans. Areas west of the IHNC flooded during Hurricane Katrina due to structural failure of floodwalls along the 17th Street and London Avenue canals, while areas east of the IHNC flooded from both damaged floodwalls and overtopping and subsequent structural failure of levees.

In response to Hurricane Katrina, the USACE has completed numerous projects for the Metropolitan New Orleans area to meet the 100-year level of risk reduction. On the east bank of the Mississippi River, this included improving and replacing levees, floodwalls and floodgates that comprise elements of the LPV project. This primarily included increasing the elevation of existing levees, replacing I-walls with more resilient T-walls to meet new design criteria, replacing floodgates, modifying the 17th Street, London Avenue and Orleans Avenue canals and constructing new pump stations, and constructing barrier structures.

For the IHNC and adjacent areas, the 100-year level of hurricane and storm damage risk reduction was provided by constructing gated structures, one set of structures and floodwalls to provide protection from storm surges coming from Lake Borgne and the other structure to provide protection from storm surges coming from Lake Pontchartrain. The Lake Borgne storm surge protection structure is located near the confluence of the GIWW and the MR-GO, east of the Paris Road Bridge, and the Lake Pontchartrain storm surge protection structure is located on the IHNC near the Senator Ted Hickey Bridge at Lake Pontchartrain. In St. Bernard Parish, a floodwall has been constructed on top of 22 miles of levee along the south bank of the MR-GO to meet the 100-year level of hurricane and storm damage risk reduction. The project also included the replacement of the navigable floodgate and associated floodwalls at the confluence of Bayou Dupre and the MR-GO.

2.2.3 Business and Industrial Activity

New Orleans is one of the older urban centers in the U.S., benefiting from its natural waterways, port facilities and services, commercial fisheries, ship building, oil and gas production, NASA space programs, and tourism, entertainment, and convention facilities. Despite being ravaged by Hurricane Katrina, the project area, which encompasses zip code 70117, including the neighborhoods of Florida, St. Claude, Bywater, Holy Cross and the Upper and Lower Ninth Wards, still contains a number of small businesses such as corner grocery stores, neighborhood bars and restaurants, and gas stations and auto services, with most of these businesses being located west of the IHNC, primarily in the Bywater and St. Claude neighborhoods. Fewer small businesses have

reopened east of the IHNC in the Lower Ninth Ward and Holy Cross. There are no major grocery stores in the immediate area, however there is a smaller grocery available for neighborhood residents and some major stores located nearby in St. Bernard Parish. A national-chain drug store opened recently on Claiborne Avenue at Forstall Street.

Current industrial activity along the IHNC includes metal and scrap recycling yards, marine-related businesses, bulk material businesses, and light industries. The Port of New Orleans owns the commercial waterfront properties along the IHNC and Mississippi River in the project area. Along the IHNC, the Port leases much of its waterfront properties to private marine-related industries, some of which maintain active operations.

2.2.4 Employment

Impacts of Hurricane Katrina included loss of life, destruction of homes and businesses, damage and disruption of public facilities and services, high unemployment, loss of income, disruption and closure of local institutions, and in many cases, the loss of neighborhood unity. The destruction of thousands of housing units has led many former metropolitan area residents to settle elsewhere, whether or not employment has been available in the local New Orleans area.

The total number of employers in Orleans Parish was greatly reduced following Hurricane Katrina (Table 2-2). A net loss of over 2,500 employers occurred in these two parishes by 2007. By 2013 employment had been slowly increasing as population and businesses have returned to the local communities. Employment changes in these two parishes mirror the changes seen in total number of employers as the civilian labor force slowly returns to pre-Hurricane Katrina levels. However, despite the growth of labor and employment opportunities, the unemployment rate in 2013 was higher than in 2000 (Table 2-3).

In 2000, the labor force of the socioeconomic project area (zip code 70117) was 18,814 with an unemployment rate of 6.8 percent. By 2013 the labor force within the project area reduced to 7,413, while the unemployment had risen to 7.8 percent. In 2000, there were 15,679 workers (ESRI 2008), but in 2013 there were only 8,929 workers in the project area (U.S. Census 2013 data).

Table 2-2: Net Change in Total Employers for Orleans Parish

Parish	Year (2nd Quarter)	Total Employers	Cumulate Net Change Since Katrina
Orleans	2005	9,592	
	2007	7,482	-2,110
	2013	8,669	-923

Source: U.S. Census Bureau

Table 2-3: Net Change in Total Employment for Orleans Parish

Parish	Year	Civilian Labor Force	Employment	Unemployment	Unemployment Rate (%)
Orleans	2000	210,684	199,940	10,744	5.1
	2005	181,098	169,767	11,331	6.3
	2010	148,632	135,521	13,311	8.8
	2013	156,213	144,753	12,860	7.8

Source: U.S. Census Bureau

2.2.5 Land Use

Although Hurricane Katrina had tremendous impacts on the population of project area neighborhoods, and either damaged or destroyed most of the businesses and residences, the designated land uses have not changed substantially. It should be noted that, although the designated land uses remain, damage to the Lower Ninth Ward neighborhood from Hurricane Katrina was so extensive that many of the residences in this primarily residential neighborhood were destroyed or demolished, and now many properties consist of vacant lots.

The St. Claude neighborhood is primarily residential with a large industrial area along the west side of the IHNC from Claiborne Avenue to Florida Avenue. The Bywater neighborhood is also primarily residential with industrial development and government use (Naval Support Facility) along the Mississippi Riverfront and along Press Street near the intersection of the IHNC and the river. Some warehouse development is located along the western edge of the Bywater neighborhood adjacent to the Faubourg Marigny. The Lower Ninth Ward neighborhood is primarily residential with an industrial area located along the IHNC, and Jackson Barracks, a U.S. Army National Guard facility, located along the eastern boundary of the neighborhood. The Holy Cross neighborhood is primarily residential with a riverfront industrial area, recreational use along the IHNC and government use along the eastern boundary of the neighborhood (Jackson Barracks). The primary commercial corridors for all four neighborhoods are St. Claude and Claiborne Avenues. (Figure 2-3 displays the location of the primary neighborhoods within the project area).

Figure 2-3. Primary Neighborhoods within IHNC project area.

2.2.6 Property Values

Property values in the project area are affected by a variety of factors, such as trends in employment and income growth experienced by the project area and the metropolitan area as a whole. Additionally, the devastation of Hurricane Katrina and the resulting out-migration have greatly influenced property values. The values of owner-occupied housing have increased between 2000 and 2013; however, if the vacant housing that had significant damage from Hurricane Katrina was included in the calculations, there would likely be a significant decrease in the median and average housing values between 2000 and 2013.

The average value of owner-occupied housing units in the project area increased from $125,742 in 2010 to $135,921 in 2013, an increase of 8.1 percent. During that same period, the consumer price index for housing for the U.S. increased 6.8 percent. The median value of owner-occupied housing units in the project area increased from $56,918 in 2000 to $65,149, an increase of only 14.5 percent, compared to the 27.9 percent increase in the median value of housing nationwide (U.S. Census 2013 data).

2.2.7 Public/Community Facility Services

Public/community facilities and services continue to be redeveloped and the following description provides the most recent available data for the area.

Police Protection

The project area is in the New Orleans Police Department (NOPD) Fifth District. The Fifth District Station house is located at 3900 North Claiborne Avenue about one-half mile west of the IHNC. The station suffered substantial damage from Hurricane Katrina but has since been renovated. When needed, the police force located has been supplemented by elements from the Louisiana State Police and Louisiana National Guard troops.

Fire Protection

Three fire stations serve the project area. All three stations received substantial damage from Hurricane Katrina but have since been renovated. The Bywater Station at 1040 Poland Avenue is currently housed in its original building. Engine No. 24 operates out of this station. Engine No. 8 operates out of its pre-Katrina location at 3300 Florida Blvd. The Lower Ninth Ward Station has Engine Nos. 22 and 39 and is located at 1616 Caffin Ave.

Schools

Prior to Hurricane Katrina there were 23 schools located in the project area. A couple of years after Katrina the number of schools dropped to only 11. Today that number has rebounded to 27 schools located in the project area. These schools are a mixture of private and public schools handling mostly elementary age children.

Health Care

Within the project area there are only 3 walk-in medical clinics available to handle routine ailments. More serious medical problems that require hospitalization are sent to facilities located in the Central Business District (CBD) of Orleans Parish.

Recreational Facilities

Numerous parks and playgrounds, as well as a recreation center, were maintained by the City of New Orleans Recreation Department prior to Hurricane Katrina. All of these recreation facilities received varying degrees of damage from Hurricane Katrina. Several parks and recreational facilities are now being used for other purposes, and most of these facilities are in need of substantial maintenance. A 3-mile long, white-striped bicycle path has recently opened along St. Claude Avenue, extending through the Lower Ninth Ward and ending at the Orleans/St. Bernard Parish line.

Other Facilities

The U.S. Postal Service's Bywater Station at 1521 Poland Avenue near Claiborne Avenue was damaged by Hurricane Katrina, but reopened for service in 2006.

2.2.8 Tax Revenues

Business, sales and property taxes in support of community services and infrastructure are an important socioeconomic resource. Within the project area the number of occupied houses decreased by 57 percent due to Hurricane Katrina and as of 2013 remained 48 percent below pre-Katrina levels, which has created a very

limited tax base. The number of retail businesses in the project area has been declining over the past several decades. The devastation caused by Hurricane Katrina further damaged the businesses in the area, reducing the retail business tax base.

2.2.9 Population

Table 2-4, which is based on U.S. Census data, shows the population change for Orleans and St. Bernard parishes since 2000, and indicates the extreme depopulation of the project area following Hurricane Katrina, and the slow recovery of that population.

Based on data in the ESRI (2013) database, the population of the project area declined from 51,528 in 2000 to 24,671 in January 2013. During this same period of time, the population of Orleans Parish declined from 484,674 to 378,718, while the population of Louisiana increased slightly from 4,468,976 to 4,567,968. The majority of the overall population of the project area continues to be made up of older persons with only 25 percent being under the age of 19 as of 2013, compared to 34 percent under 19 in 2000. In 2013, 23 percent of the population was 55 years of age or older, compared to 20 percent in 2000.

Table 2-4: Population Change for Orleans Parish and the MSA

Year	Orleans	MSA
2000	484,674	1,316,510
2010 (July)	347,858	1,105,020
2011 (July)	360,740	1,139,643
2012 (July)	369,250	1,165,967
2013 (July)	378,718	1,209,239

Source: U.S. Census Bureau MSA- Metropolitan Statistical Area

2.2.10 Community and Regional Growth

While total employment and population within the immediate area of the communities adjacent to the project site have declined in recent decades, the size of the larger New Orleans Metropolitan Statistical Area has increased as adjacent suburban areas have expanded. The New Orleans Metropolitan Statistical Area, designated by the U.S. Census, encompasses eight parishes including Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles, St. John the Baptist, and St. Tammany. As previously mentioned, however, the effects of Hurricane Katrina have included severe damage to housing and businesses, many of which have still not been restored, influencing community and regional growth.

2.2.11 Vehicular Transportation

This resource is important for a variety of reasons, among them a transportation network that links waterways, major rail lines, trucking companies and airports to limited access highways and streets and bridges supporting the urban center. Evacuation routes that are needed to respond to hurricanes that pass through the region are a major component of this resource.

The project area is comprised of a street grid that contains several arterial streets and a dense pattern of neighborhood and local streets. The east-west travel corridors of this street grid are bisected by the IHNC. The major east-west arterial routes in the project area include Florida Avenue, North Claiborne Avenue (LA Hwy 39), North Robertson Street, and St. Claude Avenue (LA Hwy 46). See Photograph 2-1 and Figure 2-4. North Robertson Street and North Claiborne Avenue are one-way streets on the west side of the IHNC that merge to cross the IHNC at the four-lane wide, mid-level North Claiborne Avenue Bridge.

Photograph 2-1. Eastbound view of St. Claude Avenue (LA Hwy 46)

Figure 2-4: MajorVehicular Transportation Routes

North Claiborne Avenue continues as a four-lane divided road east of the IHNC. The Florida Avenue Bridge is a two-lane low-level bridge that also includes a railroad crossing. The St. Claude Avenue Bridge is a four-lane, low-level bridge. These three bridges are opened frequently as a result of passing marine traffic on the IHNC. Rush-hour curfews are in effect for these three bridges during weekdays to accommodate vehicle traffic.

Table 2-5 provides the 2013 traffic counts for North Claiborne Avenue and St. Claude Avenue at the two bridges across the IHNC, along with previous traffic counts conducted in 1993 and 2004/2005. Traffic volume is increasing on these two primary east-west arterial routes since Hurricane Katrina, but is greatly reduced from pre-Katrina levels due to the significant changes in socioeconomic conditions of the project area and region.

Table 2-5: Comparison of Actual Traffic Counts, 1993 to 2013

Roadway	1993 (vehicle trips/day)	2004/2005 (vehicle trips/day)	2013 (vehicle trips/day)	Change 1993 – 2013
Florida Avenue	14,000	8,906	N/A	N/A
N. Claiborne Avenue	40,106	37,103	31,278	-8,828
St. Claude Avenue	30,190	28,653	18,483	-11,707
Total	84,296	74,662	N/A	N/A
Source: Louisiana Department of Transportation and Development				

The major north-south arterial routes include Franklin and Almonaster Avenues, Louisa Street, Piety Street and Poland Avenue on the west side of the IHNC, and Jourdon Avenue, Forstall Avenue, Caffin Street and Tupelo Street on the east side of the IHNC. Although most of these streets are two-lane, two-way or one-way streets, they primarily serve as feeders to the major east-west arterial streets and have more capacity than the present demand, especially following the reduction in local population since Hurricane Katrina.

The St. Claude Avenue and Florida Avenue bridges across the IHNC also provide access for pedestrian and bicycle traffic between neighborhoods. Pedestrian and bicyclist usage of the St. Claude Avenue crossing is well established, while such usage of the Florida Avenue Bridge is likely minimal. The North Claiborne Avenue Bridge is not designed to provide pedestrian access.

2.2.12 Housing

Hurricane Katrina floodwaters damaged or destroyed between 60 and 80 percent of the housing in the project area. In nearby St. Bernard Parish, nearly 100 percent of all residences were either damaged or destroyed. The total number of housing units in the project area was estimated to be 11,745 in 2013, down significantly from 21,048 in 2000. In terms of occupied housing units, the project area was estimated to have 9,228 units in 2013, down from 17,534 units in 2000 (U.S. Census 2013 data).

2.2.13 Community Cohesion

Community cohesion has been described as the force that bonds people together long enough to establish meaningful interactions, common institutions, and agreed ways of behavior. It is a dynamic process, changing as the physical and human environment changes. Conditions brought about by water resources development can impact community cohesion through changing a right-of-way or constructing a feature that can divide a community, cause the dislocations of a significant number of residents, or requiring the relocation of an important local institution, such as a church or community center. The basic objectives of water resources development have been to provide additional security through hurricane and storm damage risk reduction, improved navigation, environmental restoration, and recreation through civil works, as needed by the local area, region, and Nation.

The neighborhoods surrounding the IHNC were well-established with many active residents that participated in restoration of abandoned properties, community development associations and school and church groups. However, many residences and businesses adjacent to the project area were destroyed by Hurricane Katrina, causing residents to leave the area and reducing the general level of community cohesion. Furthermore, the Lower Ninth Ward neighborhood was almost entirely destroyed. A number of Federal, state, and local organizations, businesses, school, religious and other non-profit organizations, and other institutions have participated in the recovery of New Orleans following Hurricane Katrina, a reflection of social bond, community cohesion, and National support.

The IHNC has had a divisive effect on the adjacent communities, many of which existed prior to the construction of the IHNC by local governmental entities in 1923, not only because of its direct physical presence as a barrier between neighborhoods, but also because the movable bridges make bicycle and pedestrian movement more difficult and cause vehicle traffic delays, which back-up into residential neighborhoods.

There is a community garden located on the east side of the IHNC, just north of St. Claude Avenue. The garden is on the same square block as an octagonal building housing a sewage pumping station. This community garden is maintained by local residents and serves as a cohesive element in a small area of the Lower Ninth Ward neighborhood. The community garden produces food items that are sold at local area Farmer's Markets. The Upper Ninth Ward Farmer's Market is located at Holy Angels Convent on St. Claude Avenue and is open on Saturday afternoons.

2.2.14 Noise

Noise is generally described as unwanted sound, which can be based either on objective effects (*i.e.*, hearing loss, damage to structures, *etc.*) or subjective judgments (*e.g.*, community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB. Sound levels are typically expressed as A-weighted db (dBA), which describes the relative loudness of sounds as perceived by the human ear.

Noise levels occurring at night generally produce a greater annoyance than do the same levels occurring during the day. It is generally agreed that people perceive intrusive noise at night as being 10 dBA louder than the same level of noise during the day. This perception is largely because background environmental sound levels at night in most areas are also about 10 dBA lower than those during the day.

Acceptable noise levels have been established by the U.S. Department of Housing and Urban Development (HUD) for construction activities in residential areas (HUD 1984):

- Acceptable (not exceeding 65 dBA) – The noise exposure may be of some concern, but common building construction will make the indoor environment acceptable and the outdoor environment will be reasonably pleasant for recreation and play.
- Normally Unacceptable (above 65 dBA but not greater than 75 dBA) – The noise exposure is significantly more severe; barriers may be necessary between the site and prominent noise sources to make the outdoor environment acceptable; special building constructions may be necessary to ensure that people indoors are sufficiently protected from outdoor noise.
- Unacceptable (greater than 75 dBA) – The noise exposure at the site is so severe that the construction costs to make the indoor noise environment acceptable may be prohibitive and the outdoor environment would still be unacceptable.

Noise levels surrounding the IHNC project corridor are variable depending on the time of day and climatic conditions. As the project corridor is located primarily within an urban area, in July 2000, CEMVN contracted Eustis Engineering Company to perform an analysis on pile driving noise and vibration (CEMVN 2000).

Background readings were taken within the existing floodwall and outside the floodwall prior to Hurricane Katrina (CEMVN 2000). Average background readings before 12:00pm varied from 50 to 67 dBA with peak readings varying from 70 to 90 dBA. After 12:00pm, average background readings varied from 50 to 75 dBA with peak readings varying from 64 to 99 dBA. Train, vessel, vehicular, and air traffic (to a lesser extent) contribute to the background noise levels.

Two spot noise measurements were performed by Wyle Laboratories during a March 13, 2008 site visit to assess the existing noise levels. A Larson-Davis Model 831 Sound Level Meter/Analyzer was used for the measurements. The average A-weighted sound level was measured for the duration of 20 or 40 seconds at the locations when no traffic was present on nearby streets. The general ambient noise levels at Sister Street and Dauphine Street in the Holy Cross neighborhood were 48.1 dBA, and the ambient noise levels at the top of the IHNC levee near the St. Claude Avenue Bridge were 52.9 dBA (Appendix K to the 2009 SEIS).

The project area's exposure to aircraft noise was evaluated for civil and military airports within 15 miles of the site. These included Naval Air Station (NAS) Joint Reserve Base (JRB) New Orleans (located approximately 10 miles southeast in Belle Chasse), New Orleans Lakefront Airport (located 4 miles north), and Louis Armstrong New Orleans International Airport (located 14 miles west in Kenner). Two other small airfields, Southern Seaplane (located 7.5 miles south) and Braithwaite Park (located 10 miles south), conduct only infrequent small aircraft operations, are located far from the site, and provide no significant noise impact or noise level data; consequently these airfields were not considered in the study. Noise contours for New Orleans Lakefront Airport were obtained for the airport conditions in 1993 and activity forecast for 2015 from the Master Plan Update EIS for the airport (New Orleans Air Reserve Station 2008). Based on these data, it was determined that the aircraft operations at Lakefront Airport also provide no substantial noise impact to the project area.

Two railroad lines are located near the IHNC. The New Orleans Public Belt Railroad runs parallel to the west bank of the IHNC. The Norfolk-Southern Railroad runs perpendicular to the IHNC and crosses the IHNC at Florida Avenue. An existing rail yard is located on the west bank of the IHNC adjacent to the proposed lock location but separated by a floodwall. Existing railway traffic data were collected and are listed in Table 2-6.

Table 2-6: Daily Railway Traffic Data

Railroad	Public Belt	Public Belt	Norfolk Southern
Direction	West	East	West
Locomotives	1 to 3	1	1
Daytime Trips	14	2	2
Nighttime Trips	4	2	1
Freight cars/train	57	57	40
Track	Welded	Welded	Welded
Speed (mph)	10	10	10
Whistle Stop	At crossings, bridge, Florida Ave	At crossings	At crossings, bridge, Florida Ave
Power	Diesel	Diesel	Diesel
Grade	None	None	None

Currently, roadway traffic is the most prominent noise source in the neighborhoods surrounding the IHNC, especially at the three roadways that cross the IHNC. Average daily traffic volumes and vehicle distributions were obtained from the April 2008 traffic study commissioned by Regional Planning Commission (Appendix J to the 2009 SEIS). As shown in Figure 2-5, the 65 Day-Night Sound Level (DNL) contour due to traffic intersects the first city block on either side of Florida Avenue, North Claiborne Avenue, St. Claude Avenue, France Road, Poland Avenue, and Chartres Street. Vehicle traffic crossing the North Claiborne Avenue Bridge is a substantial noise contributor due to the high traffic volume, large percentage of truck traffic, the height of

the bridge, and the open metal grid road deck. Figure 2-5 also includes noise emissions from daily railroad traffic on local railway tracks.

Figure 2-5: Existing Conditions - No Action - Day-Night Sound Level (DNL) Noise Contours

Prior to 2005, there were numerous sensitive receptors in neighborhoods on both sides of the IHNC. However, since Hurricane Katrina there are substantially fewer occupied homes, schools and churches, as such, fewer nearby sensitive receptors currently exist adjacent to the project area.

2.2.15 Air Quality

The U.S. Environmental Protection Agency (EPA), Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards (NAAQS) for six principal pollutants, called "criteria" pollutants. They are carbon monoxide, nitrogen dioxide, ozone, lead, particulates of 10 microns or less in size (PM-10 and PM-2.5), and sulfur dioxide. NAAQS represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect the public health and welfare. Ozone is the only parameter not directly emitted into the air; it forms in the atmosphere when three atoms of oxygen are combined by a chemical reaction between oxides of nitrogen and volatile organic compounds in the presence of sunlight. Motor vehicle exhaust, industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of nitrogen and volatile organic compounds, also known as ozone precursors. Strong sunlight and hot weather can cause ground-level ozone to form in harmful concentrations in the air. The Clean Air Act General Conformity Rule (40 CFR §93.100 *et seq.*, Determining Conformity of Federal Actions to State or Federal Implementation Plans) dictates that a conformity review be performed when a Federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more NAAQS. A conformity assessment would require quantifying the direct and indirect emissions of criteria pollutants caused by the Federal action to determine whether the proposed action conforms to Clean Air Act requirements and any applicable State Implementation Plan (SIP).

The general conformity rule was designed to ensure that Federal actions do not impede local efforts to control air pollution. It is called a conformity rule because Federal agencies are required to demonstrate that their actions "conform with" (i.e., do not undermine) the approved SIP for their geographic area. The purpose of conformity is to (1) ensure Federal activities do not interfere with the air quality budgets in the SIPs, (2) ensure actions do not cause or contribute to new violations, (3) ensure attainment and maintenance of the NAAQS, and (4) and mitigate emissions if *de minimis* thresholds are exceeded. Orleans Parish is currently in attainment of all NAAQS, and operating under attainment status (EPA 2015). This classification is the result of area-wide air quality modeling studies.

The IHNC Lock project is located in Orleans Parish. Therefore, the air emissions generated by the proposed project would not trigger a conformity determination even if they exceed *de minimis* levels. However, due to the long time frame involved in the construction of approximately 11 years, the conformity status in Orleans Parish may change. Therefore, an air emissions analysis is presented in Chapter 6 under Air Quality for a worst case scenario and an average construction year.

2.2.16 Human Health and Safety

The proposed lock construction area is contained behind 12 and 15-foot high floodwalls along the IHNC and is relatively inaccessible to the public. The area where the St. Claude Avenue Bridge would be demolished and a new bridge constructed is currently accessible by the public, but the construction area would be made off limits to the public during construction and demolition. No significant quantities of hazardous materials are stored in the project area at USACE facilities, and lock and bridge workers follow Occupational Safety and Health Agency (OSHA) standards for workplace safety. Those neighborhoods surrounding the project area that were not severely damaged by Hurricane Katrina are densely populated and have typical public safety issues found in urban environments. Nearby neighborhoods that were severely damaged by Hurricane Katrina have been cleaned of debris by the Federal government and other entities, and no substantial health and safety concerns remain.

2.3 Natural Environment

2.3.1 Aquatic Resources

Aquatic Habitats

There are two distinct salinity regimes in the project area. Freshwater habitat is associated with the Mississippi River to the south of the lock, while brackish waters occur north of the lock in the IHNC, GIWW, and Lake Pontchartrain. Coastal waters of Louisiana contain a number of diverse habitats and a wide-range of salinities, making the estuary suitable for a wide variety of fish and crustaceans at varying times of the year.

Fish resources in the IHNC, GIWW and Lake Pontchartrain are include 85 known species; some common species include bay anchovy (*Anchoa mitchilli*), Atlantic croaker (*Micropogonias undulatus*), Gulf menhaden (*Brevoortia patronus*), and members of the silverside family (Atherinidae) (Stone *et al.* 1980). Fish populations in Lake Pontchartrain also include a number of important gamefish, such as spotted seatrout (*Cynoscion nebulous*), sand seatrout (*Cynoscion arenarius*) and red drum (*Sciaenops ocellata).* The estuarine habitat produces many species of fish that serve as prey for predatory fish. Common prey species include rainwater killifish (*Lucania parva*), naked goby (*Gobiosoma bosci*), Gulf pipefish (*Syngnathus scovelli*), clown goby (*Microgobius gulosus*), pinfish (*Lagodon rhomboides*), bay anchovy, and speckled worm eel (*Myrophis punctatus*) (Duffy and Baltz 1998).

Lake Pontchartrain's substratum constitutes a major nursery ground for commercially valuable species harvested in Louisiana's coastal waters (National Oceanic and Atmospheric Administration Fisheries Service 2014). Post-larval, juvenile, and sub-adult white (*Farfantepenaeus setiferus*), brown shrimp (*Litopenaeus aztecus*), and blue crab (*Callinectes sapidus*) are abundant in Lake Pontchartrain year-round when salinity levels are suitable. These species immigrate into Lake Pontchartrain through the GIWW and 2 natural passes as larvae and post-larvae and then emigrate from the lake and travel to the coastal waters of the Gulf of Mexico after they have grown larger.

The freshwater commercial fishery within the Mississippi River targets channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*), flathead catfish (*Pylodictis olivaris*), alligator gar (*Atractosteus spatula*), and spotted gar (*Lepisosteus oculatus*). Sport fishermen primarily pursue blue catfish, but also target striped bass (*Morone saxatilis*), largemouth bass (*Micropterus salmoides*), white crappie (*Pomoxis annularus.*), black crappie (*Pomoxis nigromaculatus*) and various species of sunfish (*Lepomis spp.*) in the Mississippi River.

The IHNC's benthic habitats can be categorized into two distinct regimes defined by salinity levels present in the water. The southern portion of the IHNC is freshwater and the benthic invertebrates consist of several species of freshwater and freshwater tolerant chiromomids, oligochaetes, amphipods, and isopods. On the northern side of the existing lock is a brackish aquatic habitat that contains similar organisms tolerant to higher salinities. The IHNC's northern brackish side also contains large benthic organisms such as mollusks and blue crabs. Some species of benthic organisms, such as rangia clams *(Rangia cuneata)*, are tolerant of a range of freshwater and brackish conditions and may be found on both sides of the lock.

Water Quality

Major waterbodies in the area consist of the Mississippi River, IHNC, MR-GO, GIWW and Lakes Pontchartrain and Borgne. Smaller hydrologic features include a number of drainage canals, natural bayous, lagoons, and intertidal marshes interspersed with small ponds. The most prominent water body is the Mississippi River, which is North America's longest and largest river and the fifth largest river worldwide. The Mississippi River flows 2,333 miles from Lake Itasca in northern Minnesota to its delta in southeast Louisiana. The IHNC is located at river mile 92.6 above Head of Passes, which is where the river splits into three major distributary passes. The Mississippi River drainage basin is the world's second largest, draining 1.83 million square miles, including tributaries from 32 U.S. states and two Canadian provinces. Lake Pontchartrain is a large, brackish shallow estuary which receives fresh water from various lakes, rivers, bayous, and canals, while receiving salt water from the Gulf of Mexico (Environmental Atlas of the Lake Pontchartrain Basin 2002). The IHNC provides the aquatic connection between Lake Pontchartrain and the GIWW/MR-GO. Some water

from the Mississippi River enters the IHNC during lockages, but the quantity of water discharged during lockages is negligible compared to the tidal flow in the IHNC between Lake Pontchartrain and the GIWW.

Section 303(d) of the Clean Water Act (CWA) requires states to identify waterbodies that do not meet water quality standards and to develop total maximum daily loads for those pollutants suspected of preventing the waterbodies from meeting those standards. Total maximum daily loads are the maximum amount of a given pollutant that can be discharged into a water body from all natural and anthropogenic sources including both point and non-point source discharges. Additionally, Section 305(b) of the CWA requires each state to provide, every two years, to the EPA, revised descriptions of the water quality of all navigable waters in the state, analyses of the status of waters of the state with regard to their support of recreational activities and fish and wildlife propagation, assessments of the state's water pollution control activities toward achieving the CWA goal of having water bodies that support recreational activities and fish and wildlife propagation, estimates of the costs and benefits of implementing the CWA, and descriptions regarding the nature and extent of nonpoint sources of pollution and recommendations for programs to address nonpoint source pollution.

In Louisiana, to comply with Sections 303(d) and 305(b) of the CWA, the Louisiana Department of Environmental Quality (LDEQ) conducts a surface water monitoring program to measure progress towards achieving water quality goals at state and National levels, to gather baseline data used in establishing and reviewing the state water quality standards, and to provide a database for use in determining the assimilative capacity of the waters of the state. Information is also used to establish permit limits for wastewater discharges. The program provides baseline data on individual waterbodies to monitor long-term trends in water quality. The LDEQ Section 305(b) and 303(d) CWA Water Quality Inventory Integrated Report for 2014 lists five waterbodies (sub-watershed code) that are located both within and adjacent to the project area: Mississippi River (LA070301); IHNC (LA041501); Intracoastal Waterway (LA041601); Bayou Bienvenue (LA041801); Lake Pontchartrain (LA041001). (Table 2-7).

Table 2-7: List of LDEQ Sub-watersheds Found in the Project Area and Water Quality Attainment Status

Sub-watershed Name & LDEQ ID	Water Quality Attainment Status	Suspected Causes of Impairment	Suspected Sources of Impairment
Mississippi River LA070301	Fully meeting standards	N/A	N/A
IHNC LA041501	Fully meeting standards	N/A	N/A
Intracoastal Waterway LA041601	Fully meeting standards	N/A	N/A
Bayou Bienvenue LA041801	Fully meeting standards	N/A	N/A
Lake Pontchartrain LA041001	Fully meeting standards	N/A	N/A

Prior to 2006, sub-watershed IHNC (LA041501) failed to meet designated uses for Primary Contact Recreation, Secondary Contact Recreation, and Fish and Wildlife Propagation. LDEQ suspected the causes of past impairment to the Primary and Secondary Contact Recreation designated uses were fecal coliforms from sanitary sewer overflows during sewerage system failures, and from urban municipal wastes. Low dissolved oxygen levels impaired the quality of water for fish and wildlife propagation. Non-point source pollution from high-density urban areas was the suspected source of oxygen demanding substances. The runoff of oxygen demanding substances and the failure of sewerage systems are associated with rain events (LDEQ 2014).

The water quality in sub-watershed IHNC (LA041501) has improved over recent years. As of 2006, LDEQ water quality monitoring data indicated that the fecal coliform levels had decreased and that the waterbody had reached attainment for both Primary and Secondary Contact Recreation. As of 2014, sub-watershed IHNC (LA041501) remains in attainment for all water quality designated uses (LDEQ 2014).

In 2006, the adjacent sub-watershed Lake Pontchartrain (LA041001) was in violation of LDEQ criteria for fecal coliforms. The water body did not support designated uses for Primary Contact Recreation; however, it did meet designated uses for Secondary Contact Recreation and Fish and Wildlife Propagation. The suspected sources of impairment to the water body were overflows of sanitary sewerage systems (LDEQ 2006). Current LDEQ water quality monitoring data (2014) indicates that the fecal coliform levels have decreased and that the water body has reached attainment for both Primary and Secondary Contact Recreation. As of 2014, sub-watershed Lake Pontchartrain (LA041001) remains in attainment for all water quality designated uses (LDEQ 2014).

Water Quality and Sediment Evaluation

Results of testing for contaminants of concern found in the 1993 sampling efforts conducted during preparation of the 1997 EIS are incorporated herein by reference. In summary, four locations were sampled in the IHNC and recovered samples were analyzed using Toxic Characteristic Leachate Procedure methods for metals, volatile organics, extractables, herbicides and pesticides in elutriates. Contaminants of concern identified in the analyses above the 1993 applicable acute toxicity criteria were zinc, lead, chromium and copper.

As part of the soil sampling on the banks of the IHNC for the 1997 EIS, numerous surface, near-surface and deep auger samples (-35 feet) were collected and analyzed at locations identified as sites of past activities generating hazardous material. Depending on the location of the samples and the suspected types of contaminants of concern at each site, analysis was performed for a wide range of contaminants, including polynuclear aromatic hydrocarbons (PAH), oil and grease, halogenated hydrocarbons, metals, volatile organics, pesticides and herbicides. The results of the soil analysis were described in the 1997 EIS and are incorporated herein by reference; most of the detectable contaminants of concern were found in the surface and near-surface samples, and the deeper (-35 feet) soil samples commonly indicated only background levels of most contaminants. The primary contaminants of concern identified included 7 metals, 21 volatile organics, 21 base/neutral semivolatile organics and 2 pesticides. The Toxic Characteristic Leachate Procedure analyses found only lead present at one site above the regulatory limits.

Spot sampling of surface and shallow subsurface soils at suspected or known hot spots for petroleum hydrocarbons contamination yielded higher concentrations of heavy hydrocarbons, with metals and chlorinated hydrocarbons near engine repair sites. Fuel contamination was localized in soil near fuel tanks and transfer stations. Lead contamination was prevalent at sites containing sandblast materials.

Water Quality and Sediment Evaluation Implementation

A more detailed soil and sediment sampling effort started in 2005, but was interrupted by Hurricane Katrina. In 2007, the project was enjoined and additional analysis of impacts based on post-Katrina conditions was determined appropriate. An expanded sampling effort was completed by Weston Solutions, Inc. during the period July 9, 2007 to September 10, 2007. The objective of that investigation was to evaluate the physical, chemical and biological characteristics of material (non-native sediment and fill and native subsurface soil) to be dredged or excavated as part of the IHNC Lock replacement project. The reported information was used to develop an environmentally acceptable and regulatory-compliant management strategy for material generated during dredging to construct the IHNC Lock replacement project and provide scientific evidence to support decisions regarding the placement of excavated and dredged material at the disposal areas being proposed.

Within each of the 10 dredged material management units (DMMUs) established based on required dredging locations (see Figure 2-6), coring and sample target depths were established based on the proposed depth of dredging or disturbance by the proposed project as interpreted from bathymetric data collected in 2003. Cores and samples were collected from submerged locations using an electric vibracore apparatus or a box core device, depending on the type and depth of sample required for each location. Samples on land were collected with a motorized auger unit using a split barrel sampler or a thin walled tube sampling sleeve.

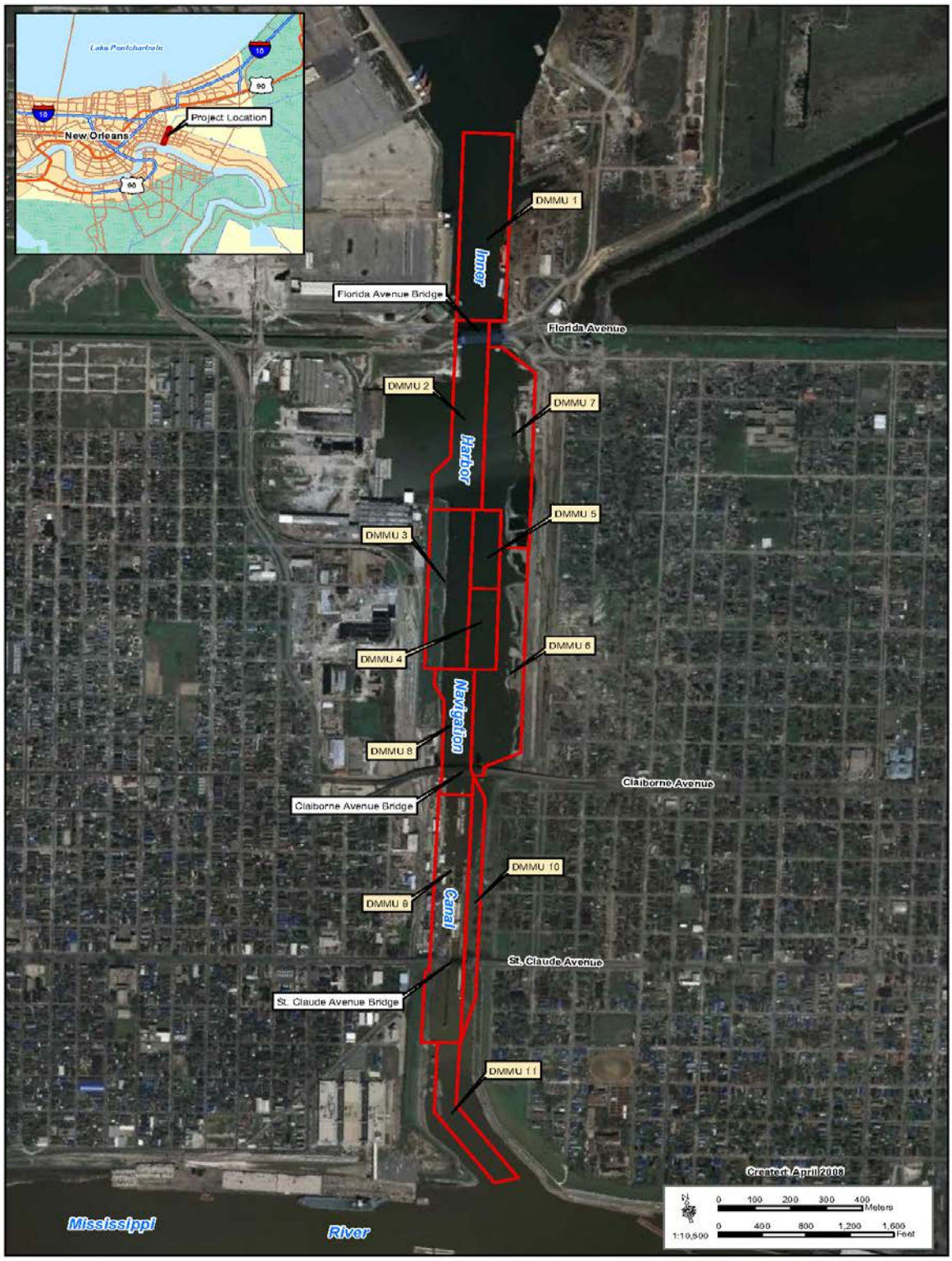

Figure 2-6: Location of Dredged Material Management Units

All cores were advanced to the target depth except for one, which was stopped short due to refusal by subsurface debris. Numerous cores were required at some locations in order to collect the amount of material required for laboratory analysis. All samples were composited, as necessary, at a field processing station prior to separation of aliquots for analysis. A total of 69 stations were sampled, with 4 to 20 cores collected at each station, depending on the amount of sample material needed for testing. A total of 339 cores were successfully recovered.

In addition to samples taken from the proposed project area, reference samples were collected from reference sites located in the Mississippi River and Bayou LaLoutre to provide material as a baseline to compare with samples from the project area. Water was also collected from all sites, including the DMMUs, for water chemistry analysis and to generate elutriates for analysis.

Sampling was conducted at each site using protocols defined by the EPA and the USACE for sample collection at proposed dredge sites. Sampling protocol includes complete chain-of-custody documentation and sample preservation during collection and shipment to off-site laboratories. Laboratories used for analysis and biological testing of the collected samples were:

- U.S. Army Engineer Research and Development Center, Environmental Laboratory, Vicksburg, Mississippi.
- TestAmerica, Pittsburgh, Pennsylvania
- Weston Solutions, Inc., Carlsbad, California
- NewFields Northwest, Port Gamble, Washington
- PACE Laboratories, St. Rose, Louisiana

These laboratories used protocols established by the *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Inland Testing Manual* (ITM; EPA/USACE 1998) to determine suitability for disposal of dredged material in open water. Samples were also analyzed for suitability for upland disposal according to protocols set by the *Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities – Upland Testing Manual* (USACE 2003b).

Physical analyses included geotechnical analyses, such as grain size distribution, soil classification, Atterberg limits, moisture content, organic content, specific gravity, pH, and hard carbon. Simplified Laboratory Runoff Procedure analysis was performed to determine runoff water content following disposal. Column settling tests were utilized to determine the disposal area needed for sediment settling and water column clarification prior to effluent discharge.

Sediments and soils were analyzed for the quantification of over 170 contaminants of concern, including metals, organotins, PCB, semi-volatiles, total petroleum hydrocarbons, pesticides, herbicides, and volatiles according to methods approved by EPA and the American Society for Testing and Materials, as well as standard operating procedures for the laboratories involved. Physical characterization and chemical inventories were used in the interpretation of biological tests (described below) and to identify sediment properties that may have contributed to observed adverse impacts on water column and benthic test organisms.

The guidance provided by the Inland Testing Manual required that bioaccumulation potential and toxicity testing using appropriate type species be conducted to determine the potential long-term impact of dredged material disposal on biological resources at open water disposal sites. Separate freshwater and estuarine biological evaluations of water column and benthic impacts were conducted.

Sediments and soils were used for the preparation of elutriates used in freshwater and estuarine suspended phase toxicity tests and for conducting freshwater and estuarine solid phase toxicity and bioaccumulation potential tests. An elutriate is an aqueous extract derived from material proposed for dredging, in which the dissolved contaminants are compared to water quality standards with consideration of mixing and used directly in toxicity tests. Elutriates are prepared using water collected at the same site as the proposed dredged material.

Freshwater and estuarine juvenile fish were exposed to elutriates to predict any potential water column toxicity at the Mississippi River and mitigation site, respectively. Note that the "mitigation site" was the proposed area where suitable dredged material from the lock construction project would be used to restore wetlands in a large area of shallow open water. This project feature is no longer part of any of the lock replacement alternatives under consideration since no impacts to fish and wildlife habitats requiring compensatory mitigation would occur. In addition to the toxicity evaluation, the potential for water column impacts were assessed by comparison of measured contaminants of concern concentration in individual samples elutriates to background levels in receiving waters and to water quality standards. Dilution requirements were then determined for each elutriate contaminants of concern to meet background levels, or site-specific and regulatory water quality standards. Maximum dilution required for each DMMU to meet the above criteria at each disposal area was identified, and mixing zone models were evaluated to determine if sufficient dilution occurred within regulatory mixing zones specified by LDEQ. Further details on the methodology are included in the Water Quality and Sediment Evaluation Report (Appendix C to the 2009 SEIS). Results of the freshwater and estuarine elutriate testing are discussed in Chapter 6.

2.3.2 Essential Fish Habitat

Specific categories of Essential Fish Habitat, as defined by the Magnuson-Stevens Fishery Conservation and Management Act, occurring in the project area include estuarine emergent wetlands, estuarine water column and estuarine mud substrate (bottom). Estuarine water column and estuarine mud substrate occurs throughout all of the tidally-influenced waters of the project area, including the IHNC, GIWW/MR-GO, Lake Pontchartrain, and numerous bayous, canals, and ponds. Since the water salinity in this area is normally brackish, the wetlands are comprised of species suited to brackish conditions, although there is evidence that the closure structure placed across the MR-GO at Bayou La Loutre and the blockage of the MR-GO by the HSDRRS floodwall near Bayou Bienvenue have caused the area to become considerably fresher due to decreased tidal exchange. The two dominant herbaceous species of the emergent estuarine wetlands are smooth cordgrass (*Spartina alterniflora*) and marsh hay cordgrass or wiregrass (*Spartina patens)*. This habitat is tidally inundated, at least occasionally, and serves as important escape and feeding habitat for a variety of estuarine species, especially the small juveniles of larger species like spotted seatrout and all life stages of smaller species like killifishes (family Cyprinodontidae).

Three Federally-managed estuarine/marine species are commonly to abundantly found in the project area; brown shrimp, white shrimp, and red drum. Brown shrimp occur as post-larvae, juveniles, and sub-adults. The post-larvae show up in large numbers beginning in late March to in early April. The juveniles and sub-adults are abundant and heavily fished in May, June, and July. White shrimp also occur as post-larvae, juveniles, and sub-adults. Post larvae begin to show up in June and July. The peak of white shrimp abundance and harvest is August through November. Both species are brought into the project area as post-larvae from the Gulf of Mexico through tidal action and emigrate from the project area as juveniles and sub-adults, also by tidal action as they make their way to spawning grounds. Red drum of various age classes from small juveniles up to sub-adults also occur in the project area and are occasionally caught by recreational anglers, although the highest abundances and catches of red drum in southeast Louisiana are located in saltier estuarine waters outside of the immediate project area.

The IHNC at the proposed new lock construction site provides poor Essential Fish Habitat due to the industrialized nature of the area and the influence of fresh water through lockages from the Mississippi River. However, the IHNC from its intersection with the MR-GO/GIWW to Lake Pontchartrain and the MR-

GO/GIWW are major man-made tidal passes through which the post-larvae of countless brown and white shrimp pass into the lake, and those that survive then later exit the lake as juveniles and sub-adults. Large quantities of brown and white shrimp are harvested in the GIWW/MR-GO usually at night on a falling tide with boats pushing skimmer nets. The intersection of the IHNC and Lake Pontchartrain, locally known as "Seabrook" is a major recreational fishing location, although its popularity has decreased considerably since the previously-mentioned channel closures have been constructed. While spotted seatrout are the predominant sport fish caught at this location, red drum and sand seatrout are also occasionally caught.

It is widely known that much of the coastal wetlands of Louisiana have been lost and continue to convert to open water due to a variety of causes including subsidence of underlying sediments, lack of riverine sediment input, and the construction of thousands of canals for various purposes that have allowed salt water and tidal influence to move far inland from the coast. As a result of this loss of emergent wetlands, major efforts are underway by a variety of governmental agencies to restore the lost wetlands which provide fish and wildlife habitats and storm surge attenuation. The conversion of shallow estuarine open water back to emergent wetlands is considered to produce beneficial effects on the overall environment, and nearly all coastal restoration projects that have been implemented and those envisioned for future construction are designed to cause wetlands to be restored or provide protection for existing wetlands. Additionally, compensatory mitigation projects for impacts on coastal wetlands usually have similar designs.

2.3.3 Threatened and Endangered Species

Several Federally-listed threatened or endangered species are known to occur in the vicinity of the project area. These species are pallid sturgeon (*Scaphirhynchus albus,* endangered), Gulf sturgeon (*Acipenser oxyrhynchus desotoi*, threatened), and the West Indian manatee (*Trichechus manatus*, endangered).

The pallid sturgeon only occurs in large rivers within the Mississippi and Missouri River Basins from Montana to Louisiana. This includes the Mississippi River and Atchafalaya River in south Louisiana. The pallid sturgeon tends to select main channel habitats in the Mississippi River. Additional habitat descriptions state that the pallid sturgeon generally inhabits large, turbid, free-flowing riverine type environments with swift moving waters and rocky or sandy substrates (USFWS 1990). The species is long-lived and spawning is believed to occur between June and August. Larval fish drift downstream from the hatching site and settle in the lower portion of the water column 11 to 17 days after hatching (USFWS 2007). Anthropogenic alterations to the Mississippi River such as bend way cutoffs, tributary impoundments and channel erosion have led to changes in deposition and erosion patterns potentially affecting pallid sturgeon populations (USFWS 2007). Habitat decline for this species has been attributed to channelization of rivers and construction of reservoirs that ultimately reduce the amount of turbidity in the water, which is vital for the pallid sturgeon for not only feeding areas but also spawning habitat.

The Gulf sturgeon is an anadromous fish that occurs in many rivers, streams, and estuarine waters along the northern Gulf coast between the Mississippi River and the Suwannee River, Florida (USFWS 2003). In Louisiana, the Gulf sturgeon has been reported at Rigolets Pass, rivers and lakes of the Pontchartrain Basin, and adjacent estuarine areas, including the MR-GO inland reach. Spawning occurs in coastal rivers between late winter and early spring (*i.e.*, March to May). Gulf sturgeon are more likely to be in the inland reach of the Mississippi River Gulf Outlet during the winter months, (i.e., November 1 through March 31). Gulf sturgeon less than 2 years old appear to remain in riverine habitats and estuarine areas throughout the year, rather than migrate to marine waters. Habitat alterations and poor water quality, especially in rivers used for spawning, and hurricanes, toxic spills and over-fishing, have negatively affected this species.

West Indian manatees can be found in shallow, slow-moving rivers, estuaries, salt-water bays, canals, and coastal areas (LDWF, 2012a). West Indian manatees are typically found in waters with dense submerged aquatic beds or floating vegetation where the species grazes on a variety of aquatic plants. This species has been known to occasionally enter Lake Pontchartrain and associated coastal waters from June through September. Manatees

have been reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of Louisiana. They have also been occasionally observed elsewhere along the Louisiana Gulf coast. The manatee has declined in numbers due to collisions with boats and barges, entrapment in flood control structures, poaching, habitat loss, and pollution.

Green sea turtles (*Chelonia mydas*, threatened); hawksbill sea turtles (*Eretmochelys imbricate*, endangered); Kemp's ridley sea turtles (*Lepidochelys kempi*, endangered), leatherback sea turtles (*Dermochelys coriacea*, endangered), loggerhead sea turtles(*Caretta caretta*, threatened), and finback whales (*Balaenoptera physalus*, endangered); sei whales (*Balaenoptera borealis*, endangered), blue whales (*Balaenoptera musculus*, endangered), and sperm whales (*Physeter macrocephalus*, endangered) are not expected in the southern end of the IHNC where construction activities would occur from any of the lock replacement alternatives. The IHNC channel and the proposed dredged material disposal areas (except for the Mississippi River site), have been heavily impacted by human activities and provide no or low quality habitat for threatened and endangered species.

2.4 Cultural Environment

2.4.1 Aesthetic Values

A significant aesthetic resource of the project area is the Holy Cross levee and batture area, which is a recreational area used for fishing, picnicking, jogging, relaxing, and walking (Photograph 2-2). This area provides a visual amenity for residents of the Holy Cross neighborhood who view the river and watch barges and ships passing, and provides views upriver of downtown New Orleans. Prior to Hurricane Katrina, it was estimated that 20 percent of the Holy Cross residents and 5 percent of the Lower Ninth Ward residents, or about 2,000 people, used the levee and batture annually. Another significant aesthetic resource in the IHNC area is the stand of 18 live oaks (*Quercus virginiana*) located north of the St. Claude Bridge on the east bank of the IHNC (Photograph 2-3). This site is owned and maintained by the CEMVN. Although the area is fenced and not available to the public, it provides a visual amenity for residents of the Lower Ninth Ward who live near Jourdan Avenue and for other residents passing over the St. Claude Avenue Bridge.

Photograph 2-2. Holy Cross levee with recreational trail

Photograph 2-3. Stand of live oaks located along Sister Street

The Bywater and Holy Cross Historic districts are the two neighborhoods in the IHNC project area listed on the National Register of Historic Places. Within these historic districts, the majority of the buildings have historic and architectural significance which is high in aesthetic value. The Bywater Historic District is a mixed residential/commercial area spanning 120 city blocks. The Holy Cross Historic District is primarily residential, covering a 60-block area. Building types in both historic districts include Creole cottages, shotgun houses, camelback houses, side hall plan houses, and bungalows. Both districts are aesthetically unique due to the diverse style and complementary architectural features present. Most of the residential structures are painted in light pastel colors. Mature trees are present along the streets in both neighborhoods, and they provide shade

and a visual softness to the street environment. Many of the residential homes in the Holy Cross neighborhood were severely damaged by Hurricane Katrina, but many have been completely restored. Substantial damage to residences and businesses also occurred in the Bywater Community, although the level of damage was much less than experienced in the Holy Cross neighborhood.

2.4.2 Recreational Opportunities

Prior to Hurricane Katrina there were 10 parks and playgrounds, two recreation centers and swimming pools operated in the project area by the New Orleans Recreation Department. All of the recreation areas sustained damage as a result of Hurricane Katrina and some have experienced repairs and are operational, while others are still in need of repair. Open space is also present in portions of the neighborhoods. The IHNC and Mississippi River levee and batture located south of the St. Claude Bridge within the Holy Cross neighborhood includes a jogging and walking path and is still heavily used post-Hurricane Katrina. There are opportunities for passive recreation, such as viewing the river and downtown New Orleans from the levee and batture. Subsided wetland areas along Bayou Bienvenue north of the railroad tracks provide open space for passive recreation for residents of the Lower Ninth Ward. A wooden staircase and viewing platform was constructed over the levee and floodwall that separates the Lower Ninth Ward from the degraded wetlands area along Bayou Bienvenue (Photograph 2-4).

Photograph 2-4. Permanent viewing platform in the Lower Ninth Ward.

Table 2-8 lists the parks, playgrounds, and recreation centers and the amenities they provide located within the Florida, St. Claude, Bywater, Lower Ninth Ward and Holy Cross neighborhoods.

Table 2-8 Project Area (Neighborhood) Parks, Playgrounds, and Recreation Centers

Neighborhood	Park, Playground, Recreation Center	Amenities Provided
Florida	Odile Davis	Outdoor basketball courts; all-purpose fields; baseball fields; and play equipment
Florida	FP Jackson	Outdoor basketball courts and play equipment.
St. Claude	Bunny Friend Park	Outdoor basketball courts; all-purpose fields; baseball fields; and play equipment.
Lower Ninth Ward	Stallings St. Claude Recreation Center	Indoor basketball courts; dance studio; all-purpose fields; fitness center; multi-purpose classrooms; outdoor pool; and recreation center
Lower Ninth Ward	Oliver Bush Playground	Covered outdoor basketball courts; all-purpose fields; baseball fields; picnic pavilion; play equipment; tennis courts; and walking path
Lower Ninth Ward	Sanchez Multi-purpose Center	Arts and crafts room; indoor basketball courts; computer lab; dance studio; fitness center; game room; music room; indoor pool; reading room; stage; multi-purpose classrooms
Lower Ninth Ward	Sam Bonart Playground	Covered basketball courts; all-purpose fields; baseball fields; play equipment; and outdoor pool
Lower Ninth Ward	Richard Lee	Outdoor basketball courts and all-purpose fields
Lower Ninth Ward	Roffignack Playspot	Play equipment
Holy Cross	Delery Playspot	Play equipment
Bywater	Mickey Marlay Playground	All-purpose fields; walking path; and play equipment

2.4.3 Cultural Resources Including National Register Listings

CEMVN completed studies of the potentially significant historic properties in the area that would be impacted by construction of the new lock in or near the IHNC. These studies were conducted between 1987 and 1992 and investigated the archaeological and historic property potential for the area of potential effect. A comprehensive summary of these studies is presented in the 1997 EIS and is incorporated herein by reference. Since 2005, the Federal Emergency Management Agency (FEMA) has served as lead agency under Section 106 of the National Historic Preservation Act for the demolition of residential buildings identified as a threat to health and safety in the aftermaths of Hurricanes Katrina and Rita. FEMA is still implementing its demolition program.

The IHNC Lock, which was completed in 1923, was evaluated and determined to be eligible for listing in the National Register of Historic Places. A detailed history and description of the IHNC Lock is presented in the 1997 EIS and is incorporated herein by reference.

The Galvez Street Wharf, originally known as the Claiborne Wharf, was designed by the Board of Commissioners in 1922 and erected in 1929. It was one of the first improvements to the Industrial Canal Zone. The building was evaluated and determined eligible for the National Register of Historic Places for its locally and regionally significant association with the early period of development of the IHNC (Criterion A). The Galvez Street Wharf was demolished in 2001 as part of the implementation of the IHNC Lock Replacement Project.

Sewage Pump Station B was built during the first decade of the 20th century and represents one of the original components of the New Orleans sewerage system. A detailed description and history of Sewage Pump Station B is presented in Appendix D of the 1997 EIS and is incorporated herein by reference. Sewage Pump Station B needed only minor alterations through the years and, overall, retained good integrity. The Sewerage Pumping Station B was evaluated and determined to be eligible for the National Register of Historic Places. Sewage Pump Station B was considered eligible for its association with events important to the settlement of New Orleans and the establishment of the city's early 20th century sewage system (Criterion A). In addition, the station was considered eligible for its Mediterranean architectural style, important to the city's early 20th century architectural history (Criterion C). Finally, the structure is also considered eligible for its engineering (Criterion C), and it retains two of the original centrifugal pumps, along with two Wood trash pumps which were installed around 1930, the latter of which are still in use. The 1930 changes made to the station in order to increase its capacity consisted of the installation of new pumps and new motors. The original 1904 plans were drawn with these future installations in mind.

Two historic districts listed on the National Register of Historic Places are located in the project area: the Holy Cross Historic District to the east of the IHNC, and the Bywater Historic District to the west of the IHNC. The Bywater Historic District was determined eligible for the National Register of Historic Places due to its architectural importance on both the local and regional levels for the quality and number of buildings built between 1807 and 1935. The predominant architectural type within the historic district is the shotgun type, which accounts for 61 percent of the structures in the district. The Holy Cross Historic District was determined to be eligible for the National Register of Historic Places under Criterion D and also consists of predominantly single or double shotguns with Italianate and Eastlake details. A detailed discussion of both the Bywater and Holy Cross National Register of Historic Places historic districts is presented in Appendix D of the 1997 EIS and is incorporated herein by reference.

Hurricanes Katrina and Rita damaged many historic buildings in New Orleans, including buildings in both the Bywater and Holy Cross historic districts. As part of the Federal Emergency Management Agency's (FEMA) compliance with Section 106 of the National Historic Preservation Act, FEMA and the State Historic Preservation Office completed surveys of affected New Orleans neighborhoods in order to evaluate the historic integrity of the districts currently listed on the National Register of Historic Places, confirm the existing boundaries of these National Register of Historic Places districts, and identify other neighborhoods that may

also be eligible for National Register of Historic Places consideration. As a result of these surveys, FEMA and SHPO concluded that the historic boundaries of both the Bywater and Holy Cross National Register of Historic Places historic districts have expanded. FEMA is still conducting the public involvement process to determine which buildings would be demolished that the City of New Orleans has identified as in imminent threat of collapsing. Through consultation with the public, FEMA is seeking to identify alternatives to the demolition of structures determined eligible for the National Register of Historic Places. Many of these structures are located in the Bywater and Holy Cross National Register of Historic Places historic districts, along with adjacent neighborhoods.

The St Claude Avenue and North Claiborne Avenue bridges were evaluated for their inclusion on the National Register of Historic Places. The St. Claude Avenue Bridge, built between 1918 and 1921, was determined to be eligible for inclusion on the National Register of Historic Places. The bridge is a Strauss Heel Trunnion Bascule bridge and represents a significant type of engineering structure which was in common use throughout the U.S. Because the St. Claude Avenue Bridge is a representative of its type, it is eligible for the National Register of Historic Places under Criterion C. The North Claiborne Avenue Bridge was determined not eligible for the National Register of Historic Places, as it was not considered an exceptional structure, rather an ordinary bridge for its time without any particular merit in design or construction. The bridge was also not associated with significant events in the past or significant people. As a result, the bridge is not considered a historic property.

The potential for intact archaeological deposits was evaluated for areas east and west of the IHNC. Given its recent development, its location on the Mississippi River delta plain, which was deposited only a few thousand to a few hundred years ago, and the extensive disturbance resulting from the construction of the existing lock, it is anticipated that any prehistoric sites that may have existed in the construction footprint of the lock have been destroyed. To the west, near the Bywater neighborhood, archaeological investigations indicated that disturbance in the area varied from minor disturbance to total disturbance. Total disturbance was noted for the area along the IHNC and the approach for the Claiborne Avenue Bridge. Another archaeological study was conducted to the east of the IHNC. For this study, computerized mapping and historic archival material were used to predict the locations of historic features. The results of the archaeological investigations confirmed the predictions and it was noted that the deposits had good integrity and further research potential. In addition to empty lots, occupied residential and commercial lots were also tested. These also yielded cultural deposits and features that had good integrity and, as a result, good research potential.

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3.0 Plan Reevaluation

This section outlines the reevaluation of previously completed studies, using current planning criteria and policies, which is required due to changed conditions and/or assumptions. The results may affirm the previous plan; reformulate and modify it, as appropriate; or find that no plan is currently justified.

3.1 Planning Problems and Opportunities (Purpose and Need)

3.1.1 Problem

The existing IHNC navigation lock (see Figure 3-1) is not efficient. The average transit[1] time for a tow using the existing IHNC navigation lock is more than 16 hours. The processing time for a tow entering and exiting the lock is nearly 44 minutes on average; meaning the delay for a tow just to enter the existing lock is more than 15 hours. This delay is a result of the existing lock's limited capacity relative to prevailing levels of traffic and the size of tows navigating the GIWW and Mississippi River that utilize the lock. Furthermore, since the existing IHNC navigation lock was constructed in 1923, operation and maintenance costs have increased due to the increasing frequency of maintenance events that result in additional delays, in addition to delays caused by the limited capacity of the existing navigation lock, or a complete closure of the lock to waterborne traffic.

Figure 3-1. Location of Existing IHNC Lock and Bridges.

[1] Transit through a lock includes entering the queue, cutting a tow, if necessary, to lock through the existing lock, locking through the structure and reassemble of a cut tow upon exiting the lock.

3.1.2 Opportunities

Improve efficiency and reliable passage of waterborne traffic locking through the IHNC.

3.2 Planning Goals, Objectives, and Constraints

3.2.1 Goal

Reduce transit times of waterborne traffic locking through the IHNC.

3.2.2 Objectives

Reduce transit times, over a 50 year period of analysis, of waterborne traffic locking through the IHNC.

3.2.3 Constraints

- Avoid and minimize impacts to local residents and businesses to the maximum extent practicable;
- Locate a replacement lock in the vicinity of the existing IHNC lock;
- Do not reduce effectiveness of flood risk reduction systems a replacement lock would tie into.

3.3 Initial Array

3.3.1 Introduction

The intent of this GRR is to re-analyze measures or plans presented and or screened in prior studies and reports. The conditions that resulted in the elimination of prior features, measures, and alternative plans have not changed. In some instances, the conditions have only become more restrictive. For example, following the partial de-authorization and physical closure of the MR-GO in 2009, deep-draft navigation via the MR-GO into the IHNC/GIWW has continued to decline. In addition, the Lake Pontchartrain and Vicinity, Louisiana Hurricane Storm Damage Risk Reduction System project (LPV) was repaired, restored and improved to provide an increased level of risk reduction. In the instance of a replacement lock constructed at Violet, LA, the adverse impacts to existing wetland habitat still exists, while constructing navigation locks through the LPV hurricane storm damage risk reduction system project (and through the Mississippi River and Tributary flood risk reduction features and the non-Federal St. Bernard back levees) would add additional construction costs to a project already estimated to cost more than the alternate north of Claiborne site. For this reanalysis, implementation (or construction period) is estimated, for purposes of this report, to be 13 years from 2019 through 2031. The first year of the construction period is set as 2019 (the first possible budget year), resulting in a base year of 2032 and a period of analysis of 50 years ending in 2081. Including the GRR study period of nearly three and a half years, the planning horizon encompasses over 66 years.

3.3.2 Historical Background

As of this report, the IHNC Lock Replacement project, also known as "MR-GO New Lock and Connecting Channels" is the longest ongoing water resource project evaluation effort within the Corps. This sub-section presents a summary of that evaluation history as reported in previous project documents. For reference, those prior reports, studies, and analyses are included with this report in Appendix F.

Since 1960, CEMVN had studied numerous options for replacement of the IHNC Lock. The initial public meeting on the IHNC Lock replacement was held in February 1960. Site plans in the vicinity of the existing IHNC Lock and in St. Bernard Parish downstream of the existing lock were developed. Efforts were focused on an IHNC replacement site. At the time, geotechnical conditions dictated that a lock could not be located closer than 750 feet from the existing IHNC Lock. This would have resulted in significant impacts to businesses,

industries, and residents. Approximately 4,100 persons would have been relocated. As a result, the local sponsor withdrew support and requested consideration of a site in St. Bernard Parish.

Between 1961 and 1964 CEMVN conducted studies for a replacement lock at either the IHNC or Violet sites (in the vicinity of Mereaux, LA). CEMVN concluded that only a barge lock was justified. However, the Chief of Engineers determined that the MR-GO legislation pertained to a ship/barge lock, and that the study should report on a ship/barge lock. After a restudy in 1964, it was determined that historical growth of deep-draft tonnage was being drastically depressed due to the existing lock's inadequate size and the physical congestion in the IHNC, which resulted in ever-increasing delays. Completion of the MR-GO also contributed to this decline in ship usage due to ships choosing to avoid the IHNC lock delays and using the MR-GO to access the IHNC. Studies were therefore focused on the feasibility of a lock at the IHNC location.

Site selection studies during the late 1960's and early 1970's addressed the IHNC and Violet sites and concluded that a Violet site was the least costly, impacted the community the least, had the smallest population, and was acceptable to navigational interests. The St. Bernard Parish Policy Jury, in May 1969, took a position favoring the location of the "connecting link" in the parish if a bridge across the same was available, but subsequently opposition to a St. Bernard location developed.

Based on the information gathered from public meetings, studies were made of 14 plans at seven separate locations. A detailed plan comparison was made with the IHNC Site. The comparison included proposals for the ultimate disposition of the old IHNC lock and canal, the utilization of a new barge canal as an extension of the GIWW, comparative bridge studies, and provision of environmental mitigation. This comparison resulted in the 1974 recommendation of the Lower Site Plan (the Violet site), containing the provisions of a ship channel and lock just below Violet, Louisiana, a barge canal to connect the lock tailbay with the GIWW, moth-balling of the old IHNC lock, and provisions for environmental mitigation. Detailed information is available in the "New Lock and Connecting Channels - Site Selection Report" dated March 1975.

In April 1977, subsequent to the submission and approval of the site selection report, President Carter recommended further study of a replacement lock at the existing IHNC Site with emphasis on action to minimize displacement and disruption of residents. In subsequent studies CEMVN has analyzed various groups of plans including lock location(s), lock size(s), number of locks, alternate channels and construction methods.

In 1982 about one-third of the cargo ships in the fleet were too large to use the existing lock and less than one-fifth of the bulk carriers likewise could use the existing lock.

Section 844 of the Water Resources Development Act of 1986, PL 99-662 modified the 1956 Act "to provide that the replacement and expansion of the existing Industrial Canal Lock and connecting channels or the construction of an additional lock and connecting channels shall be in the area of the existing industrial canal lock or at the Violet site. . . ." It also directed the Secretary to "make a maximum effort to assure the full participation of members of minority groups living in the affected areas, in the construction of the replacement or additional lock and connecting channels authorized by subsection (a) of this section, including actions to encourage the use, whenever possible, of minority owned firms."

The Violet site plan (formerly the Lower Site plan) was re-formulated with a view toward minimizing environmental impacts by reducing the required rights-of-way. Even with this, the project would have still directly impact at least 1,000 acres of valuable wetlands. In addition approximately 9,800 acres of wetlands would have been indirectly impacted. Virtually all wetland impacts resulting from construction of a new lock and connecting channel at Violet would have occurred in St. Bernard Parish. Because of this, mitigation features focused on St. Bernard and adjoining parishes.

Although the NED plan in the 1997 Evaluation Report was a shallow draft plan, the local sponsor expressed a willingness to fully fund the construction and the operation, maintenance, repair, rehabilitation and replacement

(OMRR&R) of the increment of construction required to provide a deep draft lock. For that reason, after analysis of all reasonable alternatives, including those previously investigated, the 1997 Evaluation Report recommended the construction of the locally preferred plan (the deep draft increment), with Federal and Inland Waterway funding participation being limited to the cost of the shallow draft plan (the NED plan). That recommended plan was a deep-draft navigation lock located between the Claiborne and Florida Avenue Bridges with dimensions of 1,200 feet long by 110 feet wide and -36 feet (NAVD88). The NED plan was a shallow draft lock with dimensions of 900 feet long by 110 feet wide and -22 feet (NAVD88). A 2000 Supplemental Evaluation Report determined that a federal interest existed in the construction of the deep draft increment. Rather than the non-federal sponsor paying for 100 percent of the incremental cost of a replacement deep draft navigation lock, as approved in this report, the non-federal responsibility was defined as 6.5 percent of the total cost of construction of the authorized project (which is a composite of the deep and shallow draft lock increments). Furthermore, the non-federal sponsor would not be responsible for any costs of OMRR&R for any part of the entire lock replacement project. The shallow draft navigation lock replacement increment has always been designated as an Inland Waterway navigation feature with the cost of construction allocated 50/50 between the USACE and the Inland Waterways Trust Fund. OMRR&R of the entire project would be the responsibility of the USACE.

Throughout the history of this entire project effort, there has been community and environmental interest opposition to the various proposed plans, the projected social and environmental impacts associated with those plans, and to the proposed lock replacement project in general. Critical legal decisions following both the 1997 Evaluation Report and the 2000 Supplemental Evaluation Report impacted the evaluation process and implementation of the recommended plan for a deep draft navigation lock as presented in the 1997 Evaluation Report, as amended by the 2000 Supplemental Evaluation Report.

In 2003, the Holy Cross Neighborhood Association, Gulf Restoration Network, and Louisiana Environmental Action Network filed a legal complaint challenging the 1997 Evaluations Report EIS and Record of Decision. In 2006, the United States District Court, Eastern District of Louisiana enjoined the Corps from continuing with the project until the Corps prepared a supplemental EIS further evaluating potential impacts of hurricanes and flooding on the project, and impacts from Hurricane Katrina in particular. The Court based the injunction upon its finding that the 1997 EIS "failed to take a 'hard look' at the environmental impacts and consequences of dredging and disposing of the canal's contaminated sediment" as required by the NEPA.[2] The Court also criticized the EIS for failing to "adequately address the risks of flooding and hurricanes in general", and stated further analysis was required of "the reasonable dredging and disposal alternatives that the Corps had recently adopted for maintenance dredging of the same waters," post-Katrina.[3]

In 2009, the Corps completed a Final Supplemental EIS and a Record of Decision in response to the 2006 injunction. The report recommended a float-in-place lock construction plan, hydraulic dredging, and disposing of dredged material unsuitable for open water discharge in a confined disposal facility, and for material determined to be suitable for freshwater disposal, in the Mississippi River.

In 2010, the Holy Cross Neighborhood Association, Gulf Restoration Network, and Louisiana Environmental Action Network filed suit again, alleging violations of the Court's 2006 order, NEPA, and the CWA. In that same year, the Court granted a partial motion to dismiss the Clean Water Act citizen suit claims without prejudice. In 2011, the Holy Cross Neighborhood Association, Gulf Restoration Network, and Louisiana Environmental Action Network filed an amended complaint, removing their CWA citizen suit claims to reflect the Court's order dismissing these claims, and adding a claim under the Administrative Procedure Act for violation of the CWA's Section 404(b)(1) Guidelines.

[2] Holy Cross, et al v. United States Army Corps of Engineers (Civil Action No. 03-370), 455 F.Supp.2d 523, 540 (E.D. La. 2006).
[3] *Id.* at 539, 540.

In 2011, the same Court enjoined the Corps (see Exhibit 1) from continuing with the project until the Corps complied with the NEPA and the CWA. The Court found the SEIS failed to sufficiently and properly consider the impact of the closure of the MR-GO to deep-draft traffic upon the IHNC project, particularly the draft of vessels that would use the lock, and how this depth may affect dredging and disposal alternatives.[4]

The closure of the MR-GO (as referenced in the 2011 injunction) is authorized by Section 7013 of WRDA 2007, which included language de-authorizing the MR-GO from the Gulf of Mexico to Mile 60 at the southern bank of the GIWW. In response to the de-authorization, a physical rock barrier was constructed in 2009, effectively eliminating any deep draft navigation in the de-authorized portion of the MR-GO. Furthermore, the IHNC Lake Borgne Surge Barrier (a critical component of the Lake Pontchartrain and Vicinity, Louisiana Hurricane and Storm Damage Risk Reduction System), was constructed across the MR-GO near the confluence of the GIWW, ultimately being completed in 2012.

3.3.3 Chronology of the Initial Array, Plan Formulation, and Screening

Table 3-1 summarizes the chronological progression of alternative plan development from prior reports. The report is laid out to be read from left to right, and then down. For each row an alternative plan is listed in, the row is colored green. When an alternative plan is carried forward the row remains green, but when screened (or no longer carried forward) from further consideration the row is changed to red. Additionally, labeling of each row with a letter is done to provide additional ease of tracking each alternative plan considered. Detailed information of alternative plans listed in this section can be found in their respective documents as listed below and included in Appendix F. Only the Main Report, EIS, and associated ROD for the 1997 Evaluation Report are included as an appendix to this report. Remaining sections of the 1997 Evaluation Report are available for viewing or download at: http://www.mvn.usace.army.mil/About/Projects/IHNC-Lock-Replacement/

- Mississippi River – Gulf Outlet New Lock and Connecting Channels Site Selection Report, March 1975;
- 1991 Mississippi River-Gulf Outlet New Lock and Connecting Channels, Louisiana Evaluation Study (First Mini-Report);
- 1992 Mississippi River-Gulf Outlet New Lock and Connecting Channels, Louisiana Evaluation Study (Second Mini-Report);
- 1997 Evaluation Report;
- 2009 Supplemental Environmental Impact Statement and Record of Decision.

[4] *Holy Cross Neighborhood Association v. United States Army Corps of Engineers*, consolidated with Civil Action No. 03-370, Order issued on 9 September 2011.

Table 3-1. Initial Array and Chronology of IHNC Lock Replacement Plan Development.

Chronological Progression of Alternative Plan Development — 1973 → 2016

	MRGO New Lock and Connecting Channels Site Selection Report, March 1975	1975 Site Selection Report-post-Screening	1975 Site Selection Report-1975 Plan List	1975 Site Selection Report-1975 Plan List Carried Forward	1975 Site Selection Report Recommended Plan
A	1973-1: The IHNC Existing Lock Site with Baptiste Collette Alternate Route;				
B	**1973-2: The IHNC Site--east of old lock;**	**(a) IHNC Site--east of old lock (1973-2);**	**1974-1: The Inner Harbor Navigation Canal Site "A"--(east of the old lock) ((a); 1973-2).**		
C	**1973-3: IHNC Site center channel;**	**(b) IHNC Site--west of center channel (opposite Galvez St. Wharf) (1973-3);**	**1974-2: The Inner Harbor Navigation Canal Site "B"-(east of channel center--opposite Galvez Street wharf) ((b); 1973-3);**	**1974-2: The Inner Harbor Navigation Canal Site "B"-(east of channel center--opposite Galvez Street wharf) ((b) 1973-3).**	
D	1973-4: IHNC Site east of center channel;				
E	1973-5: Saxonholm Site;				
F	1973-6: Upper Site;				
G	**1973-7: Lower Site;**	**(d) Lower Site (1973-7);**	**1974-3: The Lower Site ((d); 1973-7);**	**1974-3: The Lower Site ((d); 1973-7);**	**1975: The Lower Site [Violet Site] (1974-3; (d); 1973-7);**
H	1973-8: Lower Site barrier plan;				
I	1973-9: The Caernarvon Site;				
J	1973-10: Scarsdale Site;				
K	1973-11: Bohemia Site;				
L	1973-12: IHNC land bridge with Lower Site;	(c) Lower Site with IHNC land bridge (1973-12);	1974-4: The Lower Site with an IHNC land bridge ((c); 1973-12).		
M	1973-13: IHNC land bridge with Caernarvon Site;				
N	1973-14: IHNC land bridge with Scarsdale Site.				

	1991 First Mini-Report: Elimination Rationale of the 'Lower Site' Plan	1991 First Mini-Report: Plans for Further Evaluation	1992 Second Mini-Report: Alternative Plans	1992 Second-Report: Alternative Plans considered in Detail	1992 Second Mini-Report Recommended Plan
G	**1975: The Lower Site [Violet Site] (1974-3; (d); 1973-7).**				
		400 feet east of the existing lock;	**O Plan 1 - 200-Foot East of Existing Lock-Conventional Construction, with mid-level replacement bridges at St. Claude and Claiborne Avenues;**	**Plan 1 - 200-Foot East of Existing Lock-Conventional Construction, with mid-level replacement bridges at St. Claude and Claiborne Avenues;**	
		200 feet east of the existing lock (conventional construction);	P Plan 2 - 200-Foot East of Existing Lock-Steel Float-In Construction, with mid-level replacement bridges at St. Claude and Claiborne Avenues;		
		200 feet east of the existing lock (floated in w/steel shell);	Q Plan 3 - 200-Foot West of Existing Lock-Conventional Construction, with mid-level replacement bridges at St. Claude and Claiborne Avenues;		
		200 west of the existing lock (conventional and floated-in w/steel shell);	R Plan 4 - In situ Replacement-Relieved Deck Construction, with mid-level replacement bridge at St. Claude and the existing Claiborne Avenue Bridge;		
		In-situ floated-in lock (concrete);	S Plan 5 - North of Claiborne Avenue Location-Steel Float-In Construction, with mid-level replacement bridge at St. Claude and the existing Claiborne Avenue Bridge;		
		In-situ floated-in (steel shell);	**T Plan 6 - North of Claiborne Avenue Location-Steel Float-In Construction, with low-level replacement bridge at St. Claude and the existing Claiborne Avenue Bridge;**	**Plan 6 - North of Claiborne Avenue Location-Steel Float-In Construction, with low-level replacement bridge at St. Claude and the existing Claiborne Avenue Bridge;**	**Plan 6 - North of Claiborne Avenue Location-Steel Float-In Construction, with low-level replacement bridge at St. Claude and the existing Claiborne Avenue Bridge;**
		Earth chambered lock with floated-in sector gates.	U Plan 7 - North of Claiborne Avenue Location-Steel Float-In Construction, with low-level replacement bridge at St. Claude and a mid-level replacement bridge at Claiborne Avenue;		
			V Plan 8 - North of Claiborne Avenue Location-Conventional Construction, with low level replacement bridge at St. Claude and existing Claiborne Avenue Bridge.		

	1997 Evaluation Report Plans	1997 Evaluation Report NED Plan	1997 Evaluation Report Recommended Plan/Locally Preferred Plan	2009 final Supplemental EIS	2016 Draft General Reevaluation Report Plans Considered
W	(l) No Action/Continued Operation of the Existing Lock (Future without the project);			Plan 1 No-build/Deauthorize Lock Replacement Authorization	Plan 1 No Action/Continued Operation of the Existing Lock (Future without the project);
X	(2) Construction of a new bridge at St. Claude Avenue (commonly referred to as the Bridge Only Alternative);			Plan 2 No Action Alternative/Continue to Build the 1,200' x 110' x -36' lock (1997 Evaluation Report Recommended Plan (Alternative Plan Yf))	Construct a new lock at the North of Claiborne Avenue site in the IHNC at following dimensions:
Y	**(3) Construct new lock at North of Claiborne Avenue site in IHNC. As part of this alternative, lock sizes evaluated at the North of Claiborne Avenue site consisted of various lock dimensions (switch from steel structure to concrete structure):**				Plan 2 900' x 75' x -22' (NGVD);
Ya	a. 900' x 90' x -22' (NGVD);			Plan 3 Revised, 1,200' x 110' x -36', lock Replacement Plan:	Plan 3 900' x 110' x -22' (NGVD);
Yb	**b. 900' x 110' x -22' (NGVD);**	**Yb. 900' x 110' x -22' (NGVD);**		Plan 3a Cast-in-place lock, 1,200' x 110' x -36';	Plan 4 1,200 x 75' x -22' (NGVD);
Yc	c. 900' x 110' x -36' (NGVD);			**Plan 3b Float-in-place lock, 1,200' x 110' x -36'; Recommended Plan & LPP.**	Plan 5 1,200' x 110' x -22' (NGVD);
Yd	d. 1,200' x 90' x -22' (NGVD);				Plan 6 1,200' x 110' x -36' (NGVD) (2009 final SEIS Plan 3b).
Ye	e. 1,200' x 110' x -22' (NGVD);				
Yf	**f. 1,200' x 110' x -36' (NGVD).**	**Yf. 1,200' x 110' x -36' (NGVD)**			

Hurr Katrina 2005; MRGO Closure 2009; IHNC Surge Barrier 2012

Plan Carried Forward:

Plan Screened:

3.3.4 Current Study Area Conditions Associated with Eliminated Alternatives:

As detailed throughout Chapter 3, planning efforts for the IHNC Lock replacement project began as far back as 1960, and since that time numerous plans have been evaluated and eliminated, see Table 3-1. Since the Corps began studying the IHNC Lock replacement, there have been numerous natural and man-made alterations to both the natural and human environment of the project area, including to areas associated with previously eliminated alternatives.

Between 1960 and 2016, a total of 6 hurricanes struck Orleans Parish (National Hurricane Center 2015). Prior to Hurricane Katrina in August of 2005, Hurricanes Camille, which made landfall just east of New Orleans on August 17, 1969, and Betsy, making landfall on September 9, 1965, resulted in some of the most devastating changes to both the natural and human environment to the south and east of New Orleans. Urban and suburban areas were flooded by storm surge and coastal wetland vegetation was literally dislodged and washed away, never to naturally return in some areas. In addition, with the landfall of Hurricane Katrina on August 29, 2005, the study area was especially devastated and are still in the recovery process over a decade later. The inundation of much of metropolitan New Orleans from these storms forced the displacement and relocation of hundreds of thousands of area residents. Hurricane Katrina has proven to be the costliest and the most devastating natural disaster in U.S. history. Due to the extensive damage to residences and infrastructure, many of these displaced residents have resettled elsewhere within the region or out of the New Orleans urbanized area entirely with many likely never to return.

In response to the devastation of Hurricane Katrina, Congress authorized and funded repairs, restoration and improvement of the level of risk reduction of the existing hurricane storm damage risk reduction projects in the Greater New Orleans area, including the LPV project. As result, for the LPV project, a complex series of levees, floodwalls, floodgates, surge barriers, drainage canals, pipes and pump stations were constructed to reduce the future risk of loss of life and property as a result of certain levels of catastrophic hurricane storm surge events in the New Orleans area.

For this current IHNC Lock Replacement GRR, the February 2015 Public Scoping Meeting did not generate any new, previously unstudied alternative lock locations, alternate routes, or other feasible alternatives separate from those previously discussed in this section, nor was there any new information provided which would make the previously studied alternatives any less complicated or costly to construct. As such, the range of alternative plans reflects not only the incorporation of data and decision making rationale derived from the numerous prior Corps studies, it also takes into account the current study area conditions with respect to those previously eliminated alternative lock locations and connecting channels and alternate routes.

3.4 Focused Array of Plans

Since conditions in the study area have changed significantly or become more restrictive (e.g., construction of Hurricane and Storm Damage Risk Reduction System repairs, upgrades, etc.), it is reasonable to conclude that all prior considered and screened lock replacement plans would not offer any additional benefits or reduce adverse environmental impacts. The re-analysis of prior plans was done in consideration of comments made during scoping that all prior lock replacement plans would be revisited. Therefore, prior screened plans are not carried forward as part of this GRR.

For the purposes of reevaluation and in the interest of meeting the intent of the 2011 federal court injunction, the focus was on evaluating the effect of the closure of the MR-GO on the IHNC lock replacement project, considering possible shallow draft navigation alternatives. The following list represents the initial array of alternatives considered as part of this GRR:

Plan 1 - No-Action – continued operation and maintenance of existing lock; 640 feet long by 75 feet wide by -31.5 feet, (North American Vertical Datum, 1988 (2004.65) (NAVD88));

Plan 2 - North of Claiborne site; 900 feet long by 75 feet wide by -22 feet (NAVD88);

Plan 3 - North of Claiborne site; 900 feet long by 110 feet wide by -22 feet (NAVD88);

Plan 4 - North of Claiborne site; 1,200 feet long by 75 feet wide by -22 feet (NAVD88);

Plan 5 - North of Claiborne site; 1,200 feet long by 110 feet wide by -22 feet (NAVD88);

Plan 6 – North of Claiborne site; 1,200 feet long by 110 feet wide by -36 feet (NAVD88 (as described in the 2009 Supplemental EIS and Record of Decision)).

3.4.1 Description of Plans

Plan 1 - No-Action – continued operation and maintenance of existing lock; 640 feet long by 75 feet wide by --31.5 feet (NAVD88).

Plans 2 through 5 differ only in the dimensions of the lock chamber. The following additional information applies to Plans 2 – 5: The construction method used for a concrete navigation lock is cast-in-place; replacement of the St. Claude Avenue bridge with a new, low-level double bascule bridge; construction of a temporary by-pass bridge at St. Claude Avenue that will provide continuous use of that canal crossing during construction of the new bridge; provision of by-pass channels around the new lock construction site and the existing lock during its demolition, both of which will provide usage of the existing lock and canal during construction; disposal of dredged material that is not suitable for aquatic disposal in an approved landfill site outside of the study area; extension of the Mississippi River flood protection along the banks of the IHNC to the site of the new lock; and implementation of a Community Impact Mitigation Plan to offset and or compensate for impacts the project will have on surrounding communities.

Plan 6 – North of Claiborne site; 1,200 feet long by 110 feet wide by -36 feet (NAVD88 (as described in the 1997 Evaluation Report and EIS and the 2009 Supplemental EIS and Record of Decision)): The lock design and location, and bridge modifications in the Float-in-place Plan, which is the recommended plan, is very similar to the 1997 EIS Plan. The Float-in-place Plan requires two separate construction locations, the off-site construction area and new lock site. The off-site construction area would allow for lock module construction in dry conditions. Lock modules would be floated to the lock construction site in the IHNC. Additional evaluation has further refined the location and design of the confined disposal facility for contaminated dredged material, the location and size of the off-site construction area, and the methods for disposal of all dredged material, including an option for disposal of contaminated dredged material in a Type I landfill. A Community Impact Mitigation Plan implemented as part of the 1997 EIS Plan would continue to provide $43 million in funding for numerous projects to avoid, minimize and compensate for adverse impacts on socioeconomic resources in the nearby neighborhoods.

3.4.1.1 Reliability of the Existing IHNC Lock

On page iii of the 1975 Site Selection Report summary (see Appendix F), the following statement is made, "Traffic through the existing antiquated, dimensionally obsolete, and congested ship lock exceeded its practical capacity in 1971." While the preceding statement is referring to the functional capability of the lock, the reliability of the lock as 100 years of operation approaches is a serious condition to consider. The current operational state of the lock is at a point that maintenance events are increasing or there could be a failure of any single or multiple components adversely impacting operability of the facility. Waterborne traffic would be forced to take significantly more costly and lengthy, and possibly unsafe, alternate routes or, alternatively,

shippers would be forced to utilize non-waterborne modes of transportation for their goods. The impacts to the local and national economies could be significant. There is the potential that de-watering the existing lock as part of future maintenance activities may not be safe. An engineering assessment, not a reliability analysis, was carried out on the existing IHNC lock (see Appendix B, Annex 9). Based on the vast amount of deficiencies, replacement of the lock is recommended.

3.4.2 Additional Details on Measures Common to Each Plan

Although there are numerous similarities between all plans, there are two significant dependent measures that have changed since proposed in earlier evaluations. The deep draft and shallow draft plans require that different cubic yardages of dredged material be removed. This decrease, and reevaluation of dredge material disposal needs, impacts the decision on where and how to place both suitable material for placement in an aquatic environment and dredged material that is unsuitable for such placement and is explained in Section 3.4.2.1. Second, as required by the WRDA of 1996, a comprehensive Community Impact Mitigation Plan (see Appendix E) shall be implemented for mitigation or compensation, or both, for the direct and indirect social and cultural impacts in the areas affected by the proposed lock replacement. A brief statement is included in Section 3.4.2.2 on this topic.

3.4.2.1 Dredged Material Disposal Plan

The deep draft lock replacement plans evaluated in prior reports (1997 and 2009) would have required large areas for the disposal of dredged material generated from lock construction. In those reports, large quantities, up to 1,400,000 cubic yards, were to be excavated with hydraulic dredges and pumped as a slurry to confined disposal areas located along the south bank of the GIWW/MR-GO east of the IHNC. This material had been determined unsuitable for open water disposal and therefore required upland confinement. The confined disposal areas varied in size from around 200 to over 500 acres, depending on the lock size and construction method (float-in or cast-in-place). Material determined suitable for aquatic disposal was to be used beneficially to mitigate the effects of the confined disposal areas on wooded wetland habitat. Material to be dredged near the old lock site, late in the construction sequence, was to be hydraulically dredged and disposed in the deep channel of the Mississippi River. The 2009 SEIS evaluated an option for disposal of the contaminated material in a solid waste landfill; however the time, cost and logistics of dredging the large quantities of material necessary to build a deep draft lock with mechanical equipment, and hauling and disposing it in a landfill, made this option impractical, and it was not part of the recommended plan.

A reevaluation of dredged material disposal alternatives was conducted for this report. Current surveys from 2016 provided the basis for calculating quantities of material from each dredged material management unit (DMMU). DMMUs were established during preparation of the 2009 SEIS to designate dredging areas based on expected levels of contaminants of concern. It was determined that the required dredging quantities for all DMMUs were significantly reduced from the volumes described for all of the alternatives assessed in the 2009 SEIS. For example, the total volume of material requiring dredging for the recommended plan in 2009 was 2,200,000 cubic yards, whereas the total volume estimated for a shallow draft lock plan is roughly 719,000 cubic yards, or 32 percent of the previous amount. For material that is not suitable for open water disposal, the quantity estimates have decreased from around 317,000 cubic yards to 105,000 cubic yards, or 33 percent of the previous amount.

Two cost estimates have been developed for disposing of material that is not suitable for open water; one estimate for disposal into a confined disposal area and the second for disposal into a solid waste landfill. Details of these cost estimates are provided in Appendix B, Annex 7. A landfill disposal alternative is estimated to cost approximately $10.6 million less than a confined disposal alternative. A landfill disposal alternative eliminates all project-related environmental impacts to wetlands and fish and wildlife habitats and the need for mitigating these environmental impacts. A confined disposal alternative would have covered 82 acres of wooded wetlands and required an estimated $2,700,000 in compensatory mitigation costs. It would require perpetual maintenance

of this isolated site by the Government to assure the site is never altered or disturbed, and seasonal mowing would have been necessary to minimize wildlife usage. Additionally, there would be no need for a temporary CDF for de-watering of any material which could cause additional impacts requiring fish and wildlife mitigation. The landfill disposal alternative is, at this time, the environmentally preferred alternative and is currently the least costly alternative.

3.4.2.2 Community Impact Mitigation Plan

The WRDA of 1996 authorized the implementation of a comprehensive Community Impact Mitigation Plan (CIMP) for affected communities (see Figure 3-2) in the vicinity of the project site in accordance with a preliminary draft August 1995 CIMP. At the time of the enactment of WRDA 1996, the preliminary draft document had not undergone final review and approval by USACE and the ASA(CW). The 1997 Evaluation Report contains certain modifications of the CIMP plan that was described within the 1995 Evaluation within the discretionary authority of the Chief of Engineers (see Appendix E for Volume 2 (Draft Evaluation Report Mitigation Plan) of the August 1995 document and Appendix F for Volume 2 of the 1997 Evaluation Report). The original estimated cost of the Community Impact Mitigation Plan was $33 million dollars. That dollar amount was indexed in 2009 to $43 million. As part of this reevaluation, that number has again been indexed to current dollars in the amount of $56 million. Since implementation of the CIMP commenced after the execution of the Project Cooperation Agreement between the Government and the Port of New Orleans, as the non-Federal sponsor, some expenditures in support of the CIMP were made prior to Hurricane Katrina.

Figure 3-2. Neighborhoods Covered by the Community Impact Mitigation Plan

3.4.3 Screening the Focused Array of Plans

The No-Action Plan, Plan 1, cannot be screened at this stage of reevaluation and is carried forward. Based on previous evaluations of shallow draft navigation lock plans and preliminary benefit cost ratios developed as part of this reevaluation, indications were Plans 2 through 5, the shallow draft navigation lock plans, were expected to be greater than 1:1 so those plans were carried forward as part of this reevaluation.

Plan 6 was included (and recommended) in earlier evaluations because the benefits of the shallow draft increment, even when combined with the available benefits (below 1:1) for deep draft navigation, justified a deep draft lock.

To elaborate in more detail regarding the economics of Plan 6: in the 1997 Evaluation Study, benefits to deep draft navigation associated with a larger deep draft lock accrued to two categories of deep draft activity. The major category of savings was generated by lockages which may be called "intra-harbor" lockages. These lockages were required by operators needing to use deep draft loading and unloading facilities in the two distinct sections of the Port of New Orleans on either side of the IHNC Lock: the riverfront portion and the tidewater (MR-GO) portion. Vessels that were too large to traverse the existing IHNC Lock had to voyage or "loop" from their initial point of cargo handling down the originally used entrance channel (Mississippi River or MR-GO) into the Gulf and then travel up the other entrance channel (Mississippi River or MR-GO) to their second point of cargo handling. For example, a large vessel initially inbound via the MR-GO, after unloading its cargo at an IHNC facility, would then have to navigate back down the MR-GO into the Gulf, enter the Mississippi River at its mouth and subsequently travel upriver to a loading terminal on the riverfront. Thus, the major deep draft benefit of a larger deep draft lock is to facilitate backhauls within the port and to avoid the cost of having to "loop." In the 1997 analysis, approximately 200 to 600 deep draft vessel trips per year (over a 50 year span) were estimated to fall into this category of "Intra-Harbor" benefits.

The other minor category of deep draft vessel activity that would appear to have benefited from a larger deep draft lock is known as "Thru" lockages. This benefit accrues to the small number of vessels that would use the larger replacement lock to exit the tidewater (MR-GO) facilities via the Mississippi River. These vessels, typically destined for ports along the Texas coast, could use the river route to shorten their transit time by traveling the slightly shorter distance. In the 1997 analysis approximately 50 to 150 deep draft vessel trips per year (over a 50 year span) were estimated to fall into this category of "Thru" benefits.

However, even with this level of deep-draft activity (Intra-Harbor and Thru) that could potentially benefit from a deep-draft lock, the 1997 analysis concluded that a deep-draft lock was not incrementally justified when compared to the 900 feet long by 110 feet wide by -22 feet (NAVD88) shallow draft NED plan. For example, the incremental cost associated with the locally preferred 1,200 feet long by 110 feet wide by -36 feet (NAVD88) deep draft plan was estimated to be, in average annual terms, $10.2 million dollars whereas the incremental benefits were estimated to be, in average annual terms, $5.4 million dollars making the incremental Benefit-to-Cost ratio (BCR) 0.53.

Since the 1997 evaluation, changes have occurred that have significantly reduced deep-draft activity within the study area. Following the closure of the MR-GO all the companies along the Port of New Orleans that required deep draft vessel support via the MR-GO have moved operations to the Mississippi River section of the port or to other ports along the Gulf coast. The one or two companies that continue to operate along the MR-GO area can use the existing IHNC Lock. In 2011, a total of 53 vessels with drafts>20 feet used the IHNC; however, by 2014 the number had dropped to 18. Consequently, the deep draft activities that supported the possible deep draft benefits identified in the 1997 Evaluation Study, and described above, are no longer occurring. Therefore, no deep draft benefits would be achieved if a deep-draft lock were to be built.

Further, in regards to environmental impacts related to Plan 6, deep draft lock alternatives evaluated in prior reports (1997 and 2009) would have caused much greater adverse impacts to wetland and wildlife habitat than the shallow draft lock replacement alternatives investigated in this report. For example, the deep draft plan recommended in the 1997 report would have placed enough dredged material into approximately 240 acres of wooded wetlands, changing the area into non-wetland habitat. It also required development of an off-site construction area to support the float-in construction plan would have caused the loss of an additional 32 acres of marsh and scrub/shrub wetlands. In the 2009 SEIS, the recommended deep-draft plan included a large area for dredged material disposal that would have converted 372 acres of wooded wetlands into upland disposal areas, plus conversion of an additional 34 acres of wooded wetlands to an offsite construction area. Shallow draft lock replacement alternatives require considerably less dredging and hence, less material to dispose. This reduced quantity of material makes landfill disposal of those sediments determined to be unsuitable for aquatic disposal less costly than placing the material in confined disposal areas. By placing contaminated sediments in a landfill and hydraulically dredging and disposing the rest of the dredged material into the Mississippi River, all impacts to wetlands are avoided with the shallow-draft alternatives. Impacts to fishery resources from disposal of material in the Mississippi River would be temporary and minor. This elimination of impacts to wetlands and nearly complete elimination of impacts to fish and wildlife resources, makes a shallow draft lock a more desired and environmentally preferred replacement plan, over the deep draft lock alternative.

In conclusion, Plan 6, the deep draft navigation lock, as a part of this general reevaluation, is no longer recommended because, 1) Adverse environmental impacts from a deep draft lock are greater than any shallow draft navigation lock plan; 2) Conditions in and around the IHNC have changed enough since 2009 that there has been a divestiture of deep draft navigation support facilities in the IHNC; 3) The economic benefits for the deep draft portion remain significantly below a 1:1 benefit cost ratio; 4) Section 101 of the WRDA of 1986 requires a local cost share sponsor for a deep draft navigation project. Until the Port of New Orleans withdrew support, by letter on September 26, 2012 (see Exhibit 2), of the locally preferred plan and as the non-federal sponsor of the deep draft increment, it was reasonable to assume a deep draft navigation lock replacement would remain a viable plan. Without a NFS, the deep draft is no longer implementable. In addition, the Port of New Orleans insisted, with inland navigation industry support in tow, that only a shallow draft navigation lock be pursued; and finally, 5) the current economic update has determined that no deep draft benefits would be achieved if a deep-draft lock were to be built. When all conditions are considered as a whole, a replacement deep draft navigation lock is no longer a reasonable or practical plan and is no longer being recommended.

3.5 Screening the Focused Array of Plans

The result of screening the initial array of plans is the final array of plans. Those plans are as follows:

Plan 1 - No-Action – continued operation and maintenance of existing lock; 640 feet long by 75 feet wide by 31.5 feet deep, NAVD88;

Plan 2 - North of Claiborne site; 900 feet long by 75 feet wide by -22 feet (NAVD88);

Plan 3 - North of Claiborne site; 900 feet long by 110 feet wide by -22 feet (NAVD88);

Plan 4 - North of Claiborne site; 1,200 feet long by 75 feet wide by -22 feet (NAVD88);

Plan 5 - North of Claiborne site; 1,200 feet long by 110 feet wide by -22 feet (NAVD88).

3.6 Comparison of the Final Array of Plans

Additional detailed analysis was carried out on the final array of plans to determine the most likely outcome of net benefits and identify a TSP. See Appendix D, Economics for more information on detailed analysis.

3.6.1 Comparison of Lock Transit Times

Transit of a tow locking through the IHNC consists of the time the tow enters and waits in the lock queue, which is considered the delay. Transit time also includes the time a tow leaves the queue, or enters the lock and then exits the lock, which is considered the processing time. In some instances, when a tow with multiple barges has to cut its tow and lock through the IHNC, the emptying and filling time of the lock chamber is part of the processing time as the tow waits for the second cut to lock through. Table 3-2 shows the average transit time for each replacement lock plan. Table 3-3 shows the average processing time of each replacement lock plan.

Table 3-2. Average Transit Times of Tows in Hours.

Proposed Navigation Lock Plans	Average Transit Time (hours)
Plan 1 – Existing 640' x 75' x -31.5'	16
Plan 2 - 900’ x 75' x -22’	5
Plan 3 - 900’ x 110' x -22’	2
Plan 4 - 1200' x 75’ x -22’	3
Plan 5 - 1200’ x 110' x -22’	2
Based on 15 million annual tons, all NAVD88	

Table 3-3. Average Processing Times of Tows in Minutes.

Proposed Navigation Lock Plans	Average Processing Time (minutes)
Plan 1 - Existing 640' x 75' x 31.5'	43.7
Plan 2 - 900’ x 75' x 22’	43.6
Plan 3 - 900’ x 110' x 22’	45.7
Plan 4 - 1200' x 75’ x 22’	44.8
Plan 5 - 1200’ x 110' x 22’	46.8
Based on 15 million annual tons, all NAVD88	

Delays in the queue for a tow are reduced significantly when comparing the existing lock configuration to the configurations of Plans 2 – 5. Approximate delays in the queue for Plans 2 – 5 are as shown in Table 3-4.

Table 3-4. Approximate Delays of Tows in Hours.

Proposed Navigation Lock Plans	Approximate Delay Time (hours)
Plan 1 - Existing 640' x 75' x 31.5'	15.3
Plan 2 - 900’ x 75' x 22’	4.3
Plan 3 - 900’ x 110' x 22’	1.2
Plan 4 – 1,200' x 75’ x 22’	2.3
Plan 5 – 1,200’ x 110' x 22’	1.2
Based on 15 million annual tons, all NAVD88	

Table 3-3 can seem somewhat misleading because the processing time between the existing lock configuration and the proposed lock configuration plans are so similar. When applying the processing time in Table 3-3 to a tow that consists of two liquid or tanked barges that are each 300 feet long by 54 feet wide, with a tow boat approximately 100 feet long, translating to a tow of approximately 700 feet in length, the benefit of a lock with a larger chamber size (in length and width) than the existing lock becomes more apparent. For the existing 640 long lock chamber, a 700 foot long tow must be "cut" into two tows because the length of the complete two barge tow, end to end, is too long. In addition, tank barges of that size cannot process through the existing lock side by side since the existing lock chamber is only 75 feet wide. In the instance of a 700 foot tow, nearly 50 percent of all traffic locking through the IHNC, the processing time is almost doubled. This multi-lockage process of multiple tows leads to the delay time in the queue due to the inefficiency of the existing lock. The advanced age of the lock, 93 years of operation, also exacerbates delays due to the increased frequency of lock maintenance events. These events reduce the capacity to lock traffic or in some cases, allow no lockages at all while the lock is out of service. Figure 3-3 illustrates the forecasted impact on transit times as a function of the expected maintenance frequency for each lock plan. Figure 3-4 illustrates the forecasted growth in tonnage through the IHNC Lock. As the tonnage increases, combined with the age and maintenance requirements of the existing lock, the delays can only grow from the existing condition without a larger lock in place.

Figure 3-3. IHNC Lock Average Vessel Transit Time.

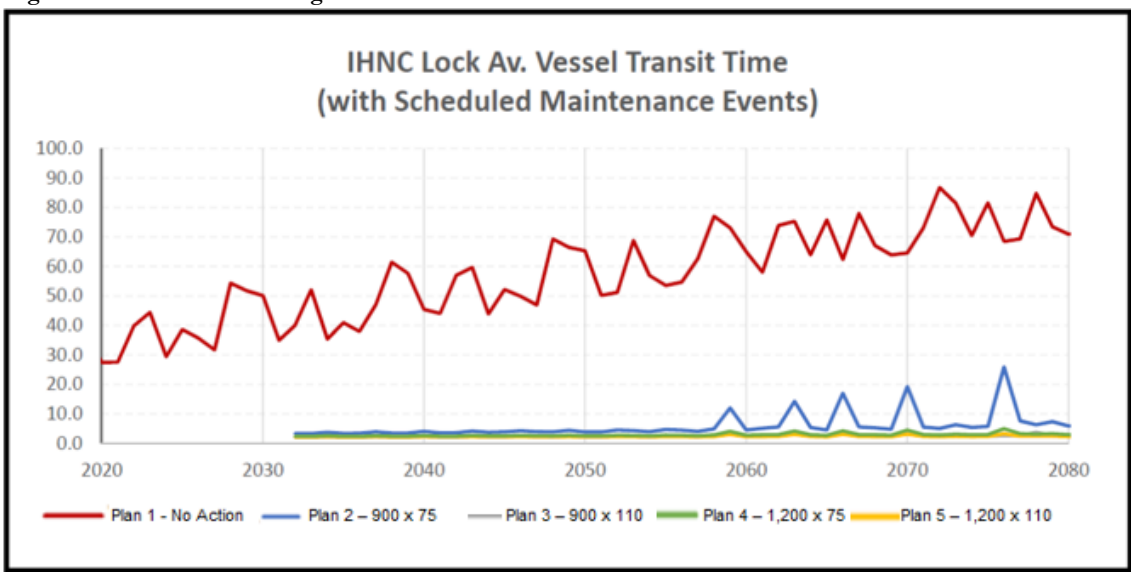
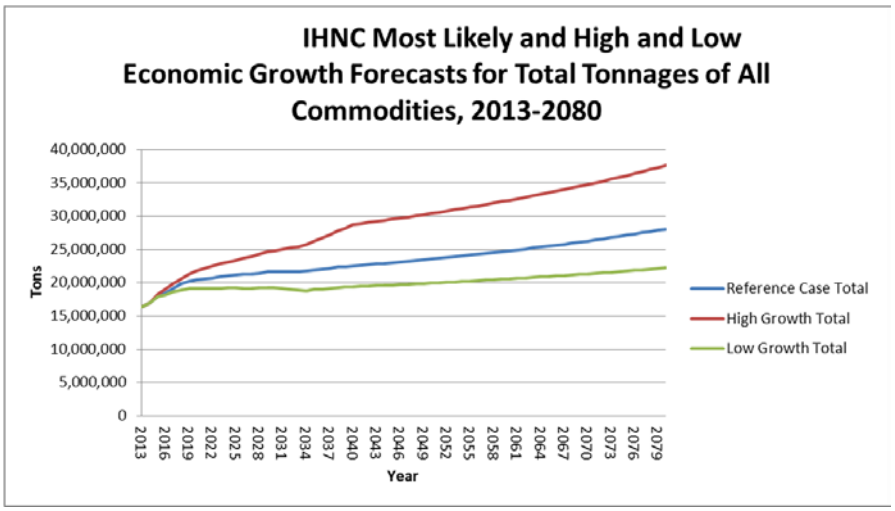
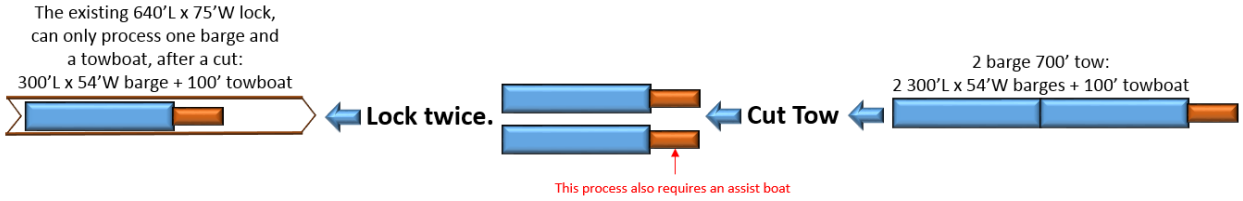


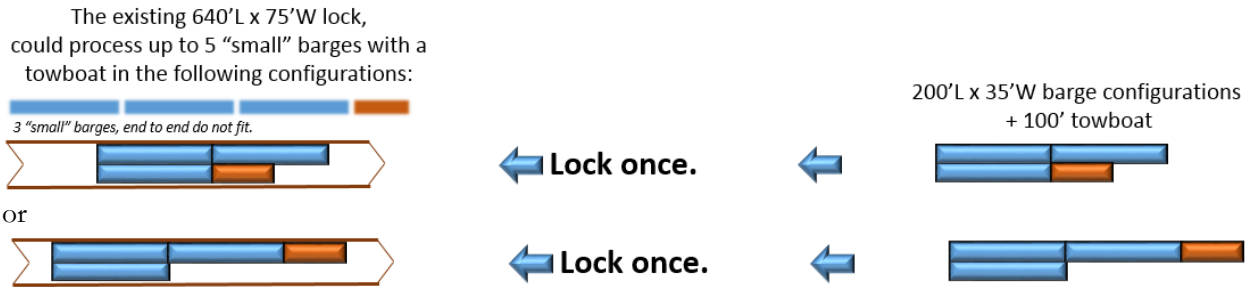
Figure 3-4. Traffic Forecast



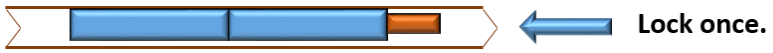
3.6.2 Comparison of Lock Chamber Packing Capacity

In an attempt to visually demonstrate the impact a new lock would have on reducing overall transit times, the following illustrations depict the dimensions of Plan 1, the existing lock, and the dimensions of Plans 2 – 5, with the possible combinations to "pack the chamber" with tows. With the increased flexibility of packing more barges into the chamber, there is a decrease in the amount of time spent in the queue (the delay) and by default there is an increase in tonnage that can pass through during any given lockage of tows. The increase in tonnage that can pass through the lock combined with the reduction in queue delays drives the benefits associated with a new, larger lock as a replacement of the existing lock.



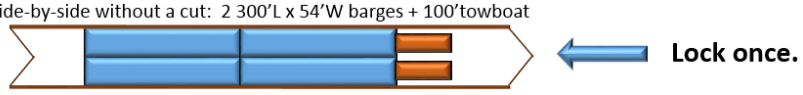


900'L x 75'W can lock one, 2 barge (700') tow without a cut:
2 300'L x 54'W barges + 100'towboat



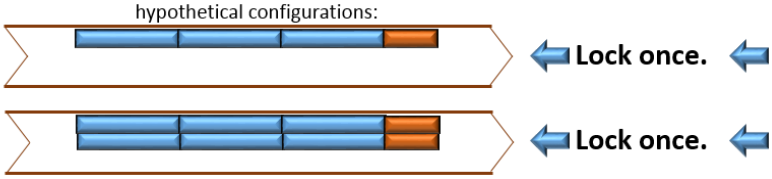
2 barge 700' tow:
2 300'L x 54'W barges + 100' towboat

900'L x 110'W can lock 2, 2 barge 700' tows,
side-by-side without a cut: 2 300'L x 54'W barges + 100'towboat

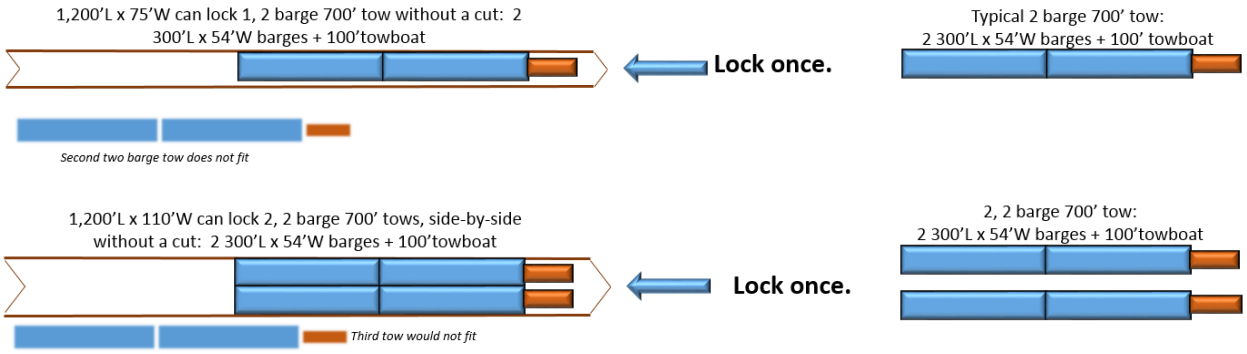


2, 2 barge 700' tows:
2 300'L x 54'W barges + 100' towboat

900'L x 110'W could lock up to 9 "small" barges
with a towboat for each 3 barge tow as depicted in the following
hypothetical configurations:



200'L x 35'W barge configurations
+ 100' towboat end to end



Intuitively, it seems the largest lock dimension would provide the greatest reduction in in overall transit times; however, that is not the case, because of prevailing waterborne traffic levels and the typical configuration of tows that lock through the IHNC, which is a large liquid barge tow consisting of two barges, set end to end, with a towboat (as depicted in the figures above). Therefore, the additional costs of constructing the largest lock reduce the overall benefits of that condition.

3.6.3 Economic Analysis of the Final Array of Plans

A benefit/cost analysis was conducted to evaluate the economic feasibility of each of the lock replacement plans. Expected annual benefits for 2032 and 2082 were converted to an equivalent annual value using the FY16 federal interest rate of 2.875%, and a 50 year period of analysis. Total cost and estimated annual costs for the project plans includes the construction costs and operation and maintenance costs. Construction costs, along with a schedule of expenditures, were used to determine the interest during construction and total investment costs at the end of construction. For the purposes of this reevaluation, implementation (or construction period) is 13 years from 2019 through 2031. As a result, the planning period extended over 63-years. The first year of the construction period was set as 2019 (the first possible budget year), resulting in a base year of 2032 and a final analysis period year of 2082.

Table 3-5 shows Cost Summary and Average Annual Benefits of the final array of plans. All plans are justified (value>1.0). Plan 3, the 900 feet long by 110 feet wide lock by -22 feet (NAVD88), has the highest benefit cost ratio at 4.78:1, and generates the greatest net excess benefits, and is the NED plan.

Table 3-5. Average Annual Benefit - Cost Summary for all Plans

Inner Harbor Navigation Canal Lock Replacement GRR Average Annual Benefit - Cost Summary[1] Elastic Movement-Level Demand[2] (Dollars, Average annual 2.875% discount/amortization rate, 2019-2082 with 2032 base year)				
Lock Alternative	Plan 2: 75' x 900'	Plan 3: 110' x 900'	Plan 4: 75' x 1,200'	Plan 5: 110' x 1,200'
First Cost of Construction	$936,900,000	$951,300,000	$972,100,000	$1,001,700,000
Interest During Construction	$209,900,000	$213,700,000	$218,300,000	$225,600,000
Total Investment	$1,146,800,000	$1,165,000,000	$1,190,400,000	$1,227,300,000
Average Annual Const. Cost	$43,500,000	$44,200,000	$45,200,000	$46,600,000
Average Annual Increm. O&M	$1,400,000	$1,400,000	$1,400,000	$1,400,000
Total Average Annual Cost	$44,900,000	$45,600,000	$46,600,000	$48,000,000
Total Average Annual Benefits	$214,700,000	$217,900,000	$216,800,000	$218,300,000
Net Excess Benefits	$169,800,000	$172,400,000	$170,200,000	$170,300,000
B/C Ratio	4.78	4.78	4.65	4.55

[1]PCXIN-RED 6-SEP-2016 draft NIM results.

[2]GEC Reference Traffic Demand Forecasts and Wilson Calcasieu study commodity group elasticities.

3.6.4 Risk and Uncertainty

USACE guidelines, as presented in the Principles and Guidelines and in the Planning Guidance Notebook, ER 1165-02-100, Appendix E-4, have long recognized that risk and uncertainty is inherent in all phases of the analysis of waterway investments. For this GRR, risk is defined as inputs or potential results that can be described probabilistically, while uncertainty is defined as inputs or potential results that cannot be defined with a probability. Inputs that can be defined probabilistically are modeled stochastically and the modeling results are displayed as expected values (often with minimum and maximum results displayed). Uncertain inputs are often modeled through sensitivity testing.

Although an IHNC Lock analysis showed structural, mechanical, and electrical risk and uncertainty was assumed manageable through cyclical maintenance, the age and current condition of the existing lock will have an impact on the ability to recover the lock from major failures in the future. A lock assessment was carried out that documented numerous deficiencies or concerns of the current condition of the lock. The lock assessment can be found in the Engineering Appendix (Annex 9). The only probabilistic lock service disruption described comes from hurricane events that occur in both the No-Action Plan and the alternative Plans. The service disruption duration and repair costs were similar between the No-Action Plan and the alternative Plans. Regardless, the hurricane event was simulated in Navigation Investment Model at an annual occurrence probability of 20% (see Appendix D, Economics, Attachment 1. Construction and Maintenance Event Data).

In the IHNC Lock analysis, as in most studies, the traffic demand forecast scenarios are not probabilistically defined, and as such are analyzed through sensitivity testing. The Gulf Engineers and Consultants (GEC) "*reference*", or most-likely, traffic demand forecast scenario is used to formulate the recommended plan and then the GEC low and high traffic demand forecast scenarios are analyzed to access the economic viability of the recommended plan to varying traffic levels.

3.6.5 Four Planning and Guidance Criteria

Alternative plans, including the NED plan, should be formulated in consideration of four criteria: Completeness; effectiveness; efficiency; and acceptability.

(1) Completeness is the extent to which a given alternative plan provides and accounts for all investments or other actions to ensure the realization of the planned effects. This may require relating the plan to other types of public or private plans if the other plans are crucial to realization of the contributions to the objective.

(2) Effectiveness is the extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities.

(3) Efficiency is the extent to which an alternative is the most cost effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation's environment.

(4) Acceptability is the workability and viability of the alternative plan with respect to acceptance by State and local entities and the public and compatibility with existing laws, regulations, and public policies.

Alternative	Completeness	Effectiveness	Efficiency	Acceptability
Plan 1: No-Action	This plan provides no benefits beyond the existing condition.	This plan will no alleviate any problems or achieve any opportunities	Although this plan has no cost, existing conditions will continue meaing objectives, goals, problems, and opportunities will not be resolved or met. It is not an efficient plan.	This plan can be implemented, but provides no solution to the identified problems.
Plan 2: 900' x 75'	This alternative can be implemented and contributes to addressing all of the identified problems, opportunities, goals, and objectives.	Addresses Problems and Opportunities. Meets goals and objectives by reducing IHNC lock transit delays and increases IHNC lock reliability.	This plan is justified and provides a significant amount of net excess benefits, but not as high as Plan 3. The benefits of this plan in alleviating specific problems and realizing specific opportunities are consistent with protecting the Nation's environment.	Acceptable to federal resource agencies.
Plan 3: 900' x 110'	This alternative can be implemented and contributes to addressing all of the identified problems, opportunities, goals, and objectives.	Addresses Problems and Opportunities. Meets goals and objectives by reducing IHNC lock transit delays and increases IHNC lock reliability more than any other plan.	This plan is justified and provides the greatest amount of net excess benefits compared to any other plan. The benefits of this plan in alleviating specific problems and realizing specific opportunities are consistent with protecting the Nation's environment. This plan, Plan 3, is the NED plan.	Acceptable to all parties. Acceptable to federal resource agencies.
Plan 4: 1,200' x 75'	This alternative can be implemented and contributes to addressing all of the identified problems, opportunities, goals, and objectives.	Addresses Problems and Opportunities. Meets goals and objectives by reducing IHNC lock transit delays and increases IHNC lock reliability.	This plan is justified and provides a significant amount of net excess benefits, but not as high as Plan 3. The benefits of this plan in alleviating specific problems and realizing specific opportunities are consistent with protecting the Nation's environment.	Acceptable to federal resource agencies.
Plan 5: 1,200' x 110'	This alternative can be implemented and contributes to addressing all of the identified problems, opportunities, goals, and objectives.	Addresses Problems and Opportunities. Meets goals and objectives by reducing IHNC lock transit delays and increases IHNC lock reliability.	This plan is justified and provides a significant amount of net excess benefits, but not as high as Plan 3. The benefits of this plan in alleviating specific problems and realizing specific opportunities are consistent with protecting the Nation's environment.	Acceptable to federal resource agencies.

3.7 Summary of Accounts and Comparison of the NED Plan and the No-Action Plan.

3.7.1 Summary of Accounts

To facilitate evaluation and comparison of the alternatives, the 1983 Principles and Guidelines lay out four Federal Accounts that are used to assess the effects of alternatives. The accounts are National Economic Development (NED), Environmental Quality (EQ), Other Social Effects (OSE), and Regional Economic Development (RED).

- The NED account displays changes in the economic value of the national output of goods and services. The 1983 Principles and Guidelines require the identification of an NED plan from among the alternatives.
- The EQ account displays non-monetary effects on significant natural and cultural resources.
- The RED account registers changes in the distribution of economic activity that result from each alternative plan. Evaluations of regional effects are to be carried out using nationally consistent projections of income, employment, output, and population.
- The OSE account registers plan effects from perspectives that are relevant to the planning process, but are not reflected in the other three accounts.

3.7.2 Comparison of the NED Plan and the No-Action Plan

Plan 1: No-action: There would be no benefits attributable to the no-action plan. The EQ and OSE accounts would remain unchanged. The NED and RED accounts would be adversely impacted as current transit times

of waterborne commerce traffic that utilize the existing lock continue to increase as traffic increases and the frequency of lock maintenance events increase.

Plan 3: 900 feet long by 110 feet wide by -22 feet (NAVD88) shallow draft navigation lock: This plan provides the greatest net NED benefits with a BCR greater than 1. Impacts to the EQ account would be minimal. The OSE account is benefitted with implementation of the Community Impact Mitigation Plan specific to this project. The RED account would benefit because a new and reliable lock would increase efficiency of cargo transiting the IHNC lock and the reliability of the lock would be increased.

3.8 Identification of the NED TSP

Plan 3, the 900 feet long by 110 feet wide by -22 feet (NAVD88) lock configuration, results in the greatest net excess benefits (over $172.4 million), with the highest benefit cost ratio of 4.78:1. All of the plans produce high benefit cost ratios and high net excess benefits. However, based on the need for a new and reliable lock that can efficiently handle forecasted traffic conditions, Plan 3 is the NED plan and is the TSP.

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4.0 Tentatively Selected Plan

4.1 Tentatively Selected Plan Description

Plan 3 – North of Claiborne Site – 900 feet long by 110 feet wide by 22 feet deep (NAVD88)

Table 4-1 outlines the project investment, interest accrued during construction, benefits, and the benefit to cost ratio of the TSP. Table 4-2 outlines the breakdown of the total costs of construction:

Table 4-1. Benefits and Costs of the TSP, Plan 3.

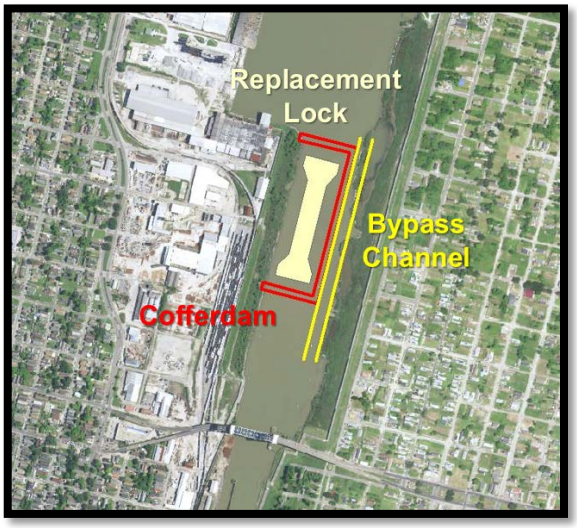
First Cost of Construction	$ 951,300,000
Interest During Construction	$ 213,700,000
Total Investment	$ 1,165,000,000
Average Annual Const. Cost	$ 44,200,000
Average Annual Increm. O&M	$ 1,400,000
Total Average Annual Cost	$ 45,600,000
Total Average Annual Benefits	$ 217,900,000
Net Excess Benefits	$ 172,400,000
B/C Ratio	4.78

Table 4-2. First Costs of the TSP, Plan 3.

Total Costs of Construction:	
PED	$ 106,300,000
Real Estate	$ 10,000
Relocations	$ 57,740,000
Construction	$ 671,030,000
S&A	$ 59,240,000
Mitigation	$ 56,980,000
Total	$ 951,300,000

The main feature of the TSP is replacement of the existing lock with a new lock having usable dimensions of 900 feet long by 110 feet wide by 22 feet deep (NAVD88) to be constructed between the banks of the IHNC, north of the Claiborne Avenue Bridge and south of the Florida Avenue Bridge (see Figure 4-1). Prior activities and work that have been completed for the previously selected deep-draft lock replacement project include: Acquisition of real estate required for project construction except for temporary construction easements; demolition and removal of the Galvez Street Wharf; demolition and removal of all businesses on the east bank of the IHNC between the existing lock and Florida Avenue; environmental remediation of that area; and testing of various pile driving equipment. These activities are compatible with and applicable to this lock replacement plan.

Figure 4-1. Location of Replacement Lock, Bypass Channel, and Cofferdam



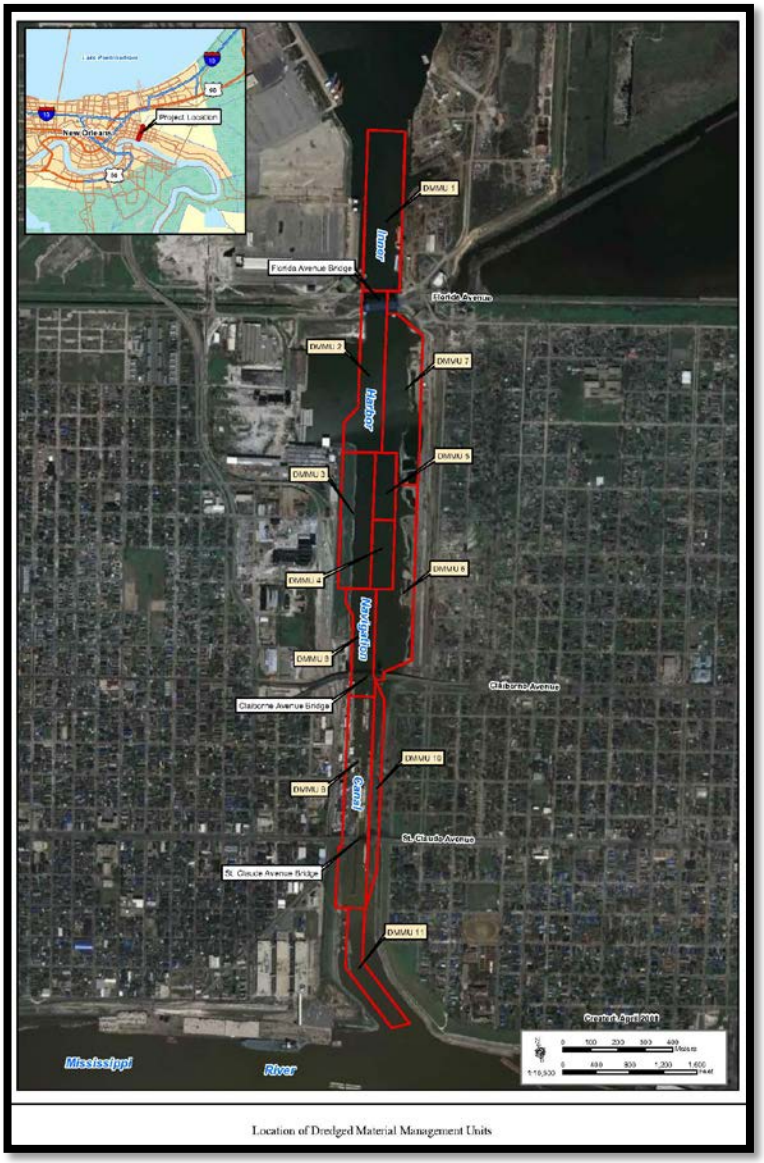
Soils and sediments that require excavation for project construction have been thoroughly evaluated under regulations and procedures developed under requirements of the CWA and may be divided into two categories:

- Approximately 614,000 cubic yards of dredged material that would be excavated from Dredged Material Management Units (DMMUs) 3, 4, 6, 9, and 10 is "suitable for open water discharge" (see Figure 4-2) for DMMU Map). This material is non-toxic to sensitive benthic organisms, does not contain contaminants at concentrations that would adversely bio-accumulate or bio-magnify in aquatic food webs, and would not violate or exceed regulatory water quality criteria or drinking water standards upon discharge into the proposed Mississippi River open-water disposal site. The dredged material would mix with the river's normal suspended and bedload sediments and be carried downstream. Approximately 105,000 cubic yards of dredged material that would be excavated from DMMUs 5 and 7 are "unsuitable for open water discharge" because these materials have been determined to be toxic to sensitive benthic organisms. These materials would be

excavated with an environmental bucket dredge to minimize on-site loss of material and turbidity, and would be hauled to and permanently disposed in a permitted solid waste landfill.

- Dredging depths and widths required for the this plan do not warrant vertical or lateral subdivision of DMMUs into "native layer" and "fill" categories as for previously-evaluated and selected deep draft lock alternatives. However, results from chemical and biological testing of the material within these DMMUs were utilized in assessing current dredged material disposal alternatives in that contaminant maximums and worst-case toxicity determinations for overlapping units were considered to represent a dredging unit. As an example, testing results from the non-native or fill layer of DMMU 7 which contained higher levels of contaminants than the native layer were used to represent the entire unit, and were not averaged or weighted with native and fill layers.
- DMMUs previously evaluated for deeper lock alternatives that have sufficient depth and would not be dredged as part of this plan are DMMUs 1, 2, 8, and 11 (IHNC Channel).
- Construction of the new lock north of Claiborne Avenue would require a complex sequence of tasks. It is anticipated that the entire construction process could take up to 13 years to complete, if adequate funding is provided. The following list describes those tasks in sequence:

Figure 4-2. Location of IHNC Dredged Material Management Units.

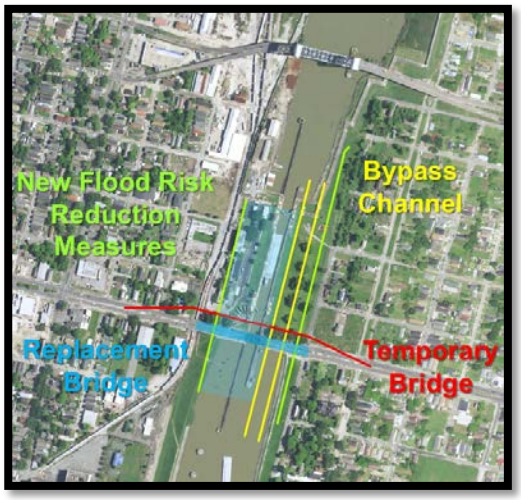


- A cofferdam around the new lock construction site is required so that the site can be unwatered. Foundational support is required for the cofferdam, therefore jet grouting of the canal bottom sediments utilizing barge-mounted equipment would be performed to strengthen the sediments. The soil improvements would occur prior to placement of sheeting for the cofferdam. The required sheet pile tip elevation for the cofferdam is elevation -90 feet (NAVD88). The sheet pilings would be placed using a barge-mounted vibratory hammer to form cell walls, and the interior of the cofferdam cells would be filled with sand to an elevation of +3.5 feet (NAVD 88).
- The north-south section (eastern wall) of the cofferdam would be constructed within the IHNC as the first actual construction feature of the project. Construction of this part of the cofferdam in the navigation channel would separate two distinct dredging areas, namely the new lock construction site on the west side and the north bypass channel on the east side. The lock construction site and the north bypass channel require excavation to significantly different depths. The dredging depth required for the new lock site is elevation -33 feet (NAVD 88). For the north bypass channel, the required elevation is -17 feet (NAVD 88).

- A temporary bypass channel would be excavated between the north-south cofferdam section and the floodwall located along the east bank of the IHNC. Some of the existing east bank of the IHNC may need to be removed. The north bypass channel would accommodate vessel traffic around the new lock construction site. To protect the east bank of the IHNC and cofferdam, and the vessels transiting the bypass channel, tugboats would be permanently stationed to assist vessels transiting the area. In addition, protection cells would be placed along the west side of the bypass channel to protect the cofferdam. All vessel traffic would be rerouted through the north bypass channel while the new lock is being constructed.
- Approximately 106,000 cubic yards of sediment would need to be dredged to construct the north bypass channel. The majority of this dredged material – approximately 70,000 cubic yards from DMMU 6 – is suitable for open water placement and would be discharged into the Mississippi River. The remaining dredged material, about 36,000 cubic yards from DMMU 7, is not suitable for discharge into the Mississippi River and would be bucket dredged and disposed of in a solid waste landfill.
- Once the north bypass channel is operational, the new lock site would be dredged by a combination of hydraulic and bucket dredges. Approximately 69,000 cubic yards of dredged material from DMMU 5 is unsuitable for discharge into the aquatic environment and would be bucket dredged and disposed of in a solid waste landfill. An additional 278,000 cubic yards of dredged material would be removed from the new lock site (DMMUs 3 and 4) by hydraulic dredging. That material is suitable for disposal in the freshwater aquatic environment and would be discharged into the Mississippi River.
- After completing the dredging work at the new lock site, the east-west sections (northern and southern walls) of the cofferdam would be constructed to close the cofferdam for unwatering. Unwatering of the cofferdam would be accomplished with a combination of pumps, sumps, and wells, including pressure relief wells. All water collected within the cofferdam would be pumped into the IHNC.
- Foundation pilings would be driven within the unwatered cofferdam to support the concrete pours of the lock module. Foundation pilings would consist of 24-inch x 24-inch precast, pre-stressed concrete pilings spaced on approximately 10-foot centers with tighter spacing under lock module walls. A total of 1,386 vertical pilings would be driven to a depth of 136 feet below grade. Either a vibratory or impact hammer, or a combination of both, would be used for pile driving. Concrete pours for the lock modules would begin at the gates and work inward to the chambers. Alternate sections of the module would be poured, and some concrete pours may need to occur at night with the use of lighting due to concrete technical restrictions. Machinery, valves, electrical, and mechanical connections would all be installed after completion of concrete placement. An on-site concrete batch plant would be necessary, and nearby staging areas for construction materials and parking areas for construction workers would be required.
- Following completion of the lock modules, the cofferdams would be removed and the area re-watered. Areas around the lock modules would be backfilled with excess sand from the cofferdams and earthen fill material from off-site sources. The west side of the lock would be backfilled first, prior to opening the lock, so that administration buildings can be constructed in that area and to avoid working on the west side of the lock while traffic is passing through the lock. The lock would then be opened to navigation traffic in a pass-through mode and the bypass channel backfilled with earthen fill material from an offsite source. Completion of tie-ins to existing floodwalls on both sides of the IHNC would be achieved after construction of the new lock, while the new lock remains in the pass-through mode (all gates open). During this time, the existing lock would continue normal operation.
- A temporary bridge (see Figure 4-3) would be constructed adjacent to the St. Claude Avenue Bridge to provide a comparable level of traffic flow while the St. Claude Avenue Bridge is replaced with a low-level double bascule bridge.
- Replacement storm and or flood risk reduction measures (see Figure 4-3) would be constructed to at least in-kind and up to current design standards in advanced engineering and design during final feasibility or in PED.

- Once the new lock becomes operational and all new levees and floodwalls are constructed, the old lock would be put into pass-through mode. During this time a south bypass channel around the east side of the old lock would be constructed to allow for continued vessel traffic while the old lock is demolished (see Figure 4-5). Hydraulic and/or mechanical dredges would remove approximately 85,000 cubic yards of sediment from DMMU 10 to construct the south bypass channel. This material is suitable for open water placement and would be discharged into the Mississippi River.
- Once the south bypass channel is operational, the old lock would be demolished and the structural material hauled away to be salvaged or scrapped. About 181,000 cubic yards of dredged material would then be removed from the lock demolition site (DMMU 9) with hydraulic and or mechanical dredges. This material is suitable for open water discharge into the Mississippi River. Upon completion, the new lock and connecting channels would be fully functional.

Figure 4-3. Demolition of Existing Lock



4.2 Hazardous, toxic, and radioactive waste

Two HTRW sites are located within property owned by the USACE that are part of the IHNC lock complex. Those sites will not be impacted by construction of the TSP (including during demolition of the existing lock). However, remediation of the sites is being coordinated between the USACE and the LADEQ. Remediation of the sites will be a separate action from construction of the TSP.

4.3 Adaptive management and monitoring

There is no adaptive management and or monitoring component associated with the TSP.

4.4 Real estate requirements

4.4.1 Real Estate Plan

A Real Estate Plan (REP) describing the real estate requirements and costs for the project can be found in Appendix C. The REP was prepared with estimated right-of-way (ROW) requirements based on available information.

The majority of the real estate needed for construction of the IHNC Project (135 +/- acres) is owned in fee by the United States. This is where the existing lock, future lock, cofferdam, flood risk reduction measures replaced in kind or up to design grade standards at the time of construction, bypass channels, St. Claude Avenue Bridge and temporary bridge will be located. A portion of the dredged material pipeline, as well as, approach ramps for the temporary bridge will cross City of New Orleans property**.** An Authorization for Entry will be acquired from the City. There will not be any displaced persons and businesses entitled to Public Law 91-646, Title II Relocations Assistance. Temporary relocations, if any, would be a part of the CIMP.

Real estate costs are minimal for administrative costs associated with obtaining the necessary rights from the City. The estimated cost of real estate for this project will be split 50/50 between the USACE and the IWWTF. There will not be a NFS for this project.

4.4.2 Borrow Material

Borrow material will be needed for various project features. Although it is anticipated that borrow materials are to be acquired through commercial sources, at this time Engineering has not determined the borrow quantities. Real Estate regulations (ER 405-1-12, paragraph 12-9d(3)) allow for small quantities of borrow material to be supplied by the construction contractor through the use of readily available commercial sites, if supported by an analysis conducted by the Government and if no other constraints exist. During the feasibility phase, once the quantity of borrow is determined, a borrow analysis will be performed to determine whether borrow material can be obtained from a local commercial source. The analysis, a small quantities analysis, would be carried out on a contract by contract basis rather than on an estimated total borrow quantity since fill/backfill material amounts would vary at different points in construction.

4.5 Relocations

Relocation data was collected, tabulated and detailed in Appendix B of this GRR, by the CEMVN Relocations Team, to a feasibility level of design. The information gathered was conducted by an in-house investigation of existing reports, files, and past correspondence with affected facility owners. The Relocations Team reviewed proposed designs against existing facility maps and databases to obtain information on existing facilities. The Relocations Team then made assumptions based on a proposed feasibility level project design and project location to determine project relocation requirements that were previous recommended. These relocation design assumptions and information were provided in the 1999 Feasibility Report (Facility Relocation Study) and associated (undated) plans (i.e. Plates B-107, B-108, B-109). The plans call for the potential relocations of several utilities via three (3) utility corridors (conventional trenching) under the channel as well as the modification or replacement of the St. Claude Bridge as listed in Section 11. Additional relocations details can be found Relocations Section 11 in the Engineering Appendix (B).

Because of the change in scope from a deep draft navigation lock to a shallow draft navigation lock, the number of relocations and associated costs might change. An analysis on prior relocations assumptions will be carried out to determine the final disposition of relocations based on the current TSP, a shallow draft lock. Provided an updated relocations cost estimate does not exceed 30 percent or more of the estimated total project costs, realty specialists may substitute a "real estate assessment" for the attorney's preliminary opinion of compensability. Such assessment is not a legal determination, but will allow planners to develop cost estimates for the project during feasibility study.

4.6 Operation and Maintenance

Cost and Closure Matrices were prepared by the USACE, Louisville District (CELRL-ED-D-S) in 2015 together with the USACE-MVN-Operations Division (CEMVN-OD). The cost and closure schedules are a series of spreadsheet matrices that detail the anticipated maintenance and repair demands for all IHNC Lock Replacement Project options during the fifty-year study period of 2032-2081. The matrices were developed based upon key indicators including historical performance at the project, the New Orleans District's current maintenance program, as well as multiple large-scale investment strategies from other Corps of Engineers inventory of projects. For more detailed information, including the report from Louisville District, refer to the Engineering Appendix (B).

4.7 Sea Level Rise

Relative sea level rise (RSLR), the combination of subsidence and eustatic sea level rise, was not specifically considered in the current design elevation of the replacement lock. However, the current design elevation of the replacement lock at 24.5 feet (NAVD88) was based on consideration of the 1973 Mississippi River & Tributaries (MR&T) flowline of 22.41 feet (NAVD88) at this location of the Mississippi River. The flowline

height of 22.41 feet includes roughly 4.6 feet of freeboard to cover a number of uncertainties, of which to some degree includes eustatic sea level rise. As stated previously, there was not a specific calculation for RSLR when existing flowline elevations were calculated; rather, the additional free board was a pre-emptive decision based on best professional judgment. The current design elevation of the replacement lock includes over 2 feet of additional elevation above the 1973 flowline. Advanced engineering and design would be done to adjust, if necessary, lock elevation prior to or in PED based on current subsidence rates and new MR&T flowlines (which consider just eustatic sea level rise) in this area of the Mississippi River when that information is approved and available for use.

4.8 Funding

Construction of the TSP is dependent on funds made available by Congress. In the case of this TSP, an inland waterway navigation project, funding is provided from two separate sources. One source of funds is what Congress appropriates out of general Treasury funds for the USACE to expend as directed. The other source of funds is from the IWWTF which are collected from a per gallon tax levied on fuels purchased by inland waterway users. The IWWTF is overseen by the Inland Waterways Users Board (IWWUB), but appropriation of funds from the IWWTF can only be made by Congress, based on the recommendations of the IWWUB. To conclude, Treasury funds are made available via the Congressional appropriations process; IWWTF funds are also made available via the Congressional appropriations process, but is subject to the availability of the balance of funds in the IWWTF, unless any deficit in the IWWTF is remedied by additional Congressional action.

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5.0 Post Authorization Changes

The following sections are recommended for a GRR and are taken from Appendix G-16 of ER 1105-2-100.

5.1 Authorized Project

The Recommended Plan (RP) presented in the 1997 Evaluation Report was a 1,200 feet long by 100 feet wide by -36 feet deep (NAVD88), deep-draft navigation lock north of the Claiborne Avenue Bridge, which, at that time, was the locally preferred plan (LLP). The NED plan in the 1997 Evaluation Report was a 900 feet long by 110 feet wide by -22 feet (NAVD88), shallow-draft navigation lock north of the Claiborne Avenue Bridge. In accordance with the 2000 Supplemental Evaluation Report, the ASA(CW) found that a federal interest existed in the deep draft increment of the 1997 Recommended Plan (the locally preferred increment) such that the investment of federal funds in the construction of a deep draft lock (the non-NED plan) was approved. As such, the federal authorized project, under the 1997 Evaluation Report, as amended by the 2000 Supplemental Report, became the deep draft lock. Although the scope of the authorized project, which was based on the Recommended Plan adopted in the 1997 Evaluation Report, as amended by the 2000 Supplemental Evaluation Report, has not changed, current environmental and economic conditions and changed assumptions required the consideration of other replacement options to replace the IHNC lock with a reliable and more efficient modern lock.

5.2 Change in Project Purpose

The project purpose remains to construct a replacement of the existing IHNC navigation lock.

5.3 Change in Local Cooperation Requirements

Since evaluating changed conditions and determining that a shallow-draft navigation lock (-22 feet (NAVD88)) is the TSP, a NFS is not required. Inland navigation does not require a non-federal cost-share.

5.4 Change in Real Estate and/or Location of Project

- Since the closure of the MR-GO, the proposed type of lock is a cast-in-place, shallow-draft lock instead of the 36' deep-draft lock to be prefabricated at a graving site approximately ten miles northeast of the IHNC then floated to the lock site. This eliminates the need, as expressed in the 1997 report, for acquiring the graving site located in St. Bernard Parish which consisted of 106 acres (69.3 wet woodlands, 19.7 acres of existing levee easement and 17 acres of existing channel easement).
- The requirement in the 1997 report for a mitigation area consisting of 136.98 acres south of the Main Outfall Canal and north of Florida Avenue is no longer needed. Not needing to mitigate for the deep draft – we no longer need to acquire this in fee from seven owners.
- The current TSP does not include replacing the Claiborne Avenue Bridge. A four lane, mid-level vertical lift span bridge would have necessitated acquiring additional areas on both sides of the IHNC in order to construct the longer ramps needed for the mid-level bridge. This would have meant relocations for several residential and commercial properties, acquiring acreage and interrupting the flow of traffic for businesses in the area. Construction of the new bridge would also have caused a temporary closure for 2 – 3 weeks, necessitating the need for detour roads in St. Bernard and Orleans parishes. This acquisition would have been for 27.92 acres of perpetual road easement.
- The current TSP no longer includes a permanent or temporary CDF disposal site for dredged materials. Disposal of dredged material suitable for aquatic disposal will still be piped into the Mississippi River; the pipeline will run through lands owned by the United States and the City of New Orleans. Acquisition of land for temporary or permanent disposal will not be needed. Dredged material not suitable for aquatic disposal will be placed in a commercial landfill.

5.5 Design Changes

The proposed 900 feet long by 110 feet wide by -22 feet (NAVD88), replacement navigation lock, as presented within this GRR, has several design changes compared to the replacement lock detailed in the original 1997 Evaluation Report and subsequent documents listed within Appendix B – Chapter entitled, *"References"*. The key design changes for the lock presented within this GRR are as follows:

- Hydraulic Elevation Changes
- Raised Lock Sill Elevation, El. -22.0 (NAVD 88) (For Shallow Draft Vessels)
- Cast-In-Place Concrete Construction Methodology
- Elimination of Claiborne Ave Bridge Modifications

Hydraulic design elevations presented within this GRR have been updated since the original 1997 Evaluation Report. New design elevations were developed in 2010 for the deep draft lock PED phase. Those design elevations were utilized for this GRR. Design elevations were referenced to NAVD88 – a land based referenced datum. Unlike navigable waterways that reference to water levels, structures, such as the navigation lock proposed in this GRR are tied into land and are referenced to a fixed point or a benchmark.

The lock detailed in the original 1997 Evaluation Report and subsequent studies was designed to accommodate deep draft vessels and ships. The proposed lock within this GRR would utilize a much shallower sill depth as a result of the decrease in navigational traffic requiring deeper draft following Hurricane Katrina. A sill elevation of 22.0 feet deep was selected for the TSP. This elevation provides the appropriate level of safety for vessels navigating the lock and allows for acceptable filling and emptying of the chamber. This elevation is compatible with the existing channel and will require minimal excavation during construction. Additional information on this design feature can be found in the Engineering Appendix B

A Cast-In-Place design was investigated as part of this GRR for construction of the new lock chamber and sector gate monoliths. Due to various concerns with the Float-In-Place design, as noted within Appendix B, Chapter entitled, *"Cast-In-Place versus Float-In-Construction of the Lock*", the Cast-In-Place option was selected. This recommendation is based on the USACE experiences with Olmsted Locks and Dam and the Harvey Canal Floodgate. It is believed that the cast-in-place design presents less chance for cost escalation and schedule delays due to unforeseen design and construction challenges. Investigations into changing from Float-In-Place to Cast-in-Place have been ongoing. However, it was not until 2015 that a final decision was made to switch to Cast-in-Place.

Steel sector gates were designed as part of the GRR in lieu of the miter gates originally proposed within the 1997 Evaluation Report. Sector Gates have been the preferred gate by MVN engineering and operations personnel due to their ability to be designed to resist reverse head loading and their ease of operation. For a detailed comparison of the sector vs miter gates, refer to Appendix B, Chapter entitled *"Sector Gate Versus Miter Gates"*.

Due to the selection of a shallow draft lock as the TSP, required vessel clearance underneath the Claiborne Avenue Bridge when in the open position has decreased. As such, no modifications to the Claiborne Avenue Bridge are necessary.

5.6 Change in Total Project First Costs

Although the Recommended Plan from the 1997 Evaluation Report, as amended by the 2000 Supplemental Evaluation Report, and the 2009 Supplemental EIS and Record of Decision, is no longer being considered, there remain changes in total project first costs that must be addressed. Total project first costs for the current TSP/NED plan can be found in Chapter 4, Section 4.1. In Section 844 of the WRDA '86, a project cost of $714,300,000 was included. Once more detailed costs are available, a 902 analysis would be prepared to determine the project is within cost limits. The same would be done for the CIMP with a $33,000,000 cost listed in the 1997 Evaluation Report.

5.7 Change in Cost Allocation

Cost allocations remain the same as statutorily required in Section 844 of the WRDA '86. Construction of inland navigation projects is allocated 50/50 between the USACE and the IWWTF. That cost allocation remains. Cost sharing for general cargo (or deep draft navigation) requires a NFS with cost share responsibilities dependent on a number of variables. However, since deep draft increment is no longer being recommended, a NFS is no longer necessary.

5.8 Changes in Cost Apportionment

A NFS is required for deep draft navigation. Inland (shallow draft) navigation is 50/50 federal/IWWTF. Because there is no deep draft increment, there is no need for a NFS; therefore, there is no cost apportionment to report.

5.9 Changes to the Community Impact Mitigation Plan

As stated in the introduction to this GRR, categories of compensation and associated dollars (as indexed) that are part of the 1997 community impact mitigation plan will be revisited during the final design phase of this report. The intent is to identify items where compensation has already been provided and identify, of the remaining compensatory mitigation items, what should be carried forward in consideration of the existing conditions of the proposed project. The reformulation of the unimplemented portions of the CIMP will consider public input, gathered during the public comment period for this integrated document and from community outreach meetings, would be used in determining an updated Community Impact Mitigation Plan.

Table 5-1 compares the 199**5** CIMP with the 199**7** CIMP that was incorporated by reference in the 2009 final SEIS. The comparison does not list funds expended as part of the 1997 CIMP as described in the 2009 final SEIS. As part of this GRR, the public is requested to review prior versions (1995 and 1997, see Appendix F) of the CIMP in terms relevant to existing conditions and provide initial comment and input on the preparation of an updated Community Impact Mitigation Plan.

Table 5-1. Comparison of 1995 versus 1997 Community Impact Mitigation Plans

1995 Draft Evaluation Report Mitigation Plan					
Impact Avoidance	**Cost**				
Comprehensive Pile Testing Program	$38,000				
Florida Avenue Access Road - Permanent Detour Route	$8,124,000				
Lighting for Florida Avenue Access Road	$243,000				
Aesthetic Mitigation					
Textured Finishes					
Floodwalls	$211,000				
St. Claude Avenue Bridge Approaches	$150,000				
Claiborne and St. Claude Bridge Piers	$900,000				
Exposed Lock walls	$211,000				
Landscaping of levees, Floodwalls, Detour Routes					
& Four Bridge Approaches	$310,000				
Landscaping on Backfill Area between Lockwalls and Floodwalls					
(both sides of the canal)	$967,000				
Historical Recordation Program	$600,000				
Sub-total	$11,754,000				
		1997 Evaluation Report Community Impact Mitigation Plan			
Direct Mitigation		**Direct Impact Minimization**	**Cost**	**Difference**	
Soundproofing Residential Structures	$1,386,000	Soundproofing Residential Structures	$1,336,000	-$50,000	
Synchronized Traffic Signals	$79,000	Synchronized Traffic Signals	$79,000	$0	
Computerized Highway Message Boards	$375,000	Computerized Highway Message Boards	$375,000	$0	
Incident Management Plan	$295,000	Incident Management Plan	$295,000	$0	
Emergency Medical Service (Ambulance)	$2,200,000				
Police Substation (4 Years)	$1,330,000				
School Crossing Guards	$41,000	School Crossing Guards	$41,000	$0	
Traffic Control Officers	$286,000	Traffic Control Officers	$286,000	$0	
Pedestrian Shuttle Service	$514,000				
Operational Subsidy for Increased Bus Service	$750,000				
Compensation to RTA for Lost Ridership	$724,000				
Street Resurfacing for Construction Traffic (7 miles)	$370,000				
Debris Removal by Barge	$2,375,000				
Cultural Resources (Brochure Publication)	$75,000	Cultural Resources (Brochure Publication)	$75,000	$0	
Salvaging and Curation of Bridge/Lock Components	$156,000	Salvaging and Curation of Bridge/Lock Components	$156,000	$0	
Historical Markers (Street Signs)	$16,000	Historical Markers (Street Signs)	$16,000	$0	
Cultural Display (Old Lock)	$20,000	Cultural Display (Old Lock)	$200,000	$180,000	
Temporary Relocation of Residents (St. Claude Bridge)	$70,000	Temporary Relocation of Residents (St. Claude Bridge)	$70,000	$0	
Compensation to Local Merchants for Lost Revenues	$1,000,000				
Compensation to Holy Cross School for Lost Enrollment	$500,000				
Transplant Oak Trees from Existing Lock	$300,000	Transplant Oak Trees from Existing Lock	$300,000	$0	
Walk, Jog, and Bike Path Along Floodwall	$250,000	Walk, Jog, and Bike Path Along Floodwall	$500,000	$250,000	
Observation Decks, Displays, Comfort Stations		Observation Decks, Displays, Comfort Stations			
and Drinking Fountains (3 each) on and along floodwalls	$123,000	and Drinking Fountains (3 each) on and along floodwalls	$123,000	$0	
Lighting Under St. Claude Avenue Bridge Approach	$11,000				
Community Facilities Under St. Claude Bridge Approach	$77,000				
Offsite Parking for Construction Workers	$1,180,000				
Training Assistance	$500,000	Training Assistance	$1,500,000	$1,000,000	
Rail Line on St. Claude Bridge	$100,000	Rail Line on St. Claude Bridge	$100,000	$0	
		New Roadway in St. Bernard Parish	$8,548,000	$8,548,000	
Sub-total	$15,103,000	Sub-total	$14,000,000	-$1,103,000	
Indirect Compensation for Impacts		**Indirect Compensation for Impacts**			
Lighting Improvements	$11,000	Lighting Improvements	$100,000	$89,000	
Community Facilities (General)	$1,359,000	Community Facilities	$1,750,000	$391,000	
Community Facilities Under Claiborne Avenue					
Bridge Approaches	$77,000				
Street Resurfacing, Lighting, and Landscaping	$959,000	Street Resurfacing, Drainage Improvements, and Landscaping	$8,500,000	$7,541,000	
Business Incubator	$750,000	Business Assistance Program	$750,000	$0	
Neighborhood Revitalization Program	$1,000,000	Neighborhood Revitalization Program	$5,900,000	$4,900,000	
Additional Police/Safety (6 yrs)	$1,995,000	Additional Police/Emergency Medical Services	$2,000,000	$5,000	
Sub-total	$6,151,000	Sub-total	$19,000,000	$12,926,000	
Total	$33,008,000				
Total Rounded	$33,000,000	**Total**	$33,000,000	$0	

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6.0 ENVIRONMENTAL CONSEQUENCES FOR COMPARATIVE ANALYSIS

This chapter describes the direct, indirect and cumulative environmental consequences of implementing the proposed lock replacement plans and the No-Action plan. The order of discussion on resources mirrors that in Chapter 2. As detailed in Chapter 4, after completion of this draft report, final feasibility-level designs will be developed for the TSP (Plan 3 – North of Claiborne Site; 900 feet long x 110 feet wide x 22 feet deep), unless the plan changes, in which case feasibility-level designs will be developed for that plan.

6.1 Human Environment (Socioeconomics)

6.1.1 Waterborne Transportation

Plan 1 - No-Action

The existing lock has long been considered dimensionally inadequate and obsolete requiring many towboats with their barges to break or cut into smaller configurations in order to physically transit. Therefore, under the no-action plan, barges needing to transit the existing structure would continue to experience transit delays which average just over 16 hours. Should traffic increase, as forecasted, delays would necessarily increase accordingly.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.

Under this plan, the existing lock would be replaced with a new lock having a longer chamber that will allow a greater percentage of barges with their towboats to transit the lock without having to break or cut into multiple smaller configurations. Compared to the existing lock, this larger structure may also provide a greater opportunity to pack the chamber with multiple vessels, all of which would more effectively reduce the queue of vessels needing to transit. Delays per tow are expected to fall significantly under this plan to about five hours, assuming similar traffic levels as currently experienced with the existing lock.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.

Compared to Plan 2, this plan would replace the existing lock with a longer and wider chamber that would allow an even greater percentage number of barge tows to transit the lock without having to break or cut into multiple smaller configurations. Compared to Plan 2, this larger structure would also provide a greater opportunity to pack the chamber with multiple vessels, which would more effectively reduce the queue of vessels needing to transit. Delays per tow would be expected to fall significantly under this plan to about two hours, assuming similar traffic levels as currently experienced with the existing lock.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.

Compared to Plan 2, this plan would replace the existing lock with a longer chamber that may allow a slightly greater percentage of barge tows to transit the lock without having to break or cut into multiple smaller configurations. Compared to Plan 2, this larger structure would also provide more of an opportunity to pack the chamber with multiple vessels, which would effectively reduce the queue of vessels needing to transit. Delays per tow would be expected to fall significantly to a level similar to Plan 3, with expected delays per tow to be about three hours assuming similar traffic levels as currently experienced with the existing lock.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.

Compared to the with-project alternative plans described above, this plan is the largest in terms of the overall capacity to process traffic. As such it provides the greatest opportunity for barge tows to transit without needing to break into smaller tows or pack the chamber with multiple vessels. However, expected delays per tow, under this plan, are estimated to be similar to Plan 3 under a moderate, most likely traffic forecast. Only under a higher traffic forecast scenario are the benefits attributable to this size lock more apparent.

6.1.2 Hurricane Storm Damage Risk Reduction System and Mississippi River and Tributaries Flood Control

Plan 1 - No-Action

Under the no-action plan, CEMVN and the non-Federal sponsors for the LPV project would continue to operate and maintain the 100-year level of risk reduction projects that are part of the hurricane storm damage

risk reduction projects within the project area. The CEMVN would continue to provide major maintenance of the Mississippi River and Tributaries project, with non-Federal sponsors providing minor maintenance, to protect the area from river flooding. The existing lock, even though not part of the Mississippi River and Tributaries project, would continue to be maintained by the CEMVN to provide control from Mississippi River flooding.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to the LPV and Mississippi River and Tributaries Flood Control projects for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
A combination of levees and floodwalls would be extended from the location of the existing lock to the new lock location north of Claiborne Avenue along both banks of the IHNC to provide flood control under the Mississippi River and Tributaries project. Once constructed under this lock replacement project, the new levees and floodwalls would be maintained under the Mississippi River and Tributaries project. Existing LPV levees, embankments, and floodwalls that are not incorporated into the extended Mississippi River and Tributaries project may be left in place in order to avoid the cost and effort of demolition and so as to not compromise underlying soils. The new lock would be built to the criteria required to protect from both river flooding and provide risk reduction from hurricane storm surge. The existing LPV levees and floodwalls would be tied into the sides of the new lock with a combination of new levees and floodwalls running perpendicular to the channel.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to the LPV and Mississippi River and Tributaries Flood Control projects for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.
The impacts to the LPV and Mississippi River and Tributaries Flood Control projects for this plan are similar to those described in Plan 3.

6.1.3 Business and Industrial Activity

Plan 1 - No-Action
With the continued use of the existing IHNC Lock and its limitations to navigation, including substantial periodic delays, industrial and commercial redevelopment along the IHNC would be limited. Large areas of previously leased waterfront commercial and industrial property along the IHNC have been vacated. It is anticipated that most remaining marine-related businesses that are not directly tied to local business would eventually reevaluate and choose other locations to conduct business, either in the Metropolitan New Orleans area, or elsewhere, such as Houston, Texas or Mobile, Alabama, where there would be substantially less hindrance to waterborne traffic.

Under the no-action plan, commercial and retail businesses would likely continue to rebuild in the nearby neighborhoods devastated by Hurricane Katrina. Residential redevelopment is key to attracting commercial and retail businesses, and it is anticipated that most of the redevelopment of both residential and commercial and retail businesses would continue to occur in the Bywater and Holy Cross neighborhoods in the near future. This is due in part to their strong neighborhood associations and higher elevation along the river; redevelopment would be followed eventually by the St. Claude and Lower Ninth Ward neighborhoods.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to businesses and industrial activities within the project area for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
A new lock constructed in the IHNC north of Claiborne Avenue may have long-term beneficial impacts on marine-related business development along the IHNC. The larger lock size would more easily accommodate modern vessel traffic, and the resulting lack of long delays could encourage some redevelopment of industry along the IHNC. However, the expectation is that redevelopment would not occur to a great extent as most of the vessel traffic using the IHNC lock is from traffic without origins or destinations along the IHNC waterway itself.

Disruptions to neighborhoods near the IHNC from lock construction, as well as increased traffic delays associated with the replacement of the St. Claude Avenue Bridge would negatively impact residential redevelopment in these areas. This short-term impact on residential redevelopment would also negatively impact nearby neighborhood commercial and retail redevelopment, as fewer local residents would equate to less business activity. Existing businesses located along St. Claude Avenue and North Claiborne Avenue would suffer short-term business losses during detours, as businesses would be less accessible and have reduced exposure.

A temporary increase in regional business activity to support lock construction workers and service and material suppliers would occur during construction activities. Activities such as the new lock construction, existing lock demolition, dredged material disposal, and St. Claude Avenue Bridge improvements could possibly generate a substantial increase in construction-related business activity in the region should costs for labor and materials be spent locally.

The Community Impact Mitigation Plan, as detailed in the 1997 Evaluation Report/EIS and the 2009 supplemental EIS, includes features to assist local businesses. As specified in the 1997 Evaluation Report, one of the features is providing financial compensation to local commercial establishments, schools, and landlords that experience an actual demonstrated decline in sales, tuitions and/or rents during the period of bridge restrictions. Compensation would be determined on a case-by-case basis. The procedures and criteria for payment and settlement would be established prior to the period of bridge restrictions. A second feature of the mitigation plan is providing seed funding to develop a business assistance program in the area to serve as a stimulus for local business development. This program would help create new businesses, help existing businesses expand, provide high-tech educational opportunities, create new jobs and preserve old ones, and help revitalize neighborhoods adjacent to the project. The program would be implemented in conjunction with the City of New Orleans and/or one of the local universities, and existing similar type programs. It is important to note that the features of the mitigation plan, as described in previous documents, are subject to revision, and will take into consideration local community input that will be obtained during public review of this draft report and subsequent meetings and discussions. A revised mitigation plan will be included in the final version of this report/SEIS.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to businesses and industrial activities within the project area for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.
The impacts to businesses and industrial activities within the project area for this plan are similar to those described in Plan 3.

6.1.4 Employment

Plan 1 - No-Action
As the project area slowly recovers from the aftermath of Hurricane Katrina, the number of workers in the labor force and the number employed are increasing. However, within the project area, it is anticipated that

there would continue to be limited job growth, and the labor force would be required to commute to other locations within or outside of Orleans Parish for employment.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to employment for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
No adverse long term impact on the levels of employment is expected from this alternative. Bridge closures during construction could have short term impacts on some of the businesses on both sides of the canal. However, these impacts would depend on the type of business. Construction activities of the project itself have the potential to increase the number of jobs available within the project area, potentially reducing unemployment and providing employment locally without the need to commute to other areas within or outside the parish for over a decade.

The Community Impact Mitigation Plan, as detailed in the 1997 Evaluation Report/EIS and the 2009 supplemental EIS, includes a feature to help increase local employment levels. As specified in the 1997 Evaluation Report, one of the features is a program to expand the skilled labor workforce within the affected community. This program would comply with WRDA 1986, which states that the project should make a maximum effort to assure full participation of locals in the construction of the project. This program was partially implemented in 2003 through the funding of a job training program through a local university. It is important to note that the features of the mitigation plan, as described in previous documents, are subject to revision, and will take into consideration local community input that will be obtained during public review of this draft report and subsequent meetings and discussions. A revised mitigation plan will be included in the final version of this report/SEIS.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to employment for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.
The impacts to employment for this plan are similar to those described in Plan 3.

6.1.5 Land Use

Plan 1 - No-Action
With the continued operation of the existing IHNC Lock by CEMVN, no substantial changes in land use are anticipated. Existing vacant lots in nearby neighborhoods are expected to slowly be filled in with residential and small businesses, where zoning allows.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to land use within the project area for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
During lock construction activities, it is anticipated that any residential and commercial redevelopment activities near the IHNC (within approximately 500 feet of the IHNC) would be suppressed due to construction noise and traffic that would be disrupting to nearby areas. Over the long-term, improved infrastructure along the IHNC, consisting of a new larger lock, would contribute to commercial and industrial development in the immediate vicinity of the IHNC.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to land use within the project area for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.
The impacts to land use within the project area for this plan are similar to those described in Plan 3.

6.1.6 Property Values

Plan 1 - No-Action
The median values for owner occupied housing units in the project area are likely to increase over time. However, housing values would likely not increase as rapidly as in other areas of the city that were less damaged by Hurricane Katrina and are in proximity to active commercial and retail businesses and jobs.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to property values within the project area for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
Property values in the immediate vicinity of construction activities could be adversely impacted by this alternative in the short term because of noise impacts and the traffic congestion caused by the replacement of the St. Claude Avenue Bridge, even though a temporary bridge would be provided. Following the completion of the project, with the likelihood of increased commercial and business activity as described previously, the expectation is that property values will increase over time but not to any great extent.

The Community Impact Mitigation Plan, as detailed in the 1997 Evaluation Report/EIS and the 2009 supplemental EIS, includes a feature for neighborhood revitalization. As specified in the 1997 Evaluation Report seed money would be provided for a multi-faceted program including housing rehabilitation, educating local residents on maintaining their housing, clearing of vacant lots, lighting improvements, demolishing dilapidated housing and rebuilding on the site. This program would be administered by already established local agencies and/or neighborhood community development organizations. It is important to note that the features of the mitigation plan, as described in previous documents, are subject to revision, and will take into consideration local community input that will be obtained during public review of this draft report and subsequent meetings and discussions. A revised mitigation plan will be included in the final version of this report/SEIS.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to property values within the project area for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.
The impacts to property values within the project area for this plan are similar to those described in Plan 3.

6.1.7 Public/Community Facility Services

Plan 1 - No-Action
Under the no-action plan, it is anticipated that existing community facilities and services would continue to provide the level of service that exists today.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to both public and community facilities for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
The use of a temporary bridge at St. Claude Avenue during the bridge replacement would cause short-term disruptions to pedestrian and vehicle traffic, impacting residents' access to the existing public and community facilities. The temporary disruption in vehicle traffic across the IHNC would also increase response times for emergency vehicles traveling across the canal. This is especially critical for residents of the Lower Ninth Ward and Holy Cross neighborhoods, who rely upon the IHNC bridges for emergency transportation to emergency medical centers located in New Orleans, west of the IHNC. However, a newly-opened hospital in St. Bernard

Parish, close to the Orleans Parish line, lessens the critical need to transport cases of medical emergencies to facilities within Orleans Parish.

The Community Impact Mitigation Plan, as detailed in the 1997 Evaluation Report/EIS and the 2009 supplemental EIS, includes features for public and community facilities and services. As specified in the 1997 Evaluation Report, public community facilities at appropriate locations in nearby neighborhoods, such as supervised playgrounds, toddler playgrounds, community gardens, and linear parks would be provided or improved through existing local programs. This feature was partially implemented while the project to replace the existing lock was under construction in the early 2000's through improvements made to local playgrounds via a grant provided to the NORD and Friends of NORD. A second feature of the mitigation plan is to fund additional police patrols and emergency medical services in the area during project construction. Additional police patrols were funded as an element of the mitigation plan during the early 2000s when the lock replacement project was in its early construction phase. It is important to note that the features of the mitigation plan, as described in previous documents, are subject to revision, and will take into consideration local community input that will be obtained during public review of this draft report and subsequent meetings and discussions. A revised mitigation plan will be included in the final version of this report/SEIS.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to both public and community facilities for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.
The impacts to both public and community facilities for this plan are similar to those described in Plan 3.

6.1.8 Tax Revenues

Plan 1 - No-Action
Under the no-action plan, the housing values and business activities of the project area would change very little in the future. As a result, the expectation is that the tax revenues generated in the project area would remain somewhat stagnant.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to tax revenues for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
Under this plan, property values and thus, property taxes, could experience a small adverse impact because of the bridge closures and construction noise. In the short-term, sales taxes could be adversely affected by the bridge replacement as residents are discouraged from shopping in nearby retail businesses due to these inconveniences. However, should an increase in economic activity from lock construction activities occur locally (such as local purchases by construction personnel, purchasing of supplies and equipment for construction, and housing needs), this could potentially offset some of the overall loss in business because of the bridge replacement.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to tax revenues for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.
The impacts to tax revenues for this plan are similar to those described in Plan 3.

6.1.9 Population

Plan 1 - No-Action
The population of the project area is slowly recovering from the aftermath of Hurricane Katrina. The biggest factors impacting population growth would be the ability of local, state, and Federal governments to reestablish

the public's confidence in the hurricane and storm damage risk reduction system to provide adequate storm surge protection.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to population of the project area for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
This plan is not expected to have any significant impacts, short or long term, on the population of the area. However, it is possible that inconveniences caused by traffic congestion or increased noise levels could cause some of the residents who do not own their homes to consider relocation and discourage returning residents from rebuilding near the IHNC during lock construction and bridge replacement activities.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to population of the project area for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.
The impacts to population of the project area for this plan are similar to those described in Plan 3.

6.1.10 Community and Regional Growth

Plan 1 - No-Action
Future community and regional growth is anticipated to be dependent upon the ability to redevelop adjacent neighborhoods that were devastated by Hurricane Katrina. Community growth requirements include the ability to improve housing conditions, provide local and regional health care, and make available adequate public schools and child care centers. The future growth of the project area and the New Orleans Metropolitan Statistical Area is at least partially correlated to the perceived risk of damage from future storm events. Additionally, costs associated with flood risk, such as insurance coverage and commuting distance to adequate jobs, also play a role in redevelopment of the project area.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to the community and regional growth of the project area for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
Redevelopment of neighborhoods in the project area could be diminished during the construction period due to the disruption from construction activities and increased vehicular traffic. However, it is anticipated that the construction of a new lock would not have any long-term impacts on community and regional growth. Should expenditures on labor and purchase of supplies and materials occur locally as a result of lock construction, it is anticipated that this would be beneficial to the community and regional growth.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to the community and regional growth of the project area for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.
The impacts to the community and regional growth of the project area for this plan are similar to those described in Plan 3.

6.1.11 Vehicular Transportation

Plan 1 - No-Action
The current transportation system is anticipated to remain relatively unchanged. The overall changes in traffic volumes at the IHNC bridges would be roughly equivalent to overall population and employment growth in

the area. The Louisiana Department of Transportation and Development continues to project a new high rise bridge across the IHNC along the Florida Avenue corridor with connections to Interstate Highway 10 to the west and Paris Road (Louisiana Highway 47) and Interstate Highway 510 to the east. This concept has been studied since at least the early 2000's and the plan had gained considerable momentum before Hurricane Katrina in 2005. Since then, the loss of local and regional population has made the project less justifiable. While a new bridge project continues to be studied, it is not anticipated that a new bridge would be constructed in the foreseeable future.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to vehicular transportation for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
The demolition of the St. Claude Avenue Bridge and construction of a replacement bridge would likely cause a shift of some vehicular traffic onto North Claiborne Avenue and the Claiborne Avenue Bridge. However, with a temporary bridge in place during the St. Claude Bridge replacement, the diverted traffic and associated delay impacts on North Claiborne Avenue are not expected to be significant. Minor to moderate delays on North Claiborne Avenue, particularly during peak hours, and moderate congestion in neighborhoods adjacent to Florida Avenue due to traffic rerouting to the Florida Avenue Bridge should be expected while the St. Claude Bridge is under construction.

It should also be noted that once the project is completed, the number of raising or openings at the Claiborne Avenue Bridge are expected to be higher during the non-curfew/non-rush hour periods, thereby causing some added delay time to vehicles using this bridge. This is due to the fact that the new lock would be constructed on the IHNC to the north of Claiborne Avenue causing higher Mississippi River stages to be present under the Claiborne Avenue Bridge, thereby lowering the vertical clearance for waterborne traffic. Consequently the percentage of vessels needing the bridge to rise when traversing this area would necessarily increase. It is anticipated that most of the vessels, both barges and towboats, using the waterway would not require raising of the Claiborne Avenue lift span during normal river stages. Only when the river is abnormally high would there be a need to raise the lift span for a high percentage of barge tows.

The Community Impact Mitigation Plan, as detailed in the 1997 Evaluation Report/EIS and the 2009 supplemental EIS, includes a number of features to address anticipated issues with vehicular transportation. As specified in the 1997 Evaluation Report, funds would be provided for synchronization of traffic signals to facilitate traffic flow across the IHNC. Computerized message boards would be provided to inform commuters of problem areas before they encounter congested traffic areas. An incident management plan would be implemented. The plan would include a police detail and tow trucks to be on standby during peak traffic hours for accident reporting and response. School crossing guards would be provided as needed, especially on streets where traffic is increased due to construction-related detours. A program of street resurfacing and drainage improvements would be funded for yet to be determined areas on both sides of the IHNC. Provisions for a light rail line, suitable for street cars (trolleys), would be included on the new St. Claude Avenue Bridge in case the Regional Transit Authority decides to extend the St. Claude street car line toward the St. Bernard Parish line. It is important to note that the features of the mitigation plan, as described in previous documents, are subject to revision, and will take into consideration local community input that will be obtained during public review of this draft report and subsequent meetings and discussions. A revised mitigation plan will be included in the final version of this report/SEIS.

In addition to the features of the Community Impact Mitigation Plan discussed in the previous paragraph, several impact avoidance features are included as integral components of the proposed action to reduce impacts on vehicular transportation. The proposed temporary bridge across the IHNC during replacement of the St. Claude Avenue Bridge is a major project feature and would significantly reduce traffic issues for local residents. Specific routes would be designated for construction-related traffic to minimize residential disturbance and

traffic congestion. Local streets that would serve construction-related traffic would be resurfaced, as appropriate, prior to initiation of construction activities, and maintenance of those streets would be provided during the project construction period. Site specific plans for street access would be determined during future detailed studies. Appropriate detour signage would be placed in order to preserve access to local streets during construction activities. Off-street parking would be provided for construction workers, and shuttle vans would be used to transport construction workers to the work sites, if necessary. Streets that are damaged by any and all construction activities would be repaired. Contract specifications would require as much construction material and equipment and debris as practicable to be delivered and removed by barge instead of trucks. This would substantially reduce heavy truck traffic.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to vehicular transportation for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.
The impacts to vehicular transportation for this plan are similar to those described in Plan 3.

6.1.12 Housing

Plan 1 - No-Action
The total number of houses in the project area is expected to remain substantially below pre-Katrina levels in the foreseeable future. Uncertainty about the rate of recovery from the aftermath of Hurricane Katrina continues to be one of the main factors affecting the future level of housing inventory and occupied housing. The level of housing reflects broad trends in categories such as migration, employment, income, and more specific perceptions such as confidence in the improved hurricane and storm damage risk reduction system.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to housing for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
Implementation of this alternative is not expected to have any significant impact on the housing in the area, as it would require no acquisition of residential property, nor would it be expected to result in damage to residential structures. However during construction activities, as stated in the section on population, increased levels of traffic congestion and noise levels may have a slight negative effect on rental housing by inducing highly mobile residents to move elsewhere. During construction and operation of temporary bridges while the St. Claude Avenue Bridge is being replaced, approximately six residential houses, some of which appear to be duplexes, and their occupants, would be subjected to high levels of noise and disruption, including possibly restricted vehicular access. These houses are located on the north side of St. Claude Avenue and face south, towards the approach to the existing bridge. As specified in the 1997 Evaluation Report, these residents would be eligible to be temporarily relocated, at their discretion, as part of the project's Community Impact Mitigation Plan, during construction and operation of the temporary bridges. However, it is important to note that the features of the mitigation plan, as described in previous documents, are subject to revision, and will take into consideration local community input that will be obtained during public review of this draft report and subsequent meetings and discussions. A revised mitigation plan will be included in the final version of this report/SEIS.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to housing for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.
The impacts to housing for this plan are similar to those described in Plan 3.

6.1.13 Community Cohesion

Plan 1 - No-Action

No significant changes in community cohesion would be expected in the absence of Federal action. It is anticipated that some of the individuals that made up the fabric of the community prior to Hurricane Katrina would slowly return to redevelop the neighborhoods as flood risk has now been reduced by construction of the hurricane storm damage risk reduction projects in the Greater New Orleans area and community services continue to improve.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.

The impacts to community cohesion under this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.

Since Hurricane Katrina, the neighborhoods adjacent to the IHNC have been rebuilding at various rates. Recovery efforts within the Bywater Community have been more successful because a smaller portion of the properties were flooded than adjacent neighborhoods. Recovery efforts in the Lower Ninth Ward and Holy Cross neighborhoods have been substantially slower because of the greater damage from flood waters. It is anticipated that implementation of the NED plan, with increased noise and construction traffic, would cause a short-term deterioration of community cohesion (such as walking in the area, visiting with neighbors, and shopping activities) between the neighborhoods located east of the IHNC and those recovering more quickly on the west side of the IHNC, especially during the project activities associated with replacement of the St. Claude Avenue bridge. The new St. Claude Avenue Bridge would accommodate pedestrians and bicyclists, so adverse long term effects are not expected.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.

The impacts to community cohesion under this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.

The impacts to community cohesion under this plan are similar to those described in Plan 3.

6.1.14 Noise

Plan 1 - No-Action

No substantial change in noise levels would occur under the no-action alternative. Information collected for the 2009 SEIS indicated that the background frequency had the following range: Average background readings before 12:00 pm varied from 50 to 67 dBA with peak readings varying from 70 to 90 dBA; after 12:00 pm, average background readings varied from 50 to 75 dBA with peak readings varying from 64 to 99 dBA (CEMVN 2000). It is anticipated that residents and business would continue to return to the project area and rebuild infrastructure. Construction noise in neighborhoods would increase during rebuilding activities. The number of sensitive receptors in the project area would increase as more homes become occupied and churches and schools reopened.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.

The noise impacts for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.

The project construction corridor is bounded by developed, urban areas. Previously, in the 1997 EIS, pile driving noise and vibration analysis was recommended to investigate innovative methods for pile driving which would generate less noise and vibration than conventional equipment. Under contract to the CEMVN, Eustis Engineering Company, Inc. prepared a report entitled *U.S. Army Corps of Engineers, Noise and Vibration Monitoring in the Adjacent Neighborhood of the Inner Harbor Navigation Canal Lock Replacement, Pile and Test and Installation Study, New Orleans, Louisiana, Contract No. DACW29-98-D-0003, Task Order No. 37, Dated July 26, 2000.* That report

was described and provided in the 2009 SEIS in Volume 1 and Appendices A, B(2) and C, which are incorporated herein by reference.

The Eustis Noise Monitoring Report (CEMVN 2000) included pile load tests and noise and vibration monitoring in the vicinity of the project site and adjacent neighborhoods. Observations were made during different construction activities. The report indicated 65 dBA and 90 dBA noise contours for the following four categories: non-pile driving activities (general construction), pile driving activities with a vibratory hammer, pile driving activities with an air impact hammer and pile driving activities with a hydraulic hammer (underwater). In summary, the report indicated that neighborhoods immediately adjacent to the project corridor may experience pile driving noise emissions greater than 65 dBA (Normally Unacceptable) but would not be subjected to noise emissions greater than 90 dBA (Unacceptable).

Pile driving activities would not expose adjacent neighborhoods to harmful vibrations (CEMVN 2000). Vibration monitoring recorded low range vibrations with average frequencies varied between 15 and 30 Hertz (Hz). These frequencies are within a range of natural frequency associated with residential construction. With measurements taken at the construction easement and beyond, peak particle velocities experienced during all construction activities, including hydraulic hammer, air hammer, and vibratory hammer operations, were minimal. The average maximum peak particle readings were approximately 0.1 inches per second, with maximum readings of 0.15 inches per second. Background peak particle velocities were of equal or greater magnitude as peak particle velocities experienced during all pile driving operations. Based on these results, the pile driving activities for the main lock structure should not adversely impact any structure beyond the floodwalls on each side of the IHNC.

Home occupancy decreased dramatically in the project area after Hurricane Katrina. Population levels in the project area have been recovering; however, recovery in some nearby neighborhoods has been slow. Therefore, these neighborhoods are a mix of vacant lots, recently renovated homes, and homes in the process of being constructed or renovated. Consequently, there are fewer sensitive receptors adjacent to the project corridor that would be impacted by noise emissions from construction activities.

The noise assessment addresses noise and vibration emissions from pile driving operations and other construction activities, as well as railway traffic and vehicular traffic, including vehicular traffic that would be detoured through adjacent neighborhoods. Results from prior vibration measurements of general construction activities and pile driving operations were analyzed and compared to acceptable standards on human-response to vibration (Appendix K of the 2009 SEIS, incorporated herein by reference).

Construction

Construction equipment used during the lock replacement would include vibratory and impact hammer pile drivers, dredging equipment, dump trucks, concrete mixers, and batch plant operations. A batch plant is a temporary or portable concrete production facility typically consisting of stockpiles of sand and gravel, silos for storage of cement and other concrete additives, aggregate loaders, and concrete mixing equipment. The construction of the new lock and removal of the existing lock is expected to last over 10 years, however the location of construction noise, the levels of the noise, and the intensity of the noise would vary considerable over the 13-year construction period.

Pile Driving

Piles would be driven in several locations throughout the construction area. The piles would form part of the protective cells, guide wall, lock foundation, and coffer dam for the cast-in-place lock. According to the proposed construction timeline, pile driving operations would occur for most of the project duration, although there would be interspersed periods of time when little to no pile driving would occur. Pile driving is the loudest construction noise emission.

Vibratory and impact hammer pile drivers would be used in the construction of the replacement lock. It is typical for vibratory hammers to start the pile and drive it to a specified depth, and then an impact hammer drives the pile to the final depth. Based on prior analyses, it was assumed that the vibratory and impact hammers would be used in this manner. It was assumed that two such systems would be in operation simultaneously on the construction site.

In the Eustis report cited above, vibratory hammers were treated as a continuous noise source, while impact hammers are an impulsive noise source. The noise value is 101 dB at 50 feet and is equivalent for both pile driver types (CEMVN 2000). The strike of an impact hammer is impulsive in nature. Therefore, previous modeling treated it as a broadband noise source. It was assumed that the vibratory hammer would be in operation 20 percent for every hour during the working day. The impact hammer was assumed to operate at a rate of 900 blows or impulses per hour during the working day. This is a typical rate equivalent to one blow every 4 seconds (Bolt, Beranek and Newman 1977) and supported by CEMVN measurement results during pile driving tests at the proposed replacement lock site (CEMVN 2000).

Dredging Operations

It was assumed that most dredging operations would consist of a diesel engine supplying power to the dredging pump located approximately 3 feet above water level on a barge. The diesel engine would be the dominant noise contributor. A barge would move the dredge pump throughout each of the DMMUs over the duration of the dredging process, except for those DMMUs that would be dredged with a bucket dredge and the material hauled to an industrial landfill (DMMUs 5 and 7). No significant noise impacts would be expected from the bucket dredging operations.

Concrete Batch Plant

A temporary concrete batch plant would be constructed to provide concrete for project construction. It is anticipated that this facility would be located on USACE-owned property adjacent to the existing IHNC Lock. According to the USACE Noise and Vibrations Monitoring report (CEMVN 2000), typical concrete mixing operations have a sound power level of 110 dB at the 500 Hz octave band frequency immediately adjacent to the machinery.

Vehicular Traffic

A temporary vertical lift bridge would be constructed adjacent to the existing St. Claude Avenue Bridge and traffic would be diverted to the temporary bridge while the existing bridge is demolished and replaced with a low-level, double-bascule bridge. Traffic flow is not expected to be significantly altered due to the temporary bridge during the replacement of the St. Claude Avenue Bridge, although some traffic is likely to divert to Claiborne Avenue and Florida Avenue.

Average Daily Traffic volumes and vehicle distributions were obtained from the April 2008 traffic study commissioned by the Regional Planning Commission (Appendix J of the 2009 SEIS, incorporated herein by reference). This included the three roads which cross the IHNC and select north-south arterial roads, such as Caffin Avenue, Forstall Street, and France Road. No roadway traffic data were included in the traffic study for residential roads. It was assumed that traffic on the residential roads is minimal and not a significant noise contributor.

Minor Noise Sources

Minor noise sources were considered negligible and omitted from the analysis (Appendix K of the 2009 SEIS, incorporated herein by reference). Meteorological effects due to wind or extreme temperatures were not considered in this analysis. Demolition was assumed to be short in duration, such that it does not influence the

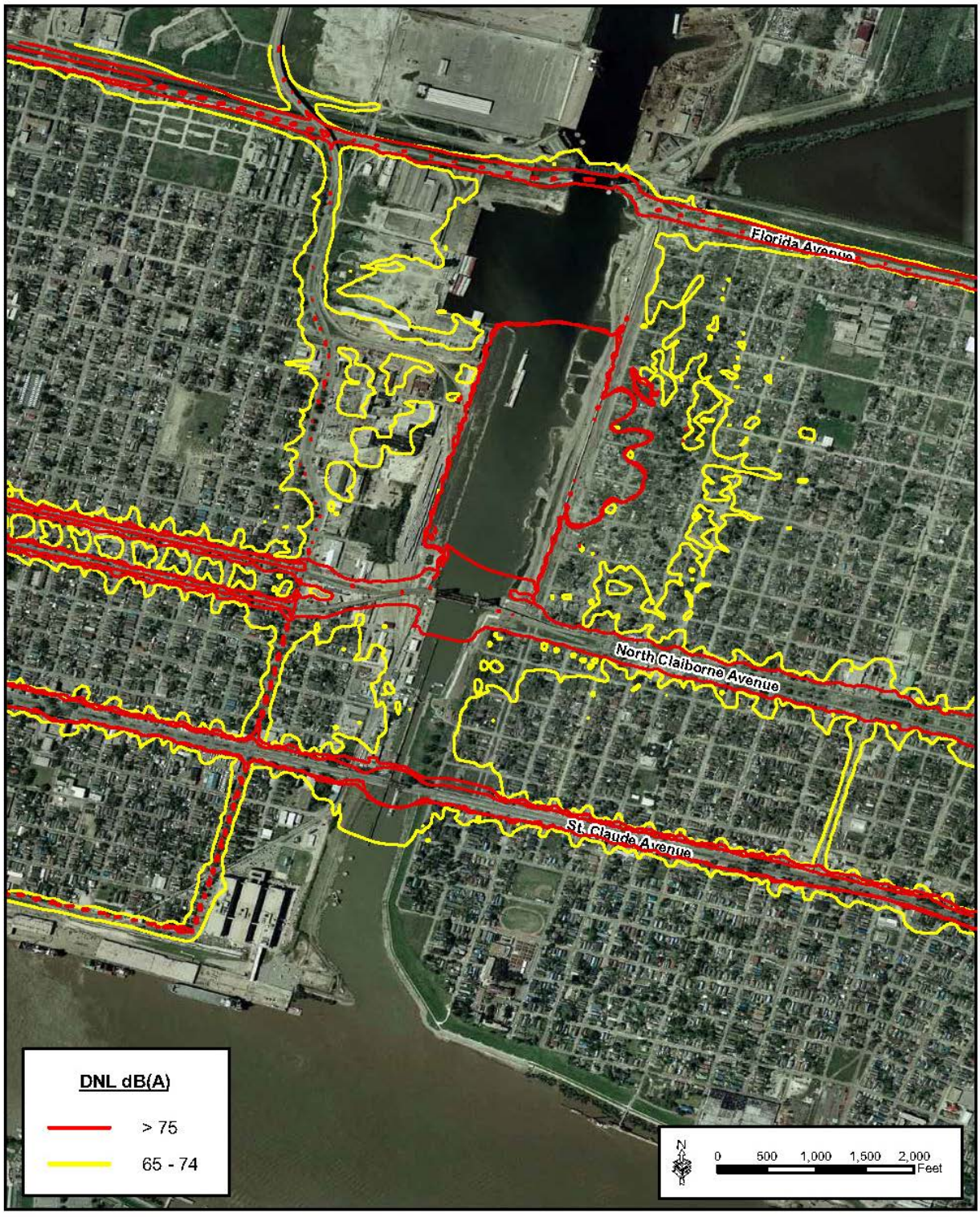

Figure 6-1: DNL Noise Contours Due to IHNC Construction,
Installation of Temporary Bridge at St. Claude Avenue, and Traffic Detours

day/night sound level contours over the total duration of the project. Barge movements and tug boat operations were assumed to be negligible noise contributors.

Noise Emission Model

The SoundPLAN noise prediction software (Braunstien *et al.* 2004) was previously used to model construction and traffic noise impacts (Appendix K of the 2009 SEIS, incorporated herein by reference). All noise sources (*i.e.*, roadway traffic, railway traffic and construction activities) detailed above were previously incorporated in the SoundPLAN model for the entire IHNC Lock construction area. The construction area included all land for 3,000 feet on either side of the IHNC. This would be the area between Caffin Avenue (east of the IHNC) and Independence Street (west of the IHNC). SoundPLAN utilizes a ray-tracing algorithm to calculate the overall day/night sound levels from all noise sources at grid points over the entire project site. A grid noise map was generated for 82-foot grid spacing.

Noise Modeling Results

Construction and dredging noise sources in the IHNC Lock construction area were incorporated in the noise model. The day/night sound level 65 dB contour is substantially increased due to construction activities (Figure 6-1). To the east of the IHNC, the day/night 65 dB sound level contour extends as far as Forstall Street, north of North Claiborne Avenue, and as far as Jourdan Avenue, between North Claiborne Avenue and North Villere Street. Residential areas between Tennessee Street, Jourdan Avenue, North Prieur Street and North Miro Street are within the day/night sound level 75 dB contour (Appendix K of the 2009 SEIS, incorporated herein by reference). According to HUD, these levels are unacceptable and severe to both indoor and outdoor activities. To the west of the IHNC, the residential areas are mostly shielded by industrial buildings and the resulting noise levels are no greater than the No-Action Plan, except for the two city blocks of Poland Avenue north of North Claiborne Avenue.

Table 6-1 contains an estimate of the number of sensitive noise receptors located within the day/night sound level 65 dB and 75 dB noise contours from the IHNC Lock construction (*i.e.*, pile driving, miscellaneous construction equipment and dredging operations). Note that these numbers of receptors in the table were developed as the community was being rebuilt following Hurricane Katrina and the number of receptors currently within these noise contours is likely higher.

Table 6-1. Number of Sensitive Noise Receptors within the 65 and 75 DNL Noise Contours

Type of Noise Receptor	Greater than DNL 75 dB (number of receptors)	Greater than DNL 65 dB (number of receptors)
Single family homes	120	423
Multiple living units	1	6
Churches	2	7
Schools	1	3
Parks	1	2

Source: Wyle 2008 (see Appendix K of the 2009 SEIS, incorporated herein by reference)

The noise exposure count includes structures that were standing in 2008. Empty lots were not counted as sensitive noise receptors. Most of the residential homes exposed to noise emissions greater than 75 dB day/night sound level occurred along St. Claude Avenue. Other areas exposed to noise emissions greater than 75 dB day/night sound level are located on the east side of the lock construction area. The pile driving activities are the source of the high noise levels in the residential neighborhoods on the east side of the IHNC.

Day/night sound level levels would exceed HUD allowable levels (day/night sound level 65 dB) in several residential areas due to construction of the IHNC lock. In particular, residential areas to the east of the IHNC (Lower Ninth Ward) would be most impacted by construction noise during the lock replacement. Most of the residential homes exposed to noise emissions greater than day/night sound level 65 db and 75 db occur along St. Claude Avenue where vehicular traffic would travel during construction of the St. Claude Avenue temporary and permanent bridges. According to HUD, day/night sound level above 65 dB is considered normally unacceptable and day/night sound level above 75 dB is considered unacceptable for residential areas.

A number of noise mitigation controls would be implemented to reduce construction-related noise impacts. These include placing temporary noise barriers adjacent to construction activities, routing of construction-related traffic to avoid residential areas, using staging areas located away from heavily populated zones, monitoring of noise levels to verify adherence to contract specifications, and limiting pile driving activities to daylight hours.

Vibration Impacts from Pile Driving

Vibration impacts from construction activities and pile driving operations were reassessed in the vicinity of the construction site based on the vibration measurement data collected by CEMVN prior to the 2009 SEIS (CEMVN 2000, 2002). In 2008, USACE contracted Wyle Research and Consulting to conduct an updated noise analysis for the proposed IHNC lock replacement in a report titled, "Wyle Report 08-29, Noise Analysis for the Inner Harbor Navigation Canal (IHNC) Lock Replacement Project, New Orleans, Louisiana" (CEMVN 2008). Under the 2008 study, the vibration monitoring data was collected for the background conditions (no construction activities), general construction with no pile driving activities, and pile driving activities with an impact hammer (hydraulic or air hammer) or vibratory hammer. The vibration measurements were conducted at various distances from 100 to 1,000 feet from the center of job site (between flood walls of the canal).

It is estimated that the lower range of vibrations in the surrounding communities would be within the acceptable vibration value and would not be perceptible by people in the community. However, the upper range of vibrations generated by the construction activities and pile driving are expected to exceed the acceptable level, would be perceptible to people and may generate adverse public reactions. The measured vibration levels were also compared to the threshold of structural damage to buildings. The proposed construction activities or pile driving would not adversely impact any structure or building in the vicinity of the construction site outside the floodwalls (Appendix K of the 2009 SEIS, incorporated herein by reference).

The Community Impact Mitigation Plan, as detailed in the 1997 Evaluation Report/EIS and the 2009 supplemental EIS, includes two features to address anticipated issues with noise impacts. As specified in the 1997 Evaluation Report., any residential or commercial structures that lie within areas where high levels of noise (above 65 dBA) are anticipated from project construction would be insulated to reduce noise levels within the structures to the maximum extent practicable. This mitigation plan feature would be predicated on the property-owners' approval. Residents living in areas that would be subjected to very high noise levels would be given the option of temporary relocation, at project expense, during such time periods when very high noise levels are expected. This mitigation plan feature is focused on residents immediately adjacent to the St. Claude Avenue Bridge approaches. It is important to note that the features of the mitigation plan, as described in previous documents, are subject to revision, and will take into consideration local community input that will be obtained during public review of this draft report and subsequent meetings and discussions. A revised mitigation plan will be included in the final version of this report/SEIS.

In addition to the features of the Community Impact Mitigation Plan discussed in the previous paragraph, several impact avoidance features are included as integral components of the proposed action to reduce impacts of construction-related noise. Vibration measurement data collected by CEMVN under the 2008 noise analysis study utilized various pile driving tests with various types of equipment and noise levels in order to develop noise contours for the surrounding residential and commercial areas (CEMVN 2008. As such, USACE contract

specifications would limit noise to certain levels at specified distances from the construction sites and require monitoring of noise levels by the contractor to verify adherence to the contract specifications. Additionally, contract specifications would require the use of pile driving equipment designed to minimize noise levels. USACE contracts would also designate specific routes for construction-related traffic to avoid residential areas, to the maximum extent practicable, and staging areas for construction equipment and personnel would be located away from heavily populated areas.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The noise impacts for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x -22 feet deep.
The noise impacts for this plan are similar to those described in Plan 3.

6.1.15 Air Quality

Plan 1 - No-Action
Under the no-action alternative, it is anticipated that the project area would continue to be in attainment for all ambient air quality standards. Traffic flow patterns are anticipated to remain similar to existing conditions, resulting in similar emissions from motor vehicles in the project area.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to air quality for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
Impacts on air quality were described in the 1997 EIS and 2009 SEIS and are incorporated herein by reference. It was previously noted that by year 10 of the construction, air emissions from the project would exceed *de minimis* thresholds. The backfilling of the lock with material from an environmentally approved commercial source would require numerous transport vehicles to haul in fill materials. Under the currently proposed plan, backfilling the lock is scheduled to take place in year 5 (2026) of a 10 year construction schedule. However, as listed in Tables 6-2 and 6-3, calculations of air emissions from an average year demonstrate that in most years, air emissions from the project would be below *de minimis* thresholds.

Construction Activities
Temporary increases in air pollution would occur from the use of construction equipment (combustible emissions). In the 2009 SEIS, combustible emission calculations were made for standard construction equipment, such as bulldozers, tug boats, excavators, dredgers, pumps, front end loaders, backhoes, cranes, and dump trucks, using emission factors from EPA-approved emission model NONROAD6.2. Analyses were made for the type of equipment, duration of the total number of days each piece of equipment would be used, and the number of hours per day each type of equipment would be used, based on the 2007 IHNC report prepared by Project Time and Cost Inc. 2007, included in Appendix L of the 2009 SEIS, incorporated herein by reference.

Construction workers would temporarily increase the combustible emissions in the air shed during their commute to and from the project area. Delivery trucks transporting supplies to the project area would also contribute to combustible emissions. MOBILE6.2 model was utilized to determine air emissions resulting from the personal motor vehicles commuting to work and delivery trucks transporting supplies to the jobsite (EPA 2005a and EPA 2005b).

Fugitive dust can arise from the mechanical disturbance of surface soils and the manufacture of concrete. Particulate matter (PM-10 and PM-2.5) emissions were calculated using emission factors recommended in EPA's National Emission Inventory (EPA 2001) which were the result of field studies conducted by Midwest Research Institute (1996).

The construction of the lock would require over 200,000 cubic yards of concrete and a concrete batch plant would be required to supply the concrete. Batch plants produce fugitive dust emissions during operation. In order to estimate emissions from the batch plant, AP 42 (EPA 2001) emission factors were utilized to calculate annual emissions.

Construction Air Emission Analysis

Project construction is predicted to last approximately 13 years. Some tasks, such as backfilling the channel around the new lock with material from an environmentally approved commercial source, would require over 30 dump trucks per day to complete the task. Several front end loaders, bulldozers, and roller-compactors would be required to distribute, level and compact fill material. Previous air emissions calculations for a deep draft lock in the 2009 SEIS determined that by year 10 of a 12 year construction schedule, air emissions would have been substantially greater during that year than other years, and provided an air emissions analysis for that year as a "worst case scenario". Since the 2009 SEIS considered a deep draft lock, which when compared to a shallow draft lock would have resulted in a substantially greater number of trucks and material needed to backfill the lock, the air emissions resulting from the shallow draft lock backfilling operations, occurring during year 5 (2026) of a 13 year construction schedule, would be expected to require substantially less fill material than the previous 2009 "worst case scenario" study results. The results of the previous 2009 air analysis are presented in Table 6-2. Previous analyses conducted for an average construction year are also presented for comparative purposes in Table 6-3.

Table 6-2. Worst Case Air Emissions (in tons per year) from Construction Activities in Year 2026 vs. *de minimis* Levels

Emission source	VOC	CO	NOx	PM-10	PM-2.5	SO2
Construction Equipment Combustible Emissions	14.19	62.51	173.03	12.58	12.25	23.23
Construction Site-fugitive PM-10	NA	NA	NA	13.75	2.75	NA
Construction Workers Commuting & Trucking	0.76	6.98	1.63	0.03	0.03	NA
Concrete Batch Plant	NA	NA	NA	5.94	NA	NA
Total emissions	***14.95***	***69.49***	***174.66***	***32.30***	***15.03***	***23.23***
De minimis threshold*	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: Time and Cost, Inc. 2007 and several air emission factors models were utilized to determine results. Data and sources are presented in Appendix L of the 2009 SEIS.

*Not applicable because Orleans Parish is currently in attainment for all NAAQS.

Several sources contribute to the air emissions analysis of the construction project. The air emission quantities presented in Tables 6-2 and 6-3 include emissions from:

- Combustible engines of construction equipment
- Vehicle emissions from construction workers during commute to and from work
- Vehicle emissions form supply trucks delivering materials for construction
- Fugitive dust emissions from job site ground disturbances
- Emissions from the pumps transporting slurry to containment areas
- Emissions from tug boat and barge
- Emissions from concrete batch factory

Table 6-3. Average Year Air Emissions (in tons per year) from Construction Activities Average Year vs. *de minimis* Levels

Emission source	VOC	CO	NOx	PM-10	PM-2.5	SO2
Construction Equipment Combustible Emissions	6.37	25.20	80.08	5.60	5.44	10.55
Construction Site-fugitive PM-10	NA	NA	NA	13.75	2.75	NA
Construction Workers Commuting and Trucking	0.73	6.83	1.07	0.02	0.02	NA
Concrete Batch Plant	NA	NA	NA	5.94	NA	NA
Total emissions	*7.49*	*34.03*	*81.15*	*25.31*	*8.20*	*10.55*
De minimis threshold*	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: Time and Cost, Inc. 2007 and several air emission factors models were utilized to determine results. Data and sources are presented in Appendix L of the 2009 SEIS.
*Not applicable because Orleans Parish is currently in attainment for all NAAQS.

The annual air emissions for construction activities would exceed *de minimis* thresholds for NOx in year 2026 if NAAQS standards were in place for Orleans Parish (previously discussed "worst case scenario"). The dump trucks contribute the greatest portion of air pollutants when backfilling the bypass channel. The assumptions, emission factors, and resulting calculations are presented in Appendix L of the 2009 SEIS.

The lock construction contracts would require contractors to conduct proper and routine maintenance of all vehicles and other equipment. These actions would ensure that emissions are within the design standards of all construction equipment. Dust suppression methods would be implemented to minimize fugitive dust emissions. Additionally, all construction equipment and vehicles would be required to be kept in good operating condition to minimize exhaust emissions. No significant impacts on air quality are expected to occur. Furthermore, there would be no violations of air quality standards and no conflicts with the state implementation plan.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to air quality for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x -22 feet deep.
The impacts to air quality for this plan are similar to those described in Plan 3.

6.1.16 Human Health and Safety

Plan 1 - No-Action
No changes to human health and safety are anticipated under the no-action alternative. OSHA regulations for workers would be implemented for lock and bridge maintenance activities, and the lock would continue to be inaccessible to the public for safety reasons.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to human health and safety for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
All lock construction and demolition activities would occur within the IHNC and public access to these construction areas would be restricted. Additionally, during levee and floodwall reconstruction, fencing and signage would be placed along the perimeter of the construction areas to restrict access to construction sites. All workers would follow applicable OSHA regulations during construction to insure worker safety at all times.

These regulations specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits with respect to workplace stressors. Construction workers at the construction sites would be exposed to safety risks from the inherent dangers of construction sites. Contractors would be required to establish and maintain safety programs at the construction site. The proposed lock construction would not expose members of the general public to increased safety risks because of the site access restrictions. The same would be true for all aspects of this construction project, including replacement of the St. Claude Avenue Bridge.

As part of compliance with Section 402 of the Clean Water Act, a Stormwater Pollution Prevention Plan (SWPPP) would be developed for the project, and the use of Best Management Practices (BMPs) would be implemented as standard operating procedures during all construction activities, including measures for dust suppression and proper handling, storage, and/or disposal of hazardous and/or regulated materials. All non-recyclable hazardous and regulated wastes would be collected, characterized, labeled, stored, transported, and disposed of as regulated by the EPA and managed by the construction contractor, pursuant to compliance with the Resource Conservation and Recovery Act (RCRA) and other applicable laws and regulations.

Solid waste receptacles would be maintained at staging areas. Non-hazardous solid waste (trash and waste construction materials) would be collected and deposited in on-site receptacles. Solid waste would be collected and disposed of properly in accordance with the Solid Waste Disposal Act [PL 89-272, 79 Stat. 997, as amended by RCRA, PL 94- 580, 90 Statute 2795 (1976)].

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to human health and safety for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x -22 feet deep.
The impacts to human health and safety for this plan are similar to those described in Plan 3.

6.2 Natural Environment

6.2.1 Aquatic Resources

Plan 1 - No-Action
There would be no expected changes to water quality under the no-action alternative. A long-term reduction in salinities is anticipated with the closure of the MR-GO and evidence of a reduction has already occurred. Evidence includes reported increases of freshwater species of fish being caught by recreational fishermen and rafts of water hyacinths (a freshwater floating plant) occurring in nearby waterways. Tate *et al.*, (2002) modeled salinity changes resulting from the MR-GO closure. Modeled changes at Little Woods on Lake Pontchartrain (closest modeled data point to the IHNC) showed that average annual salinities in Lake Pontchartrain were reduced from 6.9 parts per thousand to 4 parts per thousand. Short-term salinity reductions would also occur with periodic closures of the LPV hurricane and storm damage risk reduction structures which have been constructed in the IHNC at Seabrook and in the GIWW. Reduced long-term salinities due to the MR-GO closure would likely change the aquatic organism use in the project area from primarily an assemblage of salinity-dependent estuarine species to an assemblage containing more freshwater species that are tolerant of low–salinity waters, such as largemouth bass, redear sunfish, and blue catfish.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to aquatic resources for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
Impacts on the aquatic environment would occur from dredging and filling activities, as well as other construction-related activities such as pile driving and construction and dewatering of a large cofferdam. Past detailed studies such as elutriate testing provide estimates of the impacts on aquatic habitats from construction activities (Appendix C of the 2009 SEIS). Disposal of material into the Mississippi River would also impact

aquatic habitats. These impacts would be mainly related to increased concentrations of ammonia, copper, manganese and zinc, and increased suspended sediments. The impacts on aquatic habitats would be short-term, and the concentrations of copper and zinc would be similar to those normally experienced under ambient conditions. Only small amounts of material were found to contain high levels of manganese, and these would be dredged in a short time frame. Additionally, all materials that exceed water quality criteria would be dredged with a mechanical bucket and hauled and disposed in a landfill licensed to accept and store such material.

Suspended sediment concentrations would temporarily increase during dredging activities, and dissolved oxygen would decrease in the immediate area of dredging and disposal. Under low current conditions such as occur in the IHNC, elevated levels of suspended sediments would be localized in the vicinity of the dredging activity. This would have short-term impacts on aquatic organisms located in the IHNC, especially during summer months when water temperatures are higher. There would be some loss of less motile aquatic organisms; however, mature finfish would avoid these areas of low DO. The daily sediment load discharge for the Mississippi River ranges from 219,000 tons per day to 436,000 tons per day, with an average of 341,000 tons per day (Louisiana Department of Natural Resources 2015). The total proposed sediment discharge into the Mississippi River over the entire 13-year project is estimated at 221,000 tons. As dredging and disposal activities would take place at varying intervals throughout the project construction, it is expected that the overall total of 221,000 tons would not exceed the average daily sediment load discharge in any given year. No measurable adverse impacts on aquatic life or drinking water supply intakes downstream would be expected.

An expanded Water Quality and Sediment Evaluation program was implemented under the 2009 study, and the impacts on aquatic resources from dredging and filling activities have been reanalyzed based upon that previous detailed evaluation.

Water Column Toxicity Evaluation

The water column toxicity evaluation is provided in Appendix C of the 2009 SEIS, and is incorporated herein by reference. Based on the results of the suspended particulate-phase water column toxicity tests, dredged materials from DMMUs 5 and 7 are predicted as potentially toxic to freshwater water column organisms (Appendix C of the 2009 SEIS). Those dredged materials were further analyzed for their potential to cause impacts on water column organisms at the Mississippi River disposal site according to available dilution across an allowable mixing zone. Potential for dredged material disposal causing adverse impacts on water column organisms at the Mississippi River disposal site was further evaluated by comparing potential for state or Federal water quality standards to be exceeded outside the mixing zone (see following *Elutriate Evaluation*).

Based on the results of the suspended particulate phase water column toxicity tests previously conducted for the 2009 SEIS, dredged materials from all DMMUs are not predicted as acutely toxic to estuarine column organisms.

Elutriate Evaluation

Based on the modeling conducted for fresh water disposal in the Mississippi River (Appendix C of the 2009 SEIS), a 700-fold dilution could be met within 2,100 feet from the discharge point for low flow conditions, and within 1,000 feet for high flow conditions. This would meet the most stringent dilution requirements based on comparison of elutriate concentrations to water quality criteria, and would also satisfy the maximum dilution requirements based on the elutriate toxicity testing. This distance is consistent with the point at which non-detectable concentrations have been observed during disposal operations in the past. Also, the dilutions required to be protective based on toxicity can be met within approximately 1,400 feet for worst case conditions (low flow, pipeline disposal), as the maximum dilution based on toxicity was less than 400-fold. As these mixing zone dimensions appear to be reasonable and consistent with past operations, it appears that none of the materials tested would be excluded from open water disposal on the basis of water column impacts outside of an authorized mixing zone.

Further, evaluation of potential impacts on the St. Bernard Parish waterworks inlet indicates that dilution required in order to meet drinking water standards would be achieved within no more than 350 feet from the point of disposal for all scenarios. It is not known if the proposed mixing zone for the Mississippi River disposal site would intersect with mixing zones for other permitted discharges. This seems unlikely to be an issue given the long-standing nature of the disposal site, but state criteria require verification that overlap would not result in unacceptable conditions. Without further information regarding mixing zone dimensions for nearby permitted discharges, this remains to be confirmed.

Benthic Toxicity Evaluation
Based on the results of the solid-phase toxicity tests, two DMMUs (5 and 7) are predicted to be acutely toxic to freshwater benthic organisms. This material would be excavated with a mechanical bucket and the material hauled to a landfill. All remaining IHNC DMMUs are not predicted to be acutely toxic to freshwater benthic invertebrates. Based on the results of the solid-phase toxicity tests, dredged material from the five other DMMUs are predicted to be acutely toxic to estuarine benthic invertebrates. Material from these five DMMUs would be excavated with a hydraulic dredge and discharged into the Mississippi River.

Bioaccumulation Evaluation
For freshwater open water disposal, tissue concentrations of all contaminants from DMMUs not predicted to be toxic to benthic organisms were either statistically less than United States Food and Drug Administration (USFDA) action levels or there are no USFDA levels for the contaminants. For those DMMUs, tissue concentrations of contaminants of concern in organisms exposed to dredged material statistically exceeded those of organisms exposed to the reference material. However, the IHNC DMMUs evaluated for bioaccumulation potential are not predicted to be toxic to benthic organisms, and would not likely have an unacceptable adverse effect on survival, growth or reproduction of aquatic organisms due to bioaccumulation.

Dredged Material Placement Decisions
Under the current TSP, discharge in the Mississippi River is the recommended plan for discharge of dredged material suitable for aquatic disposal. Results from aquatic and benthic toxicity tests, and water column mixing zone analyses were evaluated to determine the suitability of DMMUs for discharge into freshwater. Based upon the sediment evaluation, dredged material suitable for aquatic disposal would be disposed of in the following manner.

Approximately 614,000 cubic yards of dredged material from DMMUs 3, 4, 6, 9, and 10 would be disposed in the Mississippi River. This material is non-toxic to sensitive benthic organisms, does not contain contaminants at concentrations that would adversely bio-accumulate or bio-magnify in aquatic food webs, and would not violate or exceed regulatory water quality criteria or drinking water standards upon discharge into the proposed Mississippi River open-water disposal site. The dredged material would mix with the river's normal suspended and bedload sediments and be carried downstream. The disposal of dredged material suitable for freshwater would occur at varying intervals over the 13-year project. Refer to Chapter 4 for the proposed construction sequence and subsequent years associated with excavation and disposal of DMMUs 3, 4, 6, 9 and 10.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to aquatic resources for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x -22 feet deep.
The impacts to aquatic resources for this plan are similar to those described in Plan 3.

6.2.2 Essential Fish Habitat

Plan 1 - No-Action
The MR-GO closure structure, across the MR-GO at Bayou La Loutre, is expected to decrease salinity levels upstream in and near the MR-GO, including the project area. Additionally, another closure structure placed

across the MR-GO as part of the hurricane storm damage risk reduction projects in the Greater New Orleans area, just downstream from Bayou Bienvenue, and water control structures placed across Bayou Bienvenue, the GIWW, and the IHNC at its intersection with Lake Pontchartrain as part of these Greater New Orleans area risk reduction projects, are likely causing additional lowering of salinities in the project area compared to levels experienced prior to 2008. Accordingly, the abundance of estuarine aquatic species that require higher salinities is expected to decrease in the project area. Conversely, the abundance of species that are tolerant of low salinity levels should increase. Since brown shrimp require a moderate salinity level, the abundance of brown shrimp could decrease in the immediate project area. Conversely, white shrimp are very tolerant of low salinity levels and should not be adversely affected. Their seasonal abundance may actually increase in the project area from the decrease in salinity levels. Red drum are found throughout the estuaries from highly saline areas to areas of very low salinity. The abundance of red drum in the project area, considering the anticipated effects of these projects, is not expected to be changed significantly.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to essential fish habitat for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
Direct impacts to approximately 30 acres of estuarine habitat, including water column and mud substrate, within the IHNC would result in a permanent loss of this habitat as a result of the proposed placement of a new lock north of Claiborne Avenue. The permanent loss of estuarine habitat would result from a series of construction activities including excavation of a north bypass channel on the east side of the IHNC, cofferdam construction, pile driving, and backfilling on both sides of the new lock. Additional short term effects to the estuarine habitat within the channel would result from increases in turbidity within the water column and permanent removal of approximately 719,000 cubic yards of dredged material. The permanent filling, with material available from an environmentally approved commercial source, of the estuarine water column and estuarine water bottom at the new lock site would be offset by the eventual demolition of the existing lock structure and subsequent conversion of that site to open water. Additionally, the existing estuarine habitat within the IHNC is considered to be of low quality and probably does not support healthy populations of benthic and water-column dwelling aquatic species within the main channel due to the heavy vessel traffic.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to essential fish habitat for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x -22 feet deep.
The impacts to essential fish habitat for this plan are similar to those described in Plan 3.

6.2.3 Threatened and Endangered Species

Plan 1 - No-Action
Under the no-action alternative, it is anticipated that existing conditions and operations of the existing lock would not affect threatened or endangered species. There have been no known incidents concerning listed species at or near the existing lock.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to threatened and endangered species for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
Since the IHNC Lock is located in a highly industrialized area of New Orleans and navigation traffic regularly passes through the lock, the canal and nearby area present poor quality habitat for most fish and wildlife species, including those listed as threatened and endangered. Listed species that could occur in the IHNC and nearby Mississippi River are pallid sturgeon, West Indian manatee, and Gulf sturgeon. While sea turtles, especially Kemp's ridleys and loggerheads, are occasionally found in or reported from estuarine waters of Louisiana, no

sea turtles would be expected in the IHNC near the lock construction site due to the lack of water flow, heavy vessel traffic, scarcity of prey items, and normally high turbidity levels in the southern end of the canal where the construction project would occur.

Pallid sturgeon, a freshwater fish, is known to occur in the main channel of the Mississippi River downstream to approximately river mile 96, which is located only about 3 miles upstream from the IHNC. The IHNC is outside of the main current of the Mississippi River and there is no strong current flowing through the canal. Pallid sturgeon are normally found in moving water, so their presence in the IHNC is unlikely. Due to consistent vessel traffic stirring up sediments, it is unlikely that the IHNC channel bottom contains adequate food items for pallid sturgeon to forage. The floor and walls of the lock would be composed of concrete and pallid sturgeon are not likely to occur or forage in areas where the natural water bottom has been altered. The intake culverts of the lock are covered with grates and are expected to prevent pallid sturgeon from being pulled into the culverts while a vessel is locking through the structure.

West Indian manatees occasionally enter Lake Pontchartrain and associated coastal waters from June through September, and could pass through the project area or forage on nearby grass beds in Lake Pontchartrain. However, the likelihood of a manatee occurring in the project area is extremely low since the project area is outside of their normal range and no aquatic plants suitable as a food source are located in the construction area. There are no known warm or hot water industrial discharge locations in the vicinity of the IHNC that would serve to attract manatees during cold water.

Critical habitat for Gulf sturgeon was designated in 2003. In Louisiana, Gulf sturgeon have been reported at Rigolets Pass, rivers and lakes of the Pontchartrain Basin, and adjacent estuarine areas, including the MR-GO inland reach (USFWS 2003). The Gulf sturgeon critical habitat unit 8 includes the portion of Lake Pontchartrain east of the Causeway, all of Little Lake (Mud Lake), the Rigolets, Lake St. Catherine, Lake Borgne, and Mississippi Sound. No Gulf sturgeon critical habitat exists within the areas that would be affected by the project. It is anticipated the proposed project would have no effect on Gulf sturgeon or their critical habitat due to the industrialized nature of the IHNC, the hydrodynamics within the IHNC (lack of water flow in the southern end of the canal), likely scarcity of prey items, lack of sandy water bottom for feeding, and the distance of the construction project from designated critical habitat Unit 8.

The CEMVN will initiate informal consultation pursuant to Section 7(a)(2) of the Endangered Species Act with the USFWS and the NMFS for the three species discussed above. Concurrence will be sought with the CEMVN's determinations of no effect on Gulf sturgeon and West Indian manatee and the determination of may affect, though not likely to adversely affect pallid sturgeon.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to threatened and endangered species for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x -22 feet deep.
The impacts to threatened and endangered species for this plan are similar to those described in Plan 3.

6.3 Cultural Environment

6.3.1 Aesthetic Values

Plan 1 - No-Action
There would be no significant changes to the aesthetic resources of the project area. However, it is anticipated that as renovation and rebuilding of the adjacent neighborhoods continues, aesthetics in the project area would improve. The local news media has reported on initiatives under way to sell abandoned, vacant and often overgrown properties to people and companies that would develop them into viable residential and commercial uses.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to aesthetic values for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
During construction activities, including levee and floodwall construction, new lock construction, demolition of the existing lock and bridge replacement, there would be adverse impacts on aesthetics, as views of the IHNC would include construction equipment and activities.

The new St. Claude Avenue Bridge would have adverse impacts on the visual environment because the new structure would be higher in the center than the existing structure. The slope of approaches would be slightly steeper and residents that have homes facing the approaches would be most negatively impacted. However, the new bridge approaches would remove a large portion of the concrete wall under the existing bridge approaches replacing the supporting wall with open space beneath the ramps. These new bridge approaches would allow passage beneath their decks and lighting would be provided beneath the ramps to deter vandalism and increase safety.

The stand of live oak trees on USACE-owned property between Sister Street and the IHNC lock would be lost with the construction of new levees and floodwalls. These are mature trees that otherwise would have a substantial life expectancy and permanent loss of these trees would negatively impact the aesthetic value of this area.

The Community Impact Mitigation Plan, as detailed in the 1997 Evaluation Report/EIS and the 2009 supplemental EIS, includes several features to address anticipated aesthetics issues. As specified in the 1997 Evaluation Report, compensation for the loss of the live oak trees adjacent to Sister Street would be involve either transplanting some of the better specimens to nearby public lands or rights-of-way, or if transplanting is not feasible, planting of mature nursery stack would be done. A walk/jog/bike path would be built on or near levees and/or floodwalls to replace loss opportunities. One or more observation decks with interpretive displays, benches, and drinking fountains would be constructed to preserve current opportunities associated with existing levees that would be converted to floodwalls. Lighting would be provided for any green space created by replacement of the St. Claude Avenue Bridge. Public rights-of-way will be landscaped to beautify the area, serve as a natural buffer, and help to reduce noise levels in adjacent areas. It is important to note that the features of the mitigation plan, as described in previous documents, are subject to revision, and will take into consideration local community input that will be obtained during public review of this draft report and subsequent meetings and discussions. A recommended mitigation plan will be included in the final version of this report/SEIS.

In addition to the Community Impact Mitigation Plan features described above, the following aesthetic impact avoidance and minimization features would be implemented as part of the construction project, but not under the Community Impact Mitigation Plan. Exterior surface of the new lock walls, floodwalls, bridge approaches and bridge piers would be finished with textured surfaces and shadow patterns to add visual appeal and deter vandalism. All areas surrounding levees, floodwalls and bridge approaches would be landscaped within allowable limits for levee safety. Lighting along existing roads used for detour routes would be improved, as appropriate.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to aesthetic values for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x -22 feet deep.
The impacts to aesthetic values for this plan are similar to those described in Plan 3.

6.3.2 Recreational Opportunities

Plan 1 - No-Action

Since Hurricane Katrina, outdoor recreational opportunities in the area surrounding the IHNC Lock have been limited primarily to the use of open space areas such as the levee and batture within the Holy Cross neighborhood and the newly constructed Bayou Bienvenue nature and bird watching platform in the Lower Ninth Ward. The New Orleans Recreation Department has reopened some local playgrounds and parks, but lacks the resources to substantially improve and maintain the parks, playgrounds and recreational areas within the project area. It is anticipated that recovery of recreational areas would be accomplished through municipal funding, local community organizations and volunteers. One sign of that recovery is the Andrew P. Sanchez and Copelin-Byrd Multi-Purpose Center, which opened in May 2015 and offers a variety of recreational experiences including basketball courts, fitness center, pool, senior center, art and crafts room and more (Photograph 6-1).

Photograph 6-1. Andrew P. Sanchez and Copelin-Byrd Multi-Purpose Center

The area along the levee and batture in the Holy Cross neighborhood is zoned light industrial; therefore, the possibility exists that the open space could be developed in the future. Currently, the levee and batture is very popular and used recreationally for jogging and walking. A cruise ship terminal is being proposed at the Poland Avenue wharf, located on the Mississippi River at the mouth of the Industrial Canal. Even though the terminal has been discussed for years, the project is in its preliminary phase. As of now, there is no timeline for the project. The Port of New Orleans is currently working on stabilizing the structure the Poland Avenue Wharf to help secure it and make it safe.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.

The impacts to recreation for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.

There could be impacts during construction on pedestrian and bicycle access across the IHNC for residents to reach parks and recreation centers, however it is anticipated that the temporary St. Claude Avenue Bridge would allow pedestrians and bicyclists to cross the bridge. The new permanent bridge would accommodate pedestrians and bicyclists.

Community facilities, such as playgrounds, gardens, toddler playgrounds, and linear parks, were addressed in the 1997 Evaluation Report as items of work to be addressed under the community impact mitigation plan. A grant was awarded to the NORD and Friends of NORD and some or all of that work was performed prior to Hurricane Katrina. Any facilities that were not addressed under the terms of that grant may be eligible to be addressed under the community impact mitigation plan. If such facilities are constructed or renovated with project funds, they would need to be operated and maintained by non-Federal interests. It is important to note that the features of the mitigation plan, as described in previous documents, are subject to revision, and will take into consideration local community input that will be obtained during public review of this draft report and subsequent meetings and discussions. A recommended mitigation plan will be included in the final version of this report/SEIS.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to recreation for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x -22 feet deep.
The impacts to recreation for this plan are similar to those described in Plan 3.

6.3.3 Cultural Resources Including National Register Listings

Plan 1 - No-Action
Under the no-action alternative the IHNC Lock would continue to be operated and maintained by USACE. As discussed in Chapter 2, the IHNC is eligible for listing in the National Register of Historic Places. The IHNC Lock underwent a significant renovation and replacement of mechanical equipment in 2016. Beginning in early August 2016 and lasting until early December 2016, major lock maintenance activities included: dewatering of the main lock chamber and general inspection of structural components; installation of new gate operating machinery at the four main miter gates; installation of four new miter gates, two at the river end of the lock chamber and two at the tail bay end; extensive lock valve refurbishing; and repairs to structural damage along the timber guide wall at the forebay. In anticipation of the lock being demolished once a new lock is constructed, damage to this structure has been mitigated through the recordation in accordance with Historic American Engineering Record and Historic American Building Survey standards, which was completed under previous studies to replace the IHNC Lock. Consultation with SHPO and the Advisory Council on Historic Preservation has been completed and a Memorandum of Agreement prepared that outlines the mitigation efforts.

The St. Claude Avenue Bridge would eventually need extensive rehabilitation or replacement by the State of Louisiana. Any rehabilitation would need to be in consultation with the Louisiana SHPO and would have to adhere to the Secretary of the Interior's standards for rehabilitation of historic structures. Although documentation in accordance with the standards of Historic American Engineering Record has been completed for the St. Claude Avenue Bridge by CEMVN, if it is determined that the rehabilitation would adversely affect the bridge's integrity or if the bridge needed to be replaced, then coordination with the SHPO and the Advisory Council on Historic Preservation by the State of Louisiana would be required. While the Historic Districts Landmark Commission and ordinances in place would protect the integrity of both the Bywater and Holy Cross National Register of Historic Places historic districts, historic structures in these neighborhoods would likely continue to deteriorate or be modernized. Over time this would adversely impact the historic character of the area.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The impacts to cultural resources for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 110 feet wide x 22 feet deep.
Under this alternative the IHNC Lock and St. Claude Avenue Bridge would be demolished. These structures are eligible for the National Register of Historic Places and damage to them has been mitigated through the recordation in accordance with Historic American Engineering Record and Historic American Building Survey standards, which was completed under previous studies to replace the IHNC Lock. Consultation with SHPO and Advisory Council on Historic Preservation has been completed and a Memorandum of Agreement prepared that outlines the mitigation efforts. There would be no other impacts on any historic or archaeological properties as a result of the implementation of this alternative. As specified in the 1997 Evaluation Report, proposed mitigation measures which are part of the project's Community Impact Mitigation Plan, include salvaging of one or more key, historically significant components of the existing lock and/or St Claude Avenue Bridge, publication of a brochure on the historical significance of the existing lock and St. Claude Avenue Bridge; historical markers and displays of the lock, bridge, and/or surrounding neighborhoods patterned after those located at National Register locations; collection of oral histories from local residents; and the

construction of a large display on maritime history at the new lock, once it is completed. It is important to note that the features of the mitigation plan, as described in previous documents, are subject to revision, and will take into consideration local community input that will be obtained during public review of this draft report and subsequent meetings and discussions. A revised mitigation plan will be included in the final version of this report/SEIS.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The impacts to cultural resources for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x -22 feet deep.
The impacts to cultural resources for this plan are similar to those described in Plan 3.

6.4 Cumulative Impacts

NEPA requires Federal agencies to consider not only direct and indirect impacts of a proposed action, but also cumulative impacts of the action. Cumulative impacts are defined as the "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.

Plan 1. No-Action
Hurricane Katrina damaged substantial portions of the Federally-constructed Lake Pontchartrain and Vicinity (LPV) project and flooded most of the project area. The LPV project is one of three hurricane storm damage risk reduction projects in the Greater New Orleans Area: 1) LPV; 2) West Bank and Vicinity; and 3) New Orleans to Venice. The West Bank and Vicinity and New Orleans to Venice projects are not discussed further because their alignments are not located within, nor do they affect, the project area. The LPV project was authorized by Section 204 of the Flood Control Act of 1965 (PL 89-298 as amended), and provides for improvements to the locally-constructed hurricane and storm damage risk reduction levees, floodwalls, and other structures on the east bank of the Mississippi River in Orleans, Jefferson, St. Charles, and St. Bernard Parishes. Impacts of Hurricane Betsy on New Orleans in September 1965 (81 deaths and billions of dollars in property damage) prompted Congress to authorize the LPV project to protect areas in the vicinity of Lake Pontchartrain and surrounding parishes from storm surges. Various features that make up the LPV project include 125 miles of levees, concrete floodwalls, navigable flood gates, and other structures. The LPV project has provided increasing levels of hurricane and storm damage risk reduction for the New Orleans area as funding for various component projects have been approved during the past 40 years.

Damage from Hurricane Katrina was quickly repaired through Task Force Guardian, whose mission was to restore pre-Katrina levels of risk reduction by June 1, 2006. All construction efforts for Task Force Guardian were completed by the end of November 2006, and included 1.3 miles of new floodwall and 6.8 miles of scour repair along the IHNC. Following Hurricane Katrina, it was recognized that portions of the levees and floodwalls that comprise the LPV project were never constructed to authorized elevations, or had not been maintained to keep previously constructed structures at the authorized elevation. CEMVN received funding and substantially improved the level of risk reduction provided by the LPV project. The most obvious and notable improvements to the project are a surge barrier near the intersection of the MR-GO and the GIWW, with navigable floodgates on the GIWW and Bayou Bienvenue, along with another navigable floodgate at the intersection of the IHNC with Lake Pontchartrain. These structures combine to prevent hurricane storm surge from entering the IHNC and adjacent section of the GIWW. Other notable improvements are temporary pump stations, currently being replaced by permanent pump stations, located at the mouths of three major drainage canals for New Orleans and Jefferson Parish. These massive pump stations, located on the 17th Street, Orleans Avenue, and London Avenue Canals are all currently being constructed. When completed, they will work in conjunction with existing pump stations located near the

heads of the canals to evacuate local rainfall from developed areas. The LPV project provides a 100-year level of risk reduction, which means that it provides risk reduction for storms with a 1 percent chance of occurring each year. The areas protected by the LPV project include the neighborhoods on both sides of the IHNC. Improvements to levees, floodwalls, and other related structures throughout the LPV project have impacted fish and wildlife habitats, requiring a substantial amount of mitigation. Impacts from these component projects have been addressed in separate Individual Environmental Reports (IERs), and IERs have also been prepared pursuant to alternative arrangements that were approved post-Katrina by the Council on Environmental Quality (CEQ) to evaluate and recommend mitigation plans for the various types of habitats that were impacted. Mitigation has been accomplished through the purchase of credits in mitigation banks and several specific mitigation projects are under construction. The impacts of most of the component projects that improved the LPV post-Katrina have been collectively addressed in a Comprehensive Environmental Document. A second Comprehensive Environmental Document that will address the remaining component projects is under preparation and is expected to be completed in 2017.

CEMVN is also involved in other regional risk reduction and coastal restoration planning efforts. Louisiana coastal protection and restoration efforts involve comprehensive planning for protection and restoration for all of coastal Louisiana. CEMVN and other Federal agencies participate in coastal restoration projects through the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) which authorizes implementation of specific prioritized restoration projects implemented coast-wide by a lead Federal agency (chosen by the CWPPRA Task Force from among five designated Federal agencies who, by statute, sit on the Task Force) in cooperation with the non-Federal sponsor, the Coastal Protection and Restoration Authority Board of Louisiana (CPRAB). Within the Lake Pontchartrain Basin there are 14 projects proposed or constructed under CWPPRA, which are designed to restore, enhance or build marsh habitat and prevent erosion of marsh habitat. Projects involve numerous protection and restoration methods, including rock armored shoreline protection breakwaters, dredge material marsh construction, marsh terracing and planting, fresh water and sediment diversion projects, and modification or management of existing structures. Several projects have been proposed by a variety of entities to restore a former 400-acre cypress swamp located immediately east of the IHNC, north of Florida Avenue, and south of Bayou Bienvenue. Proposed project features have included deposition of material dredged from the Mississippi River into the area, construction of terraces with material dredged from the water bottom, plantings of cypress and other species, and the beneficial use of disinfected, secondarily-treated sewage from the adjacent New Orleans Sewerage and Water Board's treatment plant. At this time, none of these projects are active and moving forward towards construction due mainly to the logistical issues with bringing new sediment into the area. University of Colorado students and others have built a viewing platform accessible from Florida Avenue that overlooks this area. The viewing platform includes steps providing access over the Sewerage and Water Board's levee and sheetpile flood wall.

In 2009, CEMVN placed a rock closure across the MR-GO at the Bayou LaLoutre ridge which prevents all vessel traffic in the MR-GO at this location. The closure structure, along with the surge barrier constructed across the MR-GO under the LPV project, effectively prevent vessels from travelling along the MR-GO. CEMVN investigated large-scale habitat restoration of areas impacted by the MR-GO, including coastal marshes, bayous and upland ridges between the GIWW and Breton Sound. A report on the findings was prepared, but progress was halted when the Assistant Secretary of the Army for Civil Works and the State of Louisiana disagreed on the cost sharing for the project.

All of the container cargo operations formerly located at the France Road Terminal, north of the IHNC Lock, have been shifted to the Port of New Orleans' facilities along the Mississippi Riverfront at the Napoleon Avenue Wharf. Some privately owned maritime and industrial facilities are still present along the IHNC; however, many privately-owned facilities relocated to the Mississippi River or out of state immediately following Hurricane Katrina. Much of the leasable property along the IHNC and GIWW owned by the Port of New Orleans is vacant.

The Naval Support Activity East Bank consists of approximately 25 acres of land bound by residential housing on the west and north, the IHNC on the east, and the Mississippi River on the south. Military personnel formerly located at the site have been relocated to the Federal City on the west bank of the Mississippi River in Algiers. Efforts are currently underway by the Naval Support Activity New Orleans Advisory Task Force to find potential uses for this surplus property.

Nearby Jackson Barracks, the 100-acre headquarters for the Louisiana National Guard, recently underwent $200 million worth of restoration. Community services such as fire and police stations, a health center, and a Veterans Administration outreach program were added to the area. Below-ground utilities were installed and armories and headquarters buildings have been constructed. A total of 16 buildings were completed in 2010.

Bicycle lanes are proposed for many of the streets in New Orleans, and bicycle lanes have been added to St. Claude Avenue. The new bicycle lanes extend from the St. Bernard/Orleans Parish line, westerly across the IHNC along the St. Claude Avenue Bridge, to Elysian Fields Boulevard.

LPV, WBV, SELA and NOV repairs, restorations and improvements were fully funded at approximately $14.6 billion, with approximately $12.8 billion expended to date. These improvements were scheduled and substantially completed by June 2011. Only a handful of remaining work on these projects remains under construction with physical completion dates expected in the next several years. The socioeconomic impacts of this volume of construction work in the New Orleans Metropolitan Statistical Area is difficult to quantify; however, the increased spending, demand on natural resources (*e.g.*, fuel), need for housing for construction workers, would have secondary cumulative socioeconomic impacts region-wide. Furthermore, short-term cumulative impacts on transportation from increased construction worker traffic and temporary road closures are anticipated from the implementation of the 100-year level of risk reduction projects. Long-term beneficial cumulative impacts on socioeconomics of the region are anticipated as a result of the 100-year level of risk reduction projects and reduced risk from flooding due to large storm events. In addition, there are numerous USACE risk reduction, ecosystem restoration, and navigation projects that are either in the study phase or studies have been completed such as the MR-GO Ecosystem, Mississippi River Ship Channel and the MRSC Deepening GRR that will continue to both negatively and positively affect wetlands and other potential natural, human and cultural resources should they move forward with construction. Cumulatively, these projects will continue to be documented in future studies and impacts further refined as real time information becomes available.

Plan 2 - North of Claiborne site; 900 feet long x 75 feet wide x 22 feet deep.
The cumulative impacts for this plan are similar to those described in Plan 3.

Plan 3 - North of Claiborne site; 900 feet long x 100 feet wide x 22 feet deep.
The areas that would be affected by the proposed lock replacement project are almost entirely composed of man-made waterways devoted to navigation, businesses and industries along the banks of the IHNC that are reliant upon navigation, and nearby residential interspersed with retail and light commercial businesses. For practical purposes, there would be no cumulative loss of fish and wildlife habitats associated with lock construction since such natural environments that support important fish and wildlife resources have long been eliminated from areas affected by the proposed action.

Much of the project area is defined by the IHNC, and many residents still feel that construction of the IHNC and IHNC Lock by local interests in the 1920s was a great injustice to the community and that the community has suffered because the canal essentially divides their communities and separates the Lower Ninth Ward from the main part of New Orleans.

The lock replacement would increase the efficiency of navigation traffic traveling on the GIWW and Mississippi River via the IHNC. It is also expected that there would be a decrease in navigation delays (i.e. wait times for

passing through the lock), which would lead to transportation cost savings over the long term. There is a potential for a number of businesses and industries along the IHNC and GIWW to increase in response to the convenience and predictability of the new lock. Furthermore, the potential exists for a considerable increase in the number of tows on the Mississippi River north of the IHNC and in the GIWW east of the IHNC with the implementation of new efficient shallow draft lock as compared to the no-action condition. The number of tows using the GIWW west of the IHNC would likely also increase in later years.

Should the Florida Expressway be completed, it would be expected to divert significant traffic flow from Claiborne and St. Claude avenues, which would reduce traffic. It should be noted that due to funding issues, the construction of a new high-elevation, four-lane vehicular bridge at Florida Avenue has been placed on an indeterminate hold. A replacement low-rise bridge was completed in 2005, primarily with funding from the U.S. Coast Guard. Additional proposed traffic improvement projects, such as the Almonaster Bridge replacement project and the I-10 Bridge widening project, would inevitably provide cumulative beneficial impacts on the long-term traffic movement in the project area. Traffic improvements implemented by CEMVN as mitigation would also provide cumulative long-term benefits to the project area. Furthermore, it is likely that the traffic demands on the corridor in the future will be only marginally greater than they are at present, providing adequate capacity for local residents and commuters.

Short-term cumulative impacts on residents from construction and traffic noise would also include ongoing residential and commercial redevelopment construction activities. The renovation of existing structures and new construction in now vacant lots would add to the overall noise levels during the IHNC Lock construction.

Expenditures in the project area and regionally for redevelopment and risk reduction projects, in combination with expenditures for the IHNC Lock replacement would have temporarily minor cumulative socioeconomic benefits. While these expenditures would temporarily contribute to a modest sales tax revenue for the Orleans Parish and provide local and regional employment opportunities for both skilled and un-skilled labor, it is expected there would be no long term gains in overall tax revenues and property values. Greater employment opportunities also temporarily increase housing needs, which in the short term can lead to increased rental costs regionally, but it is unlikely there would be a noticeable increase in home ownership rates in the region. Large construction projects, such as the IHNC Lock replacement project, reduce the livability of nearby neighborhoods, reduce aesthetics and interrupt linear recreational opportunities. These are cumulative short-term adverse socioeconomic impacts.

Authorization for a community impact mitigation plan, to be implemented in conjunction with the replacement of the lock, was provided in the Water Resources Development Act of 1996. This act required that a comprehensive plan be implemented that will mitigate or compensate or both for the direct and indirect social and cultural impacts that this project will have on the affected areas. The community impact mitigation plan released to the public as part of the 1997 Evaluation Report, was developed through a broad-based community participation process. It is important to note that the features of the mitigation plan, as described in previous documents, are subject to revision, and will take into consideration local community input that will be obtained during public review of this draft report and subsequent meetings and discussions. A revised mitigation plan will be included in the final version of this report/SEIS.

Plan 4 - North of Claiborne site; 1,200 feet long x 75 feet wide x 22 feet deep.
The cumulative impacts for this plan are similar to those described in Plan 3.

Plan 5 - North of Claiborne site; 1,200 feet long x 110 feet wide x 22 feet deep.
The cumulative impacts for this plan are similar to those described in Plan 3.

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7.0 Applicable Laws and Executive Orders

There are many Federal and state laws pertaining to the enhancement, management and protection of the environment. Federal projects must comply with the environmental laws, regulations, policies, rules and guidance in Appendix A, among others. Corps personnel coordinated with Federal and state resource agencies during planning and will continue to coordinate. Compliance with laws will be accomplished upon review of this report by appropriate agencies and the public, and with the signing of a Record of Decision by the Assistant Secretary of the Army for Civil Works.

7.1 Federal laws

7.1.1 Clean Air Act of 1972 (Air Quality)

The Clean Air Act (CAA) sets goals and standards for the quality and purity of air. It requires the Environmental Protection Agency to set National Ambient Air Quality Standards (NAAQS) for certain pollutants considered harmful to public health and the environment and requires federal agencies to act in conformity with an applicable State Implementation Plan (SIP). The project area is in Orleans Parish, which is currently in attainment of NAAQS. The Louisiana Department of Environmental Quality, which administers the SIP, is not required by the CAA and Louisiana Administrative Code, Title 33 to grant a general conformity determination for construction activities within Orleans Parish.

7.1.2 Clean Water Act of 1972 – Section 401 (Water Quality)

The Clean Water Act (CWA) sets and maintains goals and standards for water quality and purity. Section 401 requires a Water Quality Certification from the Louisiana Department of Environmental Quality that a proposed project does not violate established effluent limitations and water quality standards. Section 401 compliance will be documented in the final report.

7.1.3 Clean Water Act of 1972 – Section 404(b)(1) (Disposal Sites for Dredged or Fill Material)

The USACE administers regulations under Section 404(b)(1) of the CWA, which establishes a program to regulate the discharge of dredged and fill material into waters of the U.S. Potential project-induced impacts subject to these regulations were evaluated during feasibility level design; results are contained in Appendix A. A Section 404 public Notice will be prepared and distributed for public and agency review, and a final 404(b)(1) evaluation will be included in the final report.

7.1.4 Coastal Zone Management Act of 1972 (Coastal Zone Development)

The Coastal Zone Management Act establishes a partnership structure allowing states and the Federal government to work together for the protection of U.S. coastal zones from environmentally harmful over-development. Potential project-induced impacts will be evaluated during feasibility level design and will be described in a Consistency Determination that will be submitted to the Louisiana Department of Natural Resources to review for consistency with the Louisiana Coastal Resource Program. The determination and findings will be provided in the final report.

7.1.5 Endangered Species Act of 1973 (Threatened and Endangered Species)

The Endangered Species Act (ESA) is designed to protect and recover threatened and endangered (T&E) species of fish, wildlife and plants. The CEMVN is coordinating with the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to ensure the protection of those T&E species under their respective jurisdictions. The USFWS has previously identified several T&E species that are either known to or may possibly occur in the project area; West Indian manatee, pallid sturgeon and Gulf sturgeon. Additionally, the NMFS has designated critical habitat for Gulf sturgeon in the Lake Pontchartrain, Lake Borgne and other waters located east of the project area. No plants were identified as being threatened or endangered in the project area. Based on review of existing data and prior consultation with the Services for a lock replacement at the IHNC, the CEMVN finds that implementation of the TSP may affect, but would not likely adversely affect any listed species or their critical habitat.

7.1.6 Bald and Golden Eagle Protection Act of 1940 (Bald Eagles)

The Bald and Golden Eagle Protection Act protects two eagle species. Bald eagles are not known to nest in the project area, although they may be found foraging in nearby un-developed areas. Golden eagles do not occur in the area. Based on review of existing data and preliminary field surveys, the CEMVN finds that implementation of the TSP would have no effect on bald or golden eagles.

7.1.7 Fish and Wildlife Coordination Act of 1934 (Fish & Wildlife)

The Fish and Wildlife Coordination Act (FWCA) provides authority for the USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive the same consideration as other project features. It requires Federal agencies that construct, license or permit water resource development projects to first consult with the USFWS, NMFS and state resource agencies regarding the impacts on fish and wildlife resources and measures to mitigate these impacts. Section 2(b) requires the USFWS to produce a Coordination Act Report (CAR) that details existing fish and wildlife resources in the project area, potential impacts due to the proposed project and recommendations for the project. The draft CAR includes the USFWS positions and recommendations. The USFWS submitted a draft CAR, which is included in Appendix A. CEMVN's responses to the draft CAR conservation recommendations are included in Chapter 8

7.1.8 Magnuson-Stevens Fishery Conservation and Management Act of 1976 and The Magnuson-Stevens Act Reauthorization of 2006 (Essential Fish Habitat)

The law and its reauthorization govern marine fisheries management in the U.S. Specific categories of Essential Fish Habitat (EFH) occurring in the project area include estuarine emergent wetlands, estuarine water column and estuarine mud substrate (bottom). These habitats provide EFH to three Federally-managed estuarine/marine species that are commonly to abundantly found in the project area; brown shrimp, white shrimp, and red drum. Waterbodies and wetlands provide nursery and foraging habitats for a variety of fish species, some of which may serve as prey for other fish species designated as EFH species (e.g., mackerel, snapper, and grouper) and highly migratory fishes (e.g., billfish and sharks). The CEMVN has determined that the TSP would have minimal impacts to EFH due to the industrialized nature of the IHNC (where most construction would occur) and the freshwater disposal sites where dredged material suitable for aquatic disposal would be disposed.

7.1.9 Marine Mammal Protection Act of 1972 (Marine Mammals)

The Marine Mammal Protection Act (MMPA) protects whales, dolphins, sea lions, seals, manatees and other species of marine mammals. Whales, sea lions, and seals do not occur in the project area. Dolphins occur in the general vicinity, but not at the proposed new lock construction site due to its industrialized nature. Manatees may occasionally be found in the project area. To avoid "takings" of the West Indian manatee and ensure compliance with the MMPA, the CEMVN commits that all construction personnel working where manatees may occur will be educated about the MMPA, the ESA and the West Indian manatee, and implementation of appropriate best management practices to avoid or minimize potential entrapment or adverse impacts to manatees during construction.

7.1.10 Migratory Bird Treaty Act of 1918 and Migratory Bird Conservation Act of 1929 (Migratory Birds)

The Migratory Bird Treaty Act (MBTA) and the Migratory Bird Conservation Act (MBCA) protect migratory birds and their habitat. Relatively little suitable habitat exists within the project area for migratory bird shelter, nesting, feeding and roosting activities due to the urban and industrialized nature of the area.

The USFWS has previously indicated that portions of the project area may support colonial-nesting water birds (e.g., herons, egrets, ibis, night-herons, anhingas, and roseate spoonbills). The CEMVN would conduct preconstruction surveys for colonial nesting birds, and if colonies are found, would adjust the timing of construction activities so that impacts to the nesting birds are avoided.

7.1.11 National Historic Preservation Act of 1966 (Cultural and Historic Resources)

In compliance with Section 106 of the National Historic Preservation Act (NHPA) and 36 CFR §800, Federal agencies are required to identify and consider the potential effects that their undertakings might have on significant historic properties, districts, sites, buildings, structures, or objects that are included in or eligible for inclusion in the National Register. Additionally, a Federal agency shall consult with any federally-recognized tribe that attaches religious and cultural significance to such properties. Agencies shall afford the State Historic Preservation Officer (SHPO) and tribes a reasonable opportunity to comment before decisions are made.

The impacts on cultural resources under the TSP would be the same as those described in the 1997 EIS and 2009 SEIS. Under the TSP, the IHNC Lock and St. Claude Avenue Bridge would be demolished. These structures are eligible for the National Register of Historic Places and their destruction would be mitigated through the recordation in accordance with Historic American Engineering Record and Historic American Building Survey standards, which has been completed. Consultation with SHPO and Advisory Council on Historic Preservation was completed in 2009. A revised Memorandum of Agreement is being prepared that outlines the mitigation efforts and will be included in Appendix A for the final report.

7.1.12 Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984 (Hazardous, Toxic, and Radioactive Waste)

A Phase I Environmental Site Assessment is required for all of the USACE Civil Works Projects, to facilitate early identification and appropriate consideration of potential Hazardous, Toxic, and Radioactive Waste (HTRW) problems. HTRW includes any material listed as a "Hazardous Substance" under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Other regulated contaminants include those substances that are not included under CERCLA but pose a potential health or safety hazard. Examples include, but are not limited to, many industrial wastes, naturally occurring radioactive materials (NORM), many products and wastes associated with the oil and gas industry, herbicides, and pesticides. Engineer Regulation ER 1165-2-132 and Division Regulation DIVR 1165-2-9 established policies for conducting HTRW review for USACE Civil Works Projects.

The project area is contained behind 12 and 15 foot high floodwalls and is relatively inaccessible to the public. No hazardous materials are stored in the project area, and lock and bridge workers follow Occupational Safety and Health Agency standards for workplace safety. Those neighborhoods surrounding the project area that were not severely damaged by Hurricane Katrina are densely populated and have typical public safety issues found in urban environments. Nearby neighborhoods that were severely damaged by Hurricane Katrina have been cleaned of debris by the Federal government and no substantial health and safety concerns remain. The TSP will be analyzed during feasibility level project design and a standard Phase I Environmental Site Assessment will be prepared to identify potential recognized environmental concerns and to avoid areas that could contain substances of concern.

7.2 State laws

7.2.1 Louisiana State Threatened and Endangered Species and Rare and Unique Habitat

The Louisiana Department of Wildlife and Fisheries (LDWF) Louisiana Natural Heritage Program (LNHP) lists T&E species, and rare, unique and imperiled habitats in the State of Louisiana. Based on review of the LNHP online database, rare animal species that may be found in the project area include paddlefish, manatees, pallid sturgeon, Gulf sturgeon, Cooper's hawk, and glossy ibis. No rare or unique plant species are known to exist within the project area (LDWF 2016).

7.2.2 Wild and Scenic Rivers Act of 1968

The Wild and Scenic Rivers Act establishes a National Wild and Scenic Rivers System. The Louisiana Scenic Rivers Act recognizes and implements the 1968 Federal law, to preserve, protect and enhance the wilderness qualities, scenic beauties and ecological regimes of rivers and streams. Any construction within 100 feet of a

scenic stream requires a scenic streams permit. No Federal or state-designated scenic streams or rivers occur in or near the project area.

7.3 Executive orders

7.3.1 Executive Order 11514, Protection and Enhancement of Environmental Quality

EO 11514 directs Federal agencies to "initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals." The TSP complies with EO 11514.

7.3.2 Executive Order 13175 - Consultation and Coordination with Indian Tribal Governments (Tribal Interests)

In partial fulfillment of Executive Order (EO) 13175, in addition to NEPA and NHPA Section 106, consultation will be initiated with the following Federally-recognized Tribes during the release of the draft report in December 2016: Alabama-Coushatta Tribe of Texas, Caddo Nation of Oklahoma, Chitimacha Tribe of Louisiana, Choctaw Nation of Oklahoma, Coushatta Tribe of Louisiana, Jena Band of Choctaw Indians, Mississippi Band of Choctaw Indians, Quapaw Tribe of Oklahoma, Seminole Nation of Oklahoma, Seminole Tribe of Florida and Tunica-Biloxi Tribe of Louisiana. Correspondence will be included in the final report.

7.3.3 Executive Order 11988, Floodplain Management

EO 11988 directs agencies to avoid development in floodplains to the maximum extent feasible. All alternatives considered, including alternatives eliminated from detailed consideration in this SEIS, the 2009 SEIS and the 1997 EIS, would be located within the base floodplain. No non-floodplain alternatives exist. The floodplain in the area of the proposed action is completely developed for residential, commercial and industrial purposes. Levee and floodwall systems and gated structures in the area provide risk reduction from hurricane and Mississippi River flooding, and all protected areas are managed through forced drainage by pumping to remove excess rainwater. The TSP is not expected to alter base flood elevations, and complies EO 11988.

7.3.4 Executive Order 11990, Protection of Wetlands

EO 11990 directs Federal agencies to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands, and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. Mitigation planning was integrated into the planning by considering, individually and collectively, each of the CWA mitigation actions of avoiding, minimizing, reducing and rectifying potential adverse impacts to wetlands to the extent practicable. The TSP would completely avoid impacts to wetlands, and complies with EO 11990.

7.3.5 Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

EO 12898 requires agencies to make achieving environmental justice (EJ) part of their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of programs, policies and activities on minority populations and low-income populations. Potential EJ issues have been raised on multiple occasions during the very long history of studies to replace the IHNC Lock. As part of the NEPA process, scoping meetings, public meetings, and meetings with the community were held and attention was given to EJ issues. Potential impacts on minority and economically disadvantaged people in the vicinity of all lock alternatives have been considered since the initial planning of the IHNC Lock replacement. When the Violet Site was eliminated and the IHNC Site selected in 1991, the potential for EJ issues at the IHNC Site was recognized, and CEMVN looked at the IHNC Site as an opportunity to improve the overall condition of the IHNC corridor, including transportation infrastructure and the adjacent communities. Additionally, a community impact mitigation plan was developed with community representatives specifically to avoid or minimize, and where avoidance and minimization were not possible, compensate for adverse project impacts on the affected communities. Due to the devastating impacts on the adjacent neighborhoods from Hurricane Katrina (Appendix H to the 2009 SEIS), the IHNC Lock replacement project provides the opportunity to

further develop businesses in the adjacent neighborhoods, including short-term economic benefits from local purchases during construction activities, and long-term economic benefits from redevelopment of maritime industry along the IHNC. This economic development would benefit all people regardless of race or income level. The currently proposed action is the culmination of efforts to avoid and minimize impacts to the residents and business owners in nearby neighborhoods, while recognizing the need for improved navigation.

7.3.6 Executive Order 13112, Invasive Species

EO 13112 directs Federal agencies to prevent the introduction of invasive species; provide for their control; and minimize the economic, ecological and human health impacts that invasive species cause. The TSP is consistent with EO 13112 to the extent practicable and permitted by law. It is subject to the availability of appropriations, and within Administration budgetary limits. Relevant programs and authorities to prevent the introduction of invasive species would be used during construction. The CEMVN will not authorize, fund, or carry out actions likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless the CEMVN has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species, and that all feasible and prudent measures to minimize risk of harm would be taken in conjunction with the actions.

7.3.7 Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

EO 13186 directs Federal agencies to take actions to further implement the MBTA. The TSP has been evaluated for potential effects on migratory birds, with emphasis on species of concern. Relatively little suitable habitat exists within the project area for migratory bird shelter, nesting, feeding and roosting activities.

7.3.8 Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, as amended by EO 13229 and EO 13296.

These EOs require each Federal agency to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. No disproportionate environmental health risks or safety risks to children, as defined in EO 13045, are expected from implementation of the TSP.

7.3.9 Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input.

Based on review of EO 13690 and the nature of this project, EO 13690 is not applicable to this lock replacement project. A new lock, in a new location (essentially adjacent to the existing lock) would not be a modification of the existing floodplain represent a change in floodplain management. Additionally, for all intents and purposes, there is no other practicable alternative for the location of a replacement lock. However, there will be flood and storm risk reduction measure tie-ins to existing risk reduction systems the lock would tie into.

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8.0 Public Involvement

8.1 Public meetings and other coordination efforts

A Notice of Intent to prepare a draft supplemental EIS was published in the Federal register on January 29, 2015. A public scoping meeting was held at the beginning of the formal scoping process on February 4, 2015, at Dr. Martin Luther King Jr. Charter School for Science and Technology, 1617 Caffin Avenue, Orleans Parish, Louisiana. A scoping report which summarizes comments received at the meeting and by other methods of transmittal is provided in Appendix A. A scoping meeting public notice fact sheet was mailed to various Federal, State and local agencies and officials, Parish and city government representatives, non-governmental organizations, and individual stakeholders and members of the public. The fact sheet provided an overview of the meeting purpose, date, address and time as well as sufficient project background, study alternatives, the purpose and need and issues/resources to be addressed. At the scoping meeting, local residents and communities' concerns centered on construction times, noise and vibration impacts, while industry and maritime representatives stressed the need for a replacement lock at the existing IHNC site.

8.2 Draft report recipients

An electronic or paper copy of this draft report was mailed to Federal, state, and local agencies, Tribal nations, and prior commenters on the draft 2009 SEIS. Separately, a list of various interested parties and non-governmental organizations was generated from a NEPA compliance database maintained by the CEMVN and was used to distribute notices of availability of this draft report. An electronic file of the complete distribution list is available by request.

8.2.1 Federal Agencies

U.S. Advisory Council on Historic Preservation
U.S. Environmental Protection Agency, Region VI
U.S. Department of Energy, Office of Environmental Compliance
U.S. Department of the Interior, Office of Environmental Policy and Compliance
U.S. Department of the Interior, Fish and Wildlife Service
U.S. Department of the Interior, National Park Service
U.S. Department of Commerce, National Marine Fisheries Service, Habitat Conservation Division
U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. Department of Agriculture, Forest Service
U.S. Department of Homeland Security, Federal Emergency Management Agency
U.S. Department of Transportation, Federal Aviation Administration
U.S. Coast Guard, 8th District

8.2.2 State Agencies

Governor's Executive Assistant for Coastal Activities
Governor's Office of Indian Affairs
Louisiana Department of Culture, Recreation & Tourism
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, Office of the Secretary (OESC)
Louisiana Department of Transportation and Development
Louisiana Department of Agriculture and Forestry
Louisiana Department of Public Works
State Library of Louisiana
Louisiana Division of Administration
Louisiana State Attorney General's Office
Louisiana State Board of Commerce and Industry, Research Division

Louisiana State Historic Preservation Officer

8.2.3 Louisiana Parish Governments

Orleans Parish Government
St. Bernard Parish Government
Plaquemines Parish Government

8.2.4 Tribal Nations

Chitimacha Tribe of Louisiana
Alabama-Coushatta Tribe of Texas
Coushatta Tribe of Louisiana
Mississippi Band of Choctaw Indians
Tunica-Biloxi Indians of Louisiana
United Houma Nation
Inter-Tribal Council of Louisiana, Inc.
Caddo Nation of Oklahoma
Chickasaw Nation
Choctaw Nation of Oklahoma
Jena Band of Choctaw Indians
Quapaw Tribe of Oklahoma
Seminole Nation of Oklahoma
Seminole Tribe of Florida

8.2.5 2009 SEIS Commenters (does not include entities previously listed above)

Kenneth Ducote
Holy Cross Neighborhood Association
Community Based Mitigation Committee Meeting
Citizens Against Widening the Industrial Canal
Corps Reform Network
Port of New Orleans
Lafayette College
Marna David
J.W. Tatum
Michael Vega
Dean Reynolds
Robert N. Stearns
University of Wisconsin-Madison
Lake Pontchartrain Basin Foundation
Louisiana Wildlife Federation
Coalition to Restore Coastal Louisiana
Tulane Environmental Law Clinic
Alexander S. Kolker
Barry Kohl
Barry Sulkin

8.3 Views of the Public

This draft report is available for public review and comment for 45 days. The final report will include comments received. Comments received at public meetings will also be included.

8.4 Fish and Wildlife Coordination Act

The USFWS has provided a Draft Coordination Act Report dated December 9, 2016, which is contained in Appendix A. USFWS has coordinated their report with the NMFS and Louisiana Department of Wildlife and

Fisheries and incorporated their comments. The Coordination Act Report contains specific recommendations for minimizing adverse effects on the natural environment. The following are the USFWS conservation recommendations and the CEMVN responses:

1. The Service and NMFS strongly support the additional project feature of constructing a siphon or concrete channel around the lock to divert water from the river to the head of Bayou Bienvenue.

Response: While CEMVN acknowledges the potential value of the USFWS's and NMFS's proposed diversion feature to restore the degraded marsh area in the wetlands immediately east of the channel, based on the feasibility, likely added costs with no perceptible benefits added to the project, and challenging logistics of adding a permanent diversion structure in a relatively narrow navigation channel, it is not recommended that this feature be carried forward for further analysis under this current study.

2. The Service strongly supports using all clean dredged material to create brackish marsh that will improve fish and wildlife habitat in the project area.

Response: CEMVN fully supports, wherever feasible and practicable, the beneficial re-use of dredged material to restore fish and wildlife habitat. However, the small quantity of material suitable for wetland restoration or creation that would need to be excavated for the alternatives evaluated in detail, coupled with the difficult logistics of bringing the material to areas where marsh could be restored or created, makes beneficial use of the dredged material impracticable. The TSP proposes to dispose all dredged material suitable for aquatic disposal into the Mississippi River.

3. The Service recommends the use of silt curtains while dredging and disposal of dredged material whether at the IHNC or the CDF site to minimize siltation and the spread of contaminated materials.

Response: CEMVN will use silt curtains in open water areas of the IHNC during the dredging of material to minimize siltation and increased turbidity where practicable. The practicality of silt curtains would need to be determined on a site specific basis. Generally, deep water such as what is present in most of the IHNC, precludes the use of silt curtains. As the CDF is no longer a feature of the proposed project, the need for silt curtains in or near that disposal area is no longer required.

4. If contaminated material is used for backfill at the new lock, that material must be contained so that it is not open to or redistributed in the IHNC.

Response: The TSP no longer includes the use of a CDF for containment of contaminated dredged material, as such no contaminated dredged material will be re-used for backfill at the new lock. All material that is not suitable for aquatic disposal would be disposed by the USACE's contractor in a type 1 solid waste landfill.

5. The Service and NMFS shall be provided an opportunity to review and submit recommendations on future detailed planning reports (e.g., Design Document Report, Engineering Document Report, etc. and the draft plans and specifications on the Inner Harbor Navigation Canal Lock Replacement Project addressed in this report.

Response: CEMVN will provide USFWS and NMFS the opportunity to review and submit recommendations on future detailed planning reports and draft plans and specifications for the IHNC Lock Replacement project.

6. Part of Bayou Bienvenue is a Louisiana designated Natural and Scenic River. LDWF has reviewed the project and determined that Bayou Bienvenue will not be adversely impacted by the project; therefore, no Scenic Stream Permit will be required. If any project features should change the Corps should

reinitiate consultation with the LDWF, Scenic Rivers Program prior to conducting any activities within or adjacent to the banks of that bayou. Scenic Rivers Coordinator Chris Davis can be contacted at (225) 765-2642.

Response: Bayou Bienvenue is only designated as a Natural and Scenic River by the Louisiana Natural and Scenic River Act between Bayou Villere and Lake Borgne in St. Bernard Parish; this designated segment is located approximately 4 miles east of the project area. No impacts on this segment of Bayou Bienvenue are anticipated.

7. Coordination should continue with the Service and NMFS on detailed contract specifications to avoid and minimize potential impacts to manatees, Gulf sturgeon, and pallid sturgeon. Incorporation of protective conservation measures presented in this report should be included in applicable plans and specifications.

Response: CEMVN will initiate consultation with USFWS and NMFS during the public review period of the draft SEIS. CEMVN will insure that the conservation measures described in the draft SEIS and in the forthcoming informal consultation will be included in contract specifications.

8. If the proposed project has not been constructed within 1 year or if changes are made to the proposed project, the Corps should re-initiate Endangered Species Act consultation with the Service.

Response: CEMVN commits to re-initiating Endangered Species Act consultation with USFWS if the implementation of the proposed project has not started within 1 year of the completion of the SEIS.

9. Should the landfill option for disposal of contaminated dredged material change or not be used, the Service, National Marine Fisheries Service (NMFS), and Louisiana Department of Wildlife and Fisheries (LDWF) should be consulted regarding the adequacy of any proposed alternative.

Response: CEMVN will continue to coordinate with USFWS, NMFS, and LDWF regarding any project feature changes, including but not limited to the proposed plan for disposal of dredged material.

In the draft Coordination Act Report the USFWS stated: "Provided that the above recommendations are included in the feasibility report and related authorizing documents and implemented concurrently with project implementation, the Service will support further planning and implementation of the recommended plan."

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9.0 Recommendations

Information found in this document may be subject to change and further development during final feasibility analysis, to include refinement of relocation and real estate requirements, as well as from review and resolution of comments received from both the public and other agencies; the Agency Technical Review (ATR); and Independent External Peer Review (IEPR), all of which will help refine the TSP. The information provided in this chapter is based on the TSP, as currently defined and may be refined and/or changed prior to publication of the final report.

9.1 Tentatively Selected Plan

The TSP is Plan 3. Plan 3 is the replacement of the existing IHNC navigation lock with a shallow draft navigation lock located in New Orleans, LA, north of the Claiborne Bridge in the IHNC with dimensions of 900 feet long by 110 feet wide and -22 feet (NAVD88).

9.2 Plan Implementation

The following describes the division of plan responsibilities.

9.2.1 Federal and Non-Federal Cost-Sharing

According to Sec. 844 of the WRDA '86, for construction of a shallow draft (inland waterway) navigation lock, one-half of the federal costs shall be paid from the Inland Waterways Trust Fund and one-half of the federal costs shall be paid from the general fund of the Treasury. OMRR&R will be the responsibility of the USACE. Costs will be shared as follows:

US Army Corps of Engineers: $475,650,000
Inland Waterway Trust Fund: $475,650,000

Unless otherwise specified, a NFS is not required for federal inland navigation waterway projects.

9.2.2 Federal Responsibilities

The federal government will be responsible for 100 per cent of OMRR&R upon completion of the replacement lock.

9.2.3 Non-Federal Responsibilities

There are not any NFS responsibilities for the TSP. Costs for OMRR&R of existing flood and storm damage risk reduction measures that are replaced (to at least no less than in-kind) due to construction of the new lock will remain the responsibility of the NFS. OMRR&R of items in the CIMP will be addressed in the final version of the plan.

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10.0 List of Preparers

Primary individuals responsible for preparation of the GRR and SEIS

TEAM MEMBER	DISCIPLINE	ROLE IN PREPARING GRR & SEIS	EXPERIENCE
Mr. Tim Axtman	Plan Formulation	Plan formulation supervision and review	26 years, Senior Plan Formulator, Corps of Engineers, New Orleans District
Dr. David Bates, P.E.	Engineering (Hydraulics)	Input to Clean Water Act 404(b)(1) Evaluation, evaluation of changes in flows, HSDRRS structures non-impact evaluation, and coordinator for updated water quality and spill information	33 years, Engineer (Hydraulic, Civil, Environmental), Corps of Engineers, New Orleans District; DOD; LADOTD; McNeese University; private sector
Mr. Richard Boe	Environmental	SEIS Co-author, Environmental Resources Analysis, Responses to Public Comments	28 years, Supervisory Fishery Biologist, Corps of Engineers, New Orleans District
Ms. Catherine Breaux	U.S. Fish and Wildlife Service	Input to SEIS, Fish and Wildlife Coordination Act Report, Wetlands Value Assessment Model	16 years, Field Biologist, Department of the Interior, U.S. Fish and Wildlife Service
Mr. Jeffrey Corbino	Operations/Environmental	Clean Water Act 404(b)(1) Evaluation Co-author, Input to SEIS, Evaluation of Tentatively Selected Plan Dredging and Disposal Plan	13 years, Environmental Resources Specialist, Corps of Engineers, New Orleans District
Mr. Bobby Duplantier	Project Management	General oversight of scope, cost and schedule for GRR & SEIS	14 years, Senior Project Manager, Corps of Engineers, New Orleans District
Ms. Pamela Fischer	Real Estate	Input to GRR, Tentatively Selected Plan, Real Estate, Design, Benefits and Project Cost Changes, and Appendix C (Real Estate Plan)	7½years, Realty Specialist, Corps of Engineers, New Orleans District; 15 years Real Estate-related experience

LIST OF PREPARERS (continued)

TEAM MEMBER	DISCIPLINE	ROLE IN PREPARING GRR & SEIS	EXPERIENCE
Mr. Mark Haab	Economics	Input to SEIS, Supervisor and Co-author of Human Environment (Socioeconomics) resources and Economics Appendix	29 years, Supervisory Economist, Navigation Section, Economics Branch, Corps of Engineers, New Orleans District
Ms. Lourdes Hanneman	Engineering (Civil)	Input to GRR and SEIS, Engineering Division coordinator to Planning Division, Engineering Appendix and Responses to Engineering comments.	15 years, Civil Engineer, Corps of Engineers, New Orleans District; 4 years, Civil Engineering, private industry (structural design for offshore structures)
Mr. Mark Lahare	Environmental	SEIS Primary Author and Coordinator, Environmental Resources Analysis, Responses to Public Comments	9 years, Environmental Protection Specialist, Corps of Engineers, New Orleans District
Mr. Jeremy Laster	Engineering (Structural)	Technical Project Lead for Engineering, quantities and structural details for GRR and Engineering Appendix	9½years, Civil Engineer (Structural), Engineer-In-Training (E.I.), Corps of Engineers, New Orleans District
Mr. David Lovett, P.E.	Engineering (Structural)	Senior Engineering oversight for preparation of GRR	14 years, Supervisory Civil Engineer (Structural), Corps of Engineers, New Orleans District
Mr. Joseph Mann	Economics	Input to SEIS, assist senior economist in Human Environment (Socioeconomic) resources impact analysis	21 years, Regional Economist, Corps of Engineers, New Orleans District
Mr. Sean Mickal	Plan Formulation	Primary Author GRR, coordinator for report preparation and plan evaluation	21 years, Biologist, Corps of Engineers, New Orleans District

LIST OF PREPARERS (continued)

TEAM MEMBER	DISCIPLINE	ROLE IN PREPARING GRR & SEIS	EXPERIENCE
Ms. Jasmine Smith	Project Management	Oversee scope, cost and schedule for GRR & SEIS. Ensure tasks are completed in accordance with the Project Management Plan	7 years, Project Manager, Corps of Engineers, New Orleans District
Dr. Trent Stockton	Cultural Resources	Input to SEIS, Cultural Resources and Tribal Liaison	7 years, Archaeologist, Corps of Engineers, New Orleans District
Ms. Louise Williams	Plan Formulation	Input to GRR, Plan Formulator through pre-Tentatively Selected Plan draft report preparation	24 years, Regional Economist, Corps of Engineers, New Orleans District

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