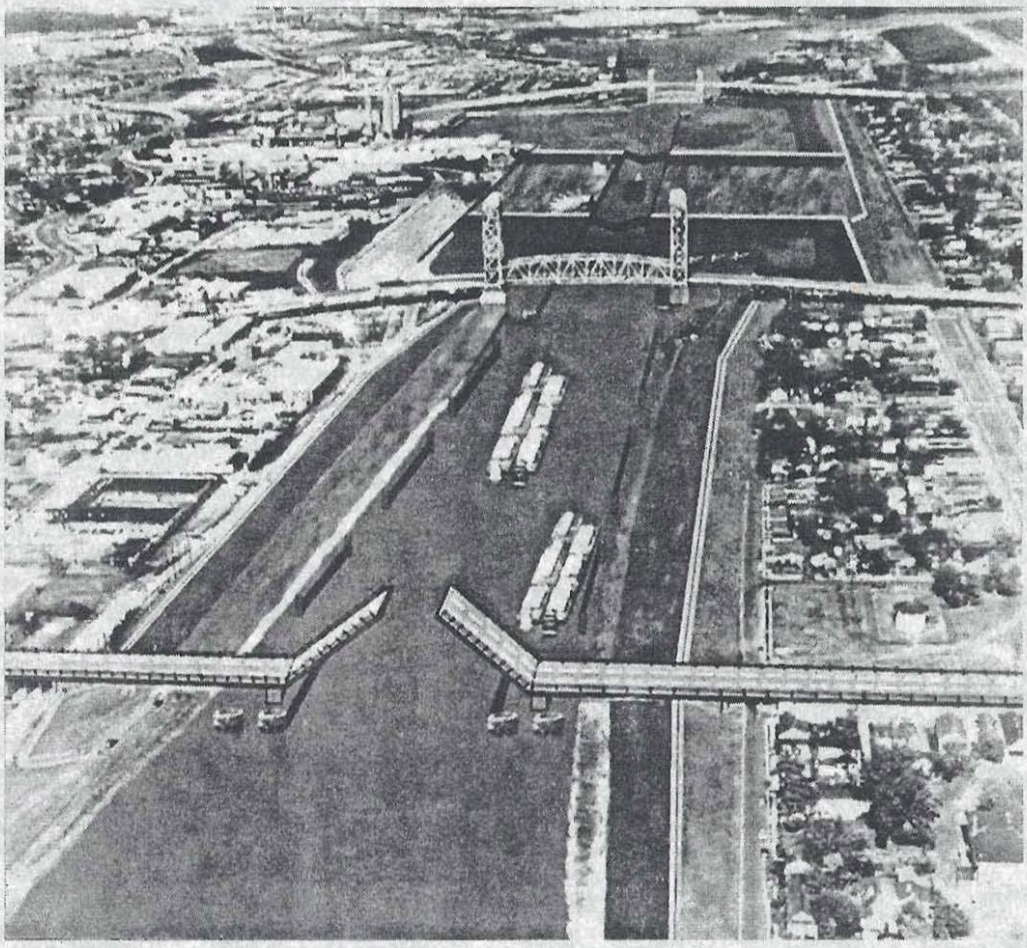
US Army Corps of Engineers
New Orleans District

Project Management

Mississippi River - Gulf Outlet

New Lock and Connecting Channels



Evaluation Report

Main Report and Environmental Impact Statement

Volume 1 of 9

March 1997

SYLLABUS

The Evaluation Report presents the results of studies that address the feasibility of improving navigation between the Mississippi River in New Orleans, Louisiana, and the Gulf Intracoastal Waterway and the Mississippi River-Gulf Outlet on the east side of the River.

Navigation between the Mississippi River and these waterways east of the river is via the Inner Harbor Navigation Canal (IHNC) and Lock, locally known as the Industrial Canal and Lock. The IHNC and Lock were completed by the Port of New Orleans in 1923 to provide navigation between the Mississippi River and Lake Pontchartrain, a distance of approximately 5 miles, and to provide areas away from the Mississippi River for industrial development. The lock is 75 feet wide and 640 feet long and has a depth over the sill of 31.5 feet Mean Low Gulf (MLG) and is located at Mississippi River Mile 92.6 Above Head of Passes (AHP).

During World War II, the Gulf Intracoastal Waterway was rerouted through the Inner Harbor Navigation Canal, and the Federal Government leased the lock and a 2.1-mile reach of the canal and assumed its operation and maintenance. The Federal Government then purchased the lock in 1986.

The River and Harbor Act of 1956 authorized the Mississippi River-Gulf Outlet, a navigation channel which was completed in the mid-1960's. The channel has a depth of 36 feet MLG over a 500-foot bottom width and extends from the Inner Harbor Navigation Canal to the Gulf of Mexico, a distance of approximately 76 miles.

The 1956 Act also provided for the construction of a new lock and connecting channel when economically justified by obsolescence of the existing lock or by increased traffic. Studies were initiated in 1960 for a new lock and connecting channel because at that time it was estimated that the lock would become dimensionally obsolete by 1970. Delays to navigation at the IHNC Lock are significant, averaging about 10 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 and the effects of the three existing bridges crossing the IHNC in the vicinity of the lock. These bridges, at St. Claude Avenue, Claiborne Avenue, and Florida Avenue, carry heavy vehicular traffic and their operation affects the ingress to and egress from the lock. These bridges are closed to navigation during morning and afternoon rush hours since these are major commuter routes for those living on the east side of the canal, including St. Bernard Parish.

Navigation traffic through the lock is projected to increase; consequently, average delays will increase unless the new lock is constructed. Barge tows approaching 12 feet of draft, moving over the Gulf Intracoastal Waterway, comprise most of the vessel traffic through the lock. Deep draft vessels using the existing lock are limited to 25 foot draft range, well below drafts demanded of the majority of the present deep draft vessels. The existing lock will require extraordinary maintenance to continue its present level of service.

Delays mean higher transportation costs for the cargo being shipped through the lock, which in turn means higher costs to the general public. Major commodities shipped through the lock include coal, petroleum and petroleum products. Much of the traffic going through the lock originates or has as its destination the Upper Mississippi River, the Ohio River and the Missouri River, in effect making the Industrial Canal Lock very vital to the nation's barge distribution system. So much so that the Inland Waterway Users Board, a national advisory group to the Corps of Engineers on the entire Inland Waterway System, has ranked this project as the No. 2 priority lock replacement project in the nation.

Seven sites for a new lock and connecting channels were considered in the preliminary analyses and were narrowed to two; the existing Inner Harbor Navigation Canal Lock site and a site at Violet, Louisiana in St. Bernard Parish, south of New Orleans, at Mississippi River Mile 83 A.H.P. The IHNC site is located in a densely populated urban area, whereas the Violet site is in a rural area comprised of brackish and saline marsh. The Violet Site was the Corps' recommended location during the 1970's, but passage of the National Environmental Policy Act (NEPA) and the Clean Water Act coupled with a national conscious raising of environmental matters during the latter part of the 1970's made this site unacceptable. Therefore, the IHNC site became the only feasible alternative.

Eight alternative plans were developed for a replacement lock at the IHNC site. These plans were comprised of various combinations of sites, construction methods, and bridge replacement scenarios. Two of the plans were selected for detailed analysis; namely, the 200-Foot East plan and the North of Claiborne Avenue plan. The 200-Foot East plan involved constructing the replacement lock adjacent to the existing lock on the east side (downriver) of the existing lock. Conventional, in-the-dry construction methods were to be used for this plan. It was selected for analysis based on the National Economic Development (NED) criteria. Construction at the North of Claiborne Avenue site involves pre-fabricated, float-in methods and would occur within the confines of the existing canal, north of the existing lock. It was analyzed further because it was the plan with the least impacts to the surrounding communities.

The 200-Foot East plan was determined to be unacceptable and not implementable because of the extensive and catastrophic impacts it would have on the neighborhoods surrounding the canal. This prevented it from qualifying as the NED Plan. Therefore, the North of Claiborne Avenue site was chosen as the recommended site. Various chamber sizes were evaluated at that site, and the NED size was determined to be 110-feet wide by 900-feet long by 22-feet deep, which was considered a shallow draft lock accommodating mainly barge traffic. The Port of New Orleans requested that a lock be built to accommodate deep draft traffic (110-feet wide by 36-feet deep by 1200-feet long). Our economic analyses determined that the larger lock was not incrementally justified (the additional benefits attributed to the increased size did not offset the additional costs to build the increased size). But, if the shallow draft and deep draft benefits are combined, then the larger lock is justified from an overall standpoint. The Port of New Orleans has agreed to pay the difference in the cost of the larger lock compared to the NED lock. Therefore, we are recommending the larger lock.

The recommended plan includes construction of a precast, floated-in, concrete lock to be constructed in four sections at an offsite construction yard located along the Gulf Intracoastal Waterway 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 will 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 will reduce the closure at that bridge, for both marine and ground traffic, for very short durations (1 -4 weeks); provision of by-pass channels around the new lock construction site and the existing lock during its demolition, both of which will provide continuous usage of the existing lock and canal during construction; extension of the Mississippi River flood protection along the canal 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, even though we are not relocating any residences.

The community impact mitigation plan was developed, in part, based on the specific Congressional guidance we received in the reports of the Appropriations committees of both the U.S. House of Representatives and Senate on the Fiscal Year 1991 Appropriations Act. That guidance provided specific directions to develop a comprehensive plan to identify and mitigate to the maximum extent practicable any social and cultural impacts associated with this project. It further required insurance that the communities adjacent to the project remain as complete, liveable neighborhoods during and after construction of the project. The committees' guidance also reaffirmed the need for full compliance with the requirements of the Water Resources Development Act of 1986 that pertained to this project, which

specifically required full participation of members of minority groups living in the affected areas in the planning for and construction of this project.

Authorization for a community impact mitigation plan, to be implemented in conjunction 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 being recommended was developed through a broad-based community participation process. A Neighborhood Working Group (NWG), composed of representatives of the affected neighborhood associations, city agencies, historical/cultural societies, the Port of New Orleans, the Corps, local elected officials, and other local residents was formed. Discussion of the impacts this project will have on the affected areas and the development of potential measures that could mitigate for these impacts was the goal of this group. Local residents participated and provided valuable input, while maintaining their strong opposition to the project. This opposition continues unabated by the numerous design improvements over the last few years.

This community impact mitigation plan includes direct impact minimization actions and measures to indirectly compensate for those impacts which direct impact minimization cannot properly address. A Claims Fund and/or Endowment Fund or other similar fund is a possibility whereby mitigation monies will be paid to individuals or businesses who can establish legitimate impacts directly attributed to the project. These actions will be taken by the Corps in partnership with local government, community groups, and residents. To implement this mitigation plan, a process to continue to allow the affected stakeholders a voice in the decisions about this mitigation plan will be established. A community-based committee will be formed to decide the details of the plan outlined in this report. A Partnering Agreement will be signed by all involved in this process that would commit all to work together for the benefit of the community and to determine how the mitigation dollars will be expended. More details of this process will be developed once construction funding is approved for this project.

The community impact mitigation plan is authorized to cost $33 million to implement. It addresses the direct impacts relating to noise, transportation, cultural resources, aesthetics, and employment. Features intended to serve as compensation to the affected areas for impacts that are not easily quantifiable, such as property values, business impacts, community and regional growth, and community cohesion, are also included in the plan. Implementation of the plan will begin prior to construction and will continue throughout the project

construction period. Included in the plan, in part, are job training assistance, business assistance programs, street and house improvements, community facilities, cultural/historical markers and displays, and new roadways. The $33 million figure has been challenged by the project's opponents, calling it "an insult" and demanding either complete removal of the mitigation plan from the project or an increase in the amount to match the total project's cost.

The first cost of the recommended plan, including the community impact mitigation plan, is estimated to be $531,400,000. The total annual cost is estimated at $63,438,000, with the average annual benefits estimated to be $110,427,000. The average annual net benefits are estimated to be $43,762,000. The benefit-to-cost ratio is 1.7 to 1. The construction period for the project is estimated to be 10-12 years, depending upon future funding levels.

Cost sharing for this project was set forth in the Water Resources Development Act of 1986. It required that all costs for the project be allocated between shallow-draft and deep draft navigation. The shallow draft costs would be cost-shared 50-50 between the regular Corps appropriations and the Inland Waterway Trust Fund. The deep draft increment will be the responsibility of the local sponsor, the Port of New Orleans, since the increment is not justified on its own. The cost of the shallow draft plan, the NED plan, is estimated at $463,100,000, and would be cost-shared as follows:

Utility Owners 1/	$	23,000,000
Inland Waterway Trust Fund		220,050,000
Corps of Engineers		220,050,000
TOTAL	$	463,100,000

The incremental cost to construct the recommended plan, the deep draft lock, is estimated to be $68,300,000. That is the cost to the local sponsor. The Port of New Orleans owns the real estate required for this project and will be given credit for these lands, presently estimated at $45,200,000, towards their requirement for this project. Therefore the cost sharing for the recommended plan is as follows:

Utility Owners 1/	$	23,000,000
Inland Waterway Trust Fund		220,050,000
Corps of Engineers		220,050,000
Port of New Orleans		68,300,000
TOTAL	$	531,400,000

Upon completion, the Corps will operate and maintain the project.

1/ Some of the utility relocations required for this project have been determined to be non-compensable and are therefore the responsibility of the utility owners.

MISSISSIPPI RIVER-GULF OUTLET,
NEW LOCK AND CONNECTING CHANNELS, LOUISIANA
EVALUATION REPORT

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INTRODUCTION

This report is presented in 9 volumes. The first volume, the draft main report and environmental impact statement (EIS), is a non-technical presentation of the study results, including a broad overview of the overall project history and formulation process, the draft EIS, and study recommendations. The second volume presents the mitigation plan. Volumes 3 through 8 include technical appendixes which contain technical data in support of the information presented in the main report and EIS. These appendixes are included primarily as an aid to the technical reviewer. Comments from other agencies and the public have been included in Volume 9) of the report.

AUTHORITY

This study was conducted in response to the following authorities and guidance:

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

> "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 recommendations of the Chief of Engineers contained in the 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 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 condition of local cooperation specified in House Document Numbered 245, Eighty-second Congress, shall likewise apply to the construction of said lock and connecting channels."

Section 186, Water Resources Development Act of 1976 (Public Law 587, 94th Congress) approved October 22, 1976.

> "The Act entitled "An Act to authorize construction of the Mississippi River-Gulf outlet", approved March 29, 1956 (70 Stat. 65), is amended by inserting before the period at the end thereof a colon and the following: "And provided further, That such conditions of local cooperation shall not apply to the construction of bridges (at a cost not to exceed $71,500,000) required as a result of the construction of the Mississippi River-Gulf outlet channel if the Secretary of the Army, after consultation with the Secretary of Transportation, determines prior to the construction of such bridges

that the Federal Government will not assume the costs of such work in accordance with section 132(a) of the Federal-Aid Highway Act of 1976 (Public Law 94-280); and before construction of the bridges may be initiated the non-Federal public bodies involved shall agree pursuant to section 221 of the Flood Control Act of 1970 (Public Law 91-611) to (a) hold and save the United States free from damages resulting from construction of the bridges and their approaches, (b) to provide without cost to the United States all lands, easements, and rights-of-way necessary for the construction of the bridges and their approaches, and (c) maintain and operate the bridges and their approaches after construction is completed"."

Section 844, Water Resources Development Act of 1986, Public Law 662, 99th Congress, approved November 17, 1986

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 the 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 cost** of $714,300,000. Before selecting the site under the preceding sentence, the Secretary shall consult with affected local communities. The cost of such modifications 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 Waterway 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 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 direction of the Secretary."

Section 326, Water Resources Development Act of 1996, Public Law 303, 104th Congress, approved October 12, 1996

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)."

Report No. 101-536, entitled Energy and Water Development Appropriations Bill, 1991, of the Committee on Appropriations of the U. S. House of Representatives, dated June 13, 1990.

Mississippi River/Gulf Outlet, Louisiana -- Pursuant to the development of a replacement lock at the Industrial Canal site in New Orleans, La., the Corps of Engineers in conjunction with the local project sponsors is directed to implement a community participation process with affected residential, business, and governmental entities. The historical nature and uniqueness of the urban environment dictate that a broad based community process is necessary. Such process shall include involvement of representatives of existing community associations and business groups in the area adjacent to the Industrial Canal as well as representatives of local government. The Corps shall designate an advisory group for the purposes of exchanging information and receiving community opinions and advising the District Engineer on various aspects of the project.

The Corps, in conjunction with the local project sponsor, shall develop a comprehensive plan to identify and mitigate to the maximum extent practicable any adverse social and cultural impacts of the project. Such plan shall include measures to provide adequate replacement housing, street circulation, and enhanced neighborhood amenities to insure that communities adjacent to the project remain as complete, livable neighborhoods during and after construction of the project. In the evaluation of benefits for implementing such plan, the benefits attributed to measures included in the project for the purposes of cultural and social mitigation and enhancement shall be deemed to be at least equal to the cost of such measures.

The preservation of historic properties and the evaluation of the impact of civil works projects on areas deemed to be of historical significance is addressed in the Corps' regulations on the subject. The Committee expects the Corps to strictly follow these guidelines in evaluating the impact of the replacement of the Industrial Canal lock.

The Water Resources Act of 1986, (PL 99-662) requires consultation on this project with affected local communities and efforts to "assure full participation of members of minority groups living in the affected areas" in the replacement of the lock. The Act requires the Secretary of the Army to report annually on the implementation of these provisions. The Committee expects full compliance with these requirements.

The Corps shall give maximum consideration to lock replacement alternatives which minimizes residential and business disruption while meeting the goals or improving waterborne commerce.

PURPOSE AND SCOPE

The purpose of this study is to address the feasibility of improving navigation between the Mississippi River in the vicinity of New Orleans, Louisiana, and the Gulf Intracoastal Waterway and the Mississippi River-Gulf Outlet, which extend east of the river.

Navigation between the Mississippi River and the waterways to the east include shallow-draft inland waterway traffic, shallow-draft local traffic, and deep-draft traffic. Inland waterway traffic is the major cause of congestion at the existing Inner Harbor Navigation Canal Lock, and the study required an inland waterways systems analysis to project navigation needs, and to estimate future inland waterway traffic and economic benefits with various alternative plans. The systems analysis addressed the effects of the lock replacement on the inland waterway system, in particular the Gulf Intracoastal Waterway and its interrelationship with the Mississippi River. The needs, projected traffic, and benefits to deep-draft and local shallow-draft navigation were also developed in the economic analysis.

Engineering investigations included the development of designs of the alternative plans, the development of construction techniques and direct construction impacts of the plans, and the development of cost estimates for the construction and maintenance of the plans.

Each of the structural alternative plans formulated to address the problems and needs developed in the study would significantly impact urban areas (the human environment) and/or the natural environment. Studies of the plans that affected urban areas were conducted to estimate their social impacts, to develop measures to mitigate these impacts, and to determine which impacts could not be mitigated or avoided. Analyses were also conducted to estimate the impacts of the plans on the natural environment and to develop measures to mitigate those impacts.

Investigations leading to the selection of the recommended plan were generally conducted in increasingly detailed levels to provide for the successive screening and refinement of alternative plans, including the without-project (rehabilitate the existing lock) plan. The investigations for the final screening and the recommended plan included:

- Economic studies of the final plans to determine their benefits, which were necessary to determine the national economic development plan, that is, the plan that provides the highest net difference between benefits and costs;
- Impact studies to identify and measure the likely social and economic consequences expected to result from implementation of the plans, including plan features to mitigate impacts to the human environment.
- Engineering studies, refined to general design memorandum scope, including innovative concepts of construction at the IHNC site, (locally referred to as the Industrial Canal site), and the development of a baseline cost estimate for the recommended plan;

Evaluation studies to determine the existence or the potential for contamination of lands within or affecting the project area.

· Environmental and cultural resource investigations to determine project impacts, to enable us to consult with the Advisory Council on Historic Preservation (ACHP) and the State Historic Preservation Officer (SHPO) to seek agreement on ways to avoid or reduce effects and enter into a Memorandum of Agreement, and to prepare an environmental impact statement; and

Real estate investigations to identify the property required and estimate the cost for lands and damages.

· Hazardous, Toxic, and Radioactive Waste (HTRW) studies to determine if such materials are present in the area.

REPORT AND STUDY PROCESS

This report, which includes the draft Environmental Impact Statement (EIS) and appendixes, is in response to the referenced authorities and guidance. The report addresses the feasibility of providing a new lock and related features to improve navigation efficiency, addresses the impacts to the community, and includes measures to mitigate project impacts.

The draft report and draft EIS was furnished to Federal, state and local agencies and other interested entities for review. Following the distribution of these documents, a public meeting was held to discuss the tentatively selected plan. After the receipt of comments from the review of the draft report and EIS and from the public meeting, the tentatively selected plan was revised and a final report was prepared. The final report includes responses to comments received from the review of the draft report and EIS

The final report will be submitted to the Lower Mississippi Valley Division Engineer in Vicksburg, Mississippi. Following review, the Division Engineer will issue a notice of availability of the report and forward the report with his recommendations to Washington. At Washington, the Corps' Headquarters will review the report, coordinate the filing of the final EIS with the EPA, and coordinate the report with other Federal and state agencies and the Governor of Louisiana. Upon receipt of their comments, the Office of the Chief of Engineers will submit its report to the Office of the Secretary of the Army.

The Secretary of the Army will obtain the comments of the President's Office of Management and Budget, sign the Record of Decision, and transmit the report with his recommendation to Congress for action.

PRIOR STUDIES, REPORTS, AND EXISTING WATER PROJECTS

FEDERAL

The following is a description of those studies, reports, and existing water resources projects that are pertinent to this study.

· **Mississippi River, Baton Rouge to the Gulf of Mexico, Louisiana.** Numerous studies have been made by the Corps of Engineers concerning deep-draft navigation on the lower Mississippi River below Baton Rouge, Louisiana. These studies have been going on intermittently for well over 100 years. The early studies were concerned with providing deep-draft access at the mouth of the river. In 1875, a depth of 26 feet was considered adequate, and dredging to attain this depth was needed only in rapidly shoaling South Pass. As depths required for navigation increased over the years, studies were authorized by Congress to determine the feasibility of providing an access channel with these greater depths. Soon after the turn of the century, an adequate depth for navigation to the Port of New Orleans was considered to be 35 feet via Southwest Pass. Dredging to maintain this depth was required between Cubits Gap and Head of Passes as well. A few decades later, Corps of Engineers studies established the need for a 35-foot deep channel of various widths from Baton Rouge down through Southwest Pass. Ship sizes continued to increase due to the economics of scale, and the need for a corresponding increase in channel size became evident. Just prior to 1940, navigation studies and the subsequent report resulted in the authorization by the River and Harbor Act of 1945 of a single project which combined several existing deep-draft projects on the river and modified them to provide the following channel dimensions:

Reach	Dimensions
Baton Rouge to New Orleans	35' x 500'
Port of New Orleans	35' x 1500'
Port of New Orleans to Head of Passes	40' x 1000'
Southwest Pass	40' x 800'
Southwest Pass Bar Channel	40' x 600'
South Pass	30' x 450'
South Pass Bar Channel	30' x 600'

The River and Harbor Act of 1962 provided for deepening the river from New Orleans to Baton Rouge to 40 feet and further provided for the 40' x 500' channel within the 35' x 1500' channel in the Port of New Orleans.

A feasibility report, "Deep-Draft Access to the Ports of New Orleans and Baton Rouge, Louisiana" containing a recommendation to deepen the Mississippi River's navigation channel to a 55-foot depth from Baton Rouge to the Gulf of Mexico, was prepared in 1984. The project was authorized for construction by the 1985

Supplemental Appropriations Act. The Water Resources Development Act of 1986 (PL 99-662) provided additional authorization by formalizing the cost-sharing provisions of the project. This act permits the local sponsor to enact user fees to defray their portion of the project costs and implements harbor maintenance fees to help pay the Federal cost of the project. The State of Louisiana, the local sponsor, requested implementation of this project in phases to spread out their financial burden. A 45-foot channel from the Gulf of Mexico to river mile 181 near Donaldsonville, Louisiana, was completed in December 1988, and from mile 181 to Baton Rouge in December 1994. Construction of the remainder of the project is pending further detailed studies of various depths and reaches.

Mississippi River-Gulf Outlet. House Document No. 245, 82nd Congress, 1st Session, dated 25 September 1951, resulted in authorization of the Mississippi River Gulf Outlet (MR-GO) project by the River and Harbor Act of 1956 (PL 84-455). The MR-GO is a tidewater ship channel 36 feet deep and 500 feet wide, extending from the Gulf of Mexico through Breton Sound to a junction with the Gulf Intracoastal Waterway (GIWW) immediately west of Lake Borgne. The MR-GO was constructed to provide deep draft navigation access to the tidewater port area located adjacent to the Inner Harbor Navigation Canal (IHNC) close to its junction with the Mississippi River. Access from this tidewater port area to the Mississippi River is through the IHNC Lock. Port officials desired the development of this deep water entrance channel for the purpose of providing additional area based on the premise that land located along the Mississippi River would not be sufficient to satisfy demand. National defense was also an issue during the development of this project. This project was placed into service in the mid-1960's. The project authorization also provides for a new lock and connecting channel between the Mississippi River and the new ship channel when economically justified by obsolescence of the existing lock.

· **Gulf Intracoastal Waterway Between Apalachee Bay, Florida, and the Mexican Border.** House Document No. 96, 79th Congress, 1st Session, submitted 29 February 1942, provides the basis for the existing project on the GIWW east of New Orleans. The IHNC and lock initially served as a toll link in the GIWW from Mobile, Alabama to New Orleans, Louisiana (via the Rigolets and Lake Pontchartrain) until enlargement of the waterway was authorized by the River and Harbor Act of 23 July 1942. Under this authorization, the GIWW was rerouted and enlarged to provide a 12- by 125-foot land-locked channel east of Lake Pontchartrain from the IHNC to the mouth of the Rigolets. The Act of 23 July 1942 also authorized acquisition of control, from the Board of Commissioners for the Port of New Orleans by the Corps of Engineers, of that part of the IHNC between the Mississippi River and the point where the GIWW turns eastward towards Mobile, a distance of about 225 miles; control of the lock, the lock forebay, and the St. Claude Avenue and Florida Avenue bridges was also transferred to the Corps. After acquisition of control by

the Corps and completion of the enlargement and rerouting of the GIWW, tolls were no longer required of vessels traveling to and from points east of the Mississippi River on the GIWW. The IHNC lock now serves as the only connection for traffic using the MR-GO, the GIWW from Mobile, Alabama, to New Orleans, Louisiana, docks along the IHNC, and traffic to and from Lake Pontchartrain.

There are five locks on the GIWW mainstem going west from the Mississippi River. They are Algiers, Harvey, Bayou Boeuf, Leland Bowman and Calcasieu, with Bayou Sorrel and Port Allen on the GIWW Morgan City-Port Allen Alternate Route. The River and Harbor Act of 1962, and numerous prior river and harbor acts, provides for the following improvements in the area: a 16- by 150- foot channel between the Mississippi River and Atchafalaya River via a lock through the west Mississippi River levee at mile 98 Above Head of Passes (AHP) at Harvey, Louisiana; an alternate 16- by 150-foot channel connecting the above channel and the Mississippi River in Algiers, Louisiana; a 12- by 125-foot channel connecting the Gulf Intracoastal Waterway at Morgan City, Louisiana, and the Mississippi River at Port Allen, Louisiana, via a lock through the levee at Mississippi River mile 228 AHP; a 12- by 150-foot channel between the Rigolets (between Lakes Borgne and Pontchartrain) and the Mississippi River via a portion of the Inner Harbor Navigation Canal and lock at mile 93 AHP; and annual payments to the Board of Commissioners of the Port of New Orleans for use of a portion of the Inner Harbor Navigation Canal and for use of the lock. In 1986, the Federal government acquired the lock from the Port of New Orleans. The Industrial Canal (IHNC), from the Mississippi River to the MR-GO is also an integral part of the Gulf Intracoastal Waterway.

· **Mississippi River and Tributaries.** House Document No. 90, 70th Congress, 1st Session, submitted 8 December 1927, is the basis for the Flood Control, Mississippi River and Tributaries project adopted by the Flood Control Act of 15 May 1928 (PL 70-391), as amended. This project provides a comprehensive plan for flood control on the lower Mississippi River below Cape Girardeau, Missouri. It includes levees as the backbone of the system and covers over 2,000 miles along the Mississippi River and principal tributaries. The purpose is to confine floodwaters to the main channel and designated floodways. The Mississippi River Levees (MRL) feature provides the first line of defense against riverine flooding in South Louisiana. These levees have protected populated areas such as New Orleans, industrial plants, and people living in the area from annual high water in the river. Any new or replacement lock project will require modification of the existing levees to tie into the new lock structure to maintain the integrity of the protection and prevent riverine flooding.

· **Mississippi River Outlets, Venice, Louisiana.** The report "Mississippi River for Additional Navigation Outlets in the Vicinity of Venice, Louisiana," published as House Document 361, 90th Congress, resulted in the authorization by the River and Harbor and Flood Control Act of 1968 (PL 90-483) of additional navigational outlets from the Mississippi River in the vicinity of

Venice, Louisiana, by enlargement of the existing channels of Baptiste Collette Bayou and Grand-Tigre Passes to provide channels 14 feet deep over a bottom width of 150 feet, with entrance channels in open water 16 feet deep over a bottom width of 250 feet. Jetties were authorized to the -6 foot contour to reduce the cost of maintenance dredging. Channel construction was completed in 1978 and jetty construction completed in 1979.

· **Lake Pontchartrain and Vicinity, Louisiana, Hurricane Protection Project.** This project was authorized by Section 204 of the Flood Control Act of 1965 (Public Law 89-298 as amended) and currently provides for enlargement of hurricane protection levees along Lake Pontchartrain in Orleans, Jefferson, and St. Charles Parishes and the Chalmette area which includes portions of Orleans and St. Bernard Parishes between the Mississippi River and the Mississippi River-Gulf Outlet. The lock project will involve reconstruction of a portion of the protection and/or tying the hurricane protection back to the new lock in order to maintain the integrity of the hurricane protection system.

· **Inner Harbor Navigation Canal (IHNC).** The IHNC and lock were built by the Board of Commissioners for the Port of New Orleans during the late 1910's and early 1920's and placed into service in May 1923. Located at Mile 92.6 AHP, it originally connected only Lake Pontchartrain with the Mississippi River. The development of the canal, subsequent to the lock, provides approximately eleven miles of additional waterfront to the Port of New Orleans. The canal originally operated as a toll facility and was designed to permit navigation between the Mississippi River and Lake Pontchartrain. The dimensions of the canal were 200 feet wide and 20 feet deep with approximately 1,000 feet of land on each side of the canal to be used for port and industrial development. The lock, a reinforced concrete "U" shaped chamber having gate bays at the river and canal ends, was built to dimensions of 640 by 75 by 31.5 feet (Mean Low Gulf). The gate bays on the river end have two sets of miter gates, one set for normal water levels and flow, and another set for water flow from the opposite direction (reverse head) when the canal water level is higher than the river water level. The gate bay on the canal end has three sets of gates, two sets for normal flow and one set for reverse head flow conditions. The second set of normal flow gates permit operation of the lock if the other set is accidentally damaged. Currently, the land on both sides of the canal is fully developed and devoted to industrial/port use. During World War II, the Federal government rerouted the GIWW so that the IHNC lock connected the eastern and western sections of the GIWW, creating a more direct route to locations on the eastern gulf coast. Concurrent with the relocation of the GIWW-east, the Federal government leased the IHNC lock and assumed its maintenance and operation. In 1956, Congress authorized the construction of the MR-GO to provide a tidewater channel to new harbor facilities that would supplement the existing port facilities as well as provide an alternate route to the Gulf of

Mexico for oceangoing vessels. Intersecting the IHNC about 2.1 miles north of its intersection with the Mississippi River, the MR-GO was completed in 1967 with project dimensions of 500 feet by 36 feet deep. The lock was subsequently acquired in 1986.

Intracoastal Waterway Locks, Louisiana Study. The purpose of this study is to address the feasibility of increasing the capacity of the locks on the GIWW system west of the Mississippi River. Seven locks are included in the study area including the Algiers, Harvey, Bayou Boeuf, Leland Bowman, Calcasieu, Port Allen, and Bayou Sorrel. The preliminary results of the reconnaissance study indicate that the most immediate needs for capacity increases are at Bayou Sorrel and Calcasieu Locks. There is also a future need for capacity increases at Port Allen and Algiers Locks. The Project Study Plan for the feasibility study was submitted in April 1995 for approval and certification by higher authority.

OTHER

· **Strategic Plan, Port of New Orleans.** The plan was prepared in 1986. The three objectives of the plan included assessing the nature and consequences of environmental change, providing strategic direction for the port and its complementary institutions, and serving as basis for commitment and implementation. The plan serves as a master plan for the future development of the port to take the port into the 21st Century. It identified the facility development and improvements that are desired and required in the near term future (end of the century). Improvements identified were geared to keeping the Port of New Orleans competitive in the world market. The plan included a capital improvement program estimated at close to $200,000,000. Improvements identified include redevelopment of three major terminals, development of the Tchoupitoulas Corridor (a major street improvement changing a two-lane street into a four-lane divided thoroughfare that will better accommodate truck traffic serving the river port area), and improvements to facilities along the IHNC and the MR-GO.

· **Progress Report on Tidewater Port Area.** This report, prepared in February 1993 by the Board of Commissioners for the Port of New Orleans, focuses on the current status of port facility development in the tidewater area and the development of the Almonaster-Michoud Industrial District. It describes current facilities and conditions and identifies future growth that is expected to occur.

PLAN FORMULATION

INTRODUCTION

This section includes a description of current and projected future conditions pertinent to the study; a description of the problems, needs, and opportunities identified in the study; and a presentation on the development, evaluation, and screening of alternative plans to address the problems, needs,

EXISTING CONDITIONS

Existing conditions pertinent to this study are those related to navigation between the Mississippi River at New Orleans, Louisiana, and the Gulf Intracoastal Waterway (GIWW) and the Mississippi River-Gulf Outlet (MR-GO) east of the river, and those related to the impacts of alternative plans developed to address the problems, needs, and opportunities identified in the study.

The Mississippi River provides deep-draft navigation access to the Port of New Orleans and upstream to the Port of Baton Rouge. The river and its tributaries also comprise a major inland waterway system which links the hinterland of the nation with other world ports via the deep-draft channel on the lower river. The Gulf Intracoastal Waterway extends from Brownsville, Texas, to Apalachicola, Florida; the main stem of the GIWW crosses the Mississippi River in New Orleans, Louisiana. Shallow-draft traffic moving between the Mississippi River and the GIWW east of the river, and GIWW traffic crossing the river must navigate the Inner Harbor Navigation Canal Lock and a 2 mile reach of the Inner Harbor Navigation Canal, which are features of the GIWW project. The Inner Harbor Navigation Canal extends a distance of approximately 3 miles from the GIWW to Lake Pontchartrain. The reach between the GIWW and the lake is a non-Federal channel which is maintained by the Port of New Orleans.

The Mississippi River-Gulf Outlet provides deep-draft access to a tidewater area of the Port of New Orleans, east of the Mississippi River. It extends from the Gulf of Mexico via a 76-mile land and water cut east of the Mississippi River to the IHNC in New Orleans. The MR-GO and GIWW share a 6-mile reach of channel extending eastward from the IHNC.

Study Area. The study area is located in Orleans, St. Bernard, and Plaquemines Parishes in southeastern Louisiana. The area is generally bounded by Lake Pontchartrain on the north, the Mississippi River on the south and west, and Lake Borgne, Breton Sound and the Gulf of Mexico on the east and south. (See Plate 1). The study area includes part of the city of New

Orleans, Louisiana, which is coextensive with Orleans Parish, and the city of Chalmette, Louisiana, and the town of Pointe a la Hache, Louisiana, in Plaquemines Parish. The area potentially affected by changes in vessel traffic includes the navigation channels and related land areas in the study area and in the inland waterway system on the GIWW and the Mississippi River.

Terrain. The study area is generally of low relief and characteristic of an alluvial plain. The most prominent topographic features of the study area are the natural levees along the Mississippi River and its abandoned courses and distributaries. These levees form ridges which range from a width of about 5 miles and an elevation of 10 feet NGVD near the IHNC in New Orleans to narrow strips less than 1-foot NGVD near the Gulf of Mexico. The troughs between the ridges are comprised of marsh, swamp, bays, and lakes. Mississippi River flows are confined by a system of levees sloping gulfward from an elevation of approximately 22.5 feet NGVD at the IHNC in New Orleans.

The area between the Mississippi River and Lake Pontchartrain in New Orleans, the area generally between the Mississippi River and the MR-GO in St. Bernard Parish, and a strip of land east of the Mississippi River between Caernarvon and Pointe a la Hache are enclosed by levees with pumped drainage. The levees were constructed to protect developed areas from tidal flows and to convert wetlands for development. The dewatering of the organic soils in the areas located away from the alluvial ridges has resulted in the compaction and subsidence with resultant elevations as low as -10 feet NGVD.

Development and Economy. Due to its location near the mouth of the Mississippi River, New Orleans is the natural gateway to the entire Mississippi Valley. The economy of the area has traditionally been based on oil and gas production, manufacturing, agricultural production, and trade. More recently, tourism has become one of the principal industries. Waterborne commerce is of major importance to the Greater New Orleans area and the State of Louisiana. Louisiana has the greatest number of waterway miles (over 2,000) maintained by the Federal government. The Port of New Orleans, coupled with the Port of South Louisiana (just upstream), constitutes the world's largest grain port. More than 4,000 ships call at its docks each year. The Port, along with the industrial developments along the Mississippi River between the Head of Passes and Baton Rouge, serves as a trans-shipment terminal for shallow-draft commerce utilizing the vast network of inland waterways formed by the river, its tributaries, and connecting streams. At any given time, approximately one of every four barges in the United States is in the New Orleans area. Within the Port of New Orleans, facilities are spread over three waterways: the Mississippi River, the IHNC, and the MR-GO. The Port of New Orleans

estimates that about 17,000 people work in port services or facilities.

The Port of New Orleans has been a dominant factor in the economy of the area and that of the state as a whole, adding millions of dollars annually to the state's treasury and providing thousands of jobs through the many services needed to carry on domestic and foreign trade. It is also the nation's largest shallow-draft port. Simply put, inland ports ship cargo by barge to New Orleans for export, and imports are loaded onto barges for distribution throughout the area serviced by the inland waterway system. There are about 40 agencies representing over 100 steamship lines offering regular and frequent sailings between New Orleans and ports throughout the world. Fifty linear miles of docking facilities are located along both banks of the Mississippi River in the vicinity.

The Inner Harbor Navigation Canal (IHNC) and Lock were initially constructed by the Board of Commissioners of the Port of New Orleans in response to the need for more port areas to handle increased water traffic. The canal was originally built to dimensions of 20-feet x 200-feet, with 1,000 feet of land on each side to be used for port and industrial development. The lock was built to dimensions of 640-feet x 75-feet x 31.5-feet and was later purchased by the Federal government.

The Port of New Orleans continued to grow in the three decades following construction of the IHNC, and the lock began to experience congestion. As a result, Congress authorized the construction of the MR-GO to provide a tidewater channel to provide additional harbor facilities as well as an alternate route to the Gulf of Mexico for oceangoing vessels. This route to the Gulf is about 50 miles shorter than the route via the Mississippi River. The MR-GO allowed the port to compete for container business, which it would not have been able to do without the tidewater channel. The Almonaster-Michoud Industrial District (A-MID) has been the subject of intense planning to develop 7,000 acres of industrial land adjacent to the Jourdan Road Terminal on the north bank of the MR-GO in the tidewater port area. A-MID is completely within the city of New Orleans and is the only industrial land of its size left in the United States that close to the central business district (downtown) served by water, rail, highway and air, and large enough where free trade zones and other industrial activities can be established. Industry currently operating in the A-MID include heavy industrial and deep port users, public port facilities, process industries, fabrication and assembly, light industrial and high technology plants, and trucking terminals. Approximately 105 companies employing 9,175 people operate in A-MID

Other significant economic activities in the area include shipbuilding, banking and finance, retail and wholesale commerce, service functions, commercial and sport fishing, and tourism. More recently, land-based and riverboat gambling have become important to the area's economy.

Population and Employment. The primary sites evaluated for the lock replacement project were in Orleans and St. Bernard Parishes. According to the US Census, between 1980 and 1990, the population of Orleans Parish (the City of New Orleans) declined from 551,927 to 496,938. During that same period, St. Bernard Parish has experienced a slight growth in population from 64,097 to 66,631. Average income in both parishes increased during the period from 1980 to 1990. Unemployment in these two parishes between 1980 and 1990 remained constant at 6.0 % in Orleans and 7.2 % in St. Bernard. There was a total of 208,900 people employed in Orleans Parish in 1990, down from 233,800 in 1980. The number of residents employed in St. Bernard Parish increased from 26,900 in 1980 to 28,500 in 1990.

Climate. The climate of the New Orleans area is subtropical marine and is influenced to a large degree by the many water surfaces provided by lakes, rivers, bayous, and by proximity to the Gulf of Mexico. Throughout the year, these water areas modify the relative humidity and temperature conditions, decreasing the range between extremes; when southern winds prevail, these effects are increased, imparting the characteristics of a marine climate. The winter months are mild. From about mid-November to mid-March, the area is subjected to tropical and cold continental air in periods of varying length. About 80 % of the December-February hourly temperatures range from about 51° to 60° (F). Rainfall is heavy during this period. The annual normal precipitation for New Orleans (Citrus Station) is 58.22 inches. Snowfall amounts are insignificant. During mid-June to mid-September, the prevailing southeast to southwesterly winds carry inland warm, moist air which is favorable for sporadic development of thunderstorms. In the New Orleans area, these showers tend to keep the temperatures from rising much above 90° F. The monthly mean temperatures vary from 53° to 83° F. The record high temperature of 102° F occurred in August 1980 at New Orleans. The record low temperature of 11° occurred in December 1989 at New Orleans.

Visibility. River fog forms when warm, moisture-laden air moves over the relatively cold waters of the Mississippi River during the winter and spring. The potential for widespread river fog is greatest in the river and adjacent wetlands. River fog is uncommon from May to November.

Extremes. While lightning usually accompanies summer showers, thunderstorms with damaging winds are relatively infrequent. Until recently, the greatest 24-hour amount of precipitation since 1871 was 14.01 inches on 15-16 April 1927. On May 8-9, 1995, new records were established throughout the metropolitan area, with amounts up to about 20 inches being recorded in a twenty-four hour period. Hail of a damaging nature seldom occurs, and tornadoes are infrequent. Since 1893, a total of 49 tropical storms has either struck or affected the coastal area of Grand Isle to the Louisiana-Mississippi state line. The maximum observed winds at landfall came from Hurricane Camille

(14-22 August 1969) and measured 160 mph near the center with gusts to 190 mph. In 1965, Hurricane Betsy brought destructive winds to the New Orleans metropolitan area and over 50 deaths from drowning. An extreme wind of 125 mph from the east was estimated atop the Federal Building in New Orleans. Hurricane Florence (1988) was the last major storm to cross the study area.

Water Levels. Water levels for each of the major water bodies in the study area are discussed below.

Mississippi River. The Mississippi River discharges the headwater flows from about 43 % of the contiguous 48 states and water levels on the Mississippi River fluctuate with seasonal flood discharges, ranging approximately 20 feet in the Port of New Orleans. The river is subject to infrequent hurricane generated wind tide levels of extreme range.

The Mississippi River, at the entrance to the IHNC Lock, is approximately 0.5 of a mile wide and flows in a southeasterly direction. Stages in the river at the IHNC have ranged from a maximum of 17.52 NGVD feet on March 4, 1950 due to high discharges to -0.48 feet NGVD on January 4, 1954. The mean stage is 6.42' NGVD. The Mississippi River levees at the IHNC lock have a crest elevation of 22.6 feet. The height of the Mississippi River levees at the Violet site, the site considered in our early evaluations, is 20.5 feet, including freeboard. Major floods have occurred on the Mississippi River in 1912, 1922, 1927, 1937, 1945, 1950, 1973, 1974, 1975, and 1983.

Velocities in the river range from 1-foot per second at low stages to 9 feet per second at high stages. During periods of high discharge, fast currents and eddies can create hazards to navigation.

IHNC. The mean stage of the IHNC on the northeast side of the lock is 1.37' NGVD. The maximum stage at the IHNC lock of 10.65' NGVD occurred on September 10, 1965 during Hurricane Betsy, and the lowest stage of -2.00' NGVD occurred on April 12, 1988.

Mississippi River-Gulf Outlet. The MR-GO carries flows to the Gulf of Mexico from Lake Pontchartrain via the IHNC and flows in a southeasterly direction. Water levels in the MR-GO are influenced by Gulf tides which range only a few feet.

Gulf of Mexico. Relative sea level rise (which results primarily from land subsidence, from other geologic activity, and possibly from global sea level rise) must be considered in designing any new lock. Southeast Louisiana has been subsiding at a rate of 2 cm per year since 1962. By comparison, the central Mississippi gulf coast has been subsiding at a rate of 0.15 cm per year.

Water Salinities. Salinity data for each body of water in the study area are discussed below.

Mississippi River. Saltwater from the Gulf of Mexico extends upstream of the mouth of the Southwest Pass of the Mississippi River most of the time. The extent of intrusion depends primarily on river discharge. Flow duration, wind velocity and direction, tides, and riverbed configuration all influence the upstream movement of saltwater. The toe of the saltwater wedge is usually well defined with relatively little mixing occurring at the freshwater-saltwater interface. Movement of saltwater into the river is primarily through Southwest Pass and also through South Pass. Since some mixing does occur at the freshwater-saltwater interface, chloride concentrations in the river increase downstream from the toe of the wedge rendering the water unsuitable for municipal and industrial uses. Data indicate that chloride concentrations at the river surface exceed the US EPA standard of 250 milligrams per liter (mg/l) for public water supplies anywhere from 15 to 25 miles downstream from the toe of the wedge. The saltwater wedge is dependent primarily upon discharge and the location of the saltwater wedge in the river to make it recede. The recession of the saltwater wedge downstream of New Orleans is generally rapid and responsive to increases in discharge.

IHNC. An environmental analysis of Lake Pontchartrain, conducted in 1980, noted that the canal showed definite evidence of saltwater stratification which occurs during a flooding tide. This occurs because the canal is connected to the Gulf of Mexico by both the Mississippi River and the MR-GO. More saline (and more dense) gulf water moves along the bottom and probably is the primary source of chlorides.

MR-GO. Salinity increases in the areas adjacent to the MR-GO have occurred because the MR-GO provides a more direct route of flow from the high salinity waters of the Gulf of Mexico into the upper areas of the estuarine system. The MR-GO is a straight and deep channel in comparison with the natural meandering shallow lagoons and characteristically sluggish water movement found in the area. Greater volumes, more rapid mixing, and deeper penetration of saltwater are responsible for higher salinities in surface waters and marsh areas adjacent to the MR-GO

Lake Pontchartrain. Before construction of the MR-GO, salinities in Lake Pontchartrain varied from an average minimum of 850 ppm to an average maximum of 4,250 ppm. The mean salinity at Little Woods in 1958 was 1,300 ppm; the average salinity rose to 3,000 ppm by 1965, after the MR-GO was completed.

Gulf Of Mexico. The Gulf of Mexico has, on the average, a salinity of 35,000 parts per million (ppm) total dissolved solids.

Water Quality. The following paragraphs provide summary information for the major waterways/water bodies in the area. Detailed information on water quality is contained in Appendix B, Section 1.

Mississippi River. The banks of the Mississippi River, from Baton Rouge to the Gulf of Mexico are lined with more than 115 industrial plants. Many of these industries utilize the Mississippi River as a source of process and cooling water, and all of these industries discharge to the Mississippi River. Additionally, wastes from various municipalities are discharged into the river. Pollutants contained in these and other wastes and inflows adversely affect the water quality. Values for the Mississippi River at New Orleans water quality parameters collected from 1970 - 1988 indicate that compliance with the U. S. Environmental Protection Agency (EPA) and the Louisiana Department of Environmental Quality (LDEQ) criteria is generally good; with the exception of high levels of heavy metals and pesticides being detected. Samples specifically tested for organic compounds show the presence of over 100 detectable compounds, but criteria for many of these have not been established, and exact concentrations cannot be determined. The LDEQ classifies the river as "Water Quality Limited." Occasional dissolved oxygen and fecal coliform violations would likely occur in the river during low flow. The 1993 sampling effort for this study produced results similar to results of historic sampling. Continued implementation and enforcement of EPA effluent limitation requirements should result in a reduction of heavy metals and the number of carcinogens.

IHNC. Water quality concerns in the IHNC include DO, coliform, pH, heavy metals, organics, and pesticides. Their presence has resulted in the LDEQ classifying the IHNC as "Water Quality Limited," the same as the Mississippi River. Pollution in the IHNC may result from discharge directly into the canal or from connecting streams, especially the Mississippi River. Direct discharges include stormwater runoff, industrial point sources, and vessel discharges. Several industries located along the IHNC discharge waste into the canal; these discharges are possibly the source of heavy metals in the canal. There are three pumping stations with a total capacity of 5,920 cfs discharging into the IHNC. These stormwater discharges could introduce significant amounts of biological oxygen demand (BOD) and coliforms into the IHNC during a relatively short period of time. There are no municipal waste discharges into the IHNC. (However, some wastes may be discharged into the channel through the pumping stations as a result of sewage from broken sewerage lines collecting stormwater). These problems are compounded by the sluggish nature of water movement through the canal. The 1993 sampling effort produced results similar to historic sampling results. No continuous long-term monitoring program is available for the IHNC.

Mississippi River-Gulf Outlet. The surface water temperature in the MR-GO is generally below state criteria. Dissolved oxygen

(DO) is generally high, and BOD is generally low; DO increases and BOD decreases with distance from the IHNC. Criteria from LDEQ and U.S. Environmental Protection Agency (EPA) for total fecal coliform were exceeded. Heavy metals are also present in the MR-GO due to industrial discharge into the IHNC.

Lake Pontchartrain. The water in Lake Pontchartrain near the entrance of the IHNC is affected by water from the canal, especially the water of the IHNC north of the MR-GO confluence. These waters show high average DO levels, high phosphorus concentrations, low BOD levels, and occasional pH levels above and below LDEQ or EPA criteria. Mean fecal coliform levels exceeded the state criteria of 200/100 ml. Heavy metals and pesticides are also present. Nevertheless, Lake Pontchartrain near the IHNC exhibits reasonably good water quality.

Biological Resources. The undeveloped portions of the study area consist mainly of brackish to saline tidal marshes, various water bodies including bayous, canals, ponds, and lagoons, and to a lesser degree, bottomland hardwood forests and scrub/shrub areas. The forested areas are located primarily on the undeveloped areas of higher elevation that border the Mississippi River and its abandoned distributary channel ridges that course through the study area. Large areas of scrub/shrub are located on dredged material disposal areas alongside the MR-GO. Small remnants of once extensive cypress swamps occur in the vicinity of Violet. In many areas downstream of the IHNC, levees constructed for drainage and storm surge protection provide a sharp dividing line between the productive tidal wetlands and developed areas. Upstream of the IHNC, all land areas in Orleans and Jefferson Parishes are developed.

The tidal marshes are very productive ecosystems that support large populations of resident and migratory birds and terrestrial animals. Seagulls, terns, skimmers, various shorebirds, herons, egrets, diving ducks, puddle ducks, and pelicans are abundant in the tidal marshes. Terrestrial animals include nutria, muskrat, mink, otter, raccoon, swamp rabbit, gray and red squirrel. Forested areas support most of these species as well as many species of amphibians and reptiles. American alligators are common in the lower salinity brackish marshes. The detrital material formed from the dead parts of marsh plants provide nutrients to fuel the food chain in estuarine waters. The tidal waters sustain a wide variety of commercially and recreationally important fish and shellfish species. The Mississippi River supports limited populations of freshwater fish because of high ambient turbidity levels and the lack of overflow lands in the study area.

Most of the threatened and endangered species known to exist in the study area are transients or strays from areas where they are more likely to be found. An exception is the endangered brown pelican, which is common in the study area, especially during

winter. These birds breed on islands closer to the Gulf of Mexico.

Cultural Resources. The study area is located adjacent to the Mississippi River in a section of the delta plain which was deposited only a few thousand to a few hundred years ago. The disturbance resulting from lock and canal construction and the infringement of industrial and residential development has destroyed any prehistoric or historic archaeological sites that may have existed in the area.

The area between the vicinity of the IHNC and the lower limits of the Violet site is a diverse region containing properties eligible for the National Register of Historic Places. These properties have been identified by a number of cultural resource investigations conducted by contractors for the New Orleans District. Each of these studies has been coordinated with the State Historic Preservation Office and provided to the Advisory Council on Historic Preservation before a field examination of the area was completed by personnel from these offices.

The IHNC lock, constructed between 1918 and 1923, was the subject of a comprehensive study completed in 1987 that determined the IHNC lock eligible for the National Register of Historic Places (Frederick D. Dobney, et. al. Evaluation of the National Register Eligibility of the Inner Harbor Canal Lock in Orleans Parish, Louisiana. New Orleans: R. Christopher Goodwin and Associates, INC.). In 1991 the New Orleans District completed a research design for archeological and architectural investigations in the area (Herschel A. Franks, et. al. A Research Design for Archeological Investigations and Architectural Evaluations within the proposed Upper Site, New Lock and Connecting Channels, Inner Harbor Navigation Canal, New Orleans, Louisiana. Baton Rouge: Museum of Geoscience, Louisiana State University). This study concluded that the St. Claude Avenue Bridge, a Strauss Heel Trunion Bascule bridge built between 1918 and 1921, was also eligible for the National Register.

The Galvez Street Wharf, designed by the Port of New Orleans in 1922 and erected in 1929, was among the first improvements to the IHNC area. This rectangular, multi-bay industrial structure is supported by a metal frame with a roof of corrugated zinc. The building is considered significant for its historical associations with the early period of development of the IHNC.

Two National Register districts are located in the area: the Holy Cross Historic District and the Bywater Historic District. The Bywater and Holy Cross neighborhoods lie west and east, respectively, of the IHNC and generally between St. Claude Avenue and the Mississippi River. The Holy Cross Historic District is significant for its classic New Orleans architectural patterns. The majority of homes consist of single and double "shotgun" houses which possess either Italianate or Eastlake details. The New Orleans District completed an archeological study of the Holy Cross Historic District, and archeological testing concluded that

architectural features associated with a 19th century brickyard and slave quarters, late 19th to early 20th century residences, commercial establishments, and truck farms were eligible for the National Register. A data recovery plan for these properties was developed (Earth Search, Archeological Survey and Testing in the Holy Cross Historic District, New Orleans, Louisiana, 1992). The Bywater Historic District is architecturally significant for the quality of its mixed collection of residential and commercial buildings dating from 1807 to 1935. In addition to commercial buildings, four major building types are found in the area: shotguns, camelbacks, bungalows, and pyramidal cottages. A comprehensive architectural assessment and preliminary archeological review of 64 city blocks west of the IHNC were completed by R. Christopher Goodwin & Associates, Inc., between November 1991 and January 1992, and confirmed that it is unlikely that significant prehistoric archeological deposits are located within the area. More detailed information on cultural resources is contained in the Environmental Appendix.

The St. Claude and Lower Ninth Ward neighborhoods are to the north of St. Claude Avenue lying west and east, respectively, of the IHNC and extend north to Florida Avenue. The area north of Claiborne Avenue was constructed in the 20th century due to the late drainage of low swampland, and the dwellings in the neighborhood generally have no architectural or cultural significance.

The present IHNC is constructed on property that once belonged to the Ursuline Order of the Catholic Church. The Ursuline Convent and other associated structures were demolished when the canal was dug in the early 1920's. During the mid-19th century, the area was transformed into an urban setting as the City of New Orleans continued to expand down river.

Hazardous, Toxic, and Radioactive Waste (HTRW). An initial assessment of the potential for HTRW was conducted which served as the basis for completion of a HTRW remedial investigation of the IHNC canal bottom and the heavily industrialized area on the east bank of the IHNC between Claiborne and Florida Avenues. The primary focus of this investigation was to collect additional information that will assist in characterizing current and future risks, and to develop and evaluate potential long-term and permanent remedial action alternatives as might be necessary.

IHNC Canal Bottom. Bottom sediment samples from the canal show detectable total and Toxic Characteristic Leachate Procedure (TCLP) concentration levels of metals including arsenic, barium, chromium, lead and mercury. Except for herbicides, 2,4, D and 2,4,5-TP (silvex), all other targeted organic pollutants are below detection limits. We have determined that the canal sediments are not considered hazardous material. No constituents exceeded the EPA's TCLP criteria.

East Bank IHNC. The soil samples from the east bank are contaminated with pollutants released from industrial activities at the site. The contaminated soils occur at the nearsurface from the top of ground to depths of about 5 feet. With few exceptions, the majority of the pollutants in soils have detectable bulk concentration levels below the 1990 action levels proposed by the EPA. TCLP and ignitability tests performed on soil samples yield results that generally pass the regulatory toxicity limits and ignitability criteria established by EPA.

The analytical data indicate that the majority of the soils to be excavated from the east bank is generally acceptable for disposal at an industrial landfill. The top five feet of soils excavated for land disposal may require special handling or treatment prior to disposal. Some nonaqueous, petroleum-product-rich liquids at the bottom of oil-saturated soils may require collection and proper disposal prior to excavation of soils. In addition, some groundwater may require treatment for metals. Soils from the east bank excavation area were not tested for aqueous disposal. Pending Louisiana Department of Environmental Quality approval, soils are assumed to be acceptable for disposal at a previously used MR-GO disposal site since contamination levels are similar to the canal bottom samples. A number of underground storage tanks located on the east bank of the IHNC are also items of concern. Although the majority of the soils generally passes published Federal criteria, the State of Louisiana may require special treatment.

West Bank IHNC. The Initial Assessment identified several areas of potential concern including the Galvez Street Wharf, the US Coast Guard Reservation, an underground storage tank located at the IHNC Lock, and an oil house apparently related to the New Orleans Public Belt Railroad, south of Claiborne Avenue. A remedial investigation for this portion of the study area was conducted by the St. Louis District for the New Orleans District. Analytical results revealed that contaminants, consisting of volatile, semivolatile, metals and pesticide compounds, were present in the parts per billion (ppb) to the parts per million (ppm) range in nine areas along the west bank of the IHNC. The contaminant levels were not detected at concentrations which would classify the soils and groundwater as hazardous by characterization as defined by Federal Regulations but are such that the Louisiana Department of Environmental Quality (LDEQ) may require remediation and/or permitting of operations during the construction phase of the new lock project.

Graving Site. A Hazardous, Toxic and Radioactive Waste (HTRW) Initial Site Assessment was completed for the Inner Harbor Navigation Canal Lock Graving Site. It was conducted according to guidance of the Corps of Engineers Regulation ER 1165-1-132, Water Resources Policies and Authorities for HTRW Guidance on Civil Works Projects, 26 June 1992. The agency data base searches and contractor work were performed according to American Society of Testing and Materials (ASTM) standards E 1527-94.

Based on information gathered during the preparation of the ISA, there is a low risk of encountering and HTRW problem. The entire excavation site and support lands (parking, equipment yards) had no visually or physically observed HTRW features, and agency research as well as land use research support this field observation. There are several potential HTRW features near-by, so should the construction methods change, or the area of construction be more than evaluated, the HTRW risk will require additional review. These potential HTRW features pose no problem for the graving site as currently designed, and the project may proceed without delays.

Existing Navigation Projects. The following paragraphs provide the current status of the pertinent navigation projects in the area.

Inner Harbor Navigation Canal (IHNC). The IHNC, colloquially referred to as the Industrial Canal, is a waterway 5.5 miles long that provides access from Lake Pontchartrain to the Mississippi River, at mile 92.6 above Head of Passes (AHP), (approximately two miles downstream of Canal Street in New Orleans). The canal and lock were constructed by the Port of New Orleans between 1918 and 1923 with the lock being placed in service in 1923 as a unit of the IHNC. The lock rests on a foundation of 19,000 piles 60 feet long, and, with gates and machinery, weighs 225,000 tons. The concrete floor is 9 to 12 feet thick, the walls 13 feet wide at the bottom, decreasing to a 2-foot width at the top. The lock and canal also serves as an integral part of both the GIWW and MR-GO for approximately half of its length. The IHNC and lock served as a toll-link in the GIWW from Mobile to New Orleans (via the Rigolets and Lake Pontchartrain), until enlargement of the waterway was authorized by the River and Harbor Act of 1942. The existing IHNC lock is a reinforced concrete structure, 75 feet wide, 640 feet long, and 31.5 feet (MLG) over the sill at low water in the river. The IHNC has a controlling depth of 30 feet, with bottom widths varying from 125 feet to 300 feet. The IHNC lock is dimensionally inadequate, primarily as a result of the continually increasing barge traffic but also because of the larger oceangoing vessels now in service. The lock was owned by the Port of New Orleans and leased to the Federal government from 1942 until 1986. At that time the Federal government acquired the lock and turned ownership of the St. Claude and Florida Avenue bridges over to the Port of New Orleans. The lock is currently owned by the Federal government. The size of vessels traveling between the river and MR-GO is constrained by the existing lock.

Mississippi River-Gulf Outlet. This project provides a 36- by 500-foot ship channel between the Inner Harbor Navigation Canal in New Orleans, Louisiana, and the Gulf of Mexico, Louisiana; a 100- by 2,000- by 36-foot turning basin at its junction with the Inner Harbor Navigation Canal; and a new high level bridge over the channel at Paris Road (Louisiana 47/I- 510). The MR-GO

affords a tidewater outlet to the Gulf that is about 37 miles shorter than the Mississippi River route. Foreshore protection along the south bank of the MR-GO from the Inner Harbor Navigation Canal to the end of the hurricane protection levee which parallels the channel, is also a feature of the project.

The Gulf Intracoastal Waterway Between Apalachee Bay, Florida and the Mexican Border. A series of Congressional Acts authorized work which eventually led to the construction of an inland coastal waterway from Apalachee Bay, Florida to the Mexican Border. This waterway is the Gulf Intracoastal Waterway (GIWW). Through its connection with the Mississippi River system and other important inland waterways, the GIWW provides for waterborne commerce throughout the eastern and southern seaboards, the Midwest, and the Great Lakes. The project, as authorized by the River and Harbor Act of 1925 and modified by the River and Harbor Act of 1946 provides for the following channel dimensions in Louisiana:

Main Routes: - 12 by 150 feet from Lake Borgne Light No. 29 to the Industrial Canal, and 12 by 125 feet from the Mississippi River to the Sabine River, including routes through both Algiers and Harvey Locks.

Alternate Routes - 12 by 125 feet from Morgan City to the Mississippi River at Port Allen, and 9 by 100 feet from Plaquemine to Indian Village on the Morgan City-Port Allen Route.

The GIWW, of which the IHNC is a crucial link, grew during the period following World War II. The IHNC lock is the only lock on the GIWW east of the Mississippi River. There are 7 locks on the GIWW in Louisiana west of the Mississippi River - five on the main stem and two on the alternate route. Table 1 provides a summary description of the eight locks located on the GIWW.

Table 1
GIWW System - Physical Description of Locks

Waterway/Lock	GIWW Mile	River Mile	Miss. Length (Feet)	Width (Feet)	Sill Depth (Feet)	Lift (Feet)	Year Opened
GIWW (East)							
IHNC	0	92.6	640	75	31.5	17	1923
GIWW (West)							
Algiers	0	88.0	760	75	13	18	1956
Harvey	0	98.2	425	75	12	20	1935
Bayou Boeuf	93.3	n.a.	1156	75	13	11	1954
Leland Bowman	162.7	n.a.	1200	110	15	5	1985
Calcasieu	238.9	n.a.	1206	75	13	4	1950
GIWW (Morgan City to Port Allen Alternate Route)							
Port Allen	64.1	227.6	1202	84	14	45	1961
Bayou Sorrel	36.7	n.a.	797	56	14	21	1952

As mentioned previously, the Inner Harbor Navigational Canal and lock, constructed by the Port of New Orleans and placed in service in 1923, was leased by the Federal government from 1942 until 1986. At this time, the Federal government acquired the lock from the Port of New Orleans. Since its construction, the IHNC, from the Mississippi River to the MR-GO, has been an integral part of and a vital link in the Gulf Intracoastal Waterway.

The Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana. The currently authorized project provides for a 55- by 750-foot channel from the Gulf of Mexico to Baton Rouge, Louisiana. The State of Louisiana requested phased construction. Phase I provides for a 45- by 750-foot channel from the Gulf to mile 181 above head of passes (AHP), near Donaldsonville, Louisiana and was completed in December 1988. Phase 2 consists of extending the 45-foot deep channel to Baton Rouge, Louisiana. Construction of Phase 2 was completed in December 1994. Further deepening will depend on future detailed studies.

Mississippi River Outlets, Venice, Louisiana. These outlets provide for a channel to -14 feet (MLG) over a bottom width of 150 feet between the Mississippi River at about mile 12 and Baptiste Collette Bayou on the east side and Grand-Tigre Passes on the west side. Jettied entrance channels to -16 feet (MLG) over a bottom width of 250 feet are also authorized.

Waterborne Commerce. Historically, the Port of New Orleans has been an important center of trade in the United States. As a result of its central location on the Gulf of Mexico and its access to other ports on the 14,500 mile arterial network of inland waterways, the Port of New Orleans serves as a major distribution center for waterborne commerce traffic. New Orleans is an entry and exit port for all types of cargo in foreign trade, especially in grain exports and petroleum imports. Records from the Waterborne Commerce Statistics Center (WCSC) show that from 1987-1989, the Port of New Orleans was the number one port in the United States in tonnage. The Port of Baton Rouge has consistently placed in the top ten by this same measure. With the 1990 redefinition of Lower Mississippi River port limits for ranking purposes, the Port of New Orleans has dropped to number six in foreign tonnage (1991). However, the newly defined ports of South Louisiana and Plaquemine have achieved the rankings of one and eight, respectively, with Baton Rouge retaining its top ten status at number five. The Mississippi River/MR-GO system has retained its status as the heaviest U.S. concentration of foreign traffic into the 1990's.

Shallow Draft. Recent historical traffic statistics at the Inner Harbor Navigational Canal are contained in Table 2 which summarizes the Inner Harbor Navigational Canal shallow draft activity for the years 1984 through 1993. From the statistics

shown, shallow draft tonnage has fallen in recent years. The reduction in traffic may be largely attributable to the elimination of shell dredging in Lake Pontchartrain. The wide fluctuation in average delays is not fully explained by changing traffic levels. Other influences include lock processing times caused by the differences in stages between the Mississippi River and the IHNC, arrival times, and chamber packing.

Table 2
Summary of Shallow Draft Activity
IHNC Lock
(1984-1993)

Year	Total Traffic (1,000 tons)	Total Number of Tows	Average Delay Per Tow (Hours)
1993	23,337	9,196	14.6
1992	23,530	10,601	6.3
1991	23,926	9,658	12.3
1990	23,412	9,891	16.2
1989	25,856	10,850	11.6
1988	27,128	11,123	11.9
1987	26,325	11,724	9.2
1986	26,608	11,733	15.8
1985	24,007	12,799	8.5
1984	22,193	12,381	8.3

Source: Lock Performance Monitoring System (LPMS)

Shallow-draft transportation is an alternative for freight that is too heavy or bulky to be shipped economically by other modes. Each year approximately 100,000 barges move in and out of the Port of New Orleans from the network of arterial inland waterways.

Table 3 gives a breakdown of the total traffic through the IHNC lock by commodity groups and direction of traffic.

Table 3
Commodity Distribution of 1989 IHNC Lock Traffic

	Total IHNC Traffic (TONS)	% of Total Traffic	North/East Traffic (TONS)	% of NE Traffic	West/East Traffic (TONS)	% of WE Traffic
Farm Products	498,998	1.9	480,667	2.8	18,331	0.2
Metallic Ores and Prod.	1,383,955	5.4	1,237,311	7.2	146,644	1.7
Coal	7,438,121	29.0	7,438,121	43.2	0	0.0
Crude Petroleum	3,460,396	13.5	976,610	5.7	2,483,787	29.4
Nonmetallic Minerals	1,443,020	5.6	869,682	5.1	573,338	6.8
Forest Products & Pulp	160,901	0.6	159,883	0.9	1,018	0.0
Industrial Chemicals	1,598,829	6.2	1,040,767	6.1	558,063	6.6
Agricultural Chemicals	542,787	2.1	501,034	2.9	41,753	0.5
Petroleum Products	7,500,241	29.2	3,359,578	19.5	4,140,663	49.0
All Others	1,619,197	6.3	1,134,456	6.6	484,741	5.7
TOTAL	25,646,445	100	17,198,109	100	8,448,338	100.0

Approximately 67 % of the total traffic that moved through the IHNC lock in 1989 consisted of movements with an origin or destination north (the Mississippi River at New Orleans and all waterway points above) and east of the lock, dominated by coal and, to a lesser extent, petroleum products. The remaining 33 % of the traffic had an origin and destination east and west of the lock, comprised mostly of petroleum products, crude petroleum, industrial chemicals, and non-metallic minerals. Tables 4 and 5 show the IHNC lock tonnage by origin region and destination region. The two largest origin regions are the GIWW east (West of Mobile) and the Ohio River and Tributaries, with approximately 36% and 29% of the total traffic, respectively. Principal commodities that make up the bulk of traffic volume are petroleum and petroleum products on the GIWW East and coal on the Ohio River system. From a destination perspective, the two GIWW East regions, GIWW East (West of Mobile) and GIWW East (East of Mobile), are the largest regions and represent 33 % and 29 %, respectively, of total traffic. Crude petroleum, coal, and petroleum products represent the bulk of GIWW East (West of Mobile) destinations, while coal and, to a lesser extent, petroleum products dominate the commodities destined for the GIWW East (East of Mobile).

Table 4
Tonnage by Origin Region

Origin Region	Tons	% of Total
Upper Mississippi	502,395	2.0
Lower Mississippi	2,733,893	10.7
Ohio River & Tributaries	7,508,291	29.3
GIWW West (LA Section)	3,733,228	14.6
GIWW West (TX Section)	1,462,799	5.7
GIWW East (West of Mobile)	9,158,369	35.7
GIWW East (Mobile & East)	547,470	2.1
Total	25,646,445	100.0

Table 5
Tonnage by Destination Region

Destination Region	Traffic (tons)	% of Total Traffic
Upper Mississippi	626,788	2.4
Lower Mississippi	4,621,126	18.0
Ohio River & Tributaries	1,333,857	5.2
GIWW West (LA Section)	1,720,377	6.7
GIWW West (TX Section)	1,403,729	5.5
GIWW East (West of Mobile)	8,535,936	33.3
GIWW East (Mobile & East)	7,404,632	28.9
Total	25,646,445	100.0

More detailed information by commodity group and origin and destination regions is included in Appendix C (Volume 7, Economic Analysis).

GIWW system-wide commodity patterns (percentages) are shown for each lock in Table 6. Commodity group percentages for individual locks generally reflect the percentages of their respective segments. The importance of the GIWW system to the petrochemical industries (crude petroleum and petroleum products) of Louisiana and Texas is evident.

Table 6
Commodity Group Percentages by Lock - 1989

Group	Port Allen	Bayou Sorrel	IHNC	Algiers	Harvey	Bayou Boeuf	Calcasieu	Leland Bowman
Farm Products	1.6	1.6	1.9	2.0	9.2	3.9	2.1	2.5
Metallic Ores	6.6	6.1	5.5	0.8	7.5	3.4	4.7	4.7
Coal	0.1	0.0	28.5	0.0	0.0	0.0	0.0	0.0
Crude Petroleum	3.3	3.6	13.3	28.0	12.7	19.3	10.4	6.7
Non-metal Minerals	19.4	18.0	5.6	9.4	9.3	3.8	3.0	3.1
Forest Products	0.1	0.1	0.6	0.0	0.2	0.1	0.1	0.1
Ind. Chemicals	33.0	33.7	6.6	8.3	9.8	9.5	25.2	25.8
Agri Chemicals	2.7	2.8	2.1	2.4	0.8	2.1	1.8	2.9
Petroleum Products	32.6	33.4	29.5	46.5	48.4	50.2	51.5	53.0
All Other	0.6	0.6	6.3	2.6	2.2	7.9	1.2	1.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Waterborne Commerce of the United States

Table 7 below displays a matrix of common traffic flows among locks in the GIWW system expressed as a percent of each lock's total traffic volume.

Table 7
Common Traffic Flows Between Locks - 1989

	Percent of Traffic that Uses							
Lock	Port Allen	Bayou Sorrel	IHNC	Algiers	Harvey	Bayou Boeuf	Calcasieu	Leland Bowman
Port Allen	100.0	97.1	0.3	0.0	0.0	1.5	78.1	78.6
Bayou Sorrel	99.2	100.0	0.4	0.2	0.1	1.8	80.1	80.6
IHNC	0.4	0.4	100.0	24.3	8.1	27.1	23.3	24.6
Algiers	0.0	0.2	28.5	100.0	0.0	74.2	58.8	63.5
Harvey	0.0	0.3	31.4	0.0	100.0	90.7	74.3	79.3
Bayou Boeuf	1.5	1.7	26.0	60.1	22.3	100.0	69.3	74.5
Calcasieu	46.9	47.0	13.6	29.1	11.2	42.4	100.0	100.0
Leland Bowman	44.8	45.0	13.6	29.9	11.3	43.3	96.7	100.0
Total System	32.2	31.5	31.3	26.6	8.1	32.8	54.6	56.4

Deep Draft. During the 1970's, traffic along the Mississippi River and MR-GO experienced tremendous growth, due mainly to the large increase in oil imports and grain exports. However, since then, there has not been any significant growth. Table 8 displays Mississippi River foreign import/export tonnage by commodity group for the years 1990 and 1991. As indicated, the majority of imports (65% in 1990) is comprised of crude petroleum, while the majority of exports (75% in 1990) consists of farm products.

Table 8
Mississippi River Foreign (Import/Export) Tonnage (1990-1991)
By Commodity Group

	1990		1991	
	Imports	Exports	Imports	Exports
Farm Products	1,298,261	79,198,723	1,758,789	78,715,549
Metallic Ores & Products	10,895,916	1,704,685	9,842,140	1,450,320
Coal	0	12,873,855	23,732	15,486,216
Crude Petroleum	41,088,500	0	37,051,980	0
Nonmetallic Minerals	1,088,714	99,315	1,398,146	125,275
Forest Products & Pulp	358,880	1,032,163	371,354	1,071,538
Industrial Chemicals	521,457	2,834,247	549,241	2,674,211
Agricultural Chemicals	1,390,045	1,997,635	1,455,330	2,020,324
Petroleum Products	6,138,247	5,897,868	7,079,352	8,016,913
All Other	191,743	237,589	143,963	167,662
Total	62,971,763	105,876,080	59,674,027	109,728,008

Source: Waterborne Commerce of the United States

Table 9 shows the total tonnage (foreign and coastwise) by year on the Mississippi River.

Table 9
Mississippi River Deep Draft Tonnage (1974 - 1992)

	Foreign			Coastwise			Total
Year	Imports	Exports	Total	Receipts	Shipments	Total	Deep Draft
1992	63,036,000	112,249,000	175,285,000	11,581,000	20,764,000	32,345,000	207,630,000
1991	60,139,000	109,936,000	170,075,000	9,797,000	21,259,000	31,056,000	201,131,000
1990	63,160,000	106,042,000	169,202,000	10,465,000	22,032,000	32,497,000	201,699,000
1989	59,889,679	103,972,049	163,861,728	10,384,467	20,666,767	31,051,234	194,912,962
1988	45,325,616	97,464,079	142,789,695	13,971,968	21,826,430	35,798,398	178,588,093
1987	38,087,066	93,688,556	131,775,622	17,853,348	19,549,195	37,402,543	169,178,165
1986	35,138,022	81,084,796	116,222,818	19,039,077	18,211,912	37,250,989	153,473,807
1985	27,040,313	81,009,372	108,049,685	21,737,400	19,215,546	40,952,946	149,002,631
1984	34,167,226	85,894,311	120,061,537	19,921,173	16,828,915	36,750,088	156,811,625
1983	32,320,125	95,763,623	128,083,748	18,256,055	20,844,285	39,100,340	167,184,088
1982	56,708,090	100,756,368	157,464,458	14,629,231	20,034,834	34,664,065	192,128,523
1981	80,094,423	98,269,761	178,364,184	21,553,015	23,189,745	44,742,760	223,106,944
1980	90,772,105	86,290,660	177,062,765	17,768,198	23,811,964	41,580,162	218,642,927
1979	105,858,988	73,255,062	179,114,050	12,780,791	20,274,910	33,055,701	212,169,751
1978	98,540,849	67,286,151	165,827,000	14,332,003	17,404,538	31,736,541	197,563,541
1977	96,028,423	59,628,562	155,656,985	9,789,919	19,836,015	29,625,934	185,282,919
1976	67,027,258	59,869,890	126,897,148	8,588,222	17,370,125	25,958,347	152,855,495
1975	45,934,905	47,615,390	93,550,295	8,670,706	21,104,606	29,775,312	123,325,607
1974	37,329,279	47,089,746	84,419,025	7,624,355	20,711,578	28,335,933	112,754,958

Source: Waterborne Commerce of the United States

Table 10 provides foreign import/export tonnage by commodity group for the MR-GO.

Table 10
MR-GO Foreign Deep Draft Tonnage
By Commodity Group

	1990		1991	
	Imports	Exports	Imports	Exports
Farm Products	202,877	97,840	172,096	326,891
Metallic Ores & Products	670,495	119,039	634,869	120,836
Coal	0	22	0	23
Crude Petroleum	0	0	0	0
Nonmetallic Minerals	1,226,495	55,328	999,306	35,756
Forest Products & Pulp	36,348	109,495	36,903	193,969
Industrial Chemicals	90,818	478,860	104,632	440,990
Agricultural Chemicals	185,449	93,097	103,646	114,853
Petroleum Products	29,776	121,580	18,797	123,715
All Others	69,237	145,775	68,585	128,513
Total	2,511,495	1,221,036	2,138,834	1,485,546

Source: United States Bureau of Census.

The MR-GO is a critical component of the port because it provides access to the Port of New Orleans' primary container facilities. The MR-GO handles in excess of 90 % of all container traffic moving through the port. The volume of container traffic has increased in recent years to the extent that New Orleans ranked as the 14th largest U.S. container port in 1990 and second largest on the gulf coast (behind Houston, Texas) in foreign container box volume.

There are deep-draft channels on either side of the IHNC lock; the Mississippi River and the MR-GO. The 45-foot Mississippi River channel is the primary route to New Orleans and points upstream. The MR-GO, with a 36-foot channel, provides a second access route to New Orleans. The port facilities served by each channel, while not completely isolated from each other, represent geographically distinct areas. The areas remain distinct because of the limited deep-draft traffic interchange. The sole route connecting the two areas requires use of the IHNC lock which is too restrictive for the vast majority of the calling fleet.

The major determinant of lock usage, as reported from field interviews with port industry representatives, is the need for a ship to be serviced by cargo handling facilities in both areas of the port (tidewater and river). In other words, if a ship can fit through the lock and requires service from both riverfront and tidewater facilities, the vessel will use the lock. While the number of deep draft vessels using the IHNC lock has remained relatively stable or declined over the past decade, this does not indicate that lock demand by deep-draft vessels has diminished. Unlike tows, ships are unable to reconfigure to fit into a lock. Interviews with port industry representatives and pilots indicate that ships that are too large to traverse the existing IHNC lock, voyage or "loop" from their points of cargo discharge down the access channel to their points of cargo loading. Thus, lock use by deep-draft vessels faces physical as well as economic

considerations. Since, historically, ship dimensions have increased, the decrease in lock usage by deep-draft vessels may be partially due to physical constraints rather than economic decisions. Table 11 shows the deep draft vessel distribution.

Table 11
Deep-Draft Vessel Type Distribution
(Based on 40% sample of pilot's reports -1992)

Vessel Type	Percent of Total	
	Mississippi River	MR-GO
Container	1.0	54.5
Tanker	29.4	1.5
General Cargo	12.8	23.7
Bulk Carrier	56.8	20.3
TOTAL	100.0	100.0

Table 12 shows the estimated maximum deadweight tonnage (DWT) for length, width and draft dimensions by vessel category. Given the 75-foot width of the existing lock, the maximum vessel sizes that can use the IHNC are general cargo ships of about 18,000 DWT, dry bulkers of 20,000 DWT, and container ships of about 13,000 DWT.

Table 12
Estimated Maximum DWT for Length, Width, and Draft Dimensions by Vessel Category

Ship Dimensions	DWT (Rounded to the nearest 1,000 DWT)		
	Bulk Carriers	General Cargo	Container
Length(ft)			
640	38,000	31,000	23,000
900	124,000	93,000	55,000
1,200	W.F.	W.F.	W.F.
Width (ft)			
75	20,000	18,000	13,000
90	36,000	34,000	23,000
110	68,000	W.F.	46,000
Draft (ft)			
22	13,000	8,000	12,000
36	91,000	69,000	87, 000

Notes: W.F. = Largest vessel of world fleet.
Largest vessel calculations for the draft dimension assume five feet underkeel clearance and a light loaded vessel..

In general, for both the Mississippi River and the MR-GO, the number of ships in the smaller deadweight classes have decreased in recent years, whereas the number of ships in the higher deadweight class have increased. The Economics Appendix (Appendix D) provides additional information on deep-draft traffic and the limited number and sizes of deep-draft vessels using the IHNC lock.

General cargo ships represent the majority of ship traffic using the IHNC lock. Container vessels and tankers are absent from current usage. Deep draft vessels transiting the lock are concentrated in the extreme low end of the overall vessel size distribution for both the Mississippi River and MR-GO.

The history of lock usage by deep draft vessels has shown a marked decline over time; from 923 ship lockages in 1959 to 138 in 1991. Table 13 shows a summary of deep-draft usage (both tonnage and number of ships) from 1983 to 1991. Over this period, deep-draft vessels have averaged 171 lockages and 137,000 tons per year.

Table 13
IHNC Lock- Deep Draft Traffic Summary
(1983-1991)

Year	Deep Draft Tonnage (1,000)	Number of Ships
1991	134	138
1990	105	163
1989	76	131
1988	175	168
1987	259	192
1986	152	195
1985	157	192
1984	101	163
1983	75	195

Source: Lockmaster Logs, New Orleans District, US Army Corps of Engineers

Navigation Problems. Shoaling in the Mississippi River and Southwest Pass, as a result of sedimentation during periods of high flow, is an extensive and continuing problem. Heavy fog, particularly during winter and early spring, often restricts navigation on the river and on the MR-GO and occasionally halts all activity for extended periods. A number of bridges also cross the GIWW/MR-GO, the Mississippi River, and their connecting link, the IHNC. Clearances of these bridges are presented in Table 14.

Table 14
Bridges Crossing Channels In Project Area

Location	Type	Clearances (feet) Vertical Average Annual High Water	Stage	Horizontal
GIWW/MR-GO:				
Paris Rd. (LA 47)	Fixed	135[1]		500
MISSISSIPPI RIVER:				
Crescent City Connection (Mile 96)	Fixed	155.8	163.8	750
Huey P. Long (mile 106)	Fixed	138.0	146.8	750
IHNC:[2]				
Florida Avenue[3]	Bascule	Unlimited		91
Claiborne Avenue	Vert. Lift	156[1]		305
St. Claude Avenue	Bascule	Unlimited		75

[1]- Clearance above mean high water

[2]- Reach of canal connecting MR-GO and the Mississippi River.

[3]- Will be replaced with a mid- or high-rise vehicular bridge and a vertical lift span rail bridge.

The existing Florida Avenue Bridge carries two railroad tracks and two single lane roadways across the IHNC. Due to the obstructive character of the bridge, the U.S. Coast Guard, on July 30, 1992, issued an Order to Alter under the provisions of PL 79-647 as amended (33 USC 511-523), commonly referred to as the Truman-Hobbs Act. The Port of New Orleans, with authorization of the Coast Guard, engaged a consultant to prepare plans and specifications for the bridge alterations. A recommended bridge replacement scheme has been proposed by the Port, primarily for rail service. Construction of the replacement bridge is scheduled to begin 1997.

The bridges on the IHNC must be operated in concert with the lock operations. During peak vehicular traffic hours in the morning and afternoon, a curfew is in effect on lock operations to allow commuter traffic to flow freely. The IHNC lock, with dimensions of 75- x 640- x 31.5-feet, limits the size of ships traveling between the river and the MR-GO. General cargo ships of about 18,000 DWT, dry bulk ships of about 20,000 DWT, and container ships of about 13,000 DWT are the largest, by category, that can safely use the existing lock. Likewise, the size and configuration of tows are also limited. The IHNC lock has long been considered to be dimensionally obsolete. Congestion at the lock is high primarily as a result of barge traffic moving between the Mississippi River and the GIWW. The lack of lay areas with appropriate mooring facilities, while waiting to lock through the IHNC, creates a less than desirable situation for tow boat operators.

Vehicular Transportation. There are 54 common carrier truck lines, in addition to dozens of drayage, heavy hauler, and refrigerated truck lines serving New Orleans. Easy access to Interstate Highway 10 (east-west) and direct connection to Interstates 55 and 59 (north-south) in the metropolitan area facilitate the movement of goods and traffic in the area. As shown in Table 15, three bridge crossings are located in the reach of the IHNC between the Mississippi River and the intersection with the GIWW/MR-GO. These include a low-level bridge at St. Claude Avenue, a mid-level bridge at Claiborne Avenue, and a low-level bridge at Florida Avenue. The existing traffic breaks down 35, 51, and 14 percent for St. Claude, Claiborne, and Florida, respectively. The IHNC bridge crossings provide access between St. Bernard Parish and the portion of the City of New Orleans bounded by the Mississippi River, the IHNC and MR-GO with the City of New Orleans upriver of the IHNC. Alternative routes, which cross the IHNC located north of the MR-GO/IHNC intersection, add 20 or more miles one-way to the trip. Alternate routes are not considered desirable under normal circumstances. As a result, most vehicles will incur considerable delay before diverting to an alternate route. US Coast Guard Regulations and Louisiana Revised Statutes 38:24 require the Board of Commissioners of the Port of New Orleans to keep the St. Claude and Claiborne Avenue bridges at the Intracoastal Canal open to vehicular traffic crossing the bridge at the following times: 7:00 o'clock to 8:30 o'clock A.M. and from 5:00 o'clock to 6:30 o'clock P.M. Monday through Friday of each week. These requirements are inapplicable in the event of emergency.

Rail Transportation. New Orleans is served by six major rail lines including the Illinois Central Gulf, CSX Transportation, the Kansas City Southern, Norfolk Southern Corp., Union Pacific, and Southern Pacific Railway. In addition, the Public Belt Railroad is the switching carrier serving all of the mainline railroads in the Port of New Orleans. Each day it moves rail cars to the port wharves along the Mississippi River as well as the maritime terminals on the IHNC. Since American railroads are divided into eastern and western railroads, the presence of both kinds provides a unique advantage for shippers. The Norfolk Southern Railway crosses the IHNC at Florida Avenue and provides the only rail service to St. Bernard Parish and the east bank of Plaquemines Parish. At present, approximately one train crosses the IHNC at Florida Avenue every day.

FUTURE CONDITIONS (WITHOUT-PROJECT)

The without-project condition serves as a baseline against which alternative improvements are evaluated.

If no Federal action is taken, and the existing lock is not replaced or an additional lock is not constructed, the lock will

require extraordinary maintenance or possibly a major rehabilitation to maintain the same level of service, as it has been in operation since 1923. The lock has long been considered dimensionally inadequate and obsolete. Operating at top efficiency, barges will continue to experience the 10-15 hour average delays to lock through. Should traffic increase, delays would likewise increase. This makes it unable to safely pass existing traffic and efficiently accommodate any future traffic growth. The physical condition of the lock structure and machinery is such that, given the high rate of utilization, the need for rehabilitation is long overdue. A total collapse of the facility would put a halt to almost all of the traffic moving through the area to or from the east. A faltering navigation system, or vital link in the system, can fatally undermine our national objective - economic development which results in employment opportunities.

Given the current state of affairs, it is assumed that the proposed new Florida Avenue bridges will be built by the State and the Port and placed into service prior to initiation of construction of the Federal lock replacement project. It is also assumed that the existing lock will be maintained and rehabilitated to continue to operate at its current level of service. It is further assumed that all existing waterway projects or those under construction would be in place and will continue to be operated and maintained.

Development and Economy. Current trends in development and the economy are generally expected to continue into the future. In recent years, the primary growth industry in the area has been the convention and tourism industry. This is expected to continue. The development of riverboat gambling in Louisiana has resulted in 15 gambling boat licenses being issued by the State. Most of these are outside of the New Orleans metropolitan area. A land-based casino is currently being planned in New Orleans. In the case of the IHNC, the economic downturn of the 1980s in the general area caused several businesses to go out of business along the IHNC. It is assumed that these businesses will not reestablish themselves. However, new development at A-MID over the next twenty years, when fully implemented, will create an increase in total direct spending of an estimated $724.6 million in the area/economy. Once A-MID is fully developed, the annual additional revenue that is estimated to be generated will produce about $61.8 million for state and local governments. The Port's Report on the Tidewater Port cites a comprehensive study of southeast Louisiana by the Fantus Company which determined that marine electronics and pharmaceuticals are ideally suited for location in the New Orleans area. The Port's Port Improvement Program (1990-1995) included over $50 million in capital funding for the Tidewater area.

Population and Employment. Population in the New Orleans metropolitan area is expected to grow. However,

population in Orleans parish will continue to decline. In St. Bernard, population will continue to grow at about the same rate as it has in the last decade. Employment conditions are expected to improve in both Orleans and St. Bernard.

Climate. There are no dramatic changes expected to occur in climatic conditions in the future. Relative sea level rise (which results primarily from land subsidence, from other geologic activity, and possibly from global sea level rise) must be considered relative to design, construction, and operation of a navigation project. The long term rate of subsidence in the area is approximately 0.48 feet per century.

Biological Resources. No significant changes are expected in the tidal wetlands of the study area. Like most of Louisiana's coastal wetlands, the wetlands of the study area are being lost to open water, mainly because of subsidence from the compaction of underlying sediments, the lack of freshwater and sediment input from rivers, and erosional forces. A slow, gradual deterioration of the remaining marsh, swamp, and scrub/shrub habitats is predicted. Populations of fish and wildlife resources dependent upon these tidal wetlands will also likely experience a gradual decline. Undeveloped forested tracts within the leveed and drained part of St. Bernard Parish will continue to be lost, mainly to residential development.

At the IHNC, the natural environment has given way to urban/suburban development. There are no significant tracts of undeveloped land that have not already been modified.

Cultural Resources. The area has already been impacted by a number of historic developments that have destroyed cultural resources. These trends are expected to continue into the foreseeable future. Eventually, the St. Claude Avenue Bridge will either require extensive rehabilitation or be replaced by a new bridge. Historic structures in the Holy Cross and Bywater Historic Districts will continue to deteriorate or to be modernized. While the New Orleans Historic District Landmarks Commission will prevent some modifications, continued changes will be inevitable.

Hazardous, Toxic, and Radioactive Wastes (HTRW). It can be assumed that in the future, more stringent environmental protection legislation may require cleanup of materials not currently classified as HTRW.

Existing Navigation Projects. It is assumed that operation and maintenance of the GIWW system will continue through the period of analysis to ensure continued navigability. In the

event the IHNC lock is not replaced, it will require extraordinary maintenance so that it will continue to provide the current level of service. It is also assumed that the MR-GO will likewise be maintained for the period of analysis. All existing waterway projects, or those under construction, are to be considered in place and will be operated and maintained through the period of analysis. Locks on the GIWW system are assumed to be using the most efficient locking policies. Waterway user taxes will continue in the form of the towboat fuel tax prescribed by the WRDA of 1986 (PL 99-662). Baptiste Collette Bayou, one of the distributary passes of the Mississippi River, is not considered a viable long-term alternative to use of the IHNC lock. The primary problem, beyond the added distance, is unpredictable weather conditions on the open channel across Breton Sound, particularly during winter months. The potential for quickly developing bad weather is compounded by the fact that the decision to commit to Baptiste Collette must be made 10 to 12 hours before actual exposure to the open channel. In addition, higher insurance premiums may be required from shippers on shipments routed via Baptiste Collette. Users have indicated that they would prefer facing delays at the IHNC rather than the uncertainties of Baptiste Collette. In addition, the American Waterway Operators have taken the position that Baptiste Collette should not be considered as a viable alternative to the IHNC Lock.

Waterborne Commerce. Unconstrained waterborne commerce is expected to grow at a medium growth rate described in Volume 7, Economic Analysis. This represents what is considered to be the most probable future scenario.

Vessel Traffic. In the absence of a project, the IHNC lock will remain an impediment to navigation. Significant growth in traffic will be constrained by the IHNC lock. As traffic increases, the lock will become an even greater constraint to navigation traffic.

Navigation Problems. There is a limit on the physical capacity of the existing lock, and in the absence of a project to improve navigation through the IHNC, current problems and conditions and delays are expected to continue and worsen over time. The outlook would be that the existing lock would be rehabilitated and continue to provide the same level of service that currently exists. During the five-year phased rehabilitation, nine intermittent closures of about 30-days each will be required. The existing navigation curfew during peak vehicular traffic hours (7:00 o'clock to 8:30 o'clock A. M. and from 5:00 o'clock to 6:30 o'clock P.M.) would remain in effect.

Vehicular Traffic. The future condition has generally the same configuration as currently exists with the exception of Florida Avenue. At Florida, the existing bridge, which includes both vehicular and rail, will be replaced by two bridges. The rail bridge will be replaced with a new vertical-lift span bridge with 300 feet of horizontal clearance. The State of Louisiana (Department of Transportation and Development) is currently planning to construct a new 4-lane, high rise vehicular bridge with 300 feet of horizontal clearance. The Regional Planning Commission for Jefferson, Orleans, St. Bernard, and St. Tammany Parishes (RPC) has estimated the future use patterns of the new high-level Florida Avenue crossing, as well as the other crossings. The RPC maintains a set of travel demand models for use in maintenance of the region's Long Range Transportation Plan. The travel demand models use socioeconomic information which suggests the number and nature of trips generated in the traffic corridor. Limited growth of existing traffic volumes is forecast, based on modest population growth projections and small changes in related variables, such as employment. Their estimate was accomplished considering socioeconomic variables as well as the structural changes to the roadways currently being planned. By the year 2000, traffic is expected to shift to 33, 45, and 22 per cent on St. Claude, Claiborne, and Florida Avenues, respectively. The majority of the increase on Florida Avenue appears to be due to trips formerly located on Claiborne Avenue which will be assured of uninterrupted transit over the IHNC on the new high-rise Florida Avenue bridge. However, the poor access and single-lane feeder streets will continue to constrain potential Florida Avenue traffic. The state law requiring the Board of Commissioners of the Port of New Orleans to open to vehicular traffic the St. Claude and Claiborne Avenue bridges during peak vehicular traffic in the morning and evening, Monday through Friday of each week, is expected to remain in effect in the future.

Rail Traffic. Rail traffic will generally be the same as under existing conditions. The only exception is that there could be an increase in traffic crossing the Florida Avenue railroad bridge as development takes place in St. Bernard Parish. Any increase in industrial and port development could serve as the catalyst for increases in rail traffic.

PROBLEMS AND OPPORTUNITIES.

The existing navigation problems at the IHNC are associated with delays to present traffic, the limited capacity of the existing lock to handle anticipated growth, and the physical condition of the lock structure. In considering the needs of navigation, attention has also been given to minimizing the

environmental and social impacts to ensure that communities adjacent to the project remain as complete, livable neighborhoods during and after construction of the project.

There is a limitation on physical capacity, and future vessels and tows will continue to experience delays. The basic problem addressed in this study is that of replacing the existing dimensionally inadequate lock at the IHNC. A new lock connecting the two port areas (river and tidewater) is considered by many to be essential for future development of the port. At the same time, a new, larger lock is critical to more efficient movement of shallow-draft traffic on the GIWW system and deep-draft traffic between the river and tidewater port areas. The situation is complicated by the three bridges crossing the canal that serve vehicular traffic. The bridges are located at St. Claude Avenue, Claiborne Avenue, and Florida Avenue. During peak vehicular traffic periods in the morning and afternoon, a curfew is in effect for navigation traffic which limits the number of lockages per day. Due to its urban setting, the lock replacement project has the potential to serve as the catalyst for facilitating improvements to the infrastructure of the neighborhoods adjacent to the IHNC, to improve the surface transportation network in the area, to provide much needed jobs, and to improve the social well-being of area residents.

PLANNING CONSTRAINTS.

Legislative and executive authorities have specified the range of impacts to be assessed and have set forth the planning constraints and criteria which must be applied when evaluating alternative plans. Plans must be developed with due regard to the benefits and costs, both tangible and intangible, as well as associated effects on the environment and the social and economic well-being of the region. Federal participation in developments should also assure that any plan is complete within itself, efficient and safe, economically feasible, environmentally acceptable, and consistent with local, regional, and state plans. In view of the obvious need for a connection between the river and tidewater ports coupled with the need for a more efficient connecting link for shallow draft traffic, this study was geared toward selecting the plan which best accommodates those needs based on current and projected traffic. The recommended plan should be acceptable to the waterway users (both shallow and deep-draft) as they will eventually pay a substantial portion of the costs.

Since the existing lock is in a highly congested area, replacement at the IHNC is difficult. Innovative engineering and construction techniques were examined and developed to identify feasible options at this location. Feasibility in this case includes consideration of environmental/social impacts, including impacts to neighborhoods.

Community participation, as directed by the Congressional guidance contained in both the US House and US Senate Appropriation Committee Reports, in conjunction with the FY 91 budget and coordination with elected officials and various stakeholders, were integral parts of our planning process.

Minimizing relocations and disruption, while enhancing the social well-being of local residents and minimizing degradation of existing neighborhoods, also constitute constraints. The historical significance of the Holy Cross and Bywater neighborhoods, coupled with the significance of the existing lock and bridges also serve as factors considered in planning a replacement lock. Construction of replacement bridges at Florida Avenue, currently being designed by the State of Louisiana and Port of New Orleans, represents the future without-project condition.

FORMULATION PRINCIPLES

The Guidance for Conducting Civil Works Planning Studies (ER 1105-2-100) requires the systematic development of alternative plans which contribute to the Federal objective. Alternatives should be formulated in consideration of four criteria: completeness, effectiveness, efficiency, and acceptability.

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

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

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

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.

In general, when formulating alternative plans, an effort is made to include only increments that increase the net NED benefits.

ALTERNATIVE PLANS

Alternative plans for addressing the navigation needs in the study area were limited to measures for improving the efficiency of commerce projected to move through the Port of New Orleans; specifically, traffic projected to have a need for a connection between the Lower Mississippi River and the GIWW, east of the Mississippi or the MR-GO. Existing navigation depths of 12 feet and 36 feet for the GIWW and MR-GO, respectively, were assumed over the project life. The Mississippi River channel is currently 45-feet deep to Baton Rouge. A project depth of 55-feet was authorized but will probably not be constructed until some time in the future when economic conditions and traffic warrant the deeper channel.

Given the constraints of the current and projected channel sizes, structural alternatives were developed ranging from maintaining the existing lock capacity to increasing lock capacity to accommodate the larger vessels and/or volumes of traffic which might reasonably be assumed to make use of a lock connecting the Lower Mississippi River with the GIWW and MR-GO. The minimum lock capacity considered was governed by the size of the existing lock. However, consideration was given to the construction of a shallower lock with a sill depth less than the existing lock, solely for the purpose of providing additional barge capacity.

Preliminary Plans Considered

Fourteen plans for a new lock and connecting channels located at 7 sites were studied in conjunction with the preparation of the Site Selection Report dated March 1975. These included the Bohemia Site, Scarsdale Site, Caernarvon Site, Upper and Lower Sites (near Violet), Saxonholm Site, IHNC-center channel, IHNC east of center channel, and combinations of the above. These sites are shown in Plate 2. These sites were compared and ranked independently by the Corps and the Port of New Orleans. The criteria by which the alternatives were ranked included cost, construction difficulty, navigation benefits, navigation adequacy, local economics, relocations, social impacts, ecological impacts, operation and maintenance difficulties, and public sentiment. Two sites, the IHNC East of Galvez Street wharf and the lower site at Violet, were compared in detail in the 1975 Site Selection Report by the New Orleans District. The Site Selection Report recommended construction of a new lock at the lower site near Violet.

Subsequent to the submission and approval of the site selection report, President Carter in his message to Congress in April 1977, concerning the Fiscal year 1978 budget, recommended that:

> "The project should be modified to eliminate consideration of the new channel location. Further study should be carried out to determine whether repair or replacement is needed of the existing lock at the existing site.

If replacement and expansions are deemed necessary, special care should be taken to minimize dislocation and disruption of residents near the site."

In 1982, the New Orleans District prepared a preliminary draft evaluation report that compared 28 plans at both Violet and the IHNC locations (Plate 3). These plans included lock extensions, lock replacements, adjacent barge locks, and adjacent ship locks. At Violet, barge and ship locks were also evaluated. Lock widths evaluated varied from 75 to 150 feet, depths from 22 feet to 40 feet, and lengths of 640 feet, 900 feet, and 1200 feet. In addition, congestion fees (a non-structural measure), alone and in conjunction with structural plans, were also considered. The tentatively selected plan identified at that time was a lock 40 feet deep by 110 feet wide by 1200 feet long, located adjacent to and 400 feet east of the existing lock. The report was never finalized or released to the public.

In response to the WRDA of 1986 (PL 99-662) which specifically directed the Corps to evaluate the Violet and IHNC sites, the Corps initiated studies to reevaluate the Violet and IHNC sites in FY 1987. In March of 1990 at a meeting of the Inland Waterway Users Board held in New Orleans, the District announced their intention to recommend elimination of Violet from further consideration. In January of 1991, the New Orleans District submitted a report which provided the rationale for eliminating the Violet site from further consideration and requested approval of limiting further detailed studies of a replacement lock to the IHNC site and abandoning consideration of the Violet site. In late June 1991, HQUSACE concurred in conducting no further detailed studies of the Violet site.

In May 1989, the New Orleans District also evaluated the continued maintenance of the MR-GO as a deep-draft waterway. While the MR-GO does not represent the primary route to the Port of New Orleans in terms of draft provided or tonnage handled, it is a critical component of the port in that it provides access to the port's primary container facilities. In fact, the MR-GO handles in excess of 90 % of all container traffic moving through the port. The volume of container traffic through New Orleans has increased in recent years to the extent that New Orleans, traditionally a bulk and breakbulk oriented port, in 1990 ranked as the 14th largest U.S. port and second largest on the gulf coast (behind Houston, Texas) in foreign container box volume. The importance of the MR-GO channel to the port is also indicated by the fact that the MR-GO handles approximately 35 % of the port's breakbulk general cargo tonnage.

The analysis identified relocation of the MR-GO container facilities to the Mississippi River and traffic diversion to other ports as the two most likely responses to MR-GO closure. While identifying only a portion of the costs that would be required to relocate container operations to the Mississippi River, those costs were greater than the cost of continued project maintenance which included a then-projected 41 % increase in existing maintenance costs by the year 2002. The result was a benefit-cost ratio of 1.4 for continued maintenance. The traffic diversion alternative quantified only the change in vessel line-haul costs.

These additional costs also exceeded the cost of projected channel maintenance. The benefit-cost ratio of continued channel maintenance for this scenario was 1.6. The average annual costs of these two alternatives ranged from $13.4 to $15.1 million.

The port facilities served by the MR-GO and Mississippi River (main channel), while not completely isolated from each other, represent geographically distinct areas. The areas remain distinct because of limited deep-draft traffic interchange. The sole route connecting the two areas requires use of the IHNC lock, which is too restrictive to the vast majority of the calling fleet. Therefore, for most deep-draft vessels, the selection of one of these two channels determines which port facilities can be accessed. Discontinuing the maintenance of the MR-GO and eventual closure to deep draft traffic, as suggested by some environmental groups, would not in any way address the problems of the IHNC lock and its use as an integral component of the inland waterway system. If anything, closure of the MR-GO would worsen the navigation problems of the IHNC to the extent that closing the channel results in induced deep-draft use of the IHNC lock. Historically, the majority of traffic through the IHNC lock has been shallow draft.

Screening of Sites - IHNC and Violet

Information presented in this section reflects the best available information at the time the screening of the two sites occurred (1991).

IHNC site. The IHNC site would utilize an existing waterway and provide a more efficient navigable connection between the lower Mississippi River and the GIWW and MR-GO. The general location of the site is shown on Plate 3. We evaluated a plan 400 feet east of the existing lock.

Construction of any plan at the IHNC site would involve two basic tasks: construction of the lock complex and construction of bridge relocations, which would be timed to minimize social and vehicular disruptions.

The plan would include construction of two bridge relocations across the IHNC and consist of four-lane semi-high level bridge replacements at St. Claude Avenue and Claiborne Avenue.

The total construction time for the bridge relocations and lock complex would take approximately 9 years.

Excavation of the new lock and connecting channels would require disposal of 5,200,000 cubic yards of material, most of which would be used to create wetland habitat in areas where marsh has deteriorated or been replaced by open water.

National Economic Development Impacts. The first cost (October 1990) of the IHNC shallow-draft lock plan with a new lock 400 feet east of the existing lock is estimated at $363.6 million. The total annual cost is estimated at $53.4 million, including approximately $51.0 million for interest and amortization of the

initial investment and $2.4 million for operation and maintenance. A deep draft lock plan would cost $415.4 million. The total annual cost is estimated at $59.2 million, including $56.5 million for interest and amortization of the initial investment and $2.7 million for O&M costs. The costs of eliminating the operation and maintenance of the existing lock is treated as a benefit. Annual costs for the shallow draft only alternative included $1.1 million representing the loss of deep draft services. The national economic development (NED) costs do not include the cost of social mitigation.

The benefits attributable to plans at this site are estimated to average $74.9 million for shallow-draft and $75.8 million for deep-draft traffic. These benefits result from savings in transportation by providing a more efficient connection between the lower Mississippi River, the GIWW and the MR-GO; from savings to the existing project as a result of eliminating the need for future rehabilitation and O&M of the existing lock. The average annual net benefits are estimated at $21.5 million for shallow draft and $16.6 million for deep-draft. The ratio of average annual benefits to average annual costs is 1.4 to 1 for shallow draft and 1.3 to 1 for deep-draft.

Environmental Impacts. The following paragraphs discuss impacts for various environmental components.

Biological resources. The impacts upon aquatic values would be limited to the affected waterways and related project-induced changes in water quality; these impacts are expected to be slight. Overall negative impacts upon biological resources would be minor, and positive impacts from wetlands creation with dredged materials would be significant. Several hundred acres of wetland habitat would be created east of the IHNC in an open water area. The plan would require disposal of 5.2 million cubic years of material and have greater releases of lock water than the existing lock.

Cultural Resources. Any plan at this site would impact the Holy Cross and Bywater Historic Districts which are listed in the National Register of Historic Places. In addition, the existing IHNC lock has been determined to be eligible for the National Register of Historic Places. Coordination with the Advisory Council on Historic Preservation and the State Historic Preservation Officer will be required. Execution of a memorandum of agreement with these agencies will be required to identify what mitigating measures will be incorporated into our plan.

Recreation Resources. Project-related increases in traffic may cause potential congestion patterns between commercial and recreation vessels in the MR-GO. Heavier wake activity may impact smaller recreational boats and the existing shoreline from which some occasional bank fishing might occur.

Social Impacts. Plans at the IHNC site have the potential for stimulating a healthier regional economy which would result in improved community facilities and greater social bonds. During lock and bridge construction, high noise levels near the lock site and disruption of vehicular traffic would adversely affect the well-being of some residents in the area. In addition, response

times for services (fire, police, and emergency medical) would be impacted. In the long term, the adjacent plan would cause the relocation of approximately 620 people in 223 residential units and 93 structures, about 150 job displacements, and take about 9 years to actually construct. Several neighborhood businesses (groceries, salons, restaurants, repair shops, etc.) employing about 160 people would also be impacted.

Regional Development. This plan has potential for stimulating regional development and growth.

The Violet Site. A lock at Violet could provide a navigable connection between the lower Mississippi River and the GIWW and MR-GO. The general location of the Violet site is shown on Plate 3. The plan's features would consist of a new lock, a new connecting channel between the new lock and the MR-GO with paralleling hurricane protection levees, a new eased barge channel at the junction of the MR-GO and the GIWW, and a navigable floodgate at Violet Canal.

Conventional construction would be used within an earthen cofferdam. When the lock construction is complete, the flood protection tie-ins would be connected to the levees outside of the cofferdam and guidewalls constructed. The lock would then be ready for operation after demolishing the cofferdam and using that material for backfill, as required.

During the project construction period a four-lane high-rise bridge would be constructed at Judge Perez Drive and a two-lane high rise bridge would be constructed at River Road (St. Bernard Highway) as part of the project. These bridges would be required to maintain the existing transportation routes which also serve as hurricane evacuation routes. In addition, a low-level vertical lift span railroad bridge across the tailbay would be included.

The total construction period for the lock is estimated to require 9 years and is expected to result in minor residential and business relocations. In addition, the Millaudon Middle School would require relocation.

Excavation for the new channels and levees would be accomplished primarily by bucket dredging. The project would require about 27,350,000 cubic yards of excavation. About 15,000,000 cubic yards of excavated material would be used for backfill in constructing the required hurricane protection levees and for tying in to the mainline Mississippi River levees.

National Economic Development Impacts. The first cost of the Violet shallow-draft lock plan is estimated at $384.2 million (October 1990 prices). The total annual cost is estimated at $51.4 million, including $47.0 million for interest and amortization of the initial investment and $2.34 million for O&M. The first cost of a deep-draft plan is estimated at $420.5 million, and the total annual cost is estimated at $55.3 million, including $50.6 million for interest and amortization of the initial investment and $2.7 million for O&M. Annual costs include $2.0 million for mitigation of environmental losses. Also

included in interest and amortization costs for the shallow draft-only alternative is $1.2 million representing the loss of deep draft service. The NED costs do not include the cost of social impact mitigation.

The average annual benefits attributable to the Violet shallow-draft plan are estimated at $58.5 million and $59.8 million for a deep-draft plan. These benefits result from savings in transportation by providing a more efficient connection between the lower Mississippi River, the GIWW, and the MR-GO; from savings in improved vehicular crossings by eliminating IHNC bridge openings; and from savings to the existing project as a result of eliminating the need for future rehabilitation and O&M of the existing lock. For shallow-draft, the ratio of average annual net benefits to average annual costs is estimated to be 1.1 to 1. For deep-draft, the average annual net benefits are $4.5 million, and the ratio of average benefits to average annual costs is estimated to be 1.1 to 1.

Environmental Impacts. The following paragraphs discuss impacts for various environmental components.

Biological Resources. Project impacts on biological resources related to increased lock water releases and increased vessel traffic would be similar to those of the IHNC plan.

Project construction would require the excavation of about 27,350,000 cubic yards of dredged material and 350,000 cubic yards associated with easing the barge channel at the junction of the MR-GO and GIWW to facilitate traffic. Construction of the lock tailbay channel would impact six scenic streams included in the Louisiana Scenic Streams system. Permits to impact these streams would require an act of the state legislature. Lock construction would also render the Violet siphon ineffective. This structure was built to enhance wetlands near Violet by diverting nutrient-rich freshwater from the Mississippi River into area marshes. Replacement of the Violet siphon flows would be difficult and expensive to accomplish due to the location of the lock. Estimated cost of replacement is $2,750,000.

Lock construction at Violet would cause direct loss of 550 acres of brackish marsh, 240 acres of bottomland hardwood forest, 220 acres of scrub/shrub wetlands, and 160 acres of MR-GO disposal area. An additional 600 acres of wetland habitat would be impacted during construction (temporary construction easement) of the tailbay levees.

Construction of the eased barge channel would cause direct loss of 110 acres of marsh and an indirect loss of an additional 243 acres of bottomland hardwood forest and scrub/shrub wetlands.

Numerous mitigation measures were considered to compensate for impacts to marsh, bottomland hardwood forest, and scrub/shrub wetlands. Efforts were made to develop mitigation plans located entirely within St. Bernard Parish so that they would be more acceptable; however, this was impracticable. The least costly plan for marsh and scrub/shrub wetland mitigation is construction of a stone dike in Lakes Pontchartrain and Borgne to protect the eroding shoreline. Grass seeding would be done as sediment builds

up behind the dikes. Mitigation for bottomland hardwood forest would involve purchase and reforestation of pasture lands in nearby Plaquemines Parish. This mitigation plan would not totally replace habitat values or areas of wetlands eliminated by the Violet site plan. Total estimated cost of the mitigation plan is $10,000,000.

Overall, the net impacts of this plan upon biological resources would be significantly adverse.

Cultural Resources. The plan at Violet would not impact any known cultural resources presently listed in the National Register of Historic Places.

Recreational Resources. Marsh losses due to project construction would result in a minor loss of potential recreational use. A loss of aesthetic value and negative impacts to six state designated natural and scenic streams would also occur.

Social Impacts. The Millaudon Middle School, with about 500 students and 45 employees, would require relocation. In addition, port related and maintenance facilities with about 100 employees would have to be relocated. Four residences would have to be relocated, and about 50 residences would experience reduced access. An automated oil pipeline facility would also have to be relocated.

Regional Development Impacts. The regional development impacts of lock plans at this site have potential for stimulating regional development and growth.

Based on our analysis, we concluded that a new lock is needed between the Mississippi river and the MR-GO/GIWW. The residents of St. Bernard are unalterably opposed to a new lock and connecting channel being located at Violet. The old Police Jury and currently the Parish Council, the governing authority of St. Bernard Parish, is unequivocally opposed to construction of a new lock and connecting channel project at Violet because it would bisect the parish and cause major adverse environmental impacts. Any plan at Violet would result in the destruction of large areas of wetlands, making Violet an unacceptable site for a new lock project.

Comparison of Sites. On the basis of preliminary costs, a site at Violet is more expensive, and a site adjacent to the existing IHNC lock is more attractive. From the standpoint of operational efficiency and intraport movement, the advantages of the IHNC site are considerable. In addition, environmental impacts for any new lock and connecting channel project at Violet are significant and adverse. Loss of wetlands, particularly in Louisiana, is a very sensitive issue. The sensitivity is evidenced by the passage of the Wetlands Conservation and Restoration Fund by the voters of Louisiana on October 7, 1989, and the state's participation in studies to seek solutions to the coastal problems.

Public Law 91-190, the National Environmental Policy Act (NEPA), declared that it was Federal policy to use all practicable

means "to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans."

Executive Order (EO) 11990, Protection of Wetlands, directs the Corps to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands in carrying out civil works activities. The key requirement of the Executive Order is determining whether a practicable alternative to locating an action in wetlands exists. This requires the identification and evaluation of alternatives that could be located outside of wetlands (alternate sites; other means that would accomplish the same purpose[s] as the proposed action [alternative actions], and no action). If there is no practicable alternative to locating an action in wetlands, the EO requires that the action include all practicable measures to minimize harm to wetlands and preserve and enhance the natural and beneficial values. Provision for Corps compliance with this EO is incorporated in standing Corps planning guidance, as part of the specific and general environmental considerations required.

Representatives of the Louisiana Department of Natural Resources have indicated that they could not conceive of a possible project design that could be constructed at the Violet site in a manner that could be consistent with the Louisiana Coastal Zone management program. In addition, the Corps would have to comply with the state laws regarding scenic streams under the Louisiana Scenic Streams program. All of these factors would make selection of any plan at Violet very difficult to implement. We concluded that, if private interests were applying for a permit for such a project that impacts wetlands as we would propose at the Violet site, the New Orleans District Engineer would not issue such a permit because there is a practicable alternative that does not impact wetlands. In testimony before a Congressional hearing on September 12, 1990, the ASA's Deputy for Planning Policy and Legislature Affairs stated the Department of the Army's policy. "We apply the same decision criteria to the Army Civil Works projects as we do on whether to grant permits for non-Corps activities."

In March 1990, the Inland Waterway Users Board met at New Orleans. At the Board's request, we presented a status briefing on the project. During the briefing we stated that "in order to comply with the President's stated policy of no net loss" relative to projects in wetlands, construction of a new lock and connecting channels project at Violet would require extensive mitigation to replace the type and quality of habitat. In addition to the adverse impact on wetlands, a Violet site has always encountered strong opposition from local elected officials and local citizen groups in St. Bernard Parish.

In conforming with Executive Order 11990, in keeping with the Federal policy of "no net loss" of wetlands, and in responding to the spirit of guidance and policy letters issued by the Chief of Engineers concerning the environment, the New Orleans District, in January of 1991, recommended that the Violet site be eliminated

from further consideration for a replacement lock. The New Orleans District concluded that any plan at the Violet site is environmentally unacceptable, even though a lock is engineeringly and economically feasible. In June 1991, HQUSACE concurred in the District's recommendation to conduct no further studies of the Violet site.

Screening of Sites at the IHNC

In 1992, subsequent to dropping the Violet site from further consideration, the New Orleans District evaluated preliminary plans at the IHNC. Eight preliminary alternative plans were then developed for a replacement lock in the vicinity of the existing IHNC Lock. These plans are comprised of various combinations of sites, construction techniques, and bridge replacement scenarios. The evaluation and comparison of the plans is limited to trade-offs between NED effects and social impacts. The impacts of any of the alternative plans on the natural environment are similar and insignificant. The preliminary plans are described below with the locations shown on Plates 4 through 7.

- Plan 1 - 200-Foot East of Existing Lock-Conventional Construction, with mid-level replacement bridges at St. Claude and Claiborne Avenues.
- Plan 2 - 200-Foot East of Existing Lock- Float-In Construction, with mid-level replacement bridges at St. Claude and Claiborne Avenues.
- Plan 3 - 200-Foot West of Existing Lock-Conventional Construction, with mid-level replacement bridges at St. Claude and Claiborne Avenues.
- Plan 4 - In situ Replacement-Relieved Deck Construction, with mid- level replacement bridge at St. Claude and the existing Claiborne Avenue Bridge.
- Plan 5 - North of Claiborne Avenue Location-Float-In Construction, with mid-level replacement bridge at St. Claude and the existing Claiborne Avenue Bridge.
- Plan 7 - North of Claiborne Avenue Location-Float-In Construction, with low-level replacement bridge at St. Claude and a mid-level replacement bridge at Claiborne Avenue .
- Plan 8 - North of Claiborne Avenue Location-Conventional Construction, with low level replacement bridge at St. Claude and existing Claiborne Avenue Bridge.

The four sites represent the full range of technically feasible locations. The 200-Foot East plans generate the highest benefits but also generate the most severe social impacts. The 200-Foot West plan, the In Situ plan, and the North of Claiborne Avenue plans were developed in response to the concerns of local residents and elected officials over the extensive social impacts to the neighborhoods in the vicinity of the IHNC Lock.

A significant amount of the social impacts (e.g., relocations, bisection of neighborhoods with bridge approaches, construction disruptions) are caused by the construction of the

bridge replacements required for some of the lock plans. One of the significant advantages of the In-Situ plan and the North of Claiborne Avenue plans is that they can be aligned to preclude the replacement of the Claiborne Avenue Bridge. With those plans, the St. Claude Avenue Bridge would also be replaced in-situ and not relocated to the east or west as with the 200-Foot East and 200-Foot West plans.

The technique used for the construction of the lock also has a significant effect on the cost and social impacts of some of the alternative plans. The New Orleans District identified a float-in method of construction as the least-cost construction option at the North of Claiborne Avenue site and the only construction method capable of taking full advantage of the mitigation potential of the North of Claiborne Avenue site. The float-in method of construction involves a prefabricated lock constructed off-site, floated in, in two pieces (730 feet long and 180 feet wide), mated, and sunk into place by ballasting with concrete. The lock would be sunk onto a pile foundation driven below the waterline using pile followers. The construction excavation would be dredged to the required elevation; therefore, no dewatering would be required.

Other variations of these seven plans were considered and dismissed. During the site evaluation process, the planning team considered the possibility of a hybrid plan which matches a 200-Foot East alignment with the community-preferred low-rise replacement bridge at St. Claude Avenue. The planning team quickly discovered that the reduction of social impacts attributable to a low-rise replacement bridge is not the same for the 200-Foot East alignment as it is for the North of Claiborne Avenue alignment. The shift of the new bridge opening centerline 200 feet east of the existing centerline would alone require real estate acquisitions and shift the noise contours further into the residential areas, effects not encountered with a replacement bridge consistent with the existing centerline. Furthermore, the necessity to replace the Claiborne Avenue Bridge would remain. The planning team also recognized that a 200-Foot East plan featuring a low-rise replacement bridge at St. Claude Avenue would require that the bridge deck be located adjacent to the new lock chamber. In this case, the new bridge would simply replicate current levels of bridge interference to navigation and reduce project benefits in this category. In contrast, a low-rise replacement bridge associated with a North of Claiborne Avenue alignment would not cause this type of interference since the approach point for waiting tows would be located at a point between the low-level bridge and the lock chamber.

A summary of the economic analysis of the plans is presented in Table 15.

Table 15

IHNC Lock Replacement Study
Site Optimization
900' x 110' x 22' Replacement Locks
1991 Price Levels, 8.5 Percent
($1,000)

Item	1 200 Ft East Conv Const Mid St. Claude Mid Claiborne	2 200 Ft East Steel Float-In Mid St Claude Mid Claiborne	3 200 Ft East Conv Const Mid St Claude Mid Claiborne	4 In-Situ Relieved Deck Mid St Claude Existing Claib.	5 N of Claiborne Steel Float-in Mid St Claude Existing Claib.	6 N of Claiborne Steel Float-In Low St Claude Existing Claib.	7 N of Claiborne Steel Float-In Low St Claude Mid Claiborne	8 N. of Claiborne Conv Constr Low St Claude Existing Claib.
Benefits (Capitalized Annual Values)								
Shallow Draft	1,419,104	1,419,104	1,419,756	1,401,104	1,419,104	1,419,104	1,419,104	1,434,761
Vehicular	44,643	44,643	44,643	44,296	37,704	(26,601)	(19,661)	(26,863)
Total Benefits	1,463,747	1,463,747	1,463,747	1,466,052	1,456,808	1,392,503	1,399,443	1,407,898
Costs								
Lock Construction	227,457	237,873	223,933	162,628	293,499	293,499	293,499	329.678
Right -of -Way	15,447	13,425	88,607	72,335	74,568	72,372	74,442	77,060
Bridges	124,677	124,677	130,603	47,580	49,411	10,915	57,375	10,915
Relocations	20,660	20,661	31,190	31,320	21,060	21,059	21,060	27,059
Mitigation								
Socio-Economic	46,057	46,057	46,531	38,489	34,823	7,022	31,464	7,022
Subtotal-Const	434,298	442,693	520,924	352,352	473,361	404,867	477,840	451,734
Industry Losses-Closure	5,500	5,500	5,500	148,500	33,000	33,000	33,000	33,000
Total Cost	439,798	448,193	526,424	500,852	506,361	437,867	510,840	484,734
Interest During Construction	169,876	175,704	231,155	139,218	187,870	182,261	183,569	241,345
Interest Costs on Closure	2,122	2,122	975	41,598	3,807	5,212	5,212	6,187
Interest Cost on Mitigation	44,119	44,106	42,913	37,625	32,385	5,273	30,412	6,318
Total Present Value Costs	655,915	670,125	801,467	719,293	730,423	630,613	730,033	738,584
(Base Year)	2007	2007	2007	2007	2007	2007	2007	2008
Net Benefits								
Present Value Net Benefits	807,832	793,622	662,280	726,759	726,385	761,890	669,410	669,314
Present Value Net Benefits								
To Common Base Year (2007)	807,832	793,622	662,280	788,534	726,385	761,890	669,410	616,880

The benefit and cost estimates displayed in Table 15 represent a partial updating of a feasibility scope economic analysis that was completed immediately prior to the initiation of the open planning process, a process that recognizes and addresses concerns of stakeholders. Elements of the analysis that were updated included the traffic base (from 1985-1989), transportation rates, price level, discount rate, and project base year. Mitigation costs used in the initial screening are based on initial estimates developed by a contractor, subsequently refined by the Corps.

A single chamber size, 900 feet long by 110 feet wide by 22 feet deep, was selected as the basis for site screening in order to limit the scope of the screening process. This size was selected because it was determined to be the NED optimized chamber size in the earlier feasibility analysis. It is not expected that the ranking of sites on the basis of net benefits would be affected by the chamber size selected for the comparison. The conventional, cast-in-place construction method design was based on engineering judgment and experience from similar projects. The float-in design was prepared in substantial part by EBASCO Services Incorporated. EBASCO designed the Sidney A. Murray Hydroelectric Power Station which was successfully floated in and installed at the Old River complex in Louisiana.

In the screening of the IHNC plans, we eliminated Plan 3, the 200-Foot West plan, and Plan 4, the In Situ plan, by comparing them to the 200-Foot East plans. Plan 3 (the 200-Foot West plan) was eliminated because, when compared to the 200-Foot East plans, it had lower net economic benefits and more severe social impacts. Plan 4 (the In Situ plan) also had lower net economic benefits than the 200-Foot East plans and was unacceptable to navigation interests. The In Situ plan would result in a shut-down of this reach of the IHNC/GIWW for approximately 2.5 years. Such a shut-down would severely disrupt shallow-draft navigation as well as impact deep-draft navigation that might normally use the lock. The plan also had lower net benefits than some other plans.

Plan 2 (the 200-Foot East - Float-In Construction plan) was eliminated because net benefits were less than Plan 1 (the 200-Foot East-Conventional Construction plan).

Of the North of Claiborne Avenue plans (Plans 5, 6, 7 and 8), Plan 6 was determined to be the environmentally preferable plan and also yielded the greatest net benefits.

Plans Considered in More Detail. Two of the preliminary plans for the replacement of the IHNC Lock (plans 1 and 6) were selected for further analysis. The navigation features of these plans are described below. The costs of the plans, the magnitude of social impacts, and the mitigation costs of the plans are determined by site of the lock, the bridge relocations required to accommodate the lock site, and the construction techniques utilized. An economic comparison of the plans, the social impacts

of the plans, and the mitigation measures developed for the plans are described in subsequent sections of this report.

- 200-Foot East: conventional construction, pile foundation; lock centerline is 200 feet east of existing lock centerline; mid-level, vertical lift replacement bridges at Claiborne Avenue and at St. Claude Avenue which includes two access loops on the west side; all pile driving requires a hydraulic hammer.

- North of Claiborne Avenue: float-in construction within the existing canal, prepared soil foundation; lock centerline is directly aligned with existing lock centerline; raised lift-span towers for the existing Claiborne Avenue bridge, low-level replacement bridge at St. Claude Avenue which does not include any access loops; all pile driving requires a hydraulic hammer; double by-pass channel around the construction site on the east side of the canal to provide navigation usage during construction.

Float-in construction is the more cost effective method for the North of Claiborne site. This method of construction avoids costs associated with a massive sheet pile cofferdam, additional levees and floodwalls, additional rights-of-way and residential relocations, additional social mitigation, and additional costs to accommodate navigation during the longer construction period that would be required for conventional construction methods. Additionally, the conventional construction would incur higher interest costs during construction due to the longer period of construction.

In addition to being the least cost construction technique at the North of Claiborne site, the float-in method of construction has significant mitigation-related advantages over the conventional cast-in-place construction for the IHNC sites. The major structural features would be constructed at off-site fabrication facilities resulting in less on-site construction activities and less noise in the local neighborhoods. The remaining on-site construction would be performed from a floating plant, reducing construction traffic through the neighborhoods. Additionally, the need for cellular cofferdams encircling the construction site would be eliminated resulting in significantly reduced pile driving requirements.

Finally, regardless of a particular construction option, a navigation bypass channel in conjunction with the North of Claiborne site is necessary to avoid shutting down a vital link in the GIWW for 5-6 years of construction. Float-in construction affords ample room in the vicinity of the IHNC to construct a navigation bypass channel without necessitating residential relocations. On the other hand, construction of a bypass channel around the cofferdam associated with conventional construction would necessitate relocation of the IHNC levees and floodwalls and consequent residential relocations.

Economic Comparison. A summary of benefit and cost data for the plans considered in more detail is presented in Table 16. Selection of the 200-Foot East

Table 16
IHNC Lock Replacement Study
Site Optimization
900′ x 110′ x 22′ Replacement Locks
1991 Price Levels, 8.5 Percent
($1,000)

Item	Plan 1 200-Ft. East Conv. Const. Mid-St. Claude Mid-Claiborne	Plan 6 N. of Claiborne Float-In Low St. Claude Existing
Claiborne		
Benefits (capitalized annual values)		
Shallow Draft	$1,419,104	$1,419,104
Vehicular	44,643	(26,201)
Total Benefits	$1,463,747	$1,392,503
Costs		
Lock Construction	227,457	293,499
Rights-of-Way	15,447	72,372
Bridges	124,677	10,915
Relocations	20,660	21,059
Mitigation		
Socio-Economic	46,057	7,022
Subtotal Construction	$434,298	$ 404,867
Industry Losses - Closure	5,500	7,022
Total Cost	$439,798	$ 437,867
Interest Costs During Construction	169,876	182,261
Interest Costs on Closure	2,122	5,212
Interest Costs on Mitigation	44,119	5,273
Total Present Value Costs	$655,915	$ 630,613
Net Benefits		
Present Value Net benefits (Rounded) (Base Year: 2007)	$807,800	$ 761,900

alternative for the final array was based on conventional NED criteria. This plan produced the highest apparent net benefits of the eight plans. The North of Claiborne alternative was selected because the significant reduction in community impacts realized qualifies it as the environmentally preferable plan. Furthermore, it is the only plan which enjoys any support from the neighborhoods, local elected officials, or the local sponsor.

The support of virtually all stakeholders -- to include navigation interests -- for the North of Claiborne plan is worth examining. Their support stems from a conclusion that the local opposition is so overwhelming that it would preclude building the 200-Foot East plan. Therefore, none of the benefits would accrue. Of the $46 million difference in net benefits, $31 million are attributed to costs sustained by navigation interests from the difference in IHNC closure durations of the two plans. The maritime industry's acceptance of this difference in closure costs stems from their view that no plan as destructive of politically powerful non-beneficiaries as is the 200-Foot East plan will ever be built. Thirty years of the project's history tend to support this view.

An additional $71 million of the difference between the two plans results from vehicular benefits forgone in the North of Claiborne Avenue plan. The vehicular benefits attributed to the 200-Foot East plan derive from the extensive bridge replacements that are elements of that plan. These benefits accrue largely to beneficiaries in the local metropolitan area.

In summary, given lower construction costs, all net benefits foregone by the North of Claiborne Avenue site are borne by stakeholders in the maritime industry or local metropolitan area. Representatives of each group prefer the North of Claiborne Avenue site: maritime interests because they believe the 200-Foot East plan is not implementable; local metropolitan interests because they perceive the negative social impacts of the 200-Foot East plan to outweigh the incremental vehicular benefits.

Socioeconomic Impacts of Plans. Careful and comprehensive measurement of social and economic impacts is rarely more important to the plan formulation process than in the case of the IHNC lock replacement study. Public Law 91-190, the National Environmental Policy Act of 1969 (NEPA), requires that all impacts to the human environment be presented in the environmental impact statement (EIS). In traditional Corps of Engineers projects, all significant impacts are usually confined to natural environmental components. The IHNC Lock is an exception. Most of the alternatives proposed at the existing location are massively disruptive of a crowded urban district which includes no project beneficiaries. A number of attempts have been made over the life of this study to engage the local residents in a process whereby impacts to the neighborhood could be mitigated, or otherwise reduced, to an acceptable level. As part of this effort, the New Orleans District (NOD) separately contracted with a local planning firm (Gregory C. Rigamer and Associates, Inc.) with experience in analyzing project impacts of similar scale. This firm assessed the full range of socio-economic impacts and proposed mitigation measures which could form the basis for negotiation. The contractor concluded that project impacts are sufficiently diverse and severe that full mitigation is not possible. The NOD has used the intermediate product of this process, i.e., the September 1991 Socio-Economic Impact Analysis and Mitigation Plan (SIA), to

develop independently a preliminary set of mitigation measures which are linked to construction impacts and which would most likely have been included in a broader, negotiated mitigation plan.

In the course of the Rigamer study, the contractor concluded that the four neighborhoods comprising the IHNC site were already highly stressed from a combination of factors. This is manifested in declining population and property values, a depressed housing market, crime, high vacancy rates, and high unemployment. He further concluded that the lengthy construction period and the nature and severity of the impacts would so exacerbate the area's decline as to undermine the viability of the neighborhoods. The initial objective of the Rigamer proposal was, therefore, aimed at stabilizing the neighborhoods with an extensive program of pre-construction measures which, taken together with lesser direct mitigation measures taken during construction, would enable the community to withstand project impacts. Recognizing that neither this plan, nor any other plan, can fully compensate the community, the contractor also recommended that we revisit the feasibility of a previously investigated site in the IHNC north of the Claiborne Avenue bridge. This location eliminates all residential relocations and most of the noise impacts, and it is compatible with minimal bridge modifications. These represent the most severe of the project impacts. Subsequent analysis confirmed the technical implementability of the North of Claiborne plan.

The following sections will compare the most basic and harmful of major impacts associated with the two sites and is not intended to either review the broader range of impacts, as the 1991 SIA did, or to substitute for a detailed environmental impact analysis which appears in the evaluation report/environmental impact statement.

Table 17 compares the impacts of each alternative in terms of a few critical variables. These variables are classified into three major impact categories where the most onerous of project impacts can be readily summarized: displacement, noise, and transportation effects.

This table should be viewed with the following in mind:

1) The source of the data for the 200-Foot East alternative was the aforementioned SIA. Comparable estimates for the North of Claiborne Avenue alternative were subsequently compiled in-house.

2) Some pile driving for lock and bridges under the 200-Foot East plan occurs simultaneously and has been accounted for.

3) Pile driving noise is measured using the Day-Night Sound Level (Ldn) model which averages noise levels detectable at a specific distance from the noise source within a standard interval of time.

Table 17

Inner Harbor Navigation Canal Lock Replacement
Social Impact Analysis
Comparative Impact of Construction Alternatives

	200-Foot East: Conventional Construction				North of Claiborne Avenue Float-In			
	Lock	Mid-Level St. Claude Bridge	Mid Level Claiborne Bridge	Total	Lock	Low-Level St. Claude Bridge	Existing Claiborne Bridge	Total
Displacement Effects:								
Population	231	24	57	312	0	0	0	0
Housing Units	102	18	25	145	0	0	0	0
Public Facilities	2	3	0	5	1	0	0	1
Businesses and Industries	6	4	3	13	6	0	0	6
Employees	85	29	21	135	85	0	0	85
City Sales Taxes ($000)/Yr.	250	78	58	386	250	0	0	250
Traffic Disruption								
Months of Closure		54	7	-	6	35	0	
Noise Effects:								
Months of Pile Driving	52	18	15	85	24	9	0	33
Noise-Affected Population:								
Within 75 Ldn of Construction "Unacceptable" Levels	0	850	521	1371	0	27	0	
Between 65 Ldn and 75 Ldn of Construction "Normally Unacceptable" Levels	1380	2560*	2392*	6332	689	759	0	1448
Total Population	1380	3410	2913	7703	689	786	0	1475
(Person-Months)	(71,760)	(61,380)	(43,695)	(176,835)	(16,536)	(7,074)	0	(23,610)
Noise-Affected Housing Units:								
Within 75 Ldn of Construction "Unacceptable" Levels	0	410	220	630	0	11		
Between 65 Ldn and 75 Ldn of Construction "Normally Unacceptable" Levels	595	1572*	1126*	3293	286	315	0	601
Total Housing Units	595	1982	1346	3923	286	326	0	612

*Some residents and housing units, already exposed to noise from lock construction, are counted again for their exposure to noise generated by bridge construction

The Ldn classifications are as follows: "75 Ldn" refers to a region which falls within 350 feet of the noise source for lock construction and within 240 feet of noise source for between 350 and 1280 feet of the noise source for lock construction and between 240 and 845 feet of the noise source for bridge construction. The terms "unacceptable" and "normally unacceptable" are associated, respectively, with each noise region, refer to the level of severity of noise, and were intended by the Department of Housing and Urban Development (HUD) to serve as criteria for deciding whether an area was sufficiently distant from particularly noisy facilities, such as airports, highways, and railroad yards, to qualify for federal urban development assistance.

4) In order to focus on impacts to the local community, the various effects of either alternative on the U.S. Coast Guard Station have been omitted.

The displacement, noise, and transportation effects of the detailed plans are discussed in the following paragraphs.

Displacement Effects Displacement effects refer to the consequences which follow from the acquisition of real property required for project construction. The rights-of-way requirements under the 200-Foot East plan result in the acquisition of 145 residential properties and the displacement of 312 people. Although owners would be compensated for the fair market value of their property to the fullest extent permissible under the terms of Uniform Relocations Assistance and Real Property Acquisition Policies Act of 1970, PL 91-646, as amended, not all residents who desire to relocate within the immediate neighborhood will be able to find suitable housing. Furthermore, the two neighborhoods most adversely affected under the 200-Foot East plan are also the most settled, a quality which is consistent with their historical character and not replaceable in-kind. In contrast, the rights-of-way associated with the North of Claiborne Avenue alternative completely avoid the requirement for the acquisition of residential property.

Noise Effects Of all major impacts, pile driving and associated construction noise are the most intrusive. For this reason, noise effects were quantified in terms of the number of months a resident is exposed to noise created by pile driving activities. Under the 200-Foot East plan, pile driving associated with bridge piers and approach ramps occur at the same time as pile driving for the lock foundation and so a number of residents will be doubly affected. Therefore, noise effects were measured in terms of the number of "person-months" of pile driving. By this measure, the lock and bridge configuration representing the North of Claiborne Avenue alternative reduces the community's exposure to noise by 86 %, from 177,000 person-months to 24,000 person-months. This reduction is attributable to five construction features:

1) the lock construction site is farther removed from residential areas,
2) the duration of pile driving for lock construction is greatly reduced,
3) the low-rise replacement bridge at St. Claude Avenue requires less construction time than a mid-rise bridge,
4) the replacement bridge at St. Claude Avenue does not include replacement bridge ramps or the addition of bridge loops, and
5) the Claiborne Avenue Bridge is not replaced.

Furthermore, since those individuals who reside within 75 Ldn of construction are exposed to more intense noise than those who reside between 65 and 75 Ldn of construction, the noise reduction benefits associated with the North of Claiborne Avenue plan is correspondingly understated.

Transportation Effects The effects associated with bridge closures are the most pervasive and most difficult to quantify. Under the 200-Foot East plan, the St. Claude Avenue Bridge would be closed for 4.5 years and the Claiborne Avenue Bridge would be closed for 7 months. Closure of the St. Claude Avenue Bridge would deny direct pedestrian access to either side of the IHNC and a mid-rise replacement bridge would not restore to the 750 daily pedestrians their current level of access. Under the North of Claiborne Avenue plan, the St. Claude Avenue Bridge would be closed nearly 3 years.

The prospect of an extended closure of the St. Claude Avenue Bridge could be very damaging to those businesses located on St. Claude Avenue in the vicinity of the IHNC -- businesses which depend upon trans-canal traffic. Although the severity of impacts will vary from business to business, overall, one can expect that the commercial value and economic viability of these businesses will be diminished. Closure of the St. Claude Avenue Bridge would also require that bridge traffic detour through connecting neighborhood streets to Claiborne and Florida Avenues. Detouring traffic would introduce substantial vehicular noise and congestion into residential areas currently separated from main thoroughfares. Similar kinds of impacts will occur upon closure of the Claiborne Avenue Bridge under the 200-Foot East plan, although they will be of shorter duration.

The general impacts described correspond to a reconnaissance-scope detour plan which was developed as input for the 1991 SIA. In this plan, certain neighborhood streets were simply identified as likely detour routes and, as such, constitute a worst-case scenario. On a fundamental level, the plan included no accommodations for re-routing public transit and access requirements of emergency vehicles. The current detour plan also lacks the detail necessary to determine the volumes and pattern in which local and commuter traffic will redistribute once a larger Florida Avenue Bridge is constructed (by the State of Louisiana separate from this project) and the St. Claude Avenue Bridge is closed. The nature of this redistribution is a function of the set of traffic control features adopted in the final plan. Prior

to project construction, a feasibility-scope traffic engineering study will be required to analyze current and future traffic volumes and types, to determine future vehicular requirements, to balance safety and efficiency objectives and, finally, to plan the redistribution of traffic during construction. The transportation network emanating from this study and, thus, the severity of associated impacts to the neighborhoods will be largely determined by the presence of one or more newly constructed access road linking Florida Avenue to main arteries beyond the affected neighborhoods. It is possible that construction of access roads as permanent components of the transportation network may permanently change traffic patterns in such a way that adverse impacts to the community are considerably reduced. Thus, the degree to which traffic-related impacts are overstated will depend upon the results of the forthcoming traffic engineering study.

Without the benefit of detailed studies, however, it is clear that the North of Claiborne Avenue plan is significantly less disruptive of circulation patterns in that only one crossing, St. Claude Avenue, is involved and closure time is reduced by over one and a half years, or 35 %.

Mitigation Features of Plans Considered. Since full mitigation for most of the impacts is not possible, the question of proper incremental analysis arises. The objective of marginal analysis in mitigation planning is normally to determine the level of mitigation at which the benefit of the last proposed increment just equals its marginal cost. In practice, mitigation planning within the Corps of Engineers is almost exclusively confined to the natural resource arena. In the case of social mitigation, however, analysis and mitigation of impacts over the entire range of community resources covered in Section 122 of the River and Harbor Act of 1970 (Public Law 91-611) do not enjoy the benefit of a common measure such as the Habitat Unit used to scale fish and wildlife mitigation features. Nor is the cumulative and interactive nature of multiple impacts well addressed by judgmental scaling one resource at a time. Once all measures for "in-kind" mitigation are exhausted, residual impacts can only be offset by "out-of-kind" mitigation. The plan objective becomes identification of a set of actions which replace one array of community resources with another array sufficient to restore to the community an equal level of satisfaction. Support for this approach was contained in instructions in the FY-91 Appropriations Act and in prior guidance.

The scope of appropriate mitigation activities suggested in Section 122 and the extent of measures considered to date by the district are extremely broad. It has been proposed that the plan be separated into "normal" and "extraordinary" features, at least for purposes of cost allocation. As discussed above, however, we believe that a mutually agreeable mitigation plan is likely to result from a negotiation process in which "out-of-kind" mitigation and over-mitigation in certain areas are required. Therefore the distinction between "normal" and "extraordinary" mitigation is blurred, if relevant at all.

The mitigation actions which follow do not constitute either a specific proposal or a commitment by the Corps of Engineers to implement any of them, in whole or in part. A final project mitigation package will only result from future active involvement with affected parties. The purpose of the mitigation plans developed for this stage of evaluation is to establish an array of actions which together constitute a level of mitigation commensurate with the scale of corresponding impacts and to estimate their cost.

The cost to implement the mitigation actions described below is detailed in Table 18 for the 200-Foot East alternative and in Table 19 for the North of Claiborne Avenue alternative. The elements of the mitigation plan and their cost are a composite of various recommendations contained in the SIA and others which were developed within the district.

Preconstruction Mitigation. As stated earlier, the Rigamer study concluded that the neighborhoods in the vicinity of the IHNC are already highly stressed and would require an extensive program of pre-construction measures as well as direct mitigation measures during construction to offset the impacts of the 200-Foot East plan. Without such actions, sustainability of the neighborhoods would be jeopardized. The pre-construction mitigation package includes upgrading the community's infrastructure (streets, street lighting, and drainage), the addition of public facilities (police substation, community college, and playgrounds), and a program of long-term housing rehabilitation. Pre-construction mitigation plan costs are summarized in Tables 15 and 16. Since the North of Claiborne Avenue alternative eliminates all residential relocations, most noise impacts, and is compatible with minimal bridge modification, it is the judgment of the district that the package of pre-construction mitigation measures would not be required.

Direct Mitigation. Costs for mitigating construction-related impacts associated with displacement effects, noise effects, and transportation effects were developed for the plans considered in detail.

1. Displacement Effects. Mitigation in this area is focused on the displacement of commercial enterprises and historic structures.

Job training is intended to allow a number of workers who may lose employment because of displacement to become employed again as part of the lock/bridge construction crew, presumably at a higher level of skill.

· The City of New Orleans is expected to lose revenue should displaced businesses either liquidate or move to a nearby parish. Mitigation consists of estimating the loss to the city, which the SIA has done, and to compensate the municipal government in a lump-sum payment.

Historic values are preserved by relocating residential structures which have historical significance and by documenting community historical landmarks prior to their demolition, i.e., the St. Claude Avenue bridge and the IHNC lock.

Table 18

Inner-Harbor Navigation Canal Lock Replacement
Social Mitigation Costs
200-Foot East: Conventional Construction

		Costs in Dollars ($)		
		Total Outlays	Interest During Construction	Compounded To Base Year
I. PRECONSTRUCTION MITIGATION				
Community Coordination:		1,332,000	1,443,696	2,775,696
Housing Rebailitation:		1,815,000	1,967,198	3,782,198
Police Substation:		2,960,000	3,208,213	6,168,213
Street Lighting:		2,108,000	2,284,768	4,392,768
Playgrounds:		889,000	963,548	1,852,548
Street and Drainage Improvements:		10,800,000	11,705,642	22,505,642
Community College:		1,850,000	2,005,133	3,855,133
Total Pre-construction mitigation costs:		21,754,000	23,578,197	45,332,197
II. DIRECT MITIGATION COSTS FOR CONSTRUCTION-RELATED IMPACT				
DISPLACEMENT EFFECTS				
Job Training				
Number of Displaced Employees:	135			
Percent in Need of Training:	30%			
Number in Need of Training:	41			
Training Cost Per Employee:	$2,000			
Total Training Cost:	$81,000	81,000	87,792	168,792
Historic Relocations				
Number of Units Relocated:	7			
Cost Per Relocation:	40,000			
Total Historic Relocations Cost:	$280,000	280,000	303,480	583,480
Historic Preservation				
Documentation of Existing IHNC Lock, St. Claude Ave. Bridge and Neighborhood Architecture:	$1,400,000	1,400,000	1,381,496	2,781,496
Compensation of Lost Sales Tax Revenue				
Annual Sales Tax Revenue Lost to Orleans Parish:	386,500			
Lump-Sum Payment to Orleans Parish:	4,547,059	4,547,059	4,928,356	9,475,414
NOISE EFFECTS				
Sound-Protecting Occupied Residential Structures				
Total Residential Units Within 65Ldn of Const.:	2029			
Total Residential Units W/in 65Ldn of Lock Const.	486			
Total Residential Units W/in 65Ldn of St. Cl Br. Only:	900			
Total Residential Units W/in 65Ldn of Claib. Br. Only:	643			
Insulation Cost Per Unit:	$2,020			
Air-Conditioning Appliance Cost Per Residence:	$1,675			
Total Installation Cost::	$7,495,718			

Table 18
(Continued)

		Costs in Dollars ($)		
		Total Outlays	Interest During Construction	Compounded To Base Year
Utility Cost Allowance ($52/Mo. for 9 Months):	$468			
Annual Utility Allowance (Lock-Related Noise):	$985,083			
Annual Utility Allowance (St. Cl. Br.-Related Noise):	$631,461			
Annual Utiliity Allowance (Claib. Br.-Related Noise):	$376,143			
Total Sound-Prootecting Cost:	$9,488,404	9,488,404,	6,738,890	16,227,294
Compensation for Lower Rental Income				
Number of Rental Units Vacated:	71			
Annual Reduction in Net Rental Income Per Unit:	$3,132			
Annual Net Rental Income Lost:	$222,372	1,000,674	671,297	1,671,971
Compensation for Lost Property Value Upon Sale				
Independent Real Estate Market Analysis:	$150,000			
No. of Owner-Occupied Housing Units Between 65 and 75LDN:	710			
Percent of Inventory Sold Annually (Turnover Rate):	0.70%			
Number of Annual Sales:	5			
Average Sales Price:	$39,651			
Average Loss Upon Sale:	$8,327			
Accumulated Lost Proceeds Per Year:	$41,385			
Total Cost:	$336,233	336,233	313,691	650,195
Construction of Recreational Facilities:				
Number of Recreational Facilities:	-			
Cost Per Facility (Structure and Land):	$1,168,350			
Monthly Utility Cost Facility:	$1,500			
Total Cost of Facilities:	$4,943,400	4,943,400	5,238,725	10,182,125
Administrative Costs Per Year:	$83,600	376,200	252,372	628,572
TRANSPORATATION EFFECTS				
St. Claude Avenue Pedestrian Access				
Shuttle Acquisition Cost:	$48,000			
Number of Months St. Claude Avenue Bridge is Closed:	54			
Monthly Cost of Shuttle:	$6,570			
Total Cost for Pedestrian Access:	$402,780	402,780	133,490	536,270
Public Transit: Radio-Activated Signals				
Number of Busses to Equip:	36			
Cost Per Transmitter:	$1,000			
Total Transmitter Cost:	$36,000	36,000	18,132	54,132
Number of Congested Intersections:	4			
Cost Per Signal:	$10,000			
Total Signal Cost:	$40,000	40,000	20,146	60,146

Table 18
(Continued)

		Costs in Dollars ($)		
		Total Outlays	Interest During Construction	Compounded To Base Year
Compensation for Additional Public Transit Operating Costs				
Total Daily Rerouted Miles (.6 Miles One Way):	231			
RTA Cost Per Mile:	$2.50			
Annual Increase in RTA Operating Cost:	$210,788			
Number of Months Bridges are Closed:	61			
Total Rerouting Cost:	$1,071,503	1,071,503	301,222	1,372,725
Landscaping				
Number of Bridges Requiring Loops:	1			
Number of Bridges Requiring Approach Ramps:	2			
Cost Per Approach or Loop:	$100,000			
Total Landscaping Cost:	$300,000	300,000	151,097	451,097
Total Direct Mitigation Costs		24,303,253	20,540,454	44,843,708
Total Mitigation Costs (Pre-Construction and Direct):		46,057,000	44,119,000	90,176,000 (Rounded)

Notes: 1. 1991 Price Levles
2. 8.5% Interest Rate

Table 19

Inner-Harbor Navigation Canal Lock Replacement
Social Mitigation Costs
North of Claiborne Avenue; Float-In
Low St. Claude - Existing Claiborne

		Costs in Dollars ($)		
		Total Outlays	Interest During Construction	Compounded To Base Year
I. PRECONSTRUCTION MITIGATION				
Community Coordination:	0	0	0	
Housing Rebailitation:	0	0	0	
Police Substation:	0	0	0	
Street Lighting:	0	0	0	
Playgrounds:	0	0	0	
Street and Drainage Improvements:	0	0	0	
Community College:	0	0	0	
Total Pre-construction mitigation costs:	0	0	0	
II. DIRECT MITIGATION COSTS FOR CONSTRUCTION-RELATED IMPACT				
DISPLACEMENT EFFECTS				
Job Training				
Number of Displaced Employees:	85			
Percent in Need of Training:	30%			
Number in Need of Training:	26			
Training Cost Per Employee:	$2,000			
Total Training Cost:	$51,000	51,000	55,277	106,277
Historic Relocations				
Number of Units Relocated:	0			
Cost Per Relocation:	40,000			
Total Historic Relocations Cost:	$0	0	0	0
Historic Preservation				
Documentation of Existing IHNC Lock and St. Claude Ave. Bridge :	$600,000	600,000	489,851	1,089,851
Compensation of Lost Sales Tax Revenue				
Annual Sales Tax Revenue Lost to Orleans Parish:	$250,000,			
Lump-Sum Payment to Orleans Parish:	$2,941,176	2,941,176	3,187,811	6,128,987
NOISE EFFECTS				
Sound-Protecting Occupied Residential Structures				
Total Residential Units Within 65Ldn of Const.:	500			
Total Residential Units W/in 65Ldn of Lock:	234			
Total Residential Units W/in 65Ldn of St. Cl Br. Only:	266			
Insulation Cost Per Unit:	$2,020			
Air-Conditioning Appliance Cost Per Residence:	$1,,675			
Total Installation Cost::	$1,847,515			

Table 19
(Continued)

		Costs in Dollars ($)		
		Total Outlays	Interest During Construction	Compounded To Base Year
Utility Cost Allowance ($52/Mo. for 9 Months):	$468			
Annual Utility Allowance:	$312,194			
Total Sound Protection Cost:	$2,159,708	2,159,708	1,194,716	3,354,424
Compensation for Lower Rental Income:				
Number of Rental Units Vacated:	6			
Annual Reduction in Net Rental Income Per Unit (@ 35.5%):	$3,132			
Annual Net Rental Income Lost:	$18.792	37,837	21,401	59,239
Compensation for Lost Property Value Upon Sale				
Independent Real Estate Market Analysis:	$0			
No. of Owner-Occupied Housing Units Between 65 and 75LDN:	230			
Percent of Inventory Sold Annually (Turnover Rate):	0.70%			
Number of Annual Sales:	2			
Average Sales Price:	$39,651			
Average Loss Upon Sale:	$8,327			
Accumulated Lost Proceeds Per Year:	$16,654			
Total Cost:	$33,533	33,533	23,429	56,962
Construction of Recreational Facilities:				
Number of Recreational Facilities:	0			
Cost Per Facility (Structure and Land):	$1,168,350			
Monthly Utility Cost Facility:	$1,500			
Total Cost of Facilities:	$0 0	0	0	
Administrative Costs Per Year:	$83,600	229,900	112,282	342,182
TRANSPORATATION EFFECTS				
St. Claude Avenue Pedestrian Access				
Shuttle Acquisition Cost:	$48,000			
Number of Months St. Claude Avenue Bridge is Closed:	35			
Monthly Cost of Shuttle:	$6,570			
Total Cost for Pedestrian Access:	$277,950	277,950	55,287	333,237
Public Transit: Radio-Activated Signals:				
Number of Busses to Equip:	36			
Cost Per Transmitter:	$1,000			
Total Transmitter Cost:	$36,000	36,000	9,982	45,982
Number of Congested Intersections	4:			
Cost Per Signal:	$10,000			
Total Signal Cost:	$40,000	40,000	11,092	51,092

Table 19
(Continued)

		Costs in Dollars ($)		
		Total Outlays	Interest During Construction	Compounded To Base Year
Compensation for Additional Public Transit Operating Costs				
Total Daily Rerouted Miles (.6 Miles One Way):	231			
RTA Cost Per Mile:	$2.50			
Annual Increase in RTA Operating Cost:	$210,788			
Number of Months Bridges are Closed:	35			
Total Rerouting Cost:	$614,797	614,797	112,,230	727,027
Landscaping				
Number of Bridges Requiring Loops:	0			
Number of Bridges Requiring Approach Ramps:	0			
Cost Per Approach or Loop:	$100,000			
Total Landscaping Cost:	$0	0	0	0
Total Direct Mitigation Costs:		7,021,902	5, 273,357	12,295,,259
Total Mitigation Costs (Pre-Construction and Direct):		7,022,000	5,273,000 (Rounded)	12,295000

Notes: 1. 1991 Price Levles
2. 8.5% Interest Rate

2. Noise Effects. Partial mitigation for the effects of noise is accomplished in two ways: 1) modifying the intensity of noise at the source and receptor level, and 2) direct financial compensation for lost real estate values during construction.

- An important method of reducing construction noise consists of restricting vehicular traffic to and from the lock/bridge sites along well-defined and isolated roadways. The details of this feature will emerge through the aforementioned traffic engineering study and are not included in this plan.
- Residents can be protected from noise to a certain degree by installing specialized insulation into their homes. Since many residences in the affected area are either not air-conditioned or are only fitted with substandard or depreciated air-conditioning units, the installation of new cooling equipment is essential. Furthermore, residents would be reimbursed directly for their added electrical utility cost for operating these units, but only to the extent that utilities are consumed during periods of pile driving.
- Interference with and decline of outdoor recreation due to construction-related noise is addressed by substituting indoor for outdoor recreation. Indoor recreation is provided by constructing and operating (for the term of pile driving activity) as many as four, fully staffed, sound-protected community recreational facilities in those areas which lie within the 65 Ldn noise contours.
- The SIA concluded that, because of construction noise, the number of vacant rental units would increase and that the value of residences marketed for sale would decrease. Since these effects occur only during construction, their magnitude is limited and identifiable. The government, by means of a professionally-staffed administrative unit, can compensate owners on a case-by-case basis as future claims are systematically processed and verified.

3. Transportation Effects. Mitigation for the effects of bridge closure are confined to the accommodation of pedestrian traffic and public transit.

- Closure of the St. Claude Avenue Bridge would leave the nearly 750 pedestrians who cross the bridge daily with no alternative access to the Industrial Canal unless specific facilities are provided. Construction of a pedestrian bridge which does not interfere with navigation traffic represents the most direct approach to mitigation but is not practical due to the nature of traffic and proposed demolition and construction activity. Instead, the cost to restore pedestrian access was estimated on the basis of providing shuttle bus service which would route through the Claiborne Avenue Bridge. "Mini-Bus" service would be at no charge to pedestrians and the termini of this service route would be strictly limited to St. Claude Avenue on either side of the IHNC.
- Coordination with the Regional Transit Authority (RTA) and the City of New Orleans was required in the development of a traffic detour plan. Furthermore, RTA would be reimbursed for

the additional operating cost associated with re-routed public transit.

· The construction of approach ramps and loops for a mid-rise St. Claude Avenue Bridge would damage the current aesthetic quality of the immediate neighborhoods. To buffer the visual impact of these bridge features, construction would include an appropriate degree of landscaping.

The New Orleans District concluded that the 200-Foot East plan is unacceptable under NEPA from a socio-environmental standpoint, even though a lock is engineeringly and economically feasible. NEPA declared that it is Federal policy to "create and maintain conditions . . . and fulfill the social, economic, and other requirements of present and future generations of Americans."

The substantially more intrusive nature of the 200-Foot East plan, particularly regarding noise, bridge replacements, and residential/commercial displacements, is the heart of the problem. These impacts are further compounded by the length of the construction period. The alignment is so inherently objectionable that no adequate compensation can be developed, particularly as long as a significantly less disruptive lock plan is known to exist. As stated in the previous section describing the mitigation plans, the measures presented in Tables 19 and 20 do not represent our specific plan; they reflect our appreciation of reasonable starting points for discussions with the affected neighborhoods. Although the magnitude of the difference in the cost of the two plans is instructive, what is not clearly reflected in the tables is the difference in the probability of successfully negotiating a mitigation plan at all.

At the gross investment level, the measures suggested for the 200-Foot East plan provide a total cost of $90 million; at North of Claiborne, the cost is about $12 million. Recognizing that neither set of mitigation measures represents full compensation, our experience in discussions to this point indicates that, in the view of the elected officials and the neighborhood residents, the nature and magnitude of uncompensated and intangible impacts at the 200-Foot East site are such that a plan several times more costly would still be rejected. In contrast, the North of Claiborne site entails fewer uncompensated and intangible impacts because of its less intrusive alignment and significantly lower noise levels. In short, the estimated mitigation costs for the North of Claiborne site shown in Table 20 probably bear a close resemblance to the actual cost of a viable plan.

As an example, consider the profound noise impacts experienced during construction. Although noise effects are primarily construction-related and thus temporary, the extensive duration of pile driving alone can be understood to deny residents the full use and enjoyment of their property, even after mitigation. Even if the Corps can negotiate a mitigation plan for the 200-Foot East plan with community leaders, this would not preclude the likelihood that any number of affected parties, acting individually or collectively, will pursue lawsuits against the Corps contending that they and the neighborhoods were not

fully compensated. Several community leaders have already indicated that they intend to block lock construction through legal action. With past experience as a guide, the only certainty associated with resolving the current impasse through the judicial system is that it will take years and be very expensive. While this can be said of both plans, to the extent that the North of Claiborne Avenue plan is much less intrusive on all counts and particularly with respect to noise, the likelihood of litigation is certainly less, and amicable resolution is a much higher probability. Discussions with local interests to this point clearly demonstrate that no acceptable mitigation plan could be developed for the 200-Foot East chamber location. As shown in correspondence attached to this report, this view is also strongly held by the local sponsor and local elected officials.

Continued pursuit of the 200-Foot East Plan comes at a cost of $20 million a year in navigation delay costs, in addition to the substantial navigation delay costs associated with past recommendations of similar plans which were strongly opposed locally. If only a third of the implementation delay experienced since 1960 can be attributed to this impasse, the present value of the cost is over $300 million, more than six times the apparent net benefit advantage of the 200-Foot East plan, even if substantial added mitigation costs needed to gain acceptance of 200-Foot East are ignored.

From the economic data presented in Table 19 one can conclude that the North of Claiborne Avenue plan has a B-C ratio greater than 2:1 and net benefits of about $760 million. More importantly, it is a viable plan which can bring a solution to the delay problems at IHNC. The 200-Foot East plan cannot do this. The Port of New Orleans gains little immediate benefit from the national economic development solution to this problem unless a deep draft facility is constructed, and the neighborhoods gain nothing. No incentive exists for these entities to bear the burdens presented by the 200-Foot East plan. Local interests have successfully resisted such plans over the long, costly history of this study and will continue to do so.

In summary, our analyses and experience to date eliminate the 200-foot East site as a candidate NED plan based on non-implementability as well as the acceptability criteria contained in ER 1105-2-100. Further, in view of the magnitude of uncompensated and intangible impacts associated with the 200-Foot East plan, we do not believe that it is an environmentally sustainable plan within the broad NEPA context.

The information in the above section was submitted through channels to higher authority in September 1992 and concurrence by ASA(CW) to focus further study efforts on the North of Claiborne Avenue site was obtained in April 1993.

PLANS CONSIDERED IN THE FINAL ARRAY

For comparative purposes, the final array of alternative plans being considered include (1) No Action, (2) construction of a new bridge at St. Claude Avenue (commonly referred to as the Bridge Only Alternative), and (3) constructing a new lock at the North of Claiborne Avenue site in the IHNC. Alternative lock sizes evaluated at the North of Claiborne Avenue site consisted of various lock depths (shallow, 22-foot and deep draft, 36-foot), widths (90-foot and 110-foot), and lengths (900-foot and 1,200-foot).

Alternative 1 - No Action/Continued Operation of the Existing Lock (Future without the project) This alternative represents the Corps best estimate of how the IHNC lock and connecting channel would exist in the future, including changes expected to occur over the 50-year period of analysis assuming no further Federal actions to replace or significantly modify the existing lock are taken. The future without project condition consists of extraordinary maintenance of the existing lock to maintain the existing level of service to navigation for the next 50 years. It is expected that this extraordinary maintenance would take place over a 4-year time frame once a decision is made that a new lock would no longer be pursued. For purposes of our evaluation, we assumed that this action would be initiated in 1999 and will include the following items:

- Construction of four spare gate leaves to be stored at an off-site location and used as substitutes when other gates are removed for maintenance. Maintenance on gates will be conducted on a 12-year cycle with gates being removed in a staggered cycle.
- Construct a spare set of miter gate machinery (strut arms, sector gears, and drive gears) and store at an off-site location. Canal end reverse-head machinery would also be raised.
- Retrofit existing lock concrete with steel wall armor or other lining material. In high damage areas, ultra-high-molecular-weight plastics may be usable in lieu of steel wall armor. The retrofit would include an estimated 50% of the chamber area from elevation -4 feet to the top of the lock wall. Cracks would be repaired by pressure injection grouting in the chamber monoliths. In addition, the vertical joints between the gatebay and chamber monoliths would be sealed and made watertight.
- Replace the existing prefabricated buildings with permanent masonry concrete structures with control panels and facilities as needed.
- Replace the existing emergency crane with a new 175-ton capacity crane (at 55' radius). The present cable unlatching system for the bulkheads will be replaced with hydraulic cylinders.

Intermittent lock closures would be required. We estimated that two separate closure periods required within the four-year period. Each of the closures would last between 6 to 8 weeks.

The extraordinary maintenance would not result in significant gains in efficiency for navigation and is estimated to cost approximately $16,100,000 more than normal operation and maintenance (O&M). Normal O&M costs are not included in this estimate.

For purposes of our analysis, the following were also assumed.

a. All GIWW locks will continue to be operated and maintained to ensure continued navigability.
b. Existing locks are using the most efficient locking policies.
c. All other existing waterway projects and those under construction will also be operated and maintained.
d. The waterway user taxes will continue as prescribed by WRDA 86, (PL 99-662).
e. Baptiste Collette is not considered a viable long-term alternative to use of the IHNC lock.
f. Traffic demands will grow at the medium rate.
g. The existing Florida Avenue Bridge will be replaced with a new high-level vehicular bridge by the Louisiana DOTD, and the Port of New Orleans will replace the rail element with a new low-level vertical lift-span rail bridge. The rail bridge will also have one vehicular lane going each way to accommodate local traffic.

Alternative 2 - Bridge Only. This alternative would consist of replacing the existing low-level St. Claude Avenue Bridge with a new 200-foot, double bascule, mid-level bridge, a relatively small-scale improvement. (See Plate 8.) The 200-foot span would require closing down the canal to navigation during demolition of the old lock. The bridge only plan would also include rehabilitation of the existing lock (as defined in the future without project condition), modification of the existing Mississippi River levee protection to tie the protection into the existing lock, modification of adjacent streets to make the bridge functional, and a detour route to accommodate traffic during bridge construction. Mitigation of the social impacts would also be required.

A mitigation plan was developed to offset the anticipated impacts of the bridge only plan. The plan includes a pile testing program to define potential noise and vibration impacts to neighboring residential and commercial facilities, a detour plan for vehicular traffic, soundproofing of residential units adjacent to the construction area and within the 65 Ldn noise level, traffic control measures, provision of emergency services to offset increased response times, resurfacing some adjacent streets, aesthetic measures, compensation for lost business revenues for affected businesses, shuttle service to offset pedestrian linkage, and compensation to RTA for lost ridership.

In addition, the impact on the Holy Cross and Bywater Historic Districts, listed on the National Register of Historic Places, and the two locally designated historic districts would have to be mitigated. The total cost for this alternative is estimated to be $55,569,000.

Alternative 3 - Construction of a new lock North of Claiborne Avenue.

The location of the proposed new lock is between the Claiborne Avenue and Florida Avenue bridges in the IHNC. Six alternative scenarios (lock sizes) were evaluated. These included the following :

a. 900′ x 90′ x -22′ (NGVD),
b. 900′ x 110′ x -22′ (NGVD),
c. 900′ x 110′ x -36′ (NGVD),
d. 1200′ x 90′ x -22′ (NGVD),
e. 1200′ x 110′ x -22′ (NGVD), and
f. 1200′ x 110′ x -36′ (NGVD).

Each of the plans identified above was evaluated both with and without curfews in our analysis.

All of these plans include provision of a temporary navigation by-pass channel to be used during lock construction, construction of a new low-level St. Claude Avenue Bridge, modifications to the Claiborne Avenue Bridge, construction of and designation of vehicular detour routes to be used primarily during times when a bridge is out of service, and demolition of the existing lock.
(See Plate 9.) Also included are mitigation measures to offset the impacts of project construction and the inconvenience and disruptions expected in the neighborhoods around the IHNC. These measures are discussed in a subsequent section.

General lock and site data. The new lock will be located in the IHNC at the north of Claiborne Avenue site, about one mile north of the east bank of the Mississippi River (river mile 92.6 AHP). The lock will include direct-head and reverse-head miter gates and lock culvert (tainter) valves. An interior, ported manifold system with 14.5 feet square culverts will be used for the -22 and -36 foot (NGVD) lock depths for the 900-foot long usable chamber. For the 1200-foot long usable chamber, the culvert size is 15- by 18-feet. The lock will be pile founded (See Plate 10). A precast, concrete float-in lock will be constructed at a graving site, located approximately 6 miles from the existing lock, just west of where the Paris Road Bridge crosses the MR-GO (See Plate 25). The graving site will consist of an earthen excavation and closure berm. A pile founded work platform will be provided with a slab elevation of EL -26 NGVD. The channel between the graving site and the staging area will be at least elevation -30 NGVD, sufficient draft for transporting all modules. The voided lock module base section will be fabricated and floated to the Galvez Street staging area. On-site the north bypass channel, lock foundation (excavation and pile-driving) and Galvez Street staging area will be constructed. The foundation

will be installed concurrent with construction of the first module. At the staging area, the miter and culvert gates and machinery will be installed, and the upper lock walls will be completed. Completed lock modules will be installed by positioning partially ballasting and then lowering the module onto the setting pads. After proper alignment is obtained on the pads, the base grouting and lock wall ballasting will be completed. Plates 11a and 11b show plan and wall profiles and cross-sections of the new lock. The lock will be opened to traffic as a pass-through only. Lock backfill will be placed and levee tie-ins completed. Lock guidewalls will be completed, and the lock will be opened to navigation. It is estimated that the 1,200-foot lock will take approximately 5.5 years to construct. A more detailed description of the lock construction is included in Appendix B, Engineering Investigations.

Since the new lock will be situated in the existing channel, temporary bypass channels that allow for continued navigation through the area will be required. The intent is to reduce canal closure to an absolute minimum because of the extreme cost of closure to navigation. Two types of bypass channels are included at different phases of project construction: (1) a two-way bypass channel between Claiborne and Florida Avenues on the east side of the canal during new lock construction, and (2) a one-way, demolition phase bypass channel between St. Claude and Claiborne Avenues on the east side, after the replacement lock is in operation and during demolition of the existing lock. The two-way bypass channel will consist of a transit bypass lane and a laying bypass lane as shown on Plate 10. Each channel is 110 feet wide; the laying channel is 20 feet deep; the transit channel is 31 feet deep. Three protection cells each will be placed at the north and south ends of the bypass channel to contain vessels. Navigation aid markers and lighting will be provided for safe channel passage. Tug assistance vessels will be stationed at the north and south protection cells and will have two-way, marine communication with vessels. The one-way bypass channel will be 12 feet deep, approximately 85 feet wide, and will be operated only after the new lock has been completed and the old lock is being demolished. Although navigation will be slowed by limitations resulting from the bypass channels, the canal will not be closed. During demolition of the existing lock, deep-draft navigation will be curtailed.

The Mississippi River flood protection levees (MRL) and floodwalls must be extended from the existing lock northward approximately 2,500 feet on the east and west banks to tie into the new lock as shown on plates 12 and 13. The MRL design grade is elevation 22.4 feet NGVD. The existing hurricane protection floodwalls will serve as hurricane flood protection during project construction, but they will have to be selectively demolished as required to construct the new MRL levee/floodwall to elevation 22.4 feet NGVD. Existing MRL forebay levees will be maintained as an all-earth section and will be shaped, where needed, to a crown elevation 22.4 feet NGVD, with 1 vertical on 3 horizontal side slopes landside and floodside.

The existing lock will be demolished after the new lock is completed and placed in service. The disruption to navigation will be kept to the minimum required to complete demolition and debris removal. The existing lock must be removed in its entirety for completion of the 200-foot bottom width replacement channel to full width.

Permanent mooring facilities will be provided on the river side of the new lock between the St. Claude Avenue Bridge and Claiborne Avenue Bridge. (See Plate 14.) Similar facilities will be provided on the north end of the lock between the lock and the new Florida Avenue bridge. (See Plate 15.) These mooring facilities, or lay areas, will provide safer operating conditions for navigation traffic than currently exists.

Bridges. Based on on-going coordination with the Louisiana DOTD and the Port of New Orleans, it is assumed that prior to construction of the lock project, the existing Florida Avenue Bridge will be replaced by the State of Louisiana with a new 4-lane, high-level, fixed-span vehicular bridge. The Port of New Orleans is replacing the railroad bridge, under the Truman Hobbs authority, with a vertical lift span railroad bridge that will initially have one vehicular lane each way for local traffic. The U. S. Coast Guard has declared the existing bridge an unreasonable hazard to navigation. The new Florida Avenue Bridges will be constructed with or without the lock project and constitute the without project condition relative to the Florida Avenue.

The existing St. Claude Avenue Bridge will be demolished and replaced with a new low-level, double bascule bridge with a 200-foot horizontal clearance and unlimited vertical clearance as part of the IHNC project as shown on Plate 16. The limited channel width in the permanent mooring area between St. Claude and Claiborne Avenues (planned after demolition of the existing lock) makes 200 feet a reasonable width (acceptable to the Coast Guard). The replacement at St. Claude Bridge, to be built on the same alignment, will include partial reuse some of the existing bridge approach ramps. The Claiborne Avenue Bridge superstructure will be replaced as shown on Plate 17. The bridge superstructure will be replaced with higher towers, a new movable span, and new electrical and mechanical equipment.

While bridges at St. Claude and Claiborne Avenues are out of service, traffic will be rerouted to a detour route that was developed in conjunction with the Regional Planning Commission, the Metropolitan Planning Office (MPO) for Federal and state transportation funds (See Plate 18). The detour route utilizes the new Florida Avenue vehicular bridge currently being planned by the State of Louisiana. As planned, no more than one bridge will be out of service an any given time.

Relocations. Data on the location of roads, railroads, and utilities was gathered by searching permits, visiting sites, and by initial contacts with facility owners. In-house relocation plans were developed using accepted design criteria or using the owners' specifications.

Roads and Bridges. Roads and bridge designs are based upon applicable design criteria such as the AASHTO Bridge Manual or upon input by the neighborhood working group. Our plan has not been endorsed by the facility owners, but they do recognize the adverse social impacts associated with other plans. The relocation of two bridges is necessitated by this work. One relocation is necessitated by its foundations being removed to make room for the new channel. The other is necessitated by the bridge being placed on the river side of the new lock and not having adequate vertical clearance for high river stages. Construction of the new bridges will be phased so that only one bridge is closed at a time.

The first bridge span to be replaced is the Claiborne Avenue Bridge. Once the new lock is completed, this bridge will be located on the Mississippi River side of the lock. Replacement of this bridge will consist of new lift towers, a new lift span, and new machinery constructed upon the existing foundation. The existing foundation may require major rehabilitation. The approaches and approach grade would remain the same. (See Plate 17.)

The next bridge to be replaced is the St. Claude Avenue Bridge. The east foundation must be removed to construct the lock demolition bypass channel. The new structure will be a double bascule bridge with approximately 200 feet of horizontal clearance. (See Plate 16.) This design was preferred by the neighborhood working group since there are no towers and pedestrian crossing would be allowed.

Railroads. The only railroad relocations required are those that lead to the Galvez Street Wharf. These tracks will be removed since the Galvez Street Wharf will be demolished and there is no other use for these tracks.

Utilities. Utility owners will remove all existing facilities except where the work is incidental to lock demolition. Owners will be contacted concerning our intent to remove their lines contained in the lock gallery, and a hold harmless statement will be obtained. Owners will design and construct power lines, telephone cables, and pipelines to the current capacities of the existing facilities.

Utility relocations will be constructed within project rights-of-way or public servitudes within the city streets. If the criteria furnished by the owner results in a betterment, we will discuss the betterment with the owner, and we will not allow payment for betterments as a Federal expense.

The relocation of utilities will be accomplished by the utility owners. These relocations are necessitated by conflicts of the existing utilities with the proposed project. These conflicts result from the narrow channel crossing, congested construction corridor, owners' need for non-interruption of existing service, and sequence of project construction. The plan consists of constructing three utility corridors. (See Plates 19 - 21.) Each corridor will contain one trench crossing the channel.

Hydraulics. The major considerations in the hydraulic design of the lock were the differential heads. In addition to normal stages, the lock must be designed to provide MRL level of protection on the river side as well as SPH protection on the lake side of the lock. The lock depth required to minimize the hawser forces was considered. Filling and emptying systems were also a major consideration. These systems were not only designed to minimize lockage times, but also to accommodate a reverse head situation. Safety was also a major consideration.

Foundations and Geology. The primary concerns addressed slope failures of the proposed levee re-alignments and the development of a foundation for the lock structure. Sheetpile seepage control was developed for the perimeter of the lock. A prepared foundation to support the lock without piles while limiting settlement was designed. A drainage blanket underneath the foundation was also designed in order to limit uplift pressures.

Project Mitigation. Given the unique circumstances associated with the urban setting of the project, a shift in focus from the natural environment to the social environment required a corresponding departure from traditional methods of environmental impact analysis and mitigation planning. In practice, mitigation planning within the Corps is almost exclusively confined to the natural resource arena. However, in this case, analysis and mitigation of impacts over the entire range of community resources covered by Section 122 of PL 91-611 does not enjoy the benefit of a common measure, such as the Habitat Unit used to scale fish and wildlife mitigation features. Nor is the cumulative and interactive nature of multiple impacts well addressed by judgmental scaling, one resource at a time. Once all measures for "in-kind" mitigation are exhausted, residual impacts can only be offset by "out-of-kind" mitigation. The plan objective becomes identification of a set of actions which replace one array of community resources with another array sufficient to restore the community to an equal level of satisfaction. Pursuant to this objective and in accordance with the specific Congressional guidance provided, a broad based community participation process was established to assist us in the development of general mitigation features as an integral part of the lock replacement plan. The impacts for the different size locks are virtually the same. More details and information on the development and process used in developing the mitigation plan, as well as the specific elements of mitigation being proposed, are contained in Appendix A, Mitigation Plan. The environmental impact statement includes a discussion of the environmental impacts expected to occur.

The North of Claiborne Avenue site reduces the scope of project impacts from all sites previously considered to the degree that mitigation planning was able to focus on the normal construction procedures and direct mitigation and minimize requirements for general mitigation. Plans at this site effectively address the three primary categories of social impacts

that are of most concern to the affected community - residential dislocation, construction noise, and traffic congestion. There are no residential dislocations required to implement this project. The soil-founded, pre-fabricated lock design significantly minimizes the construction related noise. Traffic congestion will be minimized by constructing a new roadway (a detour route) through an undeveloped tract in St. Bernard Parish and implementation of a comprehensive traffic management plan which includes recommendations made by the Regional Planning Commission. These include measures to preserve the current level of service that the bridges provide to all users (public transportation, emergency service, school transportation, pedestrians, etc.).

The key elements of the mitigation plan are discussed below under normal procedures, direct mitigation, and general mitigation.

Impact Avoidance. Impact avoidance procedures are actions taken to avoid adverse construction impacts which represent prudent engineering design and construction practice.

Noise. Measures will include contract provisions that will limit noise to a certain level with a given distance from the construction site. Pile testing will be required at selected locations to measure noise levels and define the 65 Ldn level or similar measure. Contractors will be required to use specialized pile driving equipment, such as a vibratory hammer, and monitor noise levels to ensure compliance.

Transportation. Specific routes away from residential and commercial areas will be designated for construction-related traffic and remote locations for construction staging areas. Damage to roads caused by construction activities will be repaired. Detour signage will be erected when individual streets are closed due to utility relocations. A new detour route would link West Judge Perez Drive and St. Bernard Highway in order to improve circulation of commuter traffic during periods of bridge closure and to relieve neighborhood traffic.

Aesthetics. Measures to be accomplished include utilizing textured surfaces on floodwalls, bridge approaches, and bridge piers; landscaping areas surrounding levees, floodwalls and bridge approaches; improving lighting along detour routes (existing and new); and backfilling both sides of the new lock to create green space.

Air Quality. Measures include wetting levees and construction areas (roads) and installing a monitoring system to ensure that air quality is preserved within specified levels.

Employment. Contract specifications will require the contractor to use the local work force in order to achieve minority and local resident participation.

Safety. Measures will include signage, fences, and lighting of construction areas. Measures will also include media notices during certain construction activities.

Cultural Resources. Implement a program of recordation to document structures with historical and/or cultural significance.

Direct Mitigation. This refers to actions taken by the Corps in cooperation with local government, community groups and residents to minimize those adverse impacts which remain following the implementation of the normal procedures that are described above.

Noise. This includes soundproofing any residential or commercial structure that lies within "unacceptable" levels of noise that are related to lock or bridge construction.

Transportation. Measures will include synchronized traffic signals, electronic message boards, an incident management plan to facilitate removal of disabled vehicles, preservation of emergency response capabilities, and provision of additional school crossing guards. In conjunction with the Civil Defense officials, a backup hurricane evacuation plan will be developed for times when a bridge is out of service. Local streets that will serve construction traffic will be resurfaced. Remedial actions such as subsidized fares for RTA riders and direct payments to schools will be made if additional transportation expenses are incurred.

Cultural Resources. Measures will include salvaging one or more components of the old lock and/or bridge; publishing a brochure addressing historical features of the lock and bridge, or surrounding community; and erecting a display with markers patterned on those associated with National Register locations, featuring appropriate information.

Aesthetics. Measures include replacing the stand of mature oak trees adjacent to the existing lock with new plantings, constructing a walk/jog path along the floodwall to replace the use of the existing levee crown, constructing observation decks to provide visual access from levee/floodwall, providing lighting and green space, expanding green space at lock site by tying lock walls to the Claiborne and Florida Avenue Bridges on the east side and Claiborne Avenue Bridge on west side, and landscaping the public rights-of-way along the detour route.

Employment. Notify residents in advance of project construction that specifications will require hiring local residents and provide a list of job skills that will be required. That will enable those interested to pursue any job training that may be necessary.

Air Quality. Use barriers around construction sites to reduce dust.

Safety. Mandate in specifications that evening security patrols to discourage vandalism and theft be included in the contract.

Business and Industry. Provide monetary compensation to those commercial establishments and landlords that experience a demonstrable decline in sales and rents during the period of bridge closure.

General Mitigation. General mitigation refers to actions taken by the Corps in cooperation with local government, community groups and residents to alleviate those adverse impacts which remain following the implementation of both normal procedures and direct mitigation measures previously described. **Residual impacts** from noise, to transportation, aesthetics, employment, community

and regional growth, property values, and community cohesion have been identified. A program of general mitigation is required in order to restore the community to a level of well-being equal to that which existed prior to project construction. The Port of New Orleans will assist in coordinating the implementation of the following elements of general mitigation:

a. Work with displaced lessees on the IHNC to encourage them to relocate in Orleans Parish. Incentives may include new leases on concessionary terms.

b. Implement a program of street improvements, lighting and drainage improvements in a four-block area on each side of the IHNC.

c. Establish a business incubator in the area to serve as a stimulus for local business development.

d. Establish a housing trust to serve as a source of seed money for a program of progressive housing rehabilitation.

e. Expand the skilled labor work force within the affected community. Local residents would be eligible for tuition assistance grants for training at local vocational-technical schools or similar type school for skills required for project construction.

The specifics on mitigation elements to be implemented are contained in the Volume II, Appendix A, Community Impact Mitigation Plan. A breakdown of costs for mitigation elements is likewise contained in the appendix. Recognizing that conditions change over time, items identified in the mitigation plan may require some modification as conditions and priorities in the community change during the implementation period of the project.

ASSESSMENT AND EVALUATION OF ALTERNATIVE ACTIONS

Information presented in the following paragraphs describes the alternative actions considered, the beneficial and adverse impacts, and tradeoffs for each of the three plans described in detail above. Known implementation problems and responsibilities associated with each alternative are also discussed

Alternative 1 - No Action/Continued Operation of the Existing Lock (Future without the project condition)

Brief Description. This alternative action is essentially the no action plan and represents the conditions expected to occur without a new lock project. It includes extraordinary maintenance of the existing lock over a four-year period to ensure that the current level of service can continue to be provided over the next 50 years.

Impact Assessment.

National Economic Development. The first cost is estimated at $16,100,000 above the normal operations and maintenance cost.

Environmental Impacts. There will be no significant impact on the biological resources of the area, the water quality, or the

social setting of the area. From a cultural resource perspective, there will be minor impact on the historical integrity of the existing lock, a property listed on the National Register of Historic Places. No additional impacts to the adjacent districts are expected.

Evaluation and Tradeoffs. These are the conditions expected to exist in the future, absent a new lock and/or bridge project to improve conditions. The lock capacity will remain the same as it is now.

Implementation. The status quo would continue with the Federal government rehabilitating the lock and continuing to operate and maintain the existing level of navigation service.

Alternative 2 - Bridge Only

Brief Description. This bridge only plan would consist of demolishing the existing bridge; constructing a new mid-level, 200-foot horizontal clearance, double bascule bridge at St. Claude Avenue; constructing a detour route to accommodate traffic during construction; connecting the MRL levee protection to the existing lock; and extraordinary maintenance of the existing lock. This bridge would be much higher than the existing low-level bridge and will have impacts to the community of the west side of the canal. On the east side it would be constructed within the same footprint of the existing bridge and not affect the traffic patterns on that side of the canal. Mitigation of social impacts associated with the bridge construction would also be required.

Impact Assessment.

National Economic Development. The first cost of the 200-foot horizontal clearance bridge only plan is estimated at $55,569,000. The total present value cost is estimated to be $65,401,000 including $49,949,000 for construction and $15,452,000 for mitigation. The base year for the project is 2004.

Environmental Impacts.

Biological. Impacts on the biological environment would be negligible. Any impact that would occur would be temporary in nature.

Water Quality. Impacts on water quality will be localized, minor, and of short duration. Some turbidity during construction will occur.

Cultural. Careful planning and design will be required to ensure that adverse impacts on the integrity of the National Register properties and locally designated historic properties in the area (Holy Cross, Bywater and the IHNC lock) are minimized. After consultation with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP), the existing St. Claude Avenue bridge that will be replaced will have to be documented to Historic American Engineering Record standards as it too has been evaluated and determined to be

eligible for the National Register of Historic Places. Close coordination with the New Orleans Historic Districts Landmarks Commission (HDLC), the local agency empowered by the city to protect locally designated historic properties, will be required. For new construction, the HDLC is generally concerned that the construction be visually compatible with the buildings and environment with which they are related; the general design scale, gross volume, arrangement of site plan, texture, material and exterior architectural features shall be in harmony with its surroundings and shall not impair the "toute ensemble" of the neighborhood; and quality and excellence in design should be major determinants. For demolition of landmarks or historic structures, the HDLC is generally concerned about the historic significance, the "toute ensemble" of the district, the special character and aesthetic interest that the structure adds to the district. The new bridge would require destroying the old bridge. The new mid-level bridge would rise about 39 feet higher than the existing bridge. This double bascule bridge would not have any superstructure and can operate faster than the existing bridge. On the east side, the bridge would be constructed within the same footprint as the existing bridge and would not affect vehicular traffic patterns on the east side of the canal. However, it will significantly affect the traffic patterns on the west side of the canal. In order to function properly, an overpass would be required at the intersection of Poland Avenue. Poland and St. Claude are truck routes for many port and river front activities.

Social. Implementation of this plan is expected to have significant impacts on traffic, noise impacts from construction activity, increase response times for emergency services to residents on the east side of the IHNC, adversely impact the existing neighborhood setting and aesthetic qualities, and disrupt pedestrian usage of the existing bridge by local residents. Mitigation of the social impacts related to this construction of a new bridge would be required.
Businesses on the west side would also be directly impacted as a result of the bridge approach having to be extended about one and a half blocks past Poland Avenue because of the overpass required on St. Claude at Poland. Both Poland and St. Claude Avenues are truck routes for many port and river-front activities. There are also concerns about a new bridge potentially inducing more traffic at higher speeds through the neighborhoods which have schools and other community facilities in close proximity to the proposed new bridge. These would also be negatively impacted by rerouting of traffic on the side streets. Safety is a significant concern because of the potential for increased traffic. This could also impact the integrity of the historic character of the neighborhood. In addition, pedestrian access from one side of the canal to the other would be significantly more restrictive than with the existing conditions.

Evaluation and Tradeoffs. The 200-foot double bascule mid-level bridge plan would not provide flexibility to construct the new lock and related features of the lock project when traffic increases demonstrate that construction of a new lock is

warranted, without replacing the bridge or suffering shutdown of the canal to navigation while the old lock is being demolished. This has been estimated to require about 18 months.

The bridge-only plan initially generates a reduction in the average delay. However, the magnitude of the reduction diminishes over time and finally reaches the point where the delays would return to those of the without project condition.

The bridge-only plan would have significant negative impacts to the local communities on either side of the canal. This would lead to a lack of public acceptance for the plan, which has clearly been a problem over the years for this project.

Implementation. Mitigation of project impacts on the human environment related to construction of a new bridge would be required. In spite of our mitigation plan, there are still potential problems with implementation of this plan. Local neighborhoods have indicated they would strongly oppose such a plan. Concerns voiced have ranged from the anticipated impacts of increased traffic, speed of traffic movements, conflicts with the historical integrity of the neighborhoods, changes in the setting and aesthetics with a new mid-rise bridge, etc. Also impacted will be a church and school on one of the side streets that the traffic will have to use to gain access to the bridge, and some of that traffic will be truck traffic. Safety is a significant concern here because of this increased traffic. Increased traffic will also impact parking and accessibility along side streets and add to the air and noise pollution of these areas. The integrity of the historic nature of the neighborhood could be adversely impacted. The existing bridge itself, has been evaluated and meets the criteria for inclusion on the National Register of Historic Places, although it has not yet been listed. In addition, the impacts of such a plan on the National Register Districts and the locally designated historic districts would have to be coordinated in order to achieve agreement with the appropriate historic preservation agencies and the State Historic Preservation Officer. The New Orleans Historic Districts Landmarks Commission has already expressed opposition to a bridge only plan. Without reaching agreement and executing a Memorandum of Agreement, implementation might not be accomplished.

Alternative

Brief Description. This alternative consists of constructing a new lock in the IHNC north of Claiborne Avenue. Various size locks as previously identified were considered. The plan also includes a low level replacement of the St. Claude Avenue Bridge, retrofitting the Claiborne Avenue Bridge, construction of and designation of detour routes on both sides of the IHNC, construction of a temporary two-way navigation bypass channel around the lock construction site, and construction of a one-way shallow-draft bypass around the existing lock to be used during demolition of the existing lock. A project mitigation plan

will also be implemented to offset the project's impacts to ensure that the human environment in the neighborhoods on either side of the IHNC remain viable.

Impact Assessment.

National Economic Development. The first costs vary from $413,253,000 to $496,295,000, depending on the lock size. The total present value cost estimated also varies from $634,683,000 to 800,555,000, including mitigation. Total average annual costs range from $51,510,000 to $64,013,000, including annual O&M expenditures ranging from $1,382,000 to $1,384,000.

Environmental Impacts.

Biological. The offsite construction facility (graving site) designated for partial prefabrication of the lock modules, would require 25 acres of freshwater wetlands. Loss of the wetland habitat would be fully mitigated by creation of brackish marsh in a large area of shallow, open water, with clean soil dredged from the east bank of the IHNC for construction of the north bypass channel. An estimated 137 acres of brackish marsh and tidal flats would be developed. The U.S. Fish and Wildlife Service Habitat Evaluation Procedures were used to analyze the impacts and mitigation requirements.

Sediments from the bottom of the IHNC and surface soils from the east bank of the canal have been found to contain contaminants at levels which preclude its use for wetland development. This material would be hydraulically dredged and pumped to a previously-used disposal area along the south bank of the MR-GO in Orleans parish. The disposal area currently contains scrub/shrub uplands and wooded, jurisdictional wetlands of low quality. The 240 acre disposal site is dominated by black willow and Chinese tallow, an undesirable exotic. No mitigation is proposed for disposal of dredged material in this site because of its existing low habitat quality.

Cultural. This plan would require demolition of the IHNC lock, the St. Claude Avenue Bridge, and the Galvez Street Wharf. All of these properties have been determined eligible for the National Register of Historic Places. The loss of these three structures would be mitigated by recordation to the Historic American Engineering Record standards prior to demolition. In addition, the Galvez Street Wharf would be documented to Historic American Building Survey (HABS) standards before demolition. Additional consultation with the SHPO and the Advisory Council on Historic Preservation would be necessary in order to reach agreement on the details of the mitigation plan for each of these structures. A formal Memorandum of Agreement (MOA) is required. There would be no impact to any other historic or prehistoric archeological properties in the project area. No structures in either the Bywater or Holy Cross Historic Districts would be moved or destroyed.

Water Quality. No significant, long-term changes in water quality will result from implementation of this project. Existing water quality conditions show that the Mississippi River possibly violates aquatic life criteria for chromium, copper,

mercury, and lead. Likewise, the IHNC possibly violates copper, mercury, and lead aquatic life criteria. The MR-GO possible violates lead, zinc, and mercury criteria. Most water quality samples contain levels of copper and mercury in exceedence of the aquatic life criteria.

Elutriate testing done in conjunction with this study shows that elevated concentrations above acute aquatic life criteria can possibly be expected during dredging and disposal operations. Historic testing shows that copper levels periodically exceed the applicable acute aquatic life criteria for ambient water conditions. Levels of zinc in ambient waters of the project area generally do not exceed the chronic or acute aquatic life criteria levels. However, the elutriate testing shows that zinc and copper levels will probably increase above the acute aquatic life criteria in the Mississippi River, IHNC and the waters adjacent to the MR-GO disposal area and the proposed mitigation site.

Because dredging and disposal activities have only localized, short-term effect, long-term water quality impacts are not expected. Slight increases in concentration of other parameters may be expected as a result of dredging activities, although no long-term changes in water quality will result.

Increases in concentrations of suspended sediments during the dredging period would also be expected. Because of the normal heavy sediment load carried by the Mississippi River, the increase in suspended solids would not cause any significant adverse impacts. Increased suspended solids would not cause any significant adverse impacts. Increased suspended solids in the IHNC and the waters adjacent to the MR-GO disposal area and the proposed mitigation site are also expected, but due to the short duration of dredging and disposal, impacts would not be significant. Once project construction is complete, all water quality constituents, with the exception of turbidity, are expected to return to normal levels and no long-term changes in water quality are expected.

Social. In addition to the impacts previously identified, this plan is expected to have impacts on transportation, aesthetics, noise, air quality, employment, and the overall social well-being of the area over the extended implementation period. The social fabric and impacts expected to occur are not tied to the size of the lock but to the type and duration of activities required to accomplish the project. An extensive mitigation plan has been developed, in coordination with representatives of the neighborhoods, to ameliorate these impacts.

Evaluation and Trade-offs. This plan fully addresses the study objectives, including the dimensional obsolescence of the existing lock, and provides for a safer, more efficient connection for commercial navigation between the lower Mississippi River, the GIWW, and the MR-GO. The plan would have adverse impacts on the community which will be offset by implementation of the mitigation plan. Navigation interests will also have to tolerate many inconveniences including periodic short term restrictions or closures of the waterway during project construction. In the end,

after the project is constructed, all stakeholders should benefit from the improvements proposed as part of the project.

Implementation. All costs for the project are allocated to commercial navigation. In accordance with PL 99-661, a shallow-draft lock would be shared 50 % from Federal Appropriated funds and 50 % from the Inland Waterway Trust Fund. In this particular case, since the NED plan is a shallow-draft lock, and the deep-draft increment is justified only on an overall basis, non-Federal interests will be required to bear 100 % of that incremental cost. The Federal government (Corps of Engineers) will construct the project and subsequently operate and maintain the lock project.

ANALYSIS AND COMPARISON OF STRUCTURAL PLANS (PLANS 2 & 3)

A breakdown of the expenditures by year (first costs) for each of the structural plans considered is presented in Table 20. The costs presented in that table include all costs associated with construction of each plan including the costs of constructing navigation features (channels, locks, etc.), bridges, utility relocations, real estate, major replacement of lock machinery, engineering and design, and construction management. Table 21 presents a cost summary for various alternatives showing total costs, total present value costs, and a breakdown of annual costs by category (construction costs, mitigation costs, navigation losses, permanent losses, annual O&M). The costs, based on 1996 price levels, reflect a discount rate of 7.625 %. The annual maintenance cost is the average annual cost of operating and maintaining the plan. The average annual benefits are the savings in transportation costs of the commerce moving through the area (savings in costs resulting from increased lock efficiency and capacity). The average annual net benefits are the difference in average annual benefits and average annual costs. The higher the net benefits, the better the plan is from a national economic development standpoint. The benefit-to-cost ratio is the ratio of average annual benefits to average annual costs.

There is a degree of uncertainty regarding the extent of growth of traffic through the proposed lock. Table 22 reflects a medium growth scenario which represents the most probable future condition. It includes annual costs, annual benefits, net benefits, benefit to cost ratios (BCRs) for each plan, the base year for each plan, and the net benefits adjusted to 2010. Table 23 presents a summary of annual benefits for each alternative, with and without curfews.

Table 20

Construction Expenditures By Year
Exclusive of Mitigation Cost
(1996 Prices; $1,000's)

Year	Bridge Only	900 x 90 x 22	900 x 110 x 22	900 x 110 x 36	1200 x 90 x 22	1200 x 110 x 22	1200 x 110 x 36
1998	629.8	5,152.4	5,328.4	5,884.1	5,569.9	5,953.5	6,157.2
1999	629.8	31,773.0	31,972.9	32,604.4	30,577.5	32,683.1	32,914.7
2000	678.3	29,819.4	29,952.3	30,302.3	28,324.3	30,274.8	30,490.4
2001	1,573.9	20,067.2	20,173.4	21,180.3	19,570.0	20,917.6	21,576.4
2002	3,165.8	14,026.2	13,205.3	15,154.2	13,745.5	14,692.0	15,513.0
2003	10,497.4	65,592.2	66,171.9	69,928.9	67,704.0	72,366.2	77,053.6
2004	14,086.4	36,948.5	44,288.6	41,739.9	40,550.9	43,343.3	49,056.0
2005	11,638.6	47,556.5	55,864.5	63,917.0	58,195.7	62,203.1	61,626.3
2006		37,688.5	35,382.4	38,368.3	35,263.8	37,692.1	41,247.4
2007		37,224.1	38,592.0	45,935.3	42,420.2	45,341.3	49,461.7
2008		27,504.2	23,488.7	26,996.5	26,365.2	28,180.8	29,674.9
2009		24,347.8	28,079.6	26,364.7	22,402.2	23,944.8	24,816.7
2010				10,924.1	7,210.8	7,707.4	21,111.7
Total	42,900.0	377,700.0	392,500.0	429,300.0	397,900.0	425,300.0	460,700.0

Table 21

Cost Summary
(1996 $1,000, 7.625 Percent)

	Remove Bridge Curfews	Bridge Only	900x90x22	900x110x22	900x110x36	1200x90x22	1200x110x22	1200x110x36
Construction Costs	0	42,900	377,700	392,500	429,300	397,900	425,300	460,700
Mitigation Costs	0	18,156	33,007	33,007	33,007	33,007	33,007	33,007
Nav Losses During Const	0	0	2,546	2,546	2,588	2,588	2,588	2,588
Total Costs	0	61,056	413,253	428,053	464,895	433,495	460,895	496,295
P.V. Const Costs	0	49,826	579,211	600,637	697,479	649,577	694,307	742,113
P.V. Mitigation Costs	0	22,572	52,731	52,731	55,656	55,656	55,656	55,656
P.V. Nav Losses	0	0	2,741	2,741	2,786	2,786	2,786	2,786
Total P.V. Costs	0	72,398	634,683	656,109	755,922	708,019	752,750	800,555
Annual Construction Costs	0	3,898	45,315	46,991	54,567	50,820	54,319	58,059
Annual Mitigation Costs	0	1,765	4,124	4,124	4,352	4,352	4,352	4,352
Annual Nav Losses	0	0	214	214	218	218	218	218
Annual Permanent DD Losses	0	0	475	475	0	484	484	0
Annual O&M Costs	0	0	1,382	1,382	1,384	1,382	1,382	1,384
Induced Vehicular Losses	8,565	0	0	0	0	0	0	0
Total Annual Cost	8,565	5,663	51,510	53,186	60,521	57,255	60,755	64,013
Base Year	1998	2006	2010	2010	2011	2011	2011	2011

Identification of the National Economic Development Plan.

The plan that reasonably maximizes net contributions to economic development is designated the National Economic Development (NED) plan. In the case of the IHNC, the NED plan is the most economically efficient evaluated in terms of net benefits. Plan 3b, which is a shallow draft lock compatible with the GIWW system and having dimensions of 110- x 900- x -22-feet (NGVD), is designated the NED Plan. The efficiency and ranking of NED plans in terms of maximum net annual benefits are shown in Table 22. The table summarizes the annual costs, annual benefits, and BCRs for each alternative with and without bridge curfews. Net benefits represent the difference between total annual benefits and total annual costs. Maximum net benefits define the NED plan.

Since all annual benefits and annual costs reflect the base year of the alternative in question, it is necessary to account for the fact that alternatives have different implementation dates when identifying the alternative that generates the maximum net benefits. To account for this effect of differing base years, the net benefits of each alternative can be shifted forward or backward, using present value techniques, such that all alternatives reflect a common point in time. This adjustment is reflected in Table 23 by using the year 2010 as the common reference point. For NED identification purposes, the result of this common reference adjustment is that alternatives with a base year prior to 2010 show a greater value for net benefits than that associated with its actual base year (net benefits are compounded), and alternatives with a base year after 2010 show a lower value for net benefits (benefits are discounted). It should be noted that the selection of a different common reference point does not affect the relative standing of alternatives; only the absolute amount of the net benefits would be affected.

Net benefits are maximized with the 110- x 900- x -22-foot (NGVD) alternative with bridge operating curfews ($62.7 million). This alternative also produces the highest BCR among the lock construction alternatives (2.2 to 1).

The bridge-only alternative produces a higher BCR (3.75 to 1), but it represents a significantly smaller scale improvement which does not address the dimensional obsolescence of the existing lock. As a result, the net benefits of the bridge only alternative ($20.9 million) are considerably lower than any of the lock construction alternatives.

Table 22

Mid Growth Scenario
Alternative Summary
(1996 $1,000, 7.625 Percent)

	Remove Bridge Curfews	Bridge Only w/o Curfews	900x90x22 with Curfews	900x90x22 w/o Curfews	900x110x22 with Curfews	900x110x22 w/o Curfews	900x110x36 with Curfews	900x110x36 w/o Curfews	1200x90x22 with Curfews	1200x90x22 w/o Curfews	1200x110x22 with Curfews	1200x110x22 w/o Curfews	1200x110x36 with Curfews	1200x110x36 w/o Curfews
Total Annual Cost	8,565	5,663	51,510	51,510	53,186	53,186	60,522	60,522	57,256	57,256	60,755	60,755	64,013	64,013
Total Annual Benefits	9,576	21,223	111,501	108,534	115,866	112,711	119,793	117,198	120,304	118,970	121,293	120,877	122,300	121,726
Net Benefits	1,011	15,560	59,991	57,024	62,680	59,525	59,271	56,676	63,048	61,714	60,538	60,122	58,287	57,713
BCR	1.12	3.75	2.16	2.11	2.18	2.12	1.98	1.94	2.10	2.08	2.00	1.99	1.91	1.90
Base Year	1998	2006	2010	2010	2010	2010	2011	2011	2011	2011	2011	2011	2011	2011
Net Benefits Adj. to 2010	2,442	20,876	59,991	57,024	62,680	59,525	55,072	52,661	58,582	57,342	56,249	55,862	54,157	53,624

Table 23

Annual Benefit Summary
(1996 $1,000, 7.625 Percent)

	Remove Bridge Curfews	Bridge Only w/o Curfews	900x90x22 with Curfews	900x90x22 w/o Curfews	900x110x22 with Curfews	900x110x22 w/o Curfews	900x110x36 with Curfews	900x110x36 w/o Curfews	1200x90x22 with Curfews	1200x90x22 w/o Curfews	1200x110x22 with Curfews	1200x110x22 w/o Curfews	1200x110x36 with Curfews	1200x110x36 w/o Curfews
Shallow Draft	9,576	15,621	72,051	74,860	76,321	76,829	76,841	78,178	78,178	78,306	78,629	78,715	78,675	78,698
Deep Draft	0	0	0	0	0	0	975	975	0	0	0	0	975	975
Vehicular	0	5,602	5,821	45	5,916	2,253	5,907	1,975	6,056	4,594	6,594	6,092	6,580	5,983
Savings to Fed Project	0	0	4,939	4,939	4,939	4,939	5,192	5,192	5,192	5,192	5,192	5,192	5,192	5,192
Rehab Closure - Nav Losses Prevented	0	0	28,690	28,690	28,690	28,690	30,878	30,878	30,878	30,878	30,878	30,878	30,878	30,878
Total Annual Benefits	9,576	21,223	111,501	108,534	115,866	112,711	119,793	117,198	120,304	118,970	121,293	120,877	122,300	121,726
Base Year	1998	2006	2010	2010	2010	2010	2011	2011	2011	2011	2011	2011	2011	2011

Identification of the Tentatively Selected Plan (TSP).

ER 1105-2-100 (Dec 90) states that "local interests may prefer a plan that is larger than the NED plan even though sufficient justification for full Federal participation cannot be developed. A locally preferred plan may be recommended for implementation by the Corps. The incremental cost between the Federally supportable plan (NED) and the locally preferred plan are entirely a non-Federal responsibility." The above cited ER also states that the cost for the exception will be shared on the same basis as the NED plan.

The Port of New Orleans has always supported construction of a ship (deep-draft) lock as a replacement for the existing IHNC lock, which accommodates deep-draft traffic up to 31.5 feet. In a letter dated April 13, 1992, the Port formally indicated its agreement with the District's proposed location, which was included with the report submitted to Higher Authority (HQUSACE) for approval of the screening of the alternative IHNC plans, the north of Claiborne Avenue site. They agreed that the proposed new lock would involve minimal impact in the residential communities. In addition, the Port has indicated they are willing to pay for the additional increment of cost to provide a deep-draft lock that is compatible with traffic using the MR-GO.

Table 24 presents a summary breakdown of first costs for the NED and the tentatively selected plan (TSP) as identified in the draft report that was distributed for public review.

Table 24

Summary Estimate of First Costs for the NED and Tentatively Selected Plans*

Account	Description	NED	TSP
01	Lands & Damages	$43,200,000	$43,200,000
02	Relocations	72,400,000	72,500,000
05	Locks	200,600,000	253,300,000
09	Channels and canals	16,600,000	22,000,000
11	Levees and Floodwalls	10,600,000	10,800,000
25	Mitigation	33,000,000	33,000,000
30	Engineering & Design	50,300,000	56,100,000
31	Construction Management	16,400,000	19,800,000
	T o t a l	$443,100,000	$510,700,000

* Includes sunk costs

Although the NED plan is a shallow-draft lock, there are additional benefits to be derived from deep-draft traffic. However, the magnitude of the benefits is not sufficient to incrementally justify a deep-draft lock at the current interest rate. On an overall basis, a deep-draft lock, generally compatible with MR-GO traffic, is economically justified and therefore is being recommended for construction.

The fully funded costs are estimated to be $690,998,000 for the NED plan and $794,827,000 for the tentatively selected plan.

SUMMARY COORDINATION, VIEWS AND COMMENTS DURING THE CURRENT STUDY

STATE OF LOUISIANA

In 1986, the Governor of Louisiana indicated that the State of Louisiana supports the effort to replace the existing lock and would provide formal assurances at the appropriate time. The Board of Commissioners of the Port of New Orleans, a state agency, has indicated their willingness to provide the non-Federal share of the locally preferred plan.

The State Historic Preservation Office in concert with the Advisory Council on Historic Preservation have been consulted. Coordination will continue until a Memorandum of Agreement regarding safeguards to be taken in compliance with historical statutes is executed.

OTHER FEDERAL AGENCIES

The US Fish and Wildlife Service has evaluated the proposed alternative plans and provided a Coordination Act Report (CAR). This document has been considered in our evaluation of alternatives. and is included in Volume 6, Appendix D.

NAVIGATION INTERESTS

Numerous letters have been received from port authorities, businesses, and industries that use the inland waterway system and rely on the IHNC directly or indirectly to accommodate their needs or the needs of traffic servicing their operation. These are included in Exhibit II to this report.

THE INLAND WATERWAYS USERS BOARD

At the March 1994 meeting of the Inland Waterways Users Board, the New Orleans District made a presentation of the tentative findings of our studies. When the presentation was made, questions were raised that centered on two issues:

1) How did we determine the size of the "base only" lock alternative?

The Users Board basically questioned our requirement of a 22-foot floor/sill depth and a 110-foot width for the base barge lock option.

2) Why did we eliminate a plan to only replace the St. Claude Avenue Bridge?

At the July 1994 meeting the District gave a detailed presentation addressing the board's concerns. Information presented is summarized below.

Base barge lock alternative. Even with the limited dimensions at the existing lock, it is not uncommon for more than one tow to be processed in a single lockage. It is this chamber packing that plays a significant role in identifying the optimal surface dimensions of a new lock. Unlike other segments of the inland system where lock size plays an important role in determining typical tow sizes, the GIWW on each side of the IHNC lock represents the controlling element for tow size; therefore, improvements to the lock will not change the existing tow size distribution. The ability to pack this distribution into chambers of varying dimensions becomes the issue.

Table 25 shows the distribution of individual barge sizes that comprise the fleet using this lock.

Table 25
Distribution of Barge Sizes

Length	X	
195	35	35
280	50	20
175	26	5
Others		16
Total		100

Table 26 shows the distribution of tow sizes using the IHNC lock.

Table 26
Tow Size Distribution

Barges/Tow	Percent	Length (ft)	Percent	Width (ft)	Percent
1	32.6	<300	15.8	35	44.4
2	27.2	301 - 400	12.1	50 - 54	37.6
3	12.2	401 - 500	11.6	Other	18.0
4	10.1	501 - 600	18.0	Total	100.0
5	5.9	601 - 700	5.9		
6	4.1	701 - 900	14.9		
7	0.9	>900	21.6		
8	3.0	Total	100.0		
8+	4.0				
Total	100.0				

Using these data, we evaluated combinations of the most common barge and tow sizes and settled on four surface dimensions which we studied in detail.
These included 900 feet by 90 feet , 900 feet by 110 feet, 1200 feet by 90 feet, and 1200 feet by 110 feet.

The results of our optimization process, as shown in Table 27, clearly identifies the 900-foot by 110-foot lock, with a 22-

foot floor depth, as the plan with the maximum net benefits (the NED plan).

Table 27
Benefit-Cost Summary
Barge Lock Alternatives
(Most Probable Growth Scenario)
22 foot Floor Elevation
(1993 , $1,000 , 8%)

	900 x 90	900 x 110	1200 x 90	1200 x 110
Capacity (million tons)	44.8	57.0	61.3	73.5
Total Annual Benefits	12,781	118,366	114,633	115,558
First Cost	485,816	503,816	523,816	544,816
Total Annual Cost	67,168	68,949	70,745	73,167
BCR	1.68	1.72	1.62	1.58
Net Benefits	45,613	49,417	43,888	42,391

Floor/sill depth issue. The floor and sill depths are the same for this lock. Using established Corps criteria (based on model studies) for a side port emptying and filling system, we initially set the floor depth to 25 feet and the sill depth at 22 feet to accommodate safety concerns. We then investigated raising the floor to match the sill based on economic reasons. First, we raised the floor to 22-feet and then raised both the floor and sill to 18 feet. Table 28 shows the comparison of these three floor depths.

Table 28
Incremental Benefit-Cost Comparison
900 x 110 @
18, 22, and 25 Foot Floor Elevations
(1993, $1,000, @ 8.0 Percent)

	25 ft. to 22 ft.	22 ft. to 18 ft.
Increase in Avg. Delay Time (min)	5.0	43.0
Increase in Processing Time (min)	0.8	4.1
Average Annual Benefit Decrease ($1,000)	125	1,484
First Cost Decrease ($1,000)	1,500	3,800
Avg. Annual Cost Decrease ($1,000)	144	365
Change in Net Benefits ($1,000)	19	(1,119)

The decision to go to the 22-foot depth from the 25-foot depth was rational from an economic standpoint. However, making the lock shallower to 18-foot would not be economically rational.

In the case of the IHNC Lock, the reason the cost reduction to make the barge lock floor 18 feet instead of 22 feet is only about $3.8 million, which is less than 1 % of the estimated

project cost, is the fact that pure lock construction cost is less that 50 % of the total cost of the project.

Raising the floor depth reduces the amount of concrete and steel required for the lock walls and gates, but this also increases the amount of fill required for the prepared foundation under the lock structure.

In the past, members of the Users Board have stated that the Algiers and Port Allen locks have shallow floor depths, and they are operating fine. This may well be true from a safety point of view, but they may not be operating at peak economic efficiency. Table 29 shows a comparison of filling times at the Algiers and Port Allen locks when compared to the IHNC lock. When comparing the IHNC with Algiers, it is obvious that the filling times are comparable for low heads, but differ considerably for higher heads. The Algiers Lock has a much smaller surface area to fill (about 58% of the proposed IHNC lock), and it also has different gates (sector versus miter); therefore, the Algiers lock has a different emptying and filling system. It fills and empties through and around the gates, so a comparison of those two locks would not be an accurate comparison.

Table 29
Comparative Filling Times

Lock Design Draft	Lift (ft)	Fill Time (min)
Algiers/9 feet	3	5
(Sector Gated)	7	6
	11	14
Port Allen/9 feet	3	7
	7	9
	11	13
IHNC/11 Feet	3	4
(Filling times for floor	7	5
el. @-22 ft. NGVD)	11	6

The Port Allen lock has mitre gates, a side-port filling/emptying system, and has approximately the same surface area as the proposed IHNC lock. The only difference is the floor and sill are shallower that the existing criteria dictates. The floor and sill are at a depth of 14 feet. From Table 30, it is obvious that the filling times are greater for the Port Allen lock. That increased time costs the navigation traffic in delay costs.

Our analysis is based on sound safety, engineering, and economic reasons. The length and width were optimized based on chamber packing fully recognizing the controlling dimensions of the GIWW on each side of the lock. Also the floor depth for the base barge lock was based on safety considerations of entering the lock and filling and emptying the lock. Finally, if we were to compromise on the safety issue, it would not be economically rational to make the lock shallower than the proposed 22-foot depth.

St. Claude Avenue Bridge Alternative. Complicating the operation of the existing lock is a Coast Guard regulation that requires the Port of New Orleans, the owner of the St. Claude Bridge, to keep the bridge open to vehicular traffic during the week in the morning and in the afternoon during rush hour. Both the Claiborne and St. Claude Avenue bridges are very important commuter routes between downtown New Orleans and St. Bernard Parish. While the lock chamber is packed just before the curfew begins and just prior to the curfew ending, this curfew reduces the available operation time for the lock during the work week.

Further complicating matters is the fact that each time the lock is operated, the St. Claude Avenue bridge must also be operated. This increases the lock processing time by a small increment, averaging about 3 minutes for each lockage, or about 6% of the total processing time at the existing lock. So the St. Claude Avenue bridge does cause some of the problems at the existing lock.

We evaluated 3 different bridge scenarios at St. Claude Avenue:

(1) a low level, double bascule bridge which is part of the north of Claiborne lock replacement plan;
(2) a 200-foot double bascule mid-level bridge (the bridge only scenario); and
(3) a 300-foot vertical lift span bridge which was part of the phased construction scenario.

The low level bridge can be constructed in the same footprint as the existing bridge and was developed because the neighborhood residents at the beginning of our public involvement/neighborhood working group process strongly objected to a bridge much higher than the existing bridge. This bridge would not adversely impact traffic patterns on either side of the canal, would not impact pedestrian accessibility to the bridge, and would have minimal impact to the historical/cultural aspects of the historic districts on either side of the canal. The bridge would not have any massive superstructure above the span and would operate just as fast or slightly faster than existing bridge.

The 200-foot horizontal clearance, mid-level, double bascule bridge is higher than the low-level bridge previously described. It would have more of a visual impact on the area than the low level bridge even though it does not have the steel superstructure. The issue of elevated bridge approaches being located next to residences has been a significant issue with the local people. The neighborhood residents are opposed to all mid-level bridge plans.

We also looked at a mid-level bridge with a 300-foot horizontal clearance that would be needed if a new lock would be constructed in the future (phased construction). The mid-level bridge, with a 200-foot horizontal clearance, would not provide enough area to construct the by-pass channel around the existing lock during demolition as we are providing for the lock replacement plan. The 300-foot span would accommodate this. However, that bridge would have to be a vertical lift span bridge

as the 200-foot span is the practical design limit for a double bascule bridge. This lift-span bridge would have the same negative impacts to the neighborhoods on each side of the canal as previously described. The significant negative community and cultural impacts of the mid-rise bridge plans at St. Claude Avenue are not acceptable to the public.

The following tables will address the economic aspects of the various bridges. Table 30 shows that the bridge-only plan initially generates a reduction in the average delay. However, the magnitude of the reduction diminishes over time and finally reaches the point where the delays would return to those with the without project condition.

Table 30
Selective Alternative Summary
Average Delay (hours)
Most Probable Scenario

Alternative	1990	2000	2010	2020	2030
Without Project	10.4	25.3	40.7	52.5	54.5
Bridge-Only	3.7	7.9	27.5	40.7	54.5
North of Claiborne Avenue	0.3	0.4	0.6	0.7	1.0

Table 31 shows that the shallow draft benefits associated with the bridge-only and North of Claiborne Avenue alternatives. They generally follow the pattern of delay reductions reflected in Table 30.

Table 31
Selective Alternative Summary
Shallow Draft Benefits ($1,000,000)
Most Probable Scenario

Alternative	1990	2000	2010	2020	2030
Bridge-Only	8.6	25.4	20.8	18.1	0.0
North of Claiborne Avenue	13.0	36.5	65.9	91.8	103.0

The magnitude and duration of the delay reductions and benefits are a function of the growth in traffic. Table 32 summarizes the commodity growth rates used in developing the most probable scenario used in our plan formulation process. The aggregate rate for all commodities is fairly steady over the period of evaluation: 1.3 % for the first two 10-year periods and about 1.2 % thereafter. However, the rates for individual commodity groups show considerable variation among groups, as well as variation over time within groups. In fact, for the 1990-2000 period, three groups show a negative growth rate. One of these

groups is crude petroleum, the commodity with the third highest tonnage using the lock.

Table 32
Summary of Annual Commodity Growth Rates
Most Probable Scenario (%)
IHNC Lock

Group	1990 to 2000	2000 to 2010	2010 to 2060
Farm Products	2.1	1.9	1.9
Metallic Ores & Minerals	-0.9	-0.3	-0.3
Coal	2.6	1.5	1.5
Crude	-3.7	2.5	-0.6
Non-metallic Minerals	0.5	0.5	0.5
Forest Products	1.6	0.8	0.8
Industrial Chemicals	2.8	1.7	1.7
Agricultural Chemicals	3.0	1.5	1.5
Petroleum Products	1.5	1.0	1.0
Miscellaneous	-10.5	0.7	0.7
Total Tonnage	1.3	1.3	1.2

Table 33 shows the total tonnage and annual rates for 10 year intervals for the most probable growth rate. The characteristics of these projections are that they are based on national level influences, that the projections incorporate responses to the Clean Air Act requirements, and that these national level projections are generally consistent with the Inland Waterway Investment Study. We believe the growth rates are realistic and are well within the bounds of typical economic activity.

Table 33
IHNC Traffic Projections
Most Probable Scenario

	1990	2000	2010	2020	2030	2040	2050	2060
Tons (1,000,000)	23.5	26.9	30.3	33.9	38.2	43.2	49.1	55.9
Compound Annual Growth from Previous Period	-	1.3	1.3	1.1	1.2	1.2	1.3	1.3

The major commodities moving through the existing IHNC lock are coal, petroleum products, and crude petroleum representing 34, 26, and 10 percent, respectively. These three commodity groups represent 70 % of the total IHNC traffic. Coal and petroleum products represent about 75 % of the projected traffic increases.

Four utility companies located in Mississippi and Florida represent over 90% of the total coal traffic. These companies were surveyed in order to determine their anticipated response to the upcoming Clean Air requirements. Possible responses include no action, substitution of lower sulphur coal (Powder River basin and/or Appalachian), South American imports, and switching to natural gas. The largest user (representing one third of the total volume) indicated that no action was necessary on their part to comply with the new emission standards. While considering other options, the remaining companies each indicated that their most likely response would be to shift the low sulphur coal. These actions, along with the 1993 Department of Energy base case projections for coal-generated electricity demand for the south Atlantic Region (which includes Mississippi, Alabama, Georgia, and Florida), were combined to produce the annual rates used for the projections indicated.

Figure 1 displays the actual tonnage through the lock for the last ten years (1984-1993) compared to our projections. The solid line passing through the dots represents a fitted trend line for this actual data. The upward slope reflects a statistically significant pattern of growth over the period. Our projections are not an extension of the past trend but are based on discussions with the utility companies.

Figure 2 shows our projections of petroleum products which are based on 1993 Department of Energy region specific base case projections for a number of specific commodities that comprise the petroleum products group. The result was a composite growth of 1.5 % through the year 2000 then falling to 1.0 % thereafter.

Figure 3 shows the comparison with historical trends of this commodity group. Like coal, petroleum products reflect a statistically significant pattern of historical growth.

Figure 4 shows the crude petroleum rates based on 1993 Department of Energy base case projections of gulf coast, onshore production. The base case reflects a statistically significant reduction in activity through the year 2000 with an upturn in activity thereafter.

Table 34 shows a benefit cost comparison of our lock replacement plan and the bridge-only plan. This shows that while the bridge-only plan is significantly less costly (approximately 15 % of the North of Claiborne plan), it generates only about thirty percent of the total annual benefits. As a result, the net benefits, the difference between the average annual benefits and costs, which are the basis for the NED plan identification, are significantly higher with the North of Claiborne Avenue alternative.

Coal

Most Probable Growth Rate

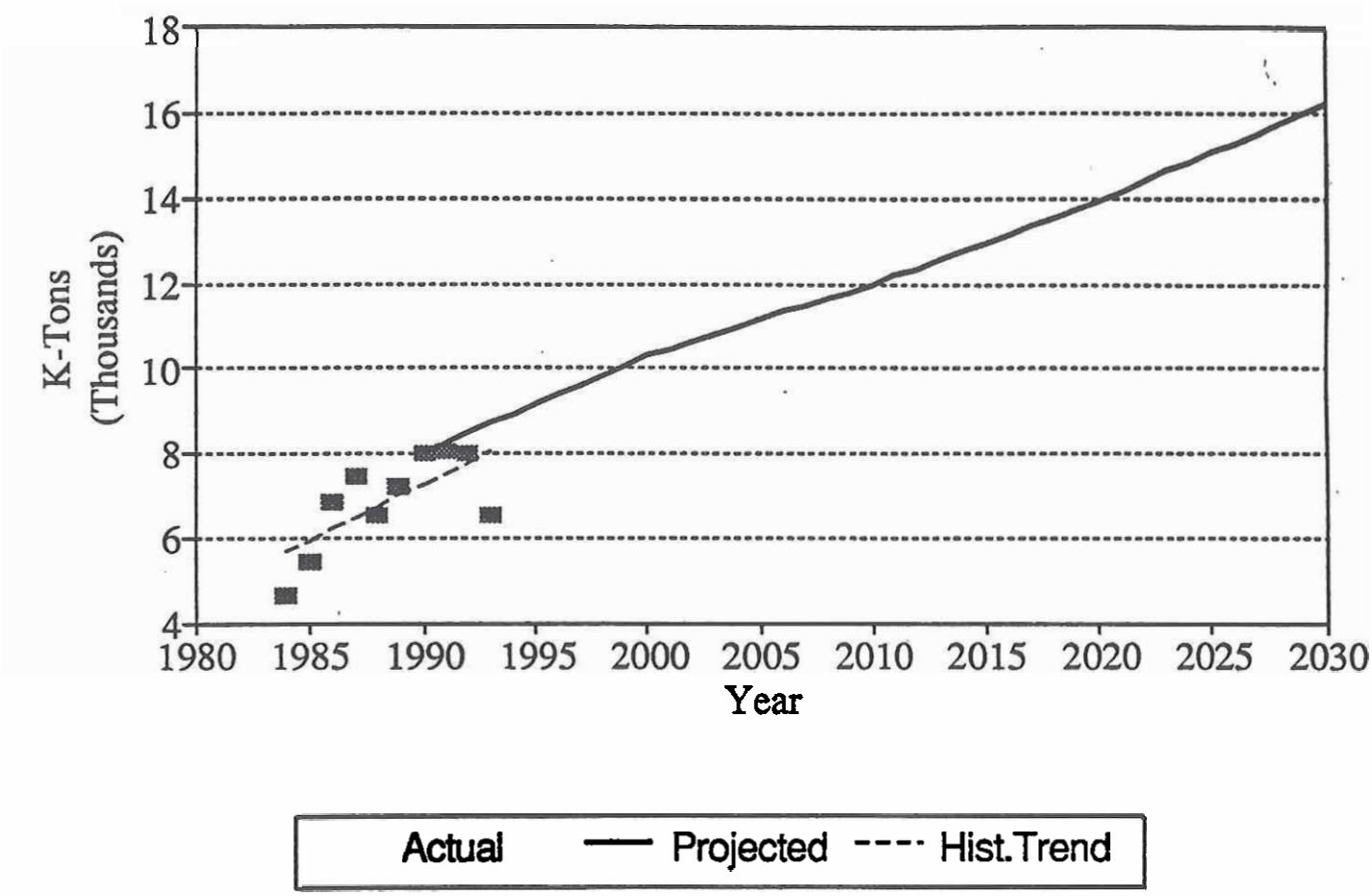


Figure 1

Petroleum Products

D.O.E. Growth Rates

Refrence Case	Gasoline	Jet Fuel	Distillate	Residual	LPG	Other
1990-2000						
South Atlantic	1.2	1.7	1.7	3.1	1.4	-0.3
Southwest	1.3	2.7	1.6	2.1	2.5	-0.5
Midwest	0.6	1.0	1.4	4.3	4.8	-0.5
2000-2010						
South Atlantic	1.0	2.4	1.5	0.4	-0.3	0.0
Southwest	0.8	1.8	1.4	1.5	1.2	0.1
Midwest	0.2	0.9	0.4	-2.7	0.4	0.1

Figure 2

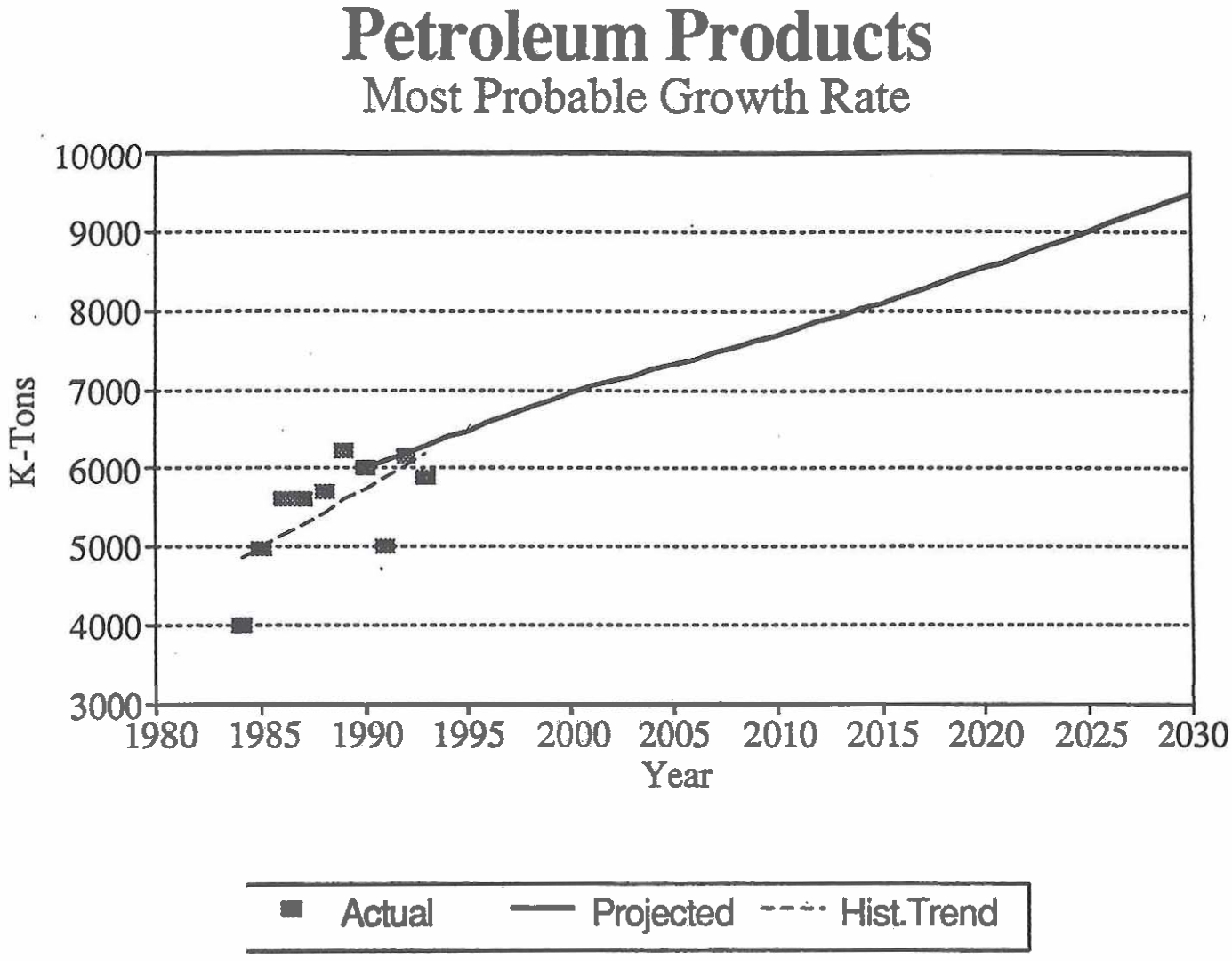

Petroleum Products
Most Probable Growth Rate
10000
9000
8000
7000
6000
5000
4000
3000
K-Tons
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2030
Year
Actual
Projected
Hist.Trend

Figure 3

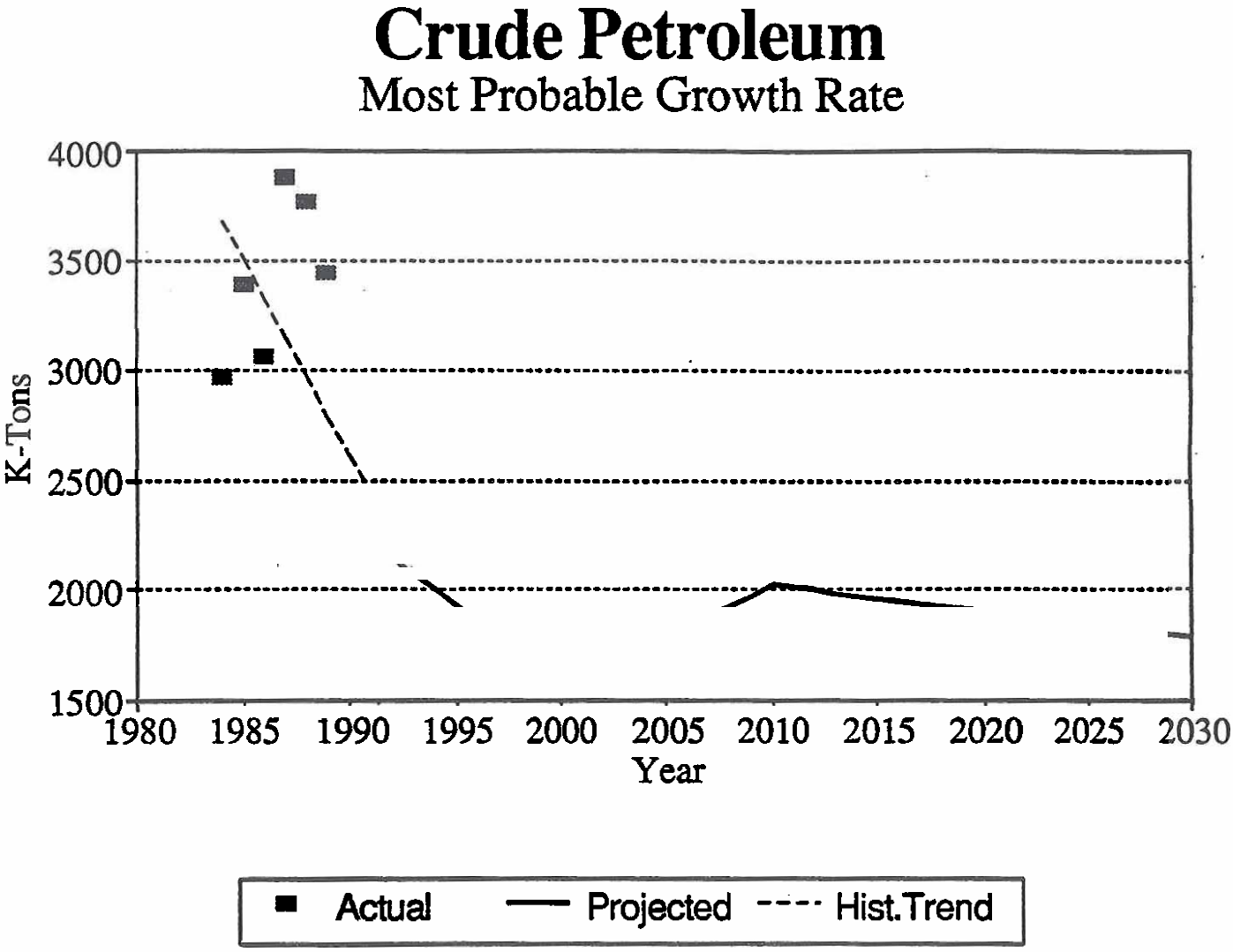

Crude Petroleum
Most Probable Growth Rate
4000
3500
3000
2500
2000
1500
K-Tons
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2030
Year
Actual
Projected
Hist.Trend

Figure 4

Since the bridge-only alternative generates short-term improvements, we evaluated a plan that would include new lock construction in the future when traffic dictated. Our estimate is that a new lock would need to be in operation by 2013 as compared to being in operation in 2011 with the construction of our proposed lock replacement plan. This Phased Construction alternative would include a 300-foot vertical lift span bridge. While similar in first costs to the north of Claiborne alternative, the annual costs of this phased alternative are lower because of the cost associated with lock construction are delayed by about 2 years. The benefits of phased construction are also lower than the North of Claiborne alternative because the years of benefit accrual involve only improvements associated with removal of bridge interference. Therefore, the net benefits of the phased alternative are higher than the bridge-only alternative, but the net benefits are still substantially lower than the North of Claiborne Avenue alternative.

Table 34
Benefit-Cost Summary
Most probable Growth Scenario
(1993, $1,000, 8.0%)

	Bridge Only*	900 x 110 x 22	Phased Approach**
Total Annual Benefits	23,323	133,262	67,266
Total First Cost	53,669	444,254	442,061
Total Annual Costs	4,987	33.262	31,847
BCR	4.6	2.2	1.9
Net Benefits	30,919	72,582	31,847
Public Acceptance	No	Yes	No

*Mid-rise 200-foot horizontal clearance double bascule St. Claude Bridge
**Mid-rise 300-foot horizontal clearance twin tower St. Claude Bridge operation in 2005 and lock operational in 2013.

City of New Orleans Agencies.

Both the New Orleans Historic Districts Landmarks Commission and the New Orleans City Planning Commission expressed opposition to a mid-level "bridge-only " plan.

Neighborhood Organizations.

The Bywater Neighborhood Association, which represents the area on the west side of the canal, expressed opposition to any mid-level bridge. "The impacts of such a proposal would have devastating effects on the surrounding area which could not be adequately mitigated. . . These impacts would cause a serious and rapid decline of Bywater. Our Board of Directors has been

unwavering in its opposition to a mid or high rise bridge at St. Claude Avenue and we will fight to its natural conclusion any proposal which would destroy our neighborhoods."

The Holy Cross Neighborhood Association submitted their recommendations for mitigation, which is included in Appendix A, Mitigation. Recommendations which were considered appropriate have been incorporated into the proposed project mitigation plan.

The Holy Cross Neighborhood Association, the Lower Ninth Ward Neighborhood Council, Inc., and the Holy Cross Community Development Corporation, as well as several local citizens all echoed their disapproval of any mid- or high-level bridge at St. Claude Avenue.

Neighborhood Working Group. As a part of our coordination with the community and in compliance with the guidance received from the Appropriations committees of both the House and Senate in conjunction with the FY-91 Appropriations Act, a Neighborhood Working Group (NWG) was established to represent community interests and provide a broad based community participation to ensure that the local community is informed about the planning process and that it has a voice in the process. The NWG consisted of representatives of the Holy Cross Neighborhood Association, the Bywater Neighborhood Association, and the Lower Ninth Ward Council, as well as the City Planning Department, the Historic Districts Landmarks Commission, the Regional Planning Commission, business interests, elected officials, and others. This group met periodically to discuss neighborhood concerns in an attempt to develop a comprehensive plan to identify and mitigate the social and cultural impacts of the project to the maximum extent practicable. The intent was to ensure that during the development of the IHNC lock replacement project, the communities adjacent to the project remained as complete, livable neighborhoods during and after construction of the project. The primary focus of the NWG was to give maximum consideration to lock replacement alternatives which minimize residential and business disruption while meeting the goals of improving waterborne commerce.

Upon completion of a framework for mitigating the project impacts, the NWG requested that we bring the results to the community. On January 3, 1995 and January 10, 1995, we held two meetings to afford neighborhood residents an opportunity to provide input.

The New Orleans District sent approximately 25,000 brochures explaining the project and announcing the meetings. A total of about 250 people attended the two meetings. They were generally critical of the project, and it was obvious that many of those in attendance felt that the project would have negative impacts on their community. A summary of the key issues surfaced at the meetings as well as summaries of the neighborhood working group meetings and their proposed mitigation plan are included in Volume II, Appendix A - Mitigation.

Navigation Interests

As a part of our coordination with navigation interests, we convened a navigation working group to assist us in developing the north of Claiborne Avenue plan to ensure that the plan was workable and acceptable to navigation interests.

Navigation interests have always supported improvements at the IHNC. Throughout the Gulf Coast region, they have expressed concern about any further delay in constructing a new lock at the IHNC. Exhibit II contains letters from several ports and navigation interests endorsing construction of a new lock at the IHNC.

PUBLIC VIEWS AND COMMENTS

As part of the planning process, the draft report was sent out to agencies and the public for review and comment in early December 1996. As part of the public review process, a public meeting was held at Holy Cross School on January 27, 1997. It was attended by approximately 325 people. The public comment period was held open until March 4, 1997. As a result of the comments received during the public review period, changes to the tentatively selected plan (TSP) presented in the draft report, have been incorporated into the recommended plan in the final report.

The primary change has been the inclusion of a temporary bridge at St. Claude Avenue during the construction of the new bridge at St. Claude. This will effectively alleviate the concerns about impacts to businesses and the impact to Holy Cross School. The temporary bridge will insure that traffic moves across St. Claude Avenue throughout the construction period. The 4-lane temporary bridge will accommodate the traffic just as the existing bridge does. In addition, innovative construction techniques at Claiborne Avenue will result in closure of the Claiborne Avenue bridge for about 2-4 weeks, while the lift span and towers are replaced.

Other changes include a "fold down" floodwall on the levee in the Holy Cross area. The floodwall would be in the raised position about 3 weeks per year. During the rest of the year the view of the river and canal would be unobstructed. The "fold down" sections can serve as a bike/walk/jog path when not needed for flood control purposes. In addition, there have been revisions to the mitigation plan.

Volume 9 (Public Views and Comments) documents the comments resulting from the public review period. Brief responses are also included in that volume.

DESCRIPTION OF THE RECOMMENDED PLAN

The recommended plan will provide a more efficient connection between the Mississippi River and the GIWW and MR-GO and addresses the concerns expressed by various stakeholders during the planning process. Specific features of the plan are described below and shown on Plates 9-21. A more detailed description of specific project features is contained in Volume 3, Appendix B, Engineering. The plan includes revisions made to the tentatively selected plan as a result of comments received during the public review period. The main changes were the inclusion of a temporary vehicular bridge at St. Claude Avenue and revisions to the community impact mitigation plan.

PLAN FEATURES

The location of the proposed new 110- by 36- by 1,200-foot lock is between the Claiborne Avenue and Florida Avenue bridges in the IHNC. The plan includes provision of a temporary navigation by-pass channel to be used during construction, construction of a new low-level St. Claude Avenue Bridge, construction of a temporary bypass bridge at St. Claude Avenue, modifications to the Claiborne Avenue Bridge, extending the Mississippi River flood protection levees to the new lock site, and demolition of the existing lock. Also included are community impact mitigation measures to offset the impacts of project construction and the inconvenience and disruptions expected in the neighborhoods around the IHNC. These measures are discussed in a subsequent section. Beautification measures and aesthetic treatment of project works are included as an integral part of the lock project.

a. **New Lock.** The new lock will be located in the IHNC (river mile 92.6), north of Claiborne Avenue, about one mile north of the east bank of the Mississippi River. The lock chamber will be 110 feet by 1,200 feet usable length, with direct head and reverse head miter gates and lock culvert (tainter) valves, and an interior, ported manifold with 14.5 feet square culverts. The lock will be pile founded. A precast, post-tensioned, concrete shell lock will be constructed at an off-site graving site and floated to the staging area in four pieces. There the lock walls, miter gates and machinery will be completed, and the sections will be moved to their final location. The completed modules will be installed by positioning, partially ballasting and then lowering the modules onto the setting pads. After proper alignment is obtained on the pads, the base grouting and lock wall ballasting will be completed. Plate 11 shows the pile foundation on which the lock will rest. The modules will be floated in, one at a time, from the lake (north) side, beginning with the river (south) module. The joints used to connect the monoliths will also act as expansion joints. The construction excavation will be dredged to the required elevation, and thus no dewatering is required.

Setting piles will be used to set the floated-in structure into final position and for aligning the culverts prior to final grouting. A more detailed description of the lock design and construction is included in Appendix B, Engineering Investigations.

Since the new lock will be situated in the existing channel, temporary bypass channels to allow for continued navigation through the area will be required. The Corp's intent is to reduce canal closure to an absolute minimum because of the extreme cost of closure to navigation. Two types of bypass channels are included at different phases of project construction: (1) a two-way bypass channel between Claiborne and Florida Avenues on the east side of the canal during new lock construction and, (2) a one-way, demolition-phase bypass channel between St. Claude and Claiborne Avenues on the east side, after the replacement lock is in operation and during demolition of the existing lock. The two-way bypass channel will consist of a transit bypass lane and a laying bypass lane as shown on Plate 9. Each channel is 110 feet wide; the laying channel is 20 feet deep, and the transit channel is 31 feet deep. Three protection cells will be placed at both the north and south ends of the bypass channel to contain vessels. Navigation aid markers and lighting will be provided for safe channel passage. Tug assistance vessels will be stationed at the north and south protection cells and will have two-way, marine communication with vessels. The one-way bypass channel will be 12 feet deep, approximately 85 feet wide, and it will be operated only after the new lock has been completed and the old lock is being demolished.

The existing lock will be demolished after the new lock is completed and placed in service. The disruption to navigation will be kept to the minimum required to complete demolition and debris removal. The existing lock must be removed in its entirety for completion of the 200-foot bottom width replacement channel to full width.

b. Levees and Floodwall. The Mississippi River flood protection levees (MRL) and floodwalls must be extended from the existing lock approximately 2,500 feet on the east and west banks to tie into the new lock as shown on Plates 12 and 13. The MRL design grade is elevation 22.4 feet NGVD. The existing hurricane protection floodwalls will serve as hurricane flood protection during project construction, but they will have to be selectively demolished as required to construct the new MRL levee/floodwall to elevation 22.4 feet NGVD. Existing MRL forebay levees will be maintained as an all-earth section, to the extend possible, and will be shaped where needed to a crown elevation 22.4 feet NGVD, with 1 vertical on 3 horizontal side slopes landside and floodside. Part of this levee will include a "fold-down" floodwall.

c. Brdge Modifications and Replacements. It is assumed that prior to construction of the lock project, the existing Florida Avenue Bridge will be replaced by the State of Louisiana

with a new 4-lane, high-level, fixed-span vehicular bridge. The Port of New Orleans is replacing the railroad portion of the bridge, under the Truman Hobbs authority, with a 300-foot vertical-lift span railroad bridge that will have one vehicular lane each way for local traffic. The U.S. Coast Guard has declared the existing bridge an unreasonable hazard to navigation. The new Florida Avenue railroad bridge will be constructed with or without the lock project and constitutes the without project condition relative to Florida Avenue. The existing St. Claude Avenue Bridge will be demolished and replaced with a new low-level, double bascule bridge with a 200-foot horizontal clearance and unlimited vertical clearance as part of the IHNC project. Before the construction of the new bridge, a temporary 4-lane bypass bridge, consisting of 2 single bascule spans (one over the lock and one over the temporary bypass channel), will be constructed and placed in service. Plates 17 - 19 show the bridge plan and details of the proposed temporary bridge which will eliminate the need to close this bridge at all during construction. The limited channel width in the permanent mooring area between St. Claude and Claiborne Avenues (planned after demolition of the existing lock) makes 200 feet a reasonable width, acceptable to the Coast Guard. The replacement St. Claude Bridge, to be built on the same alignment, will be constructed within existing rights-of-way. The touchdown points of the approaches will remain the same. The Claiborne Avenue Bridge superstructure will be replaced as shown on Plate 20. The bridge superstructure will be replaced with higher towers, a new movable span, and new electrical and mechanical equipment. A short 2-4 week closure of this major vehicular artery will be required for this construction.

A temporary bypass bridge will be constructed prior to the new St. Claude Avenue bridge being constructed to eliminate the need to close this major artery at all during construction. The temporary bridge will be two single leaf bascule spans independent of each other. Only one will be moveable at a time. Refer to Volume 3, Appendix B, Executive Addendum, Engineering Investigations for more details.

The first bridge to be constructed is the Claiborne Avenue Bridge. Once the new lock is completed, this bridge will be located on the Mississippi River side of the lock. Retrofitting of this bridge will consist of providing new lift towers, a new lift span, and new machinery constructed upon the existing foundation. The existing foundation. The approach grade would remain the same.

The next bridge to be constructed will be the St. Claude Avenue Bridge. The existing bridge will be replaced. The east foundation must be removed to construct the lock demolition bypass channel. The new structure will be a double bascule bridge with approximately 200 feet of horizontal clearance. This design was preferred by the Neighborhood Working Group since there are no towers and pedestrian crossing would be allowed. A temporary bridge consisting of two single bascule bridges (one over the lock and the other over the by-pass channel) providing 4-lanes of traffic will accommodate all of the existing traffic and require

no closure of this bridge. During the short period of time required to tie the new bridge to the approaches (estimated to be about two months on each end), traffic will be restricted to two lanes. Most of this will take place during the summer as to not impact schools in the area.

d. **Other (Relocations).** Data on the location of roads, railroads, and utilities were gathered by searching permits, visiting sites, and by initial contacts with facility owners. In-house relocation plans were developed using accepted design criteria or by using the owners' specifications.

Utility owners will remove all existing facilities except where the work is incidental to lock demolition. Owners will be contacted of our intent to remove their lines contained in the lock gallery, and a hold harmless statement will be obtained. Owners will design and construct power lines, telephone cables, and pipelines to the current capacities of the existing facilities.

Utility relocations will be constructed within project rights of way or public servitudes within the city streets. These relocations are a project cost, but they are paid for by the owners, not the Federal government.

Roads and Bridges. Road and bridge designs are based upon applicable design criteria such as the AASHTO Bridge Manual or upon input by the neighborhood working group. The relocation of two bridges is an integral part of the lock replacement project. One relocation is necessitated by its foundations being removed to make room for the new channel. The other is necessitated by the bridge being placed on the river side of the new lock and not having adequate vertical clearance for high river stages. Bridge construction will be phased so that only one bridge is closed at a time, ensuring that two crossings of the IHNC will be in operation at all times.

Railroads. The only railroad relocations required are those that lead to the Galvez Street Wharf. These tracks will be removed since the Galvez Street Wharf will be demolished.

Utilities. The relocation of these utilities will be accomplished by the utility owners. These relocations are necessitated by conflicts of the existing utilities with the proposed project. These conflicts result from the narrow channel crossing, congested construction corridor, owners' need for non-interruption of existing service, and sequence of project construction. The plan consists of constructing three utility corridors, with each containing one trench crossing the channel (See Plates 21-23). The required utility relocations are shown in Table 35.

Table 35
Required Relocations Due To Project Construction

UTILITY OWNER	DESCRIPTION OF UTILITY
South Central Bell (SCB)	1-4 Duct Structure
South Central Bell	2-12 Duct Structures
Cox Cable of New Orleans	1-3/4" Coaxial Cable
New Orleans Public Service(NOPSI)	6-24KV Feeder Lines
New Orleans Public Service(NOPSI)	1-Dual High Pressure Gas Distribution Pipeline
Sewerage and Water Board (S&WB)	2-500 MCM, 3 Conductor, Rubber Insulated Steel Wire Armored Cable
Sewerage and Water Board	1-500 MCM, 3 Single Conductors, EPR Insulated, Shielded with PVC Jacket
Sewerage and Water Board	2-20" Cast Iron Water Mains
Sewerage and Water Board	1-48" Cast Iron Water Main
Sewerage and Water Board	2-30" Concrete Gravity Sewer Main
Sewerage and Water Board	1-66" Steel Sewer Force Main
Sewerage and Water Board	1-54" Steel Sewer Force Main
Sewerage and Water Board	1-13,000 GPM Sewer Lift Station

e. **Mitigation**. Given the unique circumstances associated with the urban setting of the project, a shift in focus from the natural environment to the social environment required a corresponding departure from traditional methods of environmental impact analysis and mitigation planning. In practice, mitigation planning within the Corps is almost exclusively confined to the natural resource arena. In the case of mitigation for this project, however, analysis and mitigation of impacts over the entire range of community resources covered by Section 122 of PL 91-611 does not enjoy the benefit of a common measure such as the Habitat Unit used to scale fish and wildlife mitigation features. Nor is the cumulative and interactive nature of multiple impacts well addressed by judgmental scaling, one resource at a time. Once all measures for "in-kind" mitigation are exhausted, residual impacts can only be offset by "out-of-kind" mitigation. The plan objective becomes identification of a set of actions which replace one array of community resources with another array sufficient to restore the community to an equal level of satisfaction. Pursuant to this objective and in accordance with the specific congressional guidance provided, a broad-based community participation process was established to assist us in the development of a general mitigation plan as an integral part of the lock replacement plan. More details and information on the process used in developing the mitigation plans as well as the specific elements of mitigation being proposed are contained in Volume II, Appendix A, Community Impact Mitigation Plan. The environmental impact statement (EIS) includes a discussion of the specific project impacts expected to occur.

The North of Claiborne Avenue site reduces the scope of project impacts from all sites previously considered to the degree that mitigation planning was able to focus on the impact avoidance

procedures, direct minimization of impacts, and compensation for those impacts direct minimization could not adequately address. Plans at this site effectively address the three primary categories of project impacts that are of most concern to the affected community - residential dislocation, construction noise, and traffic congestion. There are **NO** residential dislocations required to implement this project. The pre-fabricated lock design significantly minimizes the on-site construction related noise. In addition, noise monitoring will be required of contractors. Traffic congestion will be minimized by constructing a new temporary bypass bridge at St. Claude Avenue and utilizing innovative construction methods at Claiborne Avenue. These measures will essentially preserve the current level of service that the bridges provide to all users (public transportation, emergency service, school transportation, pedestrians, etc.).

Impact Avoidance Procedures. Impact Avoidance procedures are actions taken to avoid adverse construction impacts which represent prudent engineering design and construction practice. These actions are incorporated in the construction but are not considered mitigation even though they avoid project impacts.

Noise. Construction contracts will include provisions that will limit noise to a certain level within a given distance from the construction site. Pile testing will be required at selected locations to measure noise levels and define the 65 Ldn level or similar measure. While the contractors will be given discretion in the manner of compliance with the standard, the form of compliance would likely include the employment of specialized, remote deployment or isolation of equipment, quieter equipment, and the placement of baffle walls or some other sound absorption devices. Contractors may also be required to use specialized pile driving equipment, such as a vibratory hammer and an underwater hydraulic hammer. They will be required to monitor noise levels to ensure compliance. Also specific routes away from residential areas will be designated for construction related traffic.

Transportation. Specific routes away from residential and commercial areas will be designated for construction-related traffic and remote locations for constructing staging areas. Damage to roads caused by construction activities will be repaired. Also a temporary bypass bridge will be constructed at St. Claude Avenue. Detour signage will be erected when individual streets are closed due to utility relocations. An offsite parking area will be provided for construction workers associated with the construction of levees and floodwalls. Also most of the debris from demolition will be moved by barge.

Aesthetics. Measures to be accomplished include utilizing textured surfaces on floodwalls, bridge approaches, and bridge piers; landscaping areas surrounding levees, floodwalls and bridge approaches; improving lighting along detour routes (existing and new), and backfilling both sides of the new lock to create green space.

Air Quality. Measures will be included to ensure compliance with Federal and State Air Quality Standards to preserve air quality within specified levels. The contractors will be required to monitor air quality in order to verify compliance. Measures may include wetting levees and construction areas (roads) and the use of a monitoring system to reduce dust.

Photo/video documentation. A video/photo documentation program will be implemented to establish existing conditions at the beginning of the construction period.

Employment. Contract specifications will require the contractor to use the local work force in order to achieve minority and local resident participation.
Local residents will be provided a list of job skills that will be required and training opportunities that may be necessary.

Safety. Measures will include signage, fences, and lighting of construction areas. Measurers will also include media notices during certain construction activities. Additionally, school crossing guards will be provided on each side of the canal.

Cultural Resources. The Corps will, in consultation with the Advisory Council on Historic Preservation, the State Historic Preservation Officer, and the New Orleans Historic Districts Landmarks Commission, implement a program of recordation to document structures with historical and/or cultural significance.

Air Quality. Measures will include using mesh barriers around construction sites to reduce dust.

The key elements of the mitigation plan are summarized below under direct impact mitigation, and indirect compensation of impacts.

Direct Impact Mitigation. This refers to actions taken by the Corps in cooperation with local government, community groups, and residents to minimize those adverse impacts which remain following the implementation of the impact avoidance procedures that are previously described.

Noise. Measures will include soundproofing residential or commercial structures that lie within high levels of noise that are related to lock or bridge construction. Pile driving will be scheduled for summer when schools are out of session. Optional temporary relocation of residents close to the new St. Claude Avenue Bridge will be made available.

Transportation. Measures will include synchronized traffic signals, electronic message boards, an incident management plan to facilitate removal of disabled vehicles, preservation of emergency response capabilities, and provision of additional school crossing guards. In conjunction with Civil Defense officials, a backup hurricane evacuation plan will be developed for a bridge construction periods. Local streets that will serve construction traffic will be resurfaced. A detour route from St. Bernard Highway to Florida Avenue would be constructed to improve commuter traffic. Provisions to incorporate rail service on the new St. Claude Bridge will be included.

Cultural Resources. Measures will include salvaging one or more components of the old lock and/or bridge; publishing a

brochure addressing historical features of the lock, bridge, and surrounding community; and erecting a display, or displays, with markers patterned on those associated with National Register locations, featuring appropriate information.

Aesthetics. Measures include an attempt to transplant the better specimen trees from the oak grove adjacent to the existing lock to nearby sites in the community and replacing the stand of mature oak trees adjacent to the existing lock with new plantings, constructing a walk/jog path along the floodwall to replace the use of the existing levee crown, constructing observation decks to provide visual access from the levee/floodwall, providing lighting and green space, expanding green space at lock site by tying lock walls to the Claiborne and Florida Avenue bridges on the east side and Claiborne Avenue Bridge on west side, and landscaping the public rights-of-way.

Employment. Measures will include notifying residents in advance of project construction that will require hiring local residents and providing a list of job skills that will be required. That will enable those interested to pursue the job training that will also be provided by this mitigation plan..

Safety. Barriers and evening safety patrols will be required to discourage vandalism . Increased police protection and school crossing guards will also be required.

Business and Industry. Measures include providing monetary compensation to those commercial establishments and landlords that experience a demonstrable decline in sales and rents during the period of bridge construction. This will be handled on a case by case basis.

Training. Expand the skilled labor work force within the affected community. Local residents would be eligible for tuition assistance grants for training at local vocational-technical schools, or similar type school, for skills required for project construction.

Indirect Compensation of Impacts. This refers to actions taken by the Corps in cooperation with local government, community groups and residents to alleviate those adverse impacts which remain following the implementation of both impact avoidance procedures and direct impact minimization measures previously described. Residual impacts from noise and residual impacts to transportation, aesthetics, employment, community and regional growth, property values, and community cohesion have been identified. A program of indirect compensation is required in order to restore the community to the level of well-being equal to that which existed prior to project construction. This program includes the following:

a. Working with displaced lessees on the IHNC to encourage them to relocate in Orleans Parish. Incentives may include new leases on concessionary terms.

b. Implementing a program for streets improvements, and improvements within an area, yet to be determined, on each side of the IHNC.

c. Establishing a business assistance program in the area to serve as a resource center and stimulus for local business development.

d. Establishing a Neighborhood Revitalization Program to serve as a source of money for a program of housing rehabilitation and educating local residents on maintaining their housing. Also included will be clearing vacant lots, and demolishing and rebuilding abandoned housing.

e. Community facilities, such as parks, playgrounds, community gardens, and tot lots will be provided.

f. Additional police and emergency medical services during the construction period will be paid for from the mitigation fund

Details on mitigation elements are contained in Volume II, Appendix A, Community Impact Mitigation Plan. Costs estimates for mitigation elements are likewise contained in the appendix.

DESIGN AND CONSTRUCTION CONSIDERATIONS

General. The innovative pre-cast, post-tensioned, float-in construction technique will shorten the on-site construction time required by allowing for the pile foundation to be prepared and other site work to be accomplished at the same time the lock shell is being fabricated at the graving site. The evolution of this innovative lock design, construction technique, and location have resulted from a sensitivity to potential impacts to the human environment that would result from a more conventional approach.

The following is a summary of the conceptual construction sequence for the major elements of the project which are depicted in the computer enhanced photographs contained in Exhibit 1.

(1) Existing conditions showing the north of Claiborne Avenue location.

(2) The new bridges at Florida Avenue.

(3) Site preparation which will include removing the trees, demolition and relocation of the US Coast Guard station, removal of the Galvez Street Wharf, and relocation of the businesses along the east side of the IHNC.

(4) Construction of the new levees and floodwalls to provide MR&T protection back to the new lock location and to provide hurricane protection on the tidewater side of the new lock location will be next. Mississippi River flood protection requires about 10 additional feet above the current level of protection along the canal.

(5) Construction of a navigation bypass channel between Claiborne and Florida Avenues would then take place. The

navigation bypass channel will include two lanes, one to accommodate barge traffic (22 feet) and one to accommodate ship traffic (31 feet). It is intended that the bypass channel will accommodate traffic with the use of tug assistance for tows and ships. Construction of protective cells near Florida and Claiborne Avenues will also be accomplished.

(6) Site preparation, including excavation for lock and construction of the pile foundation and preparation for the precast lock modules, will then be accomplished. This will include construction of protective cells that will delineate and protect the lock construction area within the normal channel.

(7) Floating-in the individual sections of the precast lock.

(8 & 9) Completing the lock walls machinery and gates at the work platform in the staging area.

(10) Moving the sections and attaching sections to their foundation.

(11) Completing construction of the lock at its final location.

(12) Construction of the levee tie-ins to the lock structure to provide protection from both river flooding and hurricane surge protection will then be accomplished. The area between the lock and protection levees will be backfilled and eventually developed as green space with the exception of the area along the turning basin which will be used for port related facilities. This area will also include sufficient space for development of lock support facilities (work center/shop, parking etc.). The guidewalls for the new lock will be completed and the Claiborne Avenue bridge towers will then be removed.

(13) The towers, lift span, and mechanical equipment for the Claiborne Avenue bridge will then be replaced. After the new lock is fully operational, construction of the temporary bridge at St. Claude Avenue (not shown) will take place.

(14) Demolition of the old lock, estimated to take about 18 months, will then be accomplished in several phases. This will include removal/demolition of the St. Claude Avenue bridge.

(15) The new channel will be dredged upon completion of the lock.

(16) The new St. Claude Avenue double bascule bridge and lock entrance channel mooring cells between St. Claude and Claiborne Avenue will then be constructed.

Relocations. A complete listing of all facilities affected by the IHNC Lock Replacement was developed. These facilities included roads and bridges, railroads, and utilities. Only those facilities that would interfere with excavation were relocated. The Claiborne Avenue Bridge also had to be modified since it would not provide adequate clearance for high river stages.

Hydraulic Design. The major considerations in the hydraulic design of the lock were the differential heads. In addition to normal stages the lock must be designed to provide MRL level of protection on the river side as well as SPH protection on the lake side of the lock. The lock depth required to minimize the hawser forces was also considered. Filling and emptying systems were also a major consideration. These systems were not only designed to minimize lockage times but also to accommodate a reverse head situation.

Foundations and Geology. The primary concerns addressed slope failures of the proposed levee re-alignments and the development of a foundation for the lock structure. Sheetpile seepage control was developed for the perimeter of the lock. A foundation to support the lock without piles while limiting settlement was designed. A drainage blanket underneath the foundation was also designed in order to limit uplift pressures.

PLAN ACCOMPLISHMENTS

The recommended plan, as previously described, would achieve the goals of the study, resolve the identified problems to an acceptable level, realize potential opportunities, and meet identified needs.

Construction of the plan would eliminate the delay currently experienced by navigation traffic and would significantly increase the tonnage capacity of the lock. Construction of the lay areas would provide for safer navigation passage through the area. Construction of the bridge improvements and the related detour route would facilitate movement of vehicular traffic.

Implementation of mitigation measures prior to and during construction of the project would offset the identifiable project impacts to the extent practicable and insure that the neighborhoods on both sides of the IHNC remain viable.

ECONOMICS

As a result of the changes made to various construction and mitigation features to address community impacts, changes to the project costs and benefits reflected in the Economic Analysis, Appendix E, Volume 7 have resulted. The project changes include the construction of a temporary bridge at St. Claude Avenue, redesign of the Claiborne Avenue Bridge, redesign of the proposed floodwall between St. Claude Avenue and the Mississippi River,

moving a number of features previously identified as mitigation to construction, and modification to several mitigation features. The impacts of these changes on project costs, benefits, and the recommended plan are described below.

Project costs. Project construction expenditures by year in 1996 dollars, exclusive of mitigation costs, are displayed in Table 36. The implementation periods and base years for the two plans are unaffected by the changes in project features described above. However, total first costs have increased by approximately $18.4 million for both plans. The increase reflects temporary bridge/bridge redesign, floodwall redesign, previously identified mitigation features shifted to construction, and several minor cost estimation refinements (increases and decreases) to elements of the plan that were otherwise unchanged.

Table 36
Construction Expenditures By Year
Exclusive of Mitigation and Sunk Costs
(1996 $1,000's)

Year	900 x 110 x 22	1200 x 110 x 36
1998	5,328.4	6,157.2
1999	33,832.9	34,774.7
2000	30,792.3	31,330.4
2001	30,773.4	22,176.4
2002	14,385.3	16,693.0
2003	66,171.9	77,053.6
2004	44,288.6	49,056.0
2005	53,785.5	59,547.3
2006	33,303.4	39,168.4
2007	54,631.0	49,461.7
2008	24,408.7	46.633.9
2009	29,198.6	24,816.7
2010	-	22,230.7
Total	410,900.0	479,100.0

Mitigation costs by year are identified in Table 37. As indicated above, some previously identified mitigation costs have shifted to construction items. These costs amounted to approximately $5.0 million. Another $7.0 million of previously identified mitigation costs have been eliminated as a direct result of the inclusion of the temporary St. Claude Avenue Bridge and the redesign of the Claiborne Avenue Bridge. These reductions have been offset by the inclusion of an equal amount of additional mitigation costs. Total mitigation costs are therefore unchanged from those previously presented.

Table 37
Mitigation Expenditures By Year
(1996 $1,000's)

Year	900 x 110 x 22	1200 x 110 x 36
1999	6,570.0	6,570.0
2000	187.5	187.5
2001	187.5	187.5
2002	6,376.8	6,376.8
2003	6,549.2	6,549.2
2004	332.5	332.5
2005	3,042.5	332.5
2006	1,017.5	3,042.5
2007	4,875.9	1,017.5
2008	2,824.9	4,543.4
2009	1,043.0	2,824.9
2010	-	1,043.0
Total	33,000.0	33,000.0

Table 38 displays the composition of total first cost, the present value cost necessary to calculate average annual costs, and lastly, the average annual costs. Overall, average annual costs have increased by approximate $1.9 million for both plans. The increase is a direct result of the increase in first costs.

All costs in Table 38 represent 1996 price levels. Annual costs were calculated using an interest rate of 7.375 percent, a 50-year project life, and a plan specific base year indicated in the table.

Table 38
Cost Summary
(1996 $1,000's 7.375 Percent)

Item	900 x 110 x 22	1200 x 110 x 36
Construction Costs	410,900	479,100
Mitigation Costs	33,000	33,000
Nav Losses During Const	2,546	2,588
Total Costs	446,453	514,695

Table 38 Continued
Cost Summary
(1996 $1,000's, 7.375 Percent)

Item	900 x 110 x 22	1200 x 110 x 36
P.V. Const Cost	616,667	755,237
P.V. Mitigation Costs	51,901	54,677
P.V. Nav Losses	2,735	2,780
Total P.V. Costs	671,313	812,694

Table 38 Continued
Cost Summary
(1996 $1,000's, 7.375 Percent)

Item	900 x 110 x 22	1200 x 110 x 36
Annual Construction Costs	46,814	57,333
Annual Mitigation Costs	3,939	4,150
Annual Nav Losses	208	211
Annual Perm DD Losses	477	0
Annual O&M Costs	1,382	1,384
Induced Vehicular Losses	0	0
Total Annual Cost	52,820	63,078
Base Year	2010	2011

Benefits. Table 39 displays the composition of total average annual benefits. All benefits represent 1996 price levels, an interest rate of 7.375 percent, a 50-year project life, and a plan specific base year indicated in the table. As presented, the benefits are unchanged from those previously reported in Appendix E, Volume 7. One unquantified impact, not related to the change in project features described above, should be noted. Additional investigation has revealed that the operation time of the new permanent bridge at St. Claude Avenue would be faster than that assumed in the previous estimates. As a consequence, the vehicular benefits presented here are slightly understated. The degree of understatement has not been quantified because the magnitude of bridge operation time improvement has not been precisely determined.

Table 39
Annual Benefit Summary
(1996 $1,000's, 7.375 Percent)

	900 x 110 x 22 (w/curfews)	1200 x 110 x 36 (w/curfews)
Shallow Draft	83,982	87,448
Deep Draft	0	979
Vehicular	5,909	6,563
Savings to Federal Project Maint Closure	4,017	4,194
Nav Losses Prevented	10,471	11,243
Total Annual Benefits	104,379	110,427
Base Year	2010	2011

Economic Justification. Table 40 summarizes the annual costs, annual benefits, net benefits, and benefit to cost ratios. Net benefits reflect a decrease of less than four percent. Benefit-to-cost ratios reflect a reduction of less than one-tenth of a point for both plans.

Table 40
Recommended Plan Summary Information
(1996 $1,000's, 7.375 Percent)

	900 x 110 x 22 (w/curfews)	1,200 x 110 x 36 (w/curfews)
Total Annual Cost	**52,820**	**63,078**
Total Annual Benefits	**104,379**	**110,427**
Net Benefits	**51,559**	**47,349**
BCR	**1.98**	**1.75**
Base year	2010	2011
Net Benefits Adj. to 2010	51,559	44,097

PLAN IMPLEMENTATION

INSTITUTIONAL REQUIREMENTS

Since the recommended plan is a single-purpose navigation project, all costs are attributable to navigation and will be allocated between inland waterway and deep-draft navigation.

The deep-draft feature of the project requires a non-Federal sponsor. The Board of Commissioners for the Port of New Orleans has been designated by the State of Louisiana to serve as sponsor. In accordance with PL 99-662, the inland waterway feature of the project will be cost shared 50-50 between the Inland Waterways Trust Fund and Federal Appropriated Funds. The deep-draft increment, which our analysis demonstrates does not warrant full participation, will be totally paid for by non-Federal interests. Federal participation is limited by the Federal share of the Federally supportable plan, the NED plan.

The locally preferred plan, the deep-draft lock, has outputs similar in kind, and equal to or greater than the outputs of the NED plan and is economically justified on an overall basis.

Table 41 presents a summary breakdown of the First costs for the NED and the recommended plans.

Table 41

Summary Estimate of First Costs for the NED and Recommended Plans*

Account	Description	NED	TSP
01	Lands & Damages	$45,200,000	$45,200,000
02	Relocations	85,300,000	85,500,000
05	Locks	204,500,000	257,800,000
09	Channels and canals	16,600,000	22,000,000
11	Levees and Floodwalls	11,200,000	11,400,000
18	Cultural Resources	600,000	600,000
25	Mitigation	33,000,000	33,000,000
30	Engineering & Design	50,300,000	56,100,000
31	Construction Management	16,400,000	19,800,000
	T o t a l	$463,100,000	$531,400,000

* Includes sunk costs

DIVISION OF PLAN RESPONSIBILITIES

Since the Federally supportable plan, the NED plan, is a single-purpose inland navigation project, all costs are allocated to commercial navigation. The NED plan is currently estimated to cost $463,100,000. Approximately $23,000,000 in utility relocations have been determined to be non-compensable and therefore will be paid for by the utility owners. Of the remaining $440,100,000, fifty percent, or $220,050,000, would come from Federal appropriated funds and the other fifty percent, $220,050,000, would come from the Inland Waterways Trust Fund. The recommended plan, a locally preferred plan, a deep-draft lock, will cost $531,400,000, or an increase of $68,300,000 over the NED plan. The incremental cost of $68,300,000 between a shallow- and deep-draft project will be borne in full by the Port of New Orleans. The real estate required for the project which is the same for the NED plan and the recommended plan, currently estimated to cost about $45,316,000, will be acquired by the Federal government (Corps of Engineers). The Board of Commissioners of the Port of New Orleans owns almost all of the real estate required for this project and will be given credit for these lands towards their share of the recommended plan. The entire project will be designed and constructed by the Corps of Engineers. Upon completion, the Corps will operate and maintain the project.

Cost Changes. The incremental cost difference between the NED Plan and the recommended plan is presently estimated at $68,300,000. Based on the model Project Cooperation Agreement (PCA) for navigation projects, the Port of New Orleans would be required to furnish that amount upon execution of the PCA, which will not occur until funds are appropriated for construction of this project. However, future cost changes, increases or decreases, in the recommended plan need to be accounted for in the process of ensuring this incremental cost difference is as up-to-date as possible when the Port of New Orleans has to provide this incremental cost difference.

The following method will be used to address cost changes in the future.

a. The costs for Lands and Damages, Relocations, Levees and Floodwalls, Community Impact Mitigation, and most of the Engineering and Design and Supervision and Administration are the same for the NED Plan as for the Recommended Plan. The only costs that change between plans are the costs associated with the Lock and Channels/Canal features. Therefore, the appropriate share of the project cost that is attributable to the incremental cost difference would be calculated using only the costs of the Lock and Channels/Canal feature.

b. The Lock and Channels/Canal costs for the Recommended Plan is now estimated at $279,800,000. The incremental cost difference is now estimated at $68,300,000, and that results in the appropriate share being approximately 22.9 percent.

c. The present incremental cost difference of $68,300,000 would be adjusted by applying this 24.4 percent factor to any

future changes in the Lock and Channels/Canal feature costs of the Recommended Plan. For instance, if the Lock and Channels/Canal cost for the Recommended Plan increases by $10,000,000, the incremental cost difference would increase by $2,440,000 (0.244 x $10,000,000) and the Port of New Orleans would be responsible for the additional $2,440,000. Any changes in the cost of the features other than the Lock and Channels/Canal would be considered part of the NED Plan and shared 50-50 between the Corps and the Inland Waterways Trust Fund.

CONCLUSIONS

I find that the recommended plan to provide a new lock 110- x 36- x 1200-feet at the IHNC as developed in this report and EIS is based on a thorough analysis and evaluation of all practicable alternatives, in view of applicable economic, engineering and environmental criteria. The report responds to WRDA 86 (PL 99-662) and subsequent Congressional guidance in the Committee reports of the U.S. House and Senate Appropriations Committees in conjunction with the FY-91 budget and documents the events leading to a recommendation.

I have given consideration to the risks and uncertainties associated with the unpredictability of future traffic on the waterway system and developments in navigation technology. Traffic on the waterway system in the area is projected to grow at a medium rate which I believe is reasonable. With this in mind, the IHNC lock will continue to experience significant delays and be unable to efficiently service the existing and future traffic unless action is taken to replace the existing lock.

I also understand the Port's concerns and their desire for a deep-draft facility in order to fully utilize existing facilities and insure the future viability and competitiveness of the port.

The bridge-only alternative and the phased construction approach (building a mid-level bridge now and building the rest of the lock project at a future date) would have significant negative impacts to the local communities on either side of the canal. Lack of public acceptance for the proposed bridge-only plan and any phased construction approach would make implementation virtually impossible and would not adhere to the Congressional direction of ensuring that communities adjacent to the project remain as complete, livable neighborhoods during and after construction of the project and giving maximum consideration to lock replacement alternatives which minimizes residential and business disruption while meeting the goals of improving waterborne commerce. In addition, the bridge only alternative does not maximize net benefits, and, even though it may offer a good rate of return on the investment, it does not qualify for recommendation because of the total lack of local support.

The social, environmental, and economic effects and engineering feasibility of the recommended plan and a wide range of alternative plans to address the problem and needs have been evaluated over time. Our analysis reveals that the existing navigation problems can best be solved, the needs met, and the opportunities realized through construction of the recommended plan - a new lock north of Claiborne Avenue using a precast, post-tensioned, floated-in technique.

ENVIRONMENTAL CONSIDERATIONS.

Natural Environment. The recommended plan has moderate impacts on the natural environment. The plan would require disposal of approximately 3 million cubic yards of dredged material, have slightly greater releases of lock water than the current lock and would result, in time, in increased vessel traffic on the GIWW-East. The US Fish and Wildlife Service has reviewed the proposed plan and provided comments in their Coordination Act Report (CAR). Refer to Volume 6. A part of the dredged materials that are not considered contaminated, will be used beneficially to create marsh and mitigate for the loss of wetlands at the graving site. Special recognition has been afforded wetlands because they are a unique and are considered a nationally important natural resource.

Human Environment. There are no residential relocations associated with the proposed project. The recommended plan will have significantly less impact on the neighborhoods than plans previously evaluated and proposed. These impacts have been minimized to the extent practical. The District, in conjunction with the Port of New Orleans, and with input from the affected neighborhoods, has developed a mitigation plan to ameliorate the impacts expected to result from construction of the project. The direct and indirect impacts of the project on the neighborhoods require mitigation in order to implement the project. The mitigation plan was developed in coordination with various local stakeholders through a neighborhood working group process. During construction, vehicular traffic will be inconvenienced but no major long-term detouring will be required. At St. Claude Avenue, a temporary bridge will handle the same local and commuter traffic that currently uses that route. Temporary shutdown of about 2 - 4 weeks at Claiborne Avenue will impact vehicular traffic. Some noise will also be associated with construction of the project. However, contemporary pile driving techniques, such as vibratory hammers and underwater hydraulic hammers, will significantly reduce those impacts.

The recommended plan, including all of the measures comprising the community impact mitigation plan, is probably the only plan that could ever reasonably be constructed at the IHNC to address the navigation problems in a comprehensive fashion. While there is localized opposition, all of the other plans investigated over time have encountered significantly more opposition. Continued pursuit of any of those plans would only result in more delays, with tremendous costs being incurred, only to be deadlocked.

ECONOMIC CONSIDERATIONS

Construction of the new lock, as planned, will eliminate congestion and delays to navigation and provide a safer, more

efficient connection in the waterway system. In addition, vehicular traffic will benefit from proposed bridge improvements.

The Port of New Orleans, an agency of the State of Louisiana, has indicated their willingness to pay for the incremental cost of the deep-draft lock.

The recommended plan meets the needs of both shallow and deep-draft navigation over the life of the project and the primary objective of providing a more efficient connection for commercial navigation between the Mississippi River and the GIWW and MR-GO.

ENGINEERING CONSIDERATIONS

None of the plans for constructing a new lock north of Claiborne Avenue would be readily reversible since they provide for construction of a large permanent structure, permanent bridge modifications at Claiborne Avenue, and a new bridge at St. Claude Avenue. The design and pre-cast, float-in construction technique proposed for the new lock reflect current proven technology that has been adapted to lock construction. The location recommended, coupled with the construction technique proposed, has significantly reduced the project impacts over conventional construction. When implemented, the project will fulfill the objectives of improving navigation efficiency and increasing the capacity at the IHNC lock. The proposed project incorporates lay areas, not currently available at the existing lock, which will facilitate movement of navigation traffic and make operation of the IHNC safer after the project is in service. The flow of vehicular traffic in and out of the area will also be improved as a result of the temporary and permanent bridges and other related improvements for vehicular traffic.

PUBLIC INTEREST CONSIDERATIONS

On balance, I believe it is in the overall public interest to construct the recommended plan. The recommended plan is the most desirable plan for increasing the lock capacity to accommodate the largest vessels that might reasonably make use of the lock. This plan has been developed in coordination with the Port of New Orleans, navigation interests, the neighborhoods, and the business community. Planning efforts have also been coordinated with local officials. The location of the proposed new lock at the IHNC minimizes impacts on the community compared to other plans considered in the past. Based on coordination with all stakeholders, we believe we have developed a plan that accommodates most stakeholders. The recommended plan addresses the problems in a manner consistent with the environment, provides for the future, and considers community concerns in a way that is not afforded with other plans, including the no action and the bridge-only plans.

RECOMMENDATIONS

As the District Engineer, I have considered the significant environmental, social, and economic effects, the engineering feasibility, and the input received from the neighborhood working group, the navigation working group, and the general public and have determined that the recommended plan presented in the report is in the overall public interest.

Considering the long history of this project and the sensitivity, risks, and uncertainty associated with this analysis, I recommend that a new lock be constructed in the IHNC, north of Claiborne Avenue, subject to such modifications thereof of the Commander HQUSACE (Chief of Engineers) and the Assistant Secretary of the Army (Civil Works) may deem appropriate. The recommended plan provides for:

a. Construction of a new lock 110 feet wide by 1,200 feet long by -36 feet (NGVD) deep, north of Claiborne Avenue, using a pre-cast, floated-in concrete technique,

b. Construction of a temporary bridge at St. Claude Avenue and replacement of the existing St. Claude Avenue bridge with a new, low-level double bascule bridge, and modification of the Claiborne Avenue bridge to accommodate higher stages of the Mississippi River,

c. Construction of lay areas for vessels waiting to transit the lock,

d. Construction of a temporary navigation by-pass channel around the construction site of the new lock and a temporary navigation bypass channel around the existing lock during its demolition,

e. Construction of extensions of the Mississippi River flood protection and hurricane protection levees and floodwalls,

f. Implementation of the community impact mitigation plan to ensure that the communities affected by the project are properly and adequately compensated to mitigate for project impacts.

This recommendation is also made with the full understanding that the neighborhood working group and members of the general public who live near the project site remain strongly opposed to the project.

The total first cost for the overall project is currently estimated at $463.1 million for the shallow-draft lock and $68.3 million for the deep-draft increment, totaling $531.4 million. The average annual operation, maintenance, and replacement cost for the recommended plan is estimated at $1.4 million. The Federal government will operate and maintain the new lock.

I believe that the North of Claiborne Avenue Plan is the only viable solution for lock replacement and represents the culmination of many years of effort to replace the lock while minimizing project impacts. Any further study of alternatives is deemed cumulative, and I feel that it is time to commence replacement, or discontinue work on this project. If the replacement plan is not initiated based on this document, I recommend that we commence with extraordinary maintenance plans for the existing, undersized lock, to avoid unforeseen and lengthy lock closures in the future.

The recommendations contained herein reflect the information available at this time and current departmental policies governing the formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the perspective of higher review levels within the executive branch. Consequently, the recommendations may be modified before they are transmitted to Congress as proposals for implementation funding. However, prior to transmittal to the Congress, the Port of New Orleans, the State of Louisiana, and other states, interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

William L. Conner
Colonel, U. S. Army
District Engineer

MR-GO New Lock and Connecting Channels, Louisiana

Evaluation Report

EXHIBIT I

MR-GO, New Lock & Connecting Channels
Construction Sequence

(1) **Existing conditions showing the new lock location.**

(2) **New bridges at Florida Avenue.**

(3) **Site preparation.**
(Removing the trees, demolition and relocation of the US Coast Guard station, removal of the Galvez Street Wharf, and relocation of the businesses along the east side of the IHNC.)

(4) **Construction of the new levees and floodwalls.**

(5) **Construction of a navigation bypass channel.**
(Bypass channel will accommodate traffic with the use of tug a ssistance for tows and ships. Construction of protective cells near Florida and Claiborne Avenues will also be accomplished.)

(6) **Lock Site preparation.**

(7) **Floating-in the precast lock sections.**

(8 & 9) **Completing lock walls, machinery, and gates at the work platform in the staging area.**

(10) **Moving the sections and attaching sections to pile foundation.**

(11) **Completing construction of the lock.**

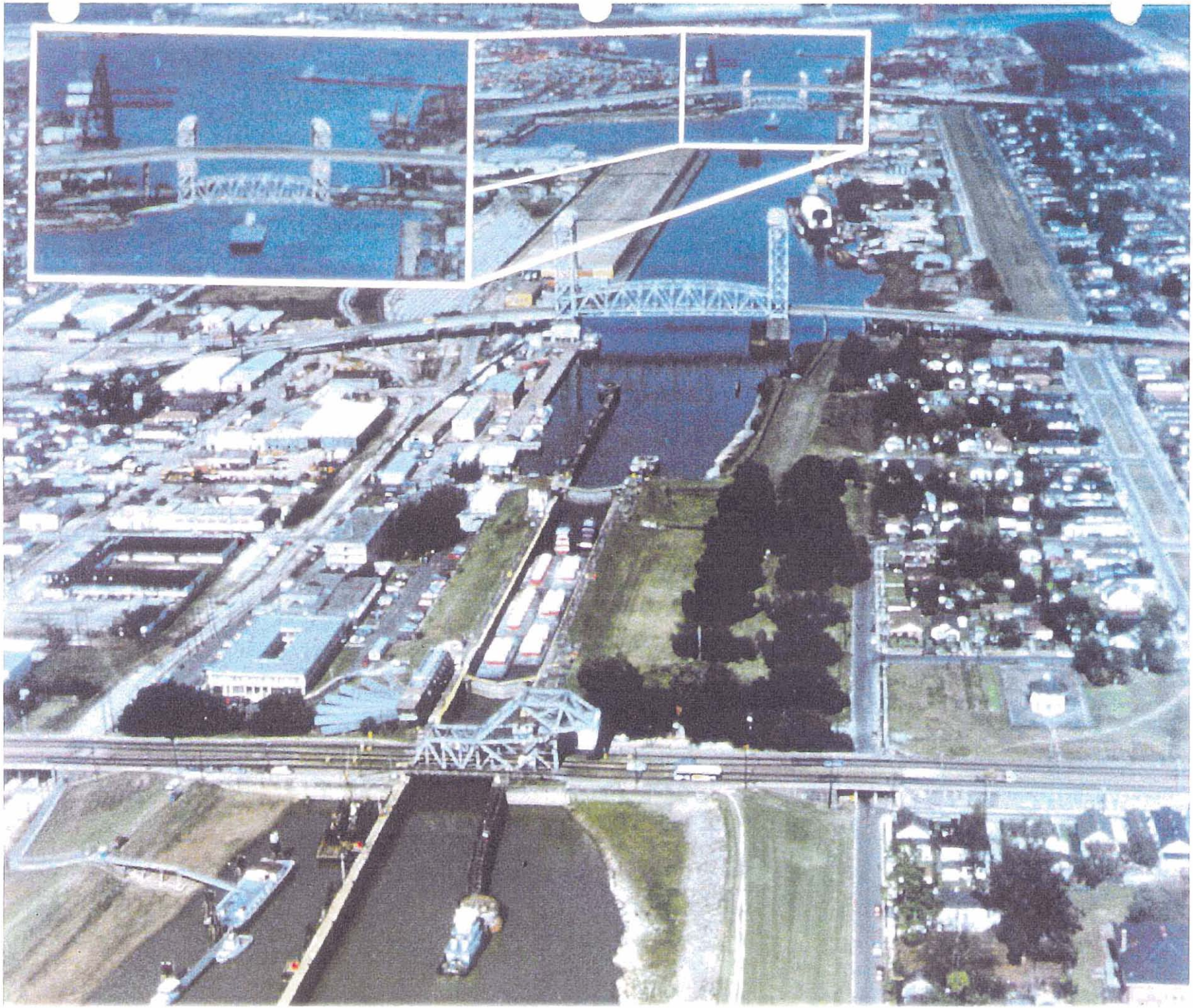
(12) **Construction of the levee tie-ins, New Lock Guide Wall, and Claiborne Avenue Bridge tower and span removed.**

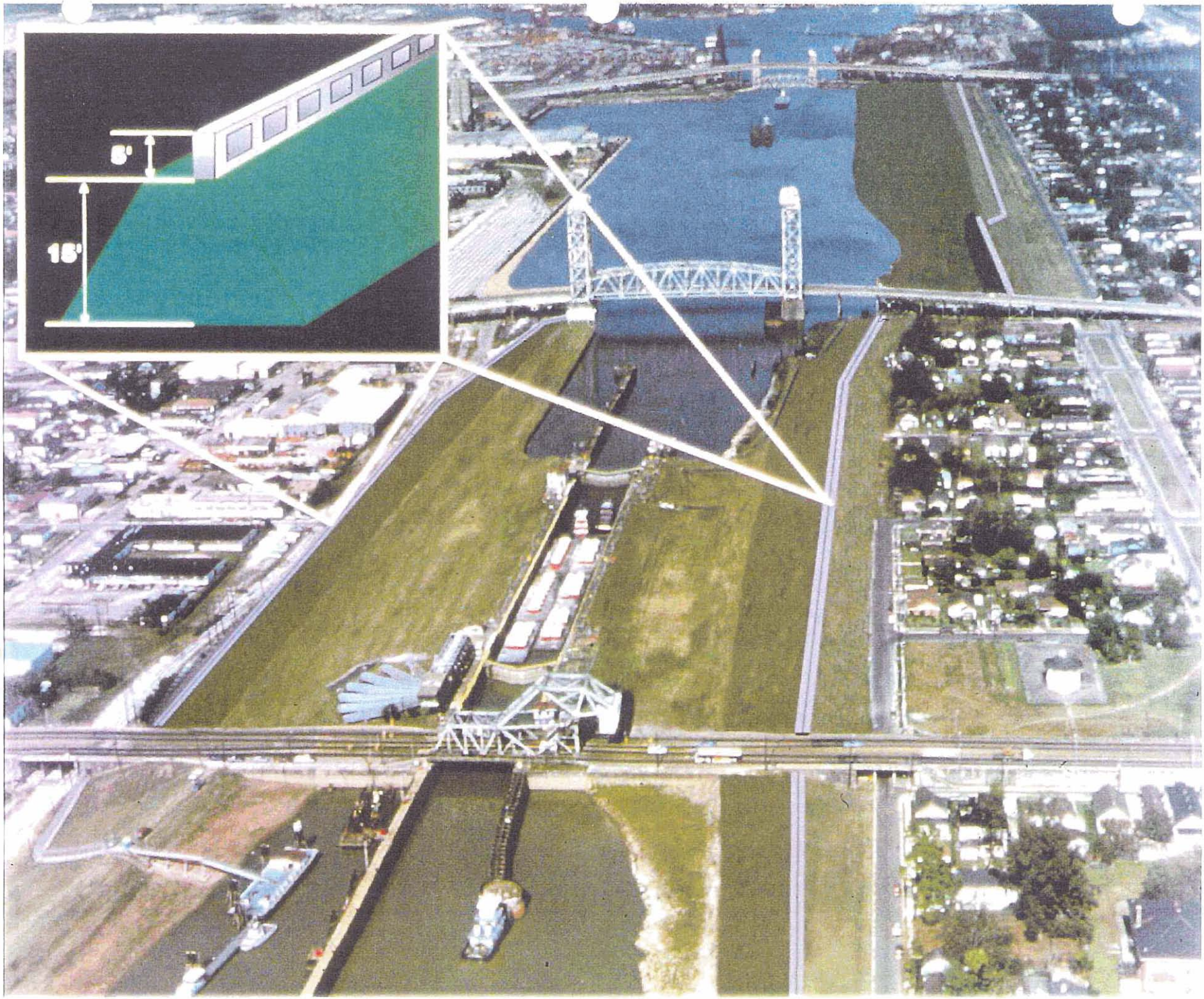
(13) **The towers, lift span, and mechanical equipment for the Claiborne Avenue bridge will then be replaced.** After the new lock is fully operational, construction of the temporary bridge at St. Claude Avenue (not shown) will take place.

(14) **Demolition of the old lock - Bypass channel.**

(15) **The new channel will be dredged.**

(16) **The new St. Claude Avenue double bascule bridge and lock entrance channel mooring cells will then be constructed.**

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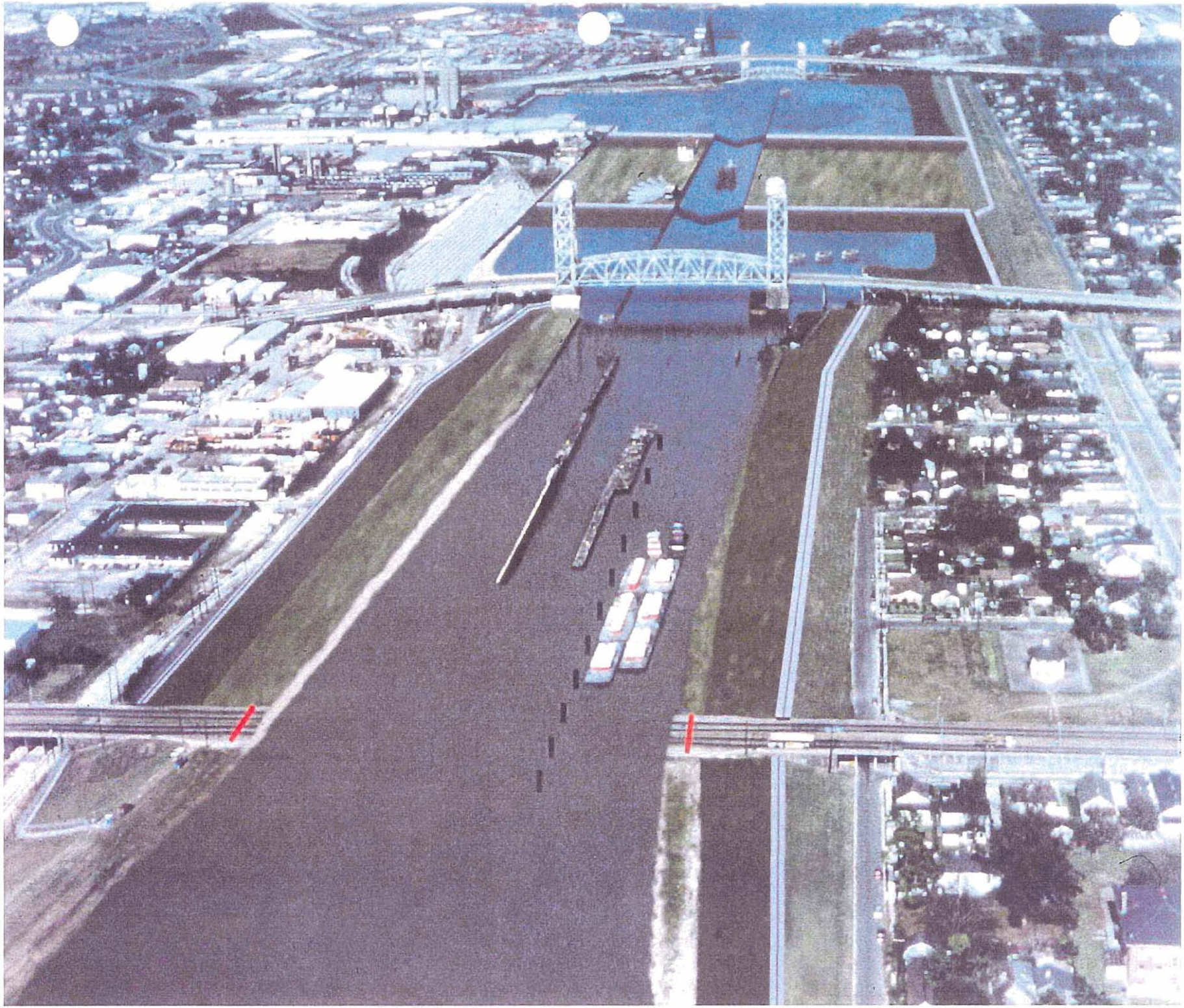

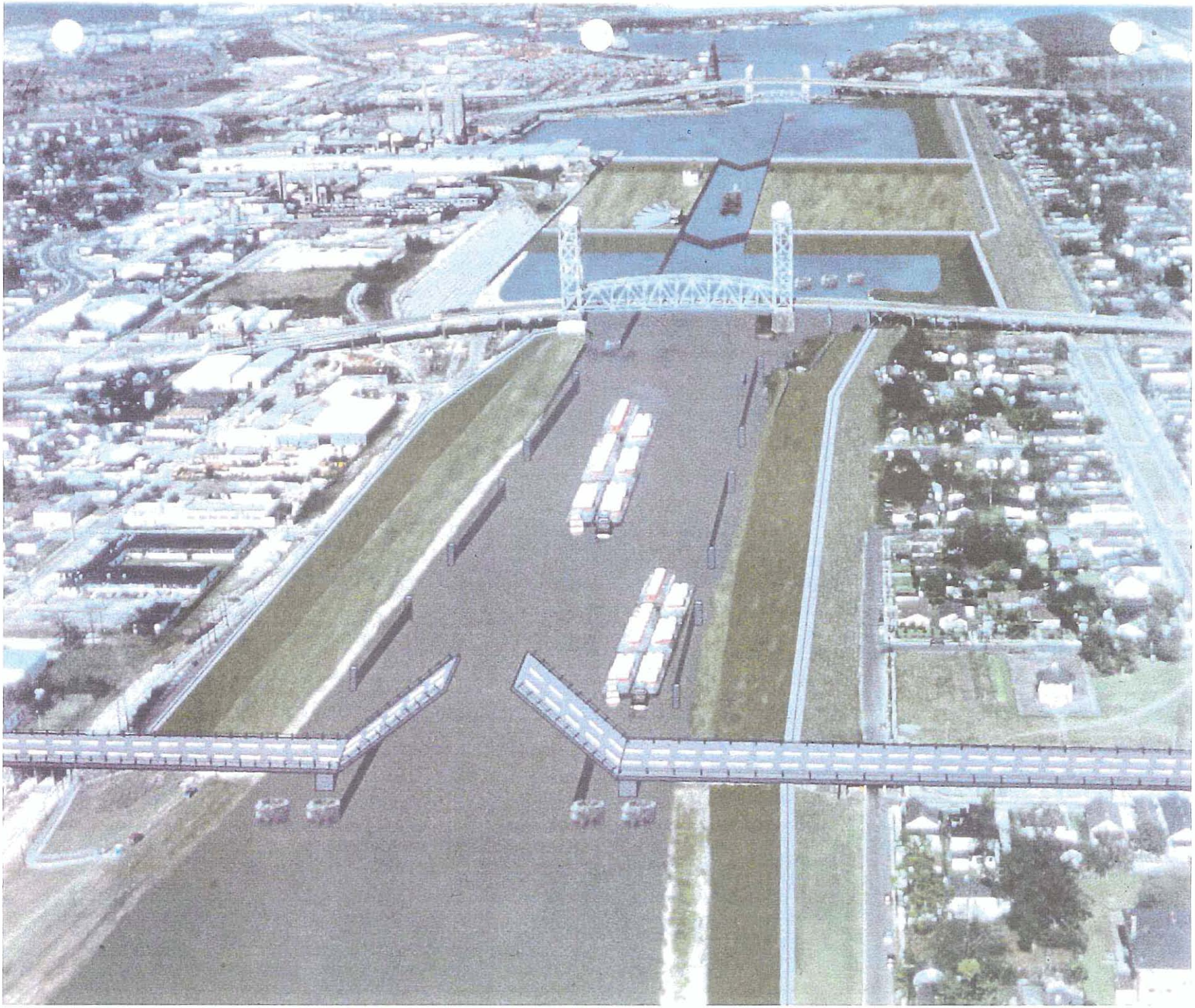

MR-GO New Lock and Connecting Channels, Louisiana

Evaluation Report

EXHIBIT II

Orange County
NAVIGATION AND PORT DISTRICT
AND
THE INDUSTRIAL DEVELOPMENT CORPORATION

Offering Deep Sea Terminals, Lay Berth Facilities, Foreign Trade Zones and Economic Development for All Orange County, Texas.

1201 CHILDERS ROAD • P.O. BOX 516 • ORANGE, TEXAS 77631-0516, U.S.A.
PHONE: 409/883-4363 • FAX: 409/883-5607 • EASYLINK: 62028583

ROGER P. RICHARD
PORT DIRECTOR
CHIEF EXECUTIVE OFFICER

June 29, 1995

Colonel Kenneth Clow
Commander and District Engineer
New Orleans District
U. S. Army Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Clow:

We would like to take this opportunity to express our concern and support for a new replacement lock to be built on the Industrial Canal in New Orleans. This vital link in our waterway system is important not only to the local economy, but to the nation as a whole. It would prove to be more important in time of national emergencies, as it has in the past.

If we delay the planning and actual replacement project any longer, we will jeopardize the cost efficient reconstruction of the lock. Every day wasted in this effort will result in increased costs, which will be very difficult to work into future budgets.

The Gulf Intracoastal Waterway is extremely important to the depressed economies of Southeast Texas and will become more important when NAFTA is fully implemented with two way trade from Mexico.

We are expressing this strong support, in the hope that the final report to Washington will fully support the immediate reconstruction of this important lock.

Sincerely,

Roger P. Richard
Port Director and
Chief Executive Officer

ORANGE COUNTY NAVIGATION & PORT DISTRICT
BOARD OF COMMISSIONERS:
Lester Winfree, President; James A. Smith, Vice President;
John W. Young, Jr., Secretary & Treasurer;
Jerry G. Hughes, Sr., Commissioner; Joel E. Steirman, Commissioner

INDUSTRIAL DEVELOPEMENT CORPORATION
BOARD OF DIRECTORS:
John A. Woodside, President; Joe J. Romano, Vice President;
Earl Williams, Secretary & Treasurer; Lester Winfree, Director;
James A. Smith, Director; Roger P. Richard, Director;
William M. "Bill" Van, Director; John W. Simmons, President Emeritus

Plimsoll Marine, Inc.

P.O. BOX 242
DARROW, LA 70725

504-473-7056
504-473-7087
FAX: 504-473-2170

June 29, 1995

Mr. Kenneth Clow
Commander and District Engineer
New Orleans District
U. S. Army Corps of Engineers
P. O. Box 60267
New Orleans, LA 70160

Dear Colonel Clow,

I am writing to express my strong support for replacement of the Industrial Lock in New Orleans. The idea of replacing the Industrial Lock has been going on with countless studies for years and years. I believe the new project has been carefully thought out and planned in detail for quite some time.

The Industrial Lock is of vital importance both to the local and regional economy in the area. With the move to reduce capital outlays now and in the future, I feel that it is extremely important that this project gets its final approval.

It is my understanding that the final report on the Industrial Lock is to be sent to Washington for review very soon. Therefore, I would like to use this opportunity to inform you of our company's strong support for the project.

Sincerely,

Eugene R. Dalton
Vice President

Greater Baton Rouge Port Commission

THE PORT OF GREATER BATON ROUGE

Head of Deep Water Navigation on the Mississippi River

P.O. Box 380 Port Allen, LA 70767-0380 (504) 342-1660
FAX # (504) 342-1666

June 30, 1995

Colonel Kenneth Clow
Commander and District Engineer
New Orleans District
U. S. Army Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Clow:

Please be advised that we are very supportive of the plan to replace the Industrial Lock in New Orleans. While this project is vital to the maritime interests in the New Orleans area, it is also important to us and the entire regional economy.

The opposition to the project is well known but nevertheless, it is necessary that it be completed because of the economic benefits to be derived from it over the next several decades.

We urge the Corps to move forward on this project as soon as possible.

Sincerely,

Gary K. Pruitt
Executive Director

J.D. Ware, Jr.
Executive Director

June 30, 1995

Colonel Kenneth Clow
Commander and District Engineer
New Orleans District
U.S. Army Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Clow:

We are writing to express our strong support for replacement of the Industrial Lock in New Orleans. This project has been carefully thought out and planned in detail for quite some time. It's importance to the local and regional economy, as well as our national export capabilities, have been demonstrated.

Our concerns, despite the efficiencies that will benefit our regional and national economies, continued delay in initiating construction may very well make the project cost prohibitive and jeopardize the entire project. It is obvious to all who are vitally interested in the Corps' Civil Works budget that your share of the overall Federal budget has either stabilized or has been in a decline.

It is our understanding that the final report on the Industrial Lock is to be sent to Washington for review in the near future. Therefore, we wanted to use this opportunity to inform you of our strong support for this project.

Sincerely,

John

J. D. Ware, Jr.

JDW/hm

SOUTH TANGIPAHOA PARISH PORT COMMISSION
163 West Hickory • Ponchatoula, Louisiana 70454 • [504] 386-9309
Fax (504) 386-9389

Guidry Brothers Towing Company, Inc.

P.O. BOX 1037 GALLIANO, LOUISIANA 70354 (504) 475-6631
(504) 827-1060 N.O. LINE

- ☐ N.J. GUIDRY & SONS TOWING CO., INC.
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- ☐ GUIDRY BROTHERS, INC.
- ☐ GUIDRY BROTHERS TOWING COMPANY, INC.
- ☐ D.N.H. TOWING CO., INC.
- ☐ RENEGADE MARINE, INC.
- ☐ HARVEY WARRIOR, INC.
- ☐ HARVEY CHALLENGER, INC.
- ☐ HUSTLER MARINE, INC.
- ☐ HARVEY VIKING, INC.
- ☐ GLADIATOR MARINE, INC.
- ☐ GUIDRY BROTHERS BARGE COMPANY
- ☐ TRIPLE R BARGE COMPANY
- ☐ BLUEWATER SUPPLY, INC.

June 30, 1995

Colonel Kenneth Clow
Commander and District Engineer
New Orleans District
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, La. 70160

Dear Colonel Clow:

As a business owner in the Marine Industry for the past 29 years, I would like to acknowledge my support for the replacement of the Industrial Lock in New Orleans. As I understand it, much study and planning has gone into this project, which I'm sure will be a costly endeavor. However, the Industrial Lock has proven to be an important factor in the local and regional economy, as well as a vital asset in our nation's export industry. In my own business, several of our vessels use the Industrial Lock on a regular basis as an expedient means to their destinations. Without this lock, our vessels would have to take a lengthy and costly detour.

I must say I'm a bit concerned with the current delays in getting this project started. We all know that this project can only benefit both our regional and national economies. But, delays can only hurt by driving up the prices that may not fit in the Corps' Civil Works budget. Also, delays may also hurt by allowing the slow and steady deterioration of the Industrial Lock, possibly rendering it irreparable.

I've been told that the final report on the Industrial Lock will be sent to Washington for review in the very near future. I would like to again express my strong support for this project.

Sincerely yours,

Dick J. Guidry

DJG/ppg

CADDO/BOSSIER PORT COMMISSION
P.O. BOX 52071 — SHREVEPORT, LOUISIANA 71135-2071
(318) 861-4981 — FAX (318) 869-2329

July 6, 1995

Colonel Kenneth Clow
Commander and District Engineer
New Orleans District
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, LA 70160

Dear Colonel Clow:

Our Port of Shreveport-Bossier wants to express our support for the replacement of the Industrial Lock in New Orleans.

This project has been planned in detail and is of vital importance to the New Orleans, Louisiana, and national economy as it relates particularly to export capacities.

Delaying this project can only be a detriment and make it cost prohibitive.

As the final report on this Industrial Lock is being sent to Washington for review, we did want you to know that our Port is strongly supportive for replacement of the Industrial Lock in New Orleans.

Sincerely,

John W. Holt, Jr., CED
Executive Port Director

JWH: cb

MEMBERS: W. Ben Helm, President; Maxine E. Sarpy, Vice President; R.M. Prestridge, Secretary-Treasurer; Wayne T. Davis; Jerry C. Harris; Robert G. Harris; Sinclair B. Kouns; Thomas E. McElroy; Mildred W. Scott

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COLONEL KENNETH CLOW
COMMANDER AND DISTRICT ENGINEER
NEW ORLEANS DISTRICT
U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LA 70160

JULY 10, 1995

DEAR SIR;

THIS LETTER IS IN REFERENCE TO INNER HARBOR NAVIGATION CANAL (INDUSTRIAL) LOCK.

I WOULD LIKE TO VOICE MY STRONG SUPPORT FOR THE REPLACEMENT OF THIS LOCK, NOW OR IN THE VERY NEAR FUTURE. THIS LOCK HAS BEEN STUDIED AND STUDIED, BUT NOTHING DONE TO REPLACE IT. IT IS A VITAL LINK IN OUR INLAND WATERWAYS. "INDUSTRIAL" LOCK HAS BECOME THE WEAKEST LINK IN A VERY IMPORTANT CHAIN OF CHANNELS FOR LOCAL AND REGIONAL ECONOMY AND GROWTH.

IF THIS LOCK IS NOT REPLACED VERY SOON THE GROWING COST OF IT MAY MAKE IT IMPOSSIBLE TO BUILD IN THE FUTURE. I UNDERSTAND EVERYBODY 'S BUDGET IS GETTING CUT, BUT THIS LOCK IS COSTING INDUSTRY, LOCALLY AND REGIONALLY MILLIONS OF DOLLARS OF LOST PRODUCTION, WHICH IN TURN COSTS JOBS AND HURTS OUR ECONOMY.

I UNDERSTAND THAT THE FINAL REPORT ON INNER HARBOR NAVIGATION CANAL (INDUSTRIAL) LOCK IS GOING TO BE SENT TO WASHINGTON FOR REVIEW VERY SOON.

I WANT TO USE THIS OPPORTUNITY TO SHARE WITH YOU OUR STRONG SUPPORT FOR REPLACEMENT OF THIS LOCK.

THANKING YOU IN ADVANCE
FOR ALL CONSIDERATION.
SINCERELY,

Bruce Barr Stapp

BRUCE BARR STAPP
CEO



PORT of GALVESTON

123 Rosenberg
P.O. Box 328
Galveston, Texas 77553

Galveston (409) 766-6103
Houston (713) 286-24[illegible]
Fax (409) 766-6

Ernest Connor
General Manager

July 10, 1995

Colonel Kenneth Clow
Commander and District Engineer
New Orleans District
U. S. Army Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Clow:

It is my conclusion that local, state, regional and federal agencies should move forward with the strongest recommendation and support for the replacement of the Industrial Lock in New Orleans.

Our water transportation system moves extraordinary volumes of people and products. Currently the system functions, yet only barely so with outdated locks and equipment.

The replacement of the lock will allow the region and its economy to become a "world class" player in the transportation network.

The region's transportation problems, while numerous, are solvable and moving your final report on this project to Washington for review, along with a strong positive endorsement for this carefully thought out and planned project will indicate the importance we place on our local and regional economy.

If our water transportation system is going to continue to answer the needs of our national and international import and export demands, the major players must realize the strategic position of this unique area of the nation.

The challenge is here; the response must be forthcoming.

You have our endorsement and strong support for the project.

Sincerely,

Ernest Connor
General Manager

Warrior & Gulf Navigation Company
P. O. Box 11397
Chickasaw, Alabama 36671

July 11, 1995

Col. Kenneth Clow
Commander and District Engineer
New Orleans District
U. S. Army Corps of Engineers
Post Office Box 60267
New Orleans LA 70160

Dear Colonel Clow:

I am writing to express our staunch support for replacement of the Industrial Lock in New Orleans. This project has been very carefully planned in every detail for many years. I believe the Corps has adequately demonstrated its importance to the local and regional economy, as well as our national export capabilities.

Despite the many efficiencies that will benefit our regional and national economies, we are concerned continued delay in initiating construction may very well make this project cost prohibitive and jeopardize it entirely. Another concern to all of us vitally interested in the Corps' Civil Works Budget is that your overall share of the Federal Budget has either declined or has been stabilized.

We understand the final report on Industrial Lock is scheduled to be sent to Washington for review very soon. Accordingly, we wanted to take this opportunity to advise you of our staunch support for this worthwhile project.

Sincerely,

J. A. MIXON
Director of Marketing

sp

MEMBER AMERICAN WATERWAYS OPERATORS

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P.O. BOX 4370, NEW ORLEANS, LA 70178-4370

July 20, 1995

Colonel Kenneth Clow
Commander and District Engineer
New Orleans District
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, LA 70160

Dear Colonel Clow:

I am writing to express my strong support for replacement of the Industrial Lock in New Orleans. This project has been carefully thought out and planned in detail for quite some time. It's importance to the local and regional economy, as well as our national export capabilities, have been demonstrated.

What concerns me is, despite the efficiencies that will benefit our regional and national economies, continued delay in initiating construction may very well make the project cost prohibitive and jeopardize the entire project. It is obvious to all who are vitally interested in the Corps' Civil Works budget that your share of the overall Federal budget has either stabilized or has been in a decline.

It is my understanding that the final report on Industrial Lock is to be sent to Washington for review very soon. Therefore, I wanted to use this opportunity to inform you of our strong support for the project.

Time is of the essence. Continued delays are costing the shipping business millions of dollars per month. This lock has been studied to death. It is now time to make the decision to move forward to completion with the utmost dispatch for both commercial and military reasons.

With Kindest Regards,
E.N. BISSO & SON, INC.

Captain Ralph Diaz
General Manager
COL EN USAR

GARY P. LaGRANGE
President & Chairman
of Executive Committee
Franklin, Louisiana

MUNSON SMITH
ent Elect
Texas

NON BEHRHORST
Chairman of the Board
Lafayette, Louisiana

J. MERRICK JONES, JR.
Vice Chairman of the Board
New Orleans, Louisiana

HOMER B. HIRT, JR.
Secretary
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Chicasaw, Alabama

DONALD G. WALDON
Vice President for Mississippi
Columbus, Mississippi

DAVID A. WAGNER
Vice President for Louisiana
New Orleans, Louisiana

RAYMOND BUTLER
Vice President for Texas
Houston, Texas

GICA
GULF INTRACOASTAL
CANAL ASSOCIATION

Organized At Victoria, Texas - August 8, 1905

P. O. Box 44050
Lafayette, Louisiana 70504
Telephone 318-235-1634 or 318-237-1473
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DOUGLASS W. SVENDSON, JR.
Executive Director
Lafayette, Louisiana

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Immediate Past President
Port Lavaca, Texas

CHARLES E. BROUSSARD
Kaplan, Louisiana

W. H. "BIII" BAUER, SR.
Port Lavaca, Texas

R. H. "Bob" PARKER, JR.
Houston, Texas

August 1, 1995

Colonel Kenneth Clow
Commander and District Engineer
New Orleans District
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Clow:

GICA wants you to know of our support for the replacement of the Industrial Lock in New Orleans. Over the years of study and planning, we believe the benefits to the local, regional, and national economy have been unquestionably demonstrated.

We hope that as the final report is forwarded to Washington for review and approval, the replacement of this facility can be expedited. Further delays, we fear, will do nothing but increase costs.

I am also enclosing for your information GICA's recent letter to Chairman W. N. Whitlock and the Inland Waterways Users Board, expressing our endorsement of the Board's ranking of the Industrial Lock project.

Sincerely,

Doug Svendson Jr

Doug Svendson, Jr.
Executive Director

Enclosure

DS/thv

GARY P LaGRANGE
[illegible]

SON SMITH
[illegible]
Texas

VERNON BEHRHORST
[illegible]

J MERRICK JONES JR
[illegible]

HOMER B HIRT JR
[illegible]

LEROY GOODSON
[illegible]

H R Rudy ETHEREDGE
[illegible]

JOHN A MIXON
[illegible]

DONALD G WALDON
[illegible]

DAVID A WAGNER
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RAYMOND BUTLER
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President Em
Washington D C

KING FISHER
Immediate Past President
Port Lavaca Texas

CHARLES E BROUSSARD
[illegible]

W H "Bill" BAUER SR
Port Lavaca Texas

R H "Bob" PARKER JR
Houston Texas

July 25, 1995

Mr. W. N. Whitlock, Chairman
Inland Waterways Users Board
American Commercial Barge Line Company
P.O. Box 610
Jeffersonville, Indiana 47131-0610

Dear Mr. Chairman:

GICA wishes to file this statement for the record in connection with the Board's meeting July 26 in Vancouver, Washington..

GICA endorses the Board's continued recommedation for the Intracoastal Waterway Lock Study in Louisiana, as well as the Board's endorsement of the Industrial Lock replacement in New Orleans.

In addition, we support the small scale improvement program because safety, both physical and environmental, is so important on our rivers and waterways. On the GIWW, it is at the top of the list.

Sincerely,

Doug Svendson, Jr.
Executive Director

FINAL ENVIRONMENTAL IMPACT STATEMENT
MISSISSIPPI RIVER-GULF OUTLET, NEW LOCK AND CONNECTING CHANNELS

Lead Agency: U.S. Army Corps of Engineers, New Orleans District

ABSTRACT: In New Orleans, Louisiana, the Mississippi River is connected to the Mississippi River-Gulf Outlet (MRGO) and the eastern portion of the Gulf Intracoastal Waterway (GIWW) by a 640- by 75- by 31.5-foot lock on the Inner Harbor Navigation Canal (IHNC). The IHNC lock, also known as the Industrial Canal lock, has been operating at its maximum capacity for a number of years and vessel delays and congestion at the lock are chronic problems. Although several sites for a new lock have been evaluated, all but one have been eliminated from further consideration because of impracticality, environmental impacts, and socioeconomic impacts. Two action alternatives are presented in this report. The no-action alternative, consisting of continued operation and maintenance of the existing lock, is presented as Plan 1. Plan 2 consists of replacing the St. Claude Avenue bridge over the IHNC with a mid-level, vertical lift-span bridge. The existing low-level bridge causes significant interference with navigation traffic. The bridge constructed for Plan 2 would be of minimal dimensions necessary for safe navigation through the existing lock and would not be compatible with future replacement of the IHNC lock. Plan 3 is divided into six sub-plans based on the size of the lock to be constructed. Plans 3a through 3f would include a new lock in the IHNC, north of the Claiborne Avenue bridge. The smallest lock investigated (Plan 3a) would be 900 feet long by 90 feet wide by 22 feet deep, while the largest lock (Plan 3f) would be 1,200 feet by 110 feet by 36 feet. Replacement of the St. Claude Avenue bridge with a low-level, double-bascule bridge and raising the towers of the Claiborne Avenue bridge are integral components of these plans. The environmental impacts of the lock replacement plans are very similar. Plan 3b, which provides for a 900- by 110- by 22-foot lock, has been determined to be the national economic development plan based on its net excess benefits over costs. Plan 3f, which provides for a 1,200- by 110- by 36-foot lock, is designated as the tentatively selected plan (TSP). The Port of New Orleans, the local project sponsor, would be responsible for its added incremental cost. Plan 3f would provide operational flexibility for deep-draft vessels and is compatible with the controlling depth of the MRGO. Although extensive efforts have been made to avoid and minimize socioeconomic impacts in the urban environment adjacent to the IHNC, many impacts are unavoidable with a lock replacement project. The TSP includes a community impact mitigation plan which would avoid, minimize, and compensate for adverse impacts to local businesses, property values, public and community facilities and services, transportation, noise, air quality, aesthetic values, cultural resources, and recreational resources.

Date: _____

Please send your comments to the District Engineer by the date stamped above. For further information, please contact Mr. Richard Boe, U.S. Army Engineer District (PD-RS), P.O. Box 60267, New Orleans, Louisiana 70160-0267. Telephone: (504) 862-1505.

Note: Information, displays, maps, etc., discussed in the Main Report and Appendixes are incorporated by reference in the Environmental Impact Statement.

MISSISSIPPI RIVER - GULF OUTLET, NEW LOCK AND CONNECTING CHANNELS EVALUATION REPORT

LIST OF VOLUMES

VOLUME 1 - MAIN REPORT AND ENVIRONMENTAL IMPACT STATEMENT

VOLUME 2 - APPENDIX A
COMMUNITY IMPACT MITIGATION PLAN

VOLUME 3 - APPENDIX B
ENGINEERING INVESTIGATIONS

VOLUME 4 - APPENDIX B-1
ENGINEERING INVESTIGATIONS PLATES

VOLUME 5 - APPENDIX C
INVESTIGATIONS OF POTENTIAL HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTES

VOLUME 6 - APPENDIX D
ENVIRONMENTAL STUDIES

VOLUME 7 - APPENDIX E
ECONOMIC ANALYSIS

VOLUME 8 - APPENDIX F
REAL ESTATE SUPPLEMENT

VOLUME 9 - APPENDIX G
PUBLIC VIEWS AND COMMENTS

1. SUMMARY

1.1. MAJOR CONCLUSIONS AND FINDINGS

1.1.1. Purpose and Alternatives

1.1.1.1. The purpose of this study is to determine the best action for alleviating or eliminating navigation traffic congestion associated with the existing lock on the Inner Harbor Navigation Canal (IHNC) in New Orleans, Louisiana. The lock allows for navigation between the Mississippi River and the IHNC, the eastern portion of the Gulf Intracoastal Waterway (GIWW), and the Mississippi River-Gulf Outlet (MRGO).

1.1.1.2. A long history of detailed studies and extensive public involvement has resulted in the elimination of all but two action plans from further consideration. The first action plan would include only the replacement of the St. Claude Avenue bridge with a mid-level, double-bascule bridge. The existing low-level bridge interferes with lock operations and a new bridge would moderate, but not eliminate, vessel traffic congestion for a period of time. The bridge to be constructed under this plan would not be compatible with construction of a new lock in the future. The second plan under consideration would involve replacement of the existing lock with a new lock located in the existing channel of the IHNC between the Claiborne Avenue and Florida Avenue bridges that span the canal, and demolition of the existing lock. This location for the new lock is referred to as the North of Claiborne Avenue site. This plan would also involve replacement of the existing, low-level St. Claude Avenue bridge with a low-level, double-bascule bridge to allow for efficient use of the new lock, and modifications of the Claiborne Avenue bridge to make it compatible with the new lock. Several lock chamber dimensions for the North of Claiborne Avenue site have been considered and analyzed.

1.1.1.3. Other sites for a replacement lock have been eliminated from consideration because they are considered not implementable for environmental and socioeconomic reasons. Construction of a new lock in the vicinity of Violet, Louisiana, would cause significant adverse effects to tidal wetlands and is vehemently opposed by the local populace and locally-elected officials. Other lock alignments within the IHNC corridor would require massive, un-mitigable impacts to the adjacent urban neighborhoods or would require a closure of the canal for an extended period of time. Nevertheless, residents of neighborhoods adjoining the IHNC and their locally-elected officials remain steadfastly opposed to the recommended plan, mainly because of socioeconomic impacts.

1.1.2. Rationale for the Recommended Plan

1.1.2.1. The plan which maximizes national economic development (NED) benefits consists of a new lock at the North of Claiborne Avenue site with usable chamber

dimensions of 900 feet long by 110 feet wide by 22 feet deep. Other features of the plan include replacement of the St. Claude Avenue bridge with a low-level, double-bascule crossing; modifications to the superstructure of the Claiborne Avenue bridge; and a mitigation package to compensate area residents and commuters for unavoidable adverse impacts. This plan would accommodate shallow-draft vessels (barges) and a very limited number of deep-draft vessels (ships).

1.1.2.2. The recommended plan is similar to the NED plan except that the usable depth of the lock is 36 feet instead of 22 feet and the length is 1,200 feet instead of 900 feet. This is also the plan preferred by the Board of Commissioners for the Port of New Orleans, the local sponsor. All other project features would be the same or very similar. The recommended plan would be commensurate with the controlling depth of the MRGO which is also 36 feet and would accommodate a large number of the deep-draft vessels that utilize the Port of New Orleans. Designation of the recommended plan is based on environmental, social, and economic considerations as well as the operational flexibility it provides. In addition, this plan would accommodate, to the maximum extent practicable, the desires of local interests including nearby residents. The Port of New Orleans has indicated their interest in contributing the difference in costs between a shallow-draft lock (NED plan) and the recommended plan in order to allow for deep-draft vessel use of the new lock.

1.1.3. Environmental Impacts

1.1.3.1. The recommended plan would have adverse impacts on fish and wildlife habitat. The adverse impacts are primarily associated with a temporary construction site (graving site) designated for partial construction of lock modules. The graving site would cause the loss of 25 freshwater, wetland acres. This impact would be fully mitigated by restoring brackish marsh, in another location, with uncontaminated soil removed from the bank of the IHNC. Canal bank soil and canal bottom sediment considered to have contaminant levels too high for use in wetland restoration would be deposited in a previously-used MRGO disposal site. This disposal site contains low-quality wetlands and upland scrub-shrub habitat. Because of the disposal site's low habitat quality, no compensatory mitigation for its use as a disposal area is proposed. The area would likely return to a habitat similar to its existing condition after deposition of the dredged material.

1.1.3.2. As much as 2.8 acres of drained, wooded land may be required for construction of a detour road that is part of the community impact mitigation plan. No compensatory mitigation is proposed for this potential loss of wooded land because of its previously altered condition and its isolation in a suburban community. However, the plan to mitigate for impacts of the graving site over-compensates for those impacts, and the excess wetland developed would provide an out-of-kind mitigation for loss of the wooded land.

1.1.3.3. The recommended plan would cause adverse socioeconomic impacts including temporary traffic detours and congestion, relocation of two businesses, job displacements,

lost revenues to some local businesses, and construction noise in the vicinity of the IHNC. A comprehensive community impact mitigation plan is proposed to avoid, minimize, and compensate for most of the adverse socioeconomic impacts of project construction and make the plan more acceptable to the local populace.

1.1.4. Environmental Features

1.1.4.1. During the study process, plans were developed to use all excess dredged soil and sediment for wetland restoration. Concerns expressed by the U.S. Fish and Wildlife Service during the study process resulted in elimination of most dredged material for wetland restoration because of contaminants. Clean soil from the east bank of the IHNC, which has been determined to be suitable for aquatic disposal, would be used to develop wetlands as mitigation for impacts of the graving site.

1.1.4.2. Material excavated for a bypass channel around the existing lock would be used for backfill around the new lock site. Some of the material to be dredged at the site of the existing lock, and between St. Claude Avenue and the Mississippi River, would also be used for backfill with the excess hydraulically pumped to the main channel of the river to be naturally carried downstream.

1.1.5. Threatened and Endangered Species

No Federally-listed threatened or endangered species, nor any critical habitat, would be affected by the recommended plan. Likewise, no species or habitats of local concern, as listed by the Louisiana Natural Heritage Program, would be affected.

1.1.6. Executive Order 11988, Floodplain Management

1.1.6.1. The recommended plan involves construction within the base (100-year) floodplain. All alternatives considered, including the alternatives eliminated from detailed consideration, would be located within the base floodplain. No non-floodplain alternatives exist. The floodplain in the area of the recommended plan is completely developed for residential, commercial, and industrial purposes. Levee systems in the area provide protection from hurricane and Mississippi River flooding, and protected areas are drained by pumping to remove excess rainwater.

1.1.6.2. The recommended plan would not encourage development in the base floodplain, although waterfront industrial sites along connecting waterways could become more desirable due to the improvement in navigation traffic flows. The recommended plan would not increase or reduce the hazard or risk of flooding. All levees and floodwalls that would be realigned for project construction would be rebuilt to current design standards for hurricane or river flooding protection, whichever is applicable. Since the IHNC area is totally developed, the natural and beneficial floodplain values of the area are virtually non-existent.

1.1.7. Executive Order 11990, Protection of Wetlands

1.1.7.1. The IHNC, although technically considered "waters of the U.S." and subject to Section 404(b) of the Federal Water Pollution Control Act (Clean Water Act), is not a wetland. The lands immediately adjacent to the IHNC which would be dredged and/or filled, likewise are not wetlands. The area is totally developed and does not support wetland vegetation.

1.1.7.2. The graving site designated for off-site construction of lock modules would cause the direct loss of 25 wetland acres. The wetland loss would be fully mitigated by the restoration of herbaceous and wooded wetlands in an area which now contains shallow open water. Wetland impacts and the need for mitigation could be avoided by designation of an acceptable, non-wetland, developed site for lock module construction, if available.

1.1.8. Executive Order 12898, Environmental Justice

The potential adverse impacts of a lock replacement project on the largely minority and economically disadvantaged population in the vicinity of the IHNC has been considered throughout the many years of this study. When the Violet Site was eliminated from further study in 1991, the New Orleans District realized the massive impacts to the natural environment that a new lock and connecting channels would have at that site. There appeared to be little chance of improving the natural environment in the vicinity through mitigation measures. The District also recognized there would be adverse socioeconomic impacts from a project at the IHNC site. However, in eliminating the Violet site, the District looked at the IHNC site as an opportunity to improve the overall condition of the entire corridor, including the bridges and the adjacent communities. The inclusion of community impact mitigation, which was developed through an open planning process with community representatives, demonstrates the Corps' sensitivity to the affected communities and good faith effort to avoid, minimize, and compensate affected communities for adverse project impacts.

1.1.9. Section 404(b)(1) Evaluation

Two Section 404(b)(1) evaluations have been prepared for the recommended plan and are contained in Appendix D. One evaluation addresses the graving site. The second evaluation addresses four disposal sites: an area of open water to be used as mitigation for the graving site; the previously-used MRGO disposal area; the main channel of the Mississippi River; and the IHNC in the vicinity of the new lock where large quantities of material would be required for backfill. The New Orleans District, has determined that, on the basis of Section 404(b)(1) guidelines, the disposal of dredged material into the proposed disposal sites would comply with the requirements of the guidelines with inclusion of appropriate and practical conditions to minimize pollution and adverse effects on the aquatic ecosystem.

1.1.10. State Water Quality Certification (Section 401)

The New Orleans District has applied for a State Water Quality Certificate from the Louisiana Department of Environmental Quality (LDEQ) pursuant to Section 401 of the Clean Water Act. The LDEQ has not responded formally to the District's request for Water Quality Certification. The District does not plan to seek an exemption to obtaining a State Water Quality Certificate as allowed by Section 404(r) of the Clean Water Act. Application for State Water Quality Certification is being made voluntarily and as a matter of comity. All criteria either have or will be met for a Section 404(r) exemption; information on the effects of discharge of dredged material into the waters of the United States, including application of Section 404(b)(1) guidelines, are included in this EIS and this EIS will be submitted to Congress before the actual discharge takes place.

1.1.11. Consistency with the Coastal Zone Management Program

A Coastal Zone Management (CZM) consistency determination for the TSP has been prepared and is contained in Appendix D. The U.S. Army Corps of Engineers, New Orleans District has determined that, on the basis of the State of Louisiana's Coastal Use Guidelines, the recommended plan would be consistent, to the maximum extent practicable, with the State of Louisiana's approved Coastal Resources Program. The Louisiana Department of Natural Resources has agreed that the recommended plan is consistent with the State's Coastal Resources Program, with restrictions on the disposal of dredged materials to prevent violation of State Water Quality Standards.

1.2. AREAS OF RESOLVED CONTROVERSY

Selection of the recommended plan in lieu of a plan that features a different lock alignment at the IHNC, or a new lock at another site as proposed in earlier efforts, minimizes conflicts that have rendered past planning efforts unproductive. The selection of the North of Claiborne Avenue site eliminates the difficulties associated with earlier attempts to implement a plan near Violet, Louisiana. A new lock at the Violet site would not be consistent with national wetlands policy and is strongly opposed at both the leadership and grass-roots level in the political subdivision in which it would have been located. A new lock for all other possible locations within the IHNC corridor is likewise, strongly opposed by the residents and local elected officials representing the area.

1.3. UNRESOLVED ISSUES

Many residents of the neighborhoods adjacent to the IHNC continue to oppose construction of a new lock because they would be inconvenienced or have their businesses adversely affected during the construction period. Also, permanent changes in levee and floodwall configurations would impact the aesthetic condition of the adjacent neighborhoods. The community impact mitigation plan contained in this report should not be viewed as unchangeable. Input from the affected communities and elected officials

during detailed design of the project and during project construction could alter the mitigation plan to make the project more acceptable to the community.

1.4. ENVIRONMENTAL COMMITMENTS AND MITIGATION PLAN

A number of commitments that would minimize or eliminate adverse effects to both the human and natural environment have been included in the recommended plan. These commitments are summarized in Table 1.

TABLE 1
ENVIRONMENTAL COMMITMENTS

Significant Issue or Resource	Reason for Commitment	Commitment
Business and Industry	Businesses in the vicinity of the IHNC may experience a decline in sales and rents during bridge closures.	Provide direct monetary compensation to commercial establishments and landlords that experience an actual, documented decline in sales, rent, or tuition.
	Industrial lessees along the IHNC would be displaced.	Encourage lessees to relocate in Orleans Parish with concessions and incentives in new leases. This effort would also address effects on Tax Revenues.
	The project would adversely affect some local business activity.	Seed money would be provided to establish a business assistance program to serve as a stimulus for local business development.
Employment	Water Resources Development Act of 1986 and Congressional guidance require minority and local involvement in project construction.	Contractors would be required to give preference to hiring fully-qualified residents within the community.
	Many potential workers in most of the vicinity are unskilled and would not be qualified for many construction jobs.	Qualified local residents would be given tuition grants for training at local vo-tech schools to learn skills needed for project construction.
Property Values	Residential property values much of in the IHNC vicinity are depressed; the situation could be worsened during project construction.	Seed money would be provided to establish a neighborhood revitalization program which would serve as a source of money for housing rehabilitation and other community improvement activities.
Public and Community Facilities and Services	Existing police, fire, and emergency medical services may be hampered during the construction period.	Police patrols and emergency medical services would be increased near the IHNC during the construction period.
	Opportunities to use neighborhood recreational facilities may be diminished during project construction.	Community facilities such as playgrounds, gardens, tot lots, and linear parks would be provided. Facilities would be operated by non-Federal interests.
Vehicular Transportation	Construction-related traffic would increase the existing chronic vehicular traffic problems in the IHNC area. Work on bridges may increase traffic problems, impacting residents and commuters.	Specific routes would be designated for construction-related traffic. This would also help mitigate for Noise impacts.[1]
		Any and all roads damaged by construction activities would be repaired.[1]

TABLE 1
ENVIRONMENTAL COMMITMENTS

Significant Issue or Resource	Reason for Commitment	Commitment
Vehicular Transportation (continued)	Continued from previous page.	A temporary bridge would be constructed at St. Claude Avenue to provide uninterrupted traffic flow through this corridor while a new permanent bridge is constructed.[1]
		Appropriate detour signs and signals would be erected to maintain access to local streets if streets are closed for utility relocations.[1]
		Offsite parking areas for construction workers would be provided on the east and west sides of the IHNC. Shuttle vans would transport workers to and from construction areas.[1]
		Contracts requirements would require as much material as possible to be moved by barge, including debris from demolished buildings and structures.[1]
		A new permanent road to link St. Bernard Highway and West Judge Perez Boulevard with an extension of Florida Avenue would be constructed to provide an easily accessible detour for commuters.
		In the vicinity of the IHNC, traffic signals would be synchronized and no less than four computerized message boards would be provided to direct traffic flow.
		An incident management plan would provide for a police detail and two tow trucks to stand by during rush hours for accident and breakdown response during periods of bridge work.
		Local streets that would serve construction-related traffic would be resurfaced prior to initiation of project construction.
		A light rail line would be included on the new St. Claude Ave. bridge and approach ramps to be compatible with the RTA's long-term plan to implement streetcar service.

TABLE 1
ENVIRONMENTAL COMMITMENTS

Significant Issue or Resource	Reason for Commitment	Commitment
Vehicular Transportation (continued)	Continued from previous page.	Provide for additional school crossing guards on each side of the IHNC during bridge construction periods.
		A program of street resurfacing and drainage improvements would be implemented on both sides of the IHNC.
Noise	Project construction would expose residents, employees of businesses, and school children near the construction site to elevated noise levels.	Pile driving tests would be performed with various types of equipment to measure noise levels and delineate noise level contours.[1]
		Contract specifications would limit noise levels to certain levels at specified distances from the construction site.[1]
		Contract specifications would require monitoring of noise levels to verify adherence to contract specifications.[1]
		Contract specifications would the use of pile driving equipment designed to minimize noise levels. Actual requirements would depend on the results of pile driving tests.[1]
		Specific routes would be designated for construction-related traffic to avoid residential areas. Construction staging sites would be designated away from heavily populated areas.[1]
		Residential and commercial structures lying within areas exposed to "unacceptable" noise levels would be modified to reduce noise levels inside of the structures.
		Pile driving and heavy truck hauling would be restricted to daylight hours, not to exceed 10 hours per day.
		Pile driving for the new St. Claude Avenue bridge would be done during summer to avoid impacts to school children.
		Residents immediately adjacent to high noise activities, especially pile driving for the St. Claude Avenue bridge, would be compensated if they choose to temporarily relocate.

TABLE 1
ENVIRONMENTAL COMMITMENTS

Significant Issue or Resource	Reason for Commitment	Commitment
Air Quality	Construction equipment would emit air pollutants and increase dust levels.	Contracts would require monitoring and compliance with Federal and State air quality standards and preservation of air quality, especially airborne particulate matter (dust), within specified levels.[1]
Wooded Lands	The detour road in St. Bernard Parish could cause the loss of up to 2.8 acres of woods.	The detour road would be constructed alongside of a parish drainage canal where a right-of-way is maintained by local interests for canal access. The loss of wooded area would thereby be minimized.
Wetlands	The requirement to mitigate for impacts of lock module construction site (graving site).	Impacts of the graving site would be minimized by restricting direct impacts to no more than 25 acres. Mitigation for impacts of the graving site would consist of wetland development with uncontaminated material from the east bank of the IHNC. Other soil and sediment would be placed in previously-used MRGO disposal areas.
Aesthetic Values	Floodwalls constructed on levees will reduce the recreational use of the levee and batture area.	Both sides of the new lock would be back-filled and landscaped to create green space and sites for community use.[1]
		Street lighting would be improved or added along designated detour routes, including both existing and new routes.[1]
		A walking/jogging/bicycling path would be built in proximity to the floodwalls and levees. The path would be extended to St. Bernard Parish.
	Bridge approaches, bridge piers, and re-aligned levees and floodwalls would adversely affect the aesthetic appeal of the historic neighborhoods.	Landscaping would be provided around levees, floodwalls, and bridge approaches.[1]
		Textured surfaces would be used on exteriors of floodwalls, bridge approaches, and bridge piers to add visual appeal.[1]
		One or more observation decks, with interpretive displays and benches, would be constructed on the new floodwall to preserve the current recreational viewing opportunities.

TABLE 1
ENVIRONMENTAL COMMITMENTS

Significant Issue or Resource	Reason for Commitment	Commitment
Aesthetic Values (continued)	Continued from previous page.	Lighting and green space would be provided in vacant areas created by reconstruction of the St. Claude Avenue bridge approaches.
		Public right-of-ways along existing streets would be landscaped.
	A grove of large live oak trees provides an aesthetically important feature. They trees would have to be removed for the bypass channel around the old lock.	Compensation for loss of the oak trees would involve either transplanting some of the trees to nearby public lands, or, if this is not feasible, planting of nursery stock.
Cultural Resources	Three structures eligible for listing in the Federal Register would be removed: the Galvez Street Wharf, the St. Claude Avenue Bridge, and the existing IHNC lock. The project is perceived by some local residents to present a threat to the historic nature of their communities.	A permanent historical record of the eligible structures would be prepared in coordination with the State Historic Preservation Officer, the Advisory Council on Historic Preservation, and the New Orleans Historic Districts Landmarks Commission.[1]
		One or more key historically-significant components of the old lock and/or the St. Claude Avenue bridge would be salvaged and displayed.
		A brochure addressing various historical features of the existing lock and St. Claude Avenue bridge, as well as significant historical attributes of the surrounding community would be produced.
		Markers and displays which feature appropriate information concerning the old lock, other historic structures, and the surrounding neighborhoods would be erected.
		Oral histories of local residents would be taken to preserve the history of the neighborhoods adjacent to the IHNC.
		A large display concentrating on the maritime history of New Orleans and south Louisiana would be constructed.

[1] These items and their costs are part of the general project construction plan. Their costs are not included in the community impact mitigation plan.

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3. NEED FOR AND OBJECTIVES OF ACTION

3.1. STUDY AUTHORITY

3.1.1. Authority for replacement of the navigation lock connecting the Mississippi River-Gulf Outlet (MRGO) with the Mississippi River was established by Public Law (PL) 84-455 of 1956. The authorizing legislation 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 . . . ."

3.1.2. Section 186 of the Water Resources Development Act of 1976 (PL 94-587), amended PL 84-455 and made construction of bridge relocations a Federal responsibility (not to exceed the cost of $71,500,000) when required by the construction of the MRGO channel.

3.1.3. A Site Selection Report, prepared in 1975 by the New Orleans District in cooperation with the Port of New Orleans, recommended the Lower Site below Violet, Louisiana, in St. Bernard Parish, as the best overall location for a new lock. The report was approved by the Office of the Chief of Engineers in 1976. Subsequently, President Carter requested a review of all water resource projects in his message to Congress concerning the 1978 budget, and recommended that:

> "The project should be modified to eliminate consideration of the new channel location. Further study should be carried out to determine whether repair or replacement is needed of the existing lock at the existing site. If replacement and expansions are deemed necessary, special care should be taken to minimize dislocation and disruption of residents near the site. Cost savings from the modification will depend on the outcome of the analysis .

3.1.4. The Director of Civil Works, in a letter, dated June 10, 1977, to the Corps of Engineers, Lower Mississippi Valley Division, directed that:

> "The Phase 1 document will address all alternatives; hence the Violet location and other sites must be fully covered in the report, as well as economic analysis of various incremental lock sizes."

3.1.5. In an August 10, 1977 letter, the Director of Civil Works further stated that:

> "This report would present events leading to the choice of the existing site. . . . The selected plan must be economically justified . . . ."

3.1.6. A Preliminary Draft Evaluation Report/Environmental Impact Statement was prepared in November 1982. The draft recommended construction of an adjacent lock at the existing site and maintenance of the existing lock in a stand-by condition for use only during emergencies. The report was not released to the public because of unresolved issues.

3.1.7. The Water Resources Development Act of 1986 (PL 99-662) modified the project and changed the cost-sharing arrangement. The act specifies that the cost of the lock shall be allocated between general cargo navigation and inland navigation. The shallow-draft cost would be funded 50 percent from the general funds of the U.S. Treasury and 50 percent from the Inland Waterway Trust Fund. The trust fund is administered by the Inland Waterway Users Board which is composed of representatives of the shallow-draft navigation industry. The funding source for the trust fund is a tax paid on the fuel used for shallow-draft navigation. The incremental, deep-draft costs of the project would be shared 75 percent by the U.S. Treasury and 25 percent by a non-Federal sponsor for a lock up to 45 feet deep and equally cost-shared for depths over 45 feet. The point at which shallow-draft becomes deep-draft is not specified in the act. The act provides that the lock and connecting channels shall be in the area of the existing lock or at the Violet site. The act also states that maximum effort should be made to assure full participation of minority groups living in the area of construction.

3.1.8. The U. S. House of Representatives, Committee on Appropriations, prepared Report Number 101-536, entitled Energy and Water Development Appropriations Bill, 1991. This report directed the Corps of Engineers, in conjunction with the local sponsor to:

> . . . implement a community participation process with affected residential, business, and government entities. . . . The Corps, in conjunction with the local project sponsor, shall develop a comprehensive plan to identify and mitigate to the maximum any adverse social and cultural impacts of the project. Such plan shall include measures to provide adequate replacement housing, street circulation, and enhanced neighborhood amenities to insure that communities adjacent to the project remain as complete, liveable, neighborhoods during and after construction of the project. . . .

3.1.9. Section 326 of the Water Resources Development Act of 1996 amends Section 844 of the Water Resources Development Act of 1986 by adding:

> . . . 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).

3.2. PUBLIC CONCERNS

3.2.1. There is a long history of local opposition associated with this study which has been a major factor in prolonging the study process. The recommended plan is the culmination of the Corps of Engineers' extensive efforts to develop a plan that is acceptable to all affected interests including local citizens, local governments, cost-sharing partners, environmental organizations, and the navigation industry. Section 6, Public Involvement, Review, and Consultation, contains information about the concerns expressed by various interests throughout the study process.

3.2.2. Even though many of the concerns expressed by local residents during the study process have been minimized or eliminated through development and selection of the recommended plan, there remains the concern about the long duration of project construction activities. Construction noise, vibrations from pile driving, traffic delays, the addition of floodwalls on top of levees, and general disruption of the community during project construction are the main concerns of area residents. Commuters, who must cross the IHNC during rush hours are concerned about increased travel times during the construction period.

3.2.3. The U.S. Inland Waterways Users Board has identified the IHNC Lock replacement as a Category 1 project. Category 1 projects are those they have determined should be accelerated consistent with maximum Corps of Engineers' capabilities or for which increased capabilities would be appropriate. The shallow-draft shipping industry is well aware, probably more so than an other interest, of the of the existing IHNC lock's inefficiencies and the need for improvement.

3.3. PLANNING OBJECTIVES

The following objectives were established in response to the problems, needs, and opportunities identified by public and private interests:

To develop plans that reduce or eliminate delays to navigation between the Mississippi River and tidewater facilities and waterways to the east of the river;

To develop plans that avoid and minimize relocations and other impacts to local residents and businesses to the maximum extent practicable;

To develop plans that avoid and minimize environmental impacts to the maximum extent practicable; and

To design and recommend appropriate mitigation features for unavoidable impacts to local residents, cultural resources, and environmental resources.

4. ALTERNATIVES

4.1. PLANS ELIMINATED FROM FURTHER STUDY

4.1.1. New Lock Sites Eliminated during Early Studies

4.1.1.1. Since planning for a new lock began in 1960, eight locations have been investigated, to various degrees, for construction of a new lock (Plate 2). In addition, various lock and connecting channel sizes, alignments, and construction methods have been considered at several of the locations.

4.1.1.2. During early studies, it was determined that the Meraux site, mentioned in the original authorizing legislation, was unsatisfactory due to industrial development and adverse river conditions. A Site Selection Report prepared in 1975 by the New Orleans District evaluated fourteen plans at the seven remaining sites. Based on criteria which included costs, benefits, construction difficulty, local economic and social impacts, environmental impacts, operation and maintenance difficulties, and public sentiment, five sites were eliminated and two sites were selected for additional study. The Scarsdale, Caernarvon, and Bohemia Sites were eliminated partially because they were too circuitous for practicality and would cause massive, irreversible damages to extensive areas of productive coastal marshes. The Saxonholm Site would have caused considerably more disruption to the residents of St. Bernard Parish than the Upper or Lower Sites in the vicinity of Violet, Louisiana and was also eliminated. Between the Upper and Lower Sites, the Upper Site was eliminated because it would be more disruptive to local residents than the Lower Site. The two sites selected for additional study were the IHNC site and the Lower Site near Violet, Louisiana (Plate 3). The Site Selection Report recommended a new lock at the Lower Site since it would cause less disruption to residents than the IHNC site.

4.1.2. Elimination of the Violet (Lower) Site

4.1.2.1. In 1977, President Carter directed the Corps of Engineers to undertake further studies of a replacement lock at the IHNC site with emphasis on actions to minimize the displacement and disruption of residents. A preliminary draft feasibility report/EIS was prepared in 1982, but was not released to the public. Alternatives under consideration at that time included an extension of the existing lock, an extension of the existing lock with a congestion fee added, an additional lock east of the existing lock, replacement of the existing lock with a new lock to the east of the existing lock, and a new lock at the Lower Site. Since 1975, the only sites that have been considered are the IHNC and Lower Sites, although several alternative alignments and bridge replacement scenarios have been investigated at the IHNC site.

4.1.2.2. The Water Resources Development Act of 1986 provided specific direction that expansion or replacement of the IHNC lock shall be in the area of the existing lock or at the Violet (Lower) Site. Extensive studies of both sites were made during the late 1980's with emphasis on minimizing potential impacts to the natural environment at the Lower Site and on minimizing social and economic impacts at the IHNC site. Even after reducing the right-of-way requirements for a lock and connecting channels at the Lower Site to the absolute minimum necessary, over 550 acres of brackish marsh, 240 acres of bottomland hardwood forest, and 380 acres of scrub/shrub wetlands would have to be destroyed. In addition, substantial losses would occur to brackish marsh and scrub/shrub habitat from construction of an eased barge channel which would be necessary at the intersection of the GIWW and MRGO. The hydrology of nearly 20,000 acres of brackish marsh and shallow open water, lying on both sides of the lock tail-bay channel would be altered, resulting in considerably decreased habitat quality. A freshwater diversion siphon, located at the head of the Violet Canal, which diverts Mississippi River water into the tidal wetlands, would be rendered useless by a lock project near Violet. The siphon's function could only be partially restored by incorporation of a replacement siphon into the lock project. A project at Violet would bisect a State-designated scenic stream. This type of disturbance to a scenic stream would require an act of the State Legislature. Adverse effects would also occur to five other state-designated scenic streams.

4.1.2.3. The major, negative impacts on the environment, together with widespread and long-standing opposition to construction of a lock in St. Bernard Parish, and the higher cost compared to a new lock at the IHNC, led the New Orleans District to request higher authority of the Corps of Engineers to approve dropping the Lower Site from further consideration. Additional information concerning public views on the Violet site is included in Section 6, Public Involvement, Review, and Consultation. The written request included a "mini-report" explaining the rationale behind the request to eliminate the Lower Site from consideration. The Corps' Lower Mississippi River Valley Division, along with Headquarters, U.S. Army Corps of Engineers and the Assistant Secretary of the Army for Civil Works agreed, but stated that the feasibility report should present the evidence leading up to the decision. Additional rationale for eliminating the Lower Site from further consideration is provided in the Plan Formulation Section of the Main Report.

4.1.3. Elimination of Lock Alignments at the Inner Harbor Navigation Canal

4.1.3.1. Elimination of the Violet site as a viable alternative left the IHNC site as the only practical location for a new lock. A variety of alternative alignments, construction methods, and other structural and non-structural alternatives for reducing lock congestion have been studied for the IHNC site. The Appropriations Committees of the U.S. House of Representatives and the U.S. Senate, in conjunction with the FY 1991 Appropriations Act, directed that the Corps of Engineers establish a broad-based community participation plan to insure that the local community is fully informed about the project planning process and that the local community has a voice in that process. In addition, the committees directed the Corps of Engineers to give maximum consideration to alternatives

which minimize residential and business disruption while meeting the goal of improving waterborne navigation. They also instructed the Corps of Engineers to develop a comprehensive plan to identify and mitigate, to the maximum extent practicable, any adverse social and cultural impacts of the project. In 1991, the New Orleans District had a socioeconomic impact analysis of five alternative lock replacement plans prepared by a local contractor. The plans analyzed in the report were:

200-foot east of the existing lock, conventional construction, new mid-level bridges at St. Claude and Claiborne Avenues

- 200-foot east of the existing lock, steel shell, float-in construction, new mid-level bridges at St. Claude and Claiborne Avenues
- 200-foot west of the existing lock, conventional construction, new mid-level bridges at St. Claude and Claiborne Avenues
- In situ replacement, concrete or steel shell, float-in construction, new mid-level bridge at St. Claude Avenue
- In situ replacement, float-in gate-bays, new mid-level bridge at St. Claude Avenue

4.1.3.2. The 200-foot east, 200-foot west, and in situ plans are shown on Plates 4, 5, and 6, respectively. All five plans included replacement of the St. Claude Avenue bridge with a mid-level crossing. A mid-level crossing is required because the lock chamber for any of the above scenarios would be immediately next to St. Claude Avenue and a low-level bridge would seriously affect operation of the lock. Such is the case under existing conditions. If a staging area for vessels was available between the bridge and the lock, a low-level bridge would cause significantly less interference with the lock.

4.1.3.3. A mid-level bridge replacement at St. Claude Avenue would not require displacement of any residences or businesses along St. Claude Avenue. Noise associated with pile driving and other bridge construction features, along with traffic detours and congestion would be a significant problem for local residents during the construction phase. A mid-level bridge *would* require conversion of several neighborhood streets to one-way traffic to accommodate some through-traffic approaching and exiting the bridge. Routing of through traffic down narrow neighborhood streets would cause safety problems and is objectionable to the residents.

4.1.3.4. The 200-foot east plans and the 200-foot west plan would require replacement of the Claiborne Avenue bridge with a mid-level crossing. The existing bridge is mid-level, but a new lock situated either east or west of the existing lock would not be properly aligned to allow vessels to navigate through the existing bridge.

4.1.3.5. Replacement of the Claiborne Avenue bridge would also produce significant adverse socioeconomic impacts. For the 200-foot east plans, east and west approach ramps and loops would require the displacement of 25 dwelling units inhabited by 57 people, along with 3 businesses. For the 200-foot west plans, east and west approach ramps and

loops would require the displacement of 117 dwelling units housing 274 people. As would be the case with replacement of St. Claude Avenue bridge, noise and other bridge construction activities, traffic detours, and traffic congestion associated with the replacement of the Claiborne Avenue bridge would significantly affect local residents.

4.1.3.6. In addition to displacements necessary for bridge replacements, the 200-foot east plans would require substantial relocation of dwelling units and individuals for the lock structure and connecting channels. Either of the two 200-foot east plans would require displacement of 87 dwelling units housing 205 people. Forty-two of the dwelling units are located within the Holy Cross Historic District. The displacement of 2 public facilities and 6 businesses or industries would also be required. Displacements would also be necessary for the relocation of an historically important sewage pumping station that lies within the required right-of-way for the new lock. It is estimated that 15 dwelling units housing 26 persons would be required for relocation of the pumping station.

4.1.3.7. Table 2 shows the total relocations required for the alternatives evaluated for the 1991 socioeconomic impact analysis.

TABLE 2
RELOCATIONS NECESSARY FOR LOCK REPLACEMENT PLANS

	200-foot east plans	200-foot west plan	In situ plans
Dwelling Units	127	121	12
Population	288	336	84
Public Facilities	2	3	2
Businesses and Industries	9	6	0
Employees	115	310	250

4.1.3.8. The right-of-way required for a new lock under the 200-foot west plan would require displacement of 4 dwelling units, housing 12 people. A U.S. Coast Guard (USCG) Station which provides housing for 50 employees would also have to be relocated, although this relocation is not considered to be a significant negative effect. The 50 USCG employees housed at the facility are on active duty and are transferable to other locations. In addition to the military personnel who live at the facility, an undetermined number of other employees, both civilian and military, work there. The cost of relocating the USCG facility is a project cost. The estimated cost of relocating the facility is $10,000,000.

4.1.3.9. The in-situ replacement plans, listed previously, would also require displacements for the new lock right-of-way. The right-of-way for a new lock would require displacement of 12 housing units occupied by 30 people. These displacements are necessary because the new lock would be wider than the existing lock and additional

right-of-way is needed for construction and levee setback. The single largest drawback to the in-situ replacement plans is the required long-term shutdown of traffic through the IHNC. The maritime industry has stated that it would not support a plan that requires a long-term shutdown of the IHNC -- they would rather endure the lock congestion. Furthermore, long-term shutdown of the lock substantially reduces project net benefits.

4.1.3.10. The socioeconomic impact analysis determined that all five of the alternatives under study would cause massive, significant, adverse impacts to the local community. It was also determined that the communities surrounding the IHNC are highly stressed. This determination was based partly on a loss in the area's population and an increase in vacant dwelling units as reported by the 1990 census. The socioeconomic impact study contractor recommended the initiation of an overall, community-based improvement program to strengthen the communities prior to project initiation, to increase the probability that project consequences would be effectively mitigated. Otherwise, the contractor believed that the viability of the neighborhoods would be undermined by any of the alternatives investigated.

4.1.3.11. The socioeconomic impact contractor recommended re-evaluation of a site north of Claiborne Avenue for a new lock. Although the socioeconomic impact study did not investigate or rate the engineering feasibility of the site, the site was believed to offer significant advantages over the other sites for the following reasons:

- The need for residential displacements would likely be eliminated.
- Business and industrial displacements would be minimized.
- A temporary bypass channel could be maintained around the construction site allowing traffic through the IHNC during project construction.
- The St. Claude Avenue bridge could be replaced with a low-level bridge since a vessel staging area would be available between the bridge and the new lock.
- The Claiborne Avenue bridge would probably not have to be replaced.
- All of the physical impacts to the Historic Districts would be avoided.
- Most of the noise and vibration impacts to the nearby communities would be avoided.
- Vehicular traffic congestion would be minimized.

4.1.3.12. The New Orleans District had studied a North of Claiborne Avenue alternative during the 1975 Site Selection Study, but the conceptual design at that time required a long-term shutdown of traffic through the IHNC to demolish the existing lock. For that reason and others, including the engineering feasibility of the plan, the North of Claiborne Avenue site had been eliminated. Based on the socioeconomic impacts that were to be expected from the other alternative sites, and the insistence of neighborhood working groups, the New Orleans District investigated innovative engineering designs and developed a plan for the North of Claiborne site in late 1991. The construction sequence was designed to avoid a long-term shutdown of the canal. In order to take full advantage of the impact-reducing potential of the site, a float-in lock design was developed.

4.1.3.13. During early 1992, the New Orleans District continued studying the economic feasibility of constructing various alternatives including the North of Claiborne alternative. The North of Claiborne Avenue site was determined to be a technically feasible alternative. In mid-1992 the New Orleans District produced a second "mini-report" documenting the costs, benefits, and major impacts of the various IHNC alternatives. The report included analysis of 200-foot east plans, a 200-foot west plan, an in-situ plan, and several plans for North of Claiborne Avenue. The plans investigated are listed as follows:

A new lock, 200 feet east of the existing lock, constructed with conventional methods. Mid-level replacement bridges at St. Claude and Claiborne Avenues are also included as plan components.

- A new lock, 200 feet east of the existing lock. The steel shell of the lock would be prefabricated off-site and floated into place in sections. Mid-level replacement bridges at St. Claude and Claiborne Avenues are also included as plan components.
- A new lock, 200 feet west of the existing lock, constructed with conventional methods. Mid-level replacement bridges at St. Claude and Claiborne Avenues are included as plan components.
- In-situ replacement of existing lock, with a mid-level replacement bridge at St. Claude Avenue. The existing Claiborne Avenue bridge would be compatible with this lock alignment and would not need replacement.
- A new lock, located within the IHNC, north of Claiborne Avenue. The shell of the lock would be prefabricated off-site and floated into place in sections. A mid-level bridge would be constructed at St. Claude Avenue but the Claiborne Avenue bridge would not be replaced.
- A new lock, located within the IHNC, north of Claiborne Avenue. The shell of the lock would be prefabricated off-site and floated into place in sections. A low-level bridge would be constructed at St. Claude Avenue but the Claiborne Avenue bridge would not be replaced.
- A new lock, located within the IHNC, north of Claiborne Avenue. The shell of the lock would be prefabricated off-site and floated into place in sections. A low-level bridge would be constructed at St. Claude Avenue and a new mid-level bridge would be constructed at Claiborne Avenue.
- A new lock, located within the IHNC, north of Claiborne Avenue. The lock would be built using conventional construction methods. A new low-level bridge at St. Claude Avenue and a new mid-level bridge at Claiborne Avenue are part of this plan.

4.1.3.14. The four sites for a new lock included in the above plans represent the full range of technically feasible and rational locations for lock replacement at the IHNC site. A 200-foot east plan was determined to produce the highest apparent net benefits of the plans studied but, of the $46 million apparent difference in net benefits between the best 200-foot east plan and the best North of Claiborne Avenue plan, $31 million are attributable to costs sustained by navigation interests from the difference in IHNC closure durations of the two

plans. An additional $71 million of the difference between the two plans results from vehicular transportation benefits foregone in the North of Claiborne Avenue Plan. The vehicular benefits attributable to the 200-foot east plan are derived from the extensive bridge replacements that are part of that plan -- replacements that produce significant socioeconomic impacts. The actual construction costs are lower for the North of Claiborne alternative.

4.1.3.15. During preparation of the second "mini-report", representatives of the Port of New Orleans and local elected officials met with the representatives of the New Orleans District to discuss the planning process. At the meeting held on March 20, 1992, the Port and elected officials agreed that only the North of Claiborne Avenue alternative would be implementable and refused to support a 200-foot east plan because of intolerable and unmitigable neighborhood impacts. The significant adverse impacts that were expected from most of the lock replacement plans at the IHNC, together with steadfast opposition to all but the North of Claiborne Avenue site by local residents and elected officials, led the New Orleans District to conclude in the second "mini-report" that the only site where a new lock could possibly be built at the IHNC was within the existing channel, North of Claiborne Avenue. The other site locations were determined to not be implementable because of significant, adverse socioeconomic project impacts that galvanized the local community and locally elected officials against them. Additional rationale for this conclusion is detailed in the Plan Formulation Section of the Main Report.

4.1.4. Phased Construction Plan

4.1.4.1. At the request of the Inland Waterway Users Board, a variation of the North of Claiborne Avenue lock replacement plan, called the phased construction plan, was investigated in considerable detail. In this plan, a new mid-level, St. Claude Avenue bridge would be constructed as early as possible but construction of a new lock would be delayed until a later date. The intention is to reduce vessel traffic congestion at the existing lock as soon as possible with a relatively low-cost effort and delay the expenditure of the considerable funds necessary for lock replacement. In order to allow for lock construction at a future date, the new bridge at St. Claude Avenue would have to provide sufficient horizontal clearance for vessels to use the existing lock and for vessels to use a temporary bypass channel during demolition of the existing lock. For this plan, at least a 300-foot horizontal clearance would be necessary. The most appropriate type of bridge would be a mid-level, vertical lift-span. This type of bridge has high towers and could be considered more objectionable than a double bascule bridge from an aesthetic perspective.

4.1.4.2. Of significantly more importance than the type of bridge, is the height of the bridge necessary for the phased construction plan. A low-level bridge is a component of the non-phased construction plan whereas the phased plan requires a mid-level bridge. This is an important consideration because of the number pedestrians and bicyclists that cross the existing low-level bridge. A mid-level bridge would seriously limit use by pedestrians and bicyclists. Also, a mid-level bridge would have significantly more impacts

on the local community since touch-down points and access ramps would extend farther into the adjacent neighborhoods and could require elevated access ramps. A mid-level bridge is required for the phased construction plan because a low-level bridge would not solve the problem of bridge interference with the existing lock.

4.1.4.3. A variety of lock sizes was investigated for the phased construction plan and for the conventional construction plan, which is discussed under Section 4.4., Plans Considered in Detail. It was determined the phased construction plan would result in short-term reductions in average vessel delays compared to the without-project condition. The year in which the net transportation cost savings of a particular size lock exceeds the average annual cost of the plan determined the optimal time when the new lock should be operational. For the optimally-sized, phased construction plan, it was determined that the lock should be operational by the year 2013, which is only two years after a lock would be completed by the non-phased construction plan. The phased plan was found to be clearly inferior economically, accounting for only 69 percent of the total average annual net benefits of the non-phased plan. It is not considered to be a viable alternative, and it has been eliminated from further discussion.

4.1.5. Steel-shell Lock Design

Social mitigation efforts focused on avoiding as many adverse impacts to adjacent neighborhoods as possible. A soil-founded lock design was investigated in detail to minimize the potential noise and vibration effects of driving a large number of pilings. For a soil-founded lock, only a small number of leveling pilings would be necessary, with the lock being supported from below by soils and bedding material. Plans for a steel-shell lock to be constructed in modules at an off-site location were developed. Foundations testing and analysis indicated that the plan would be feasible. During internal review of the steel-shell, soil-founded lock design, serious concerns surfaced over the long-term viability of a steel-shell lock. Corrosion, damage from vessels, maintenance costs, and lock closures for required repairs were critical topics. After much discussion and review within the Corps of Engineers, the steel-shell lock design was deemed infeasible from a long-term viability perspective. Planning then shifted to a concrete lock design which, because of its massive weight, can not be soil-founded and would require a large number of pilings for support.

4.2. NO ACTION/WITHOUT PROJECT CONDITIONS

4.2.1. If no Federal action is taken to address the planning objectives, waterborne commerce would continue to use the existing lock and would experience more frequent and costly delays due to lock congestion. The average waiting time at the IHNC lock is 10 to 15 hours. This condition is expected to continue into the future without any action to alleviate the situation. Florida Avenue bridge replacements and improvements by others are not expected to relieve the chronic vessel congestion problems at the lock.

4.2.2. There would be a change in vehicular transportation without a project. Vehicular traffic in the area of the IHNC would increase as the population of St. Bernard Parish grows and the more commuters use existing corridors for access to the New Orleans Central Business District.

4.2.3. The existing Florida Avenue bridge across the IHNC is a combination rail and vehicle bridge. It breaks down and is hit by barges frequently. The U.S. Coast Guard has declared it to be a hazard to navigation and has issued an Order to Alter to the Port of New Orleans to replace the bridge. Funding for replacing the bridge is from Truman-Hobbs legislation. The replacement bridge will have a 300-foot horizontal clearance, which is compatible with the proposed lock replacement. The bridge is in the final design phase and will be replaced in the near future. The U.S. Coast Guard has made a preliminary determination that the bridge will be replaced under a categorical exclusion, which excludes the action from further National Environmental Policy Act documentation. This bridge replacement must be completed before the new lock modules can be floated into place, since the existing bridge does not provide sufficient horizontal clearance.

4.2.4. In addition to the replacement bridge at Florida Avenue, the Louisiana Department of Transportation and Development is planning to construct a new high-level or mid-level vehicular bridge across the IHNC in the vicinity of Florida Avenue. Less definitive plans include an extension of Florida Avenue east to Paris Road (Louisiana Highway 47) which connects to Interstate 510 and west to Interstate 10. The new bridge, whether it is mid-level or high-level would be compatible with a new lock.

4.2.5. The two new bridges planned at Florida Avenue are not expected to significantly improve traffic flows in the study area without other improvements to the Florida Avenue corridor. There may be some additional use of Florida Avenue once the new bridges are constructed, but it is not expected to appreciably reduce traffic delays at either the St. Claude or Claiborne Avenue bridges. An extension of Florida Avenue to Paris Road would make the new bridge at Florida Avenue more attractive to commuters and would likely draw traffic away from the other crossing of the IHNC. For this study, the replacement bridge and the new bridge at Florida Avenue are included as part of the future without project condition. However, only the low-level replacement bridge is necessary for the construction of the recommended plan. Plans for a Florida Avenue extension to Paris Road are in preliminary stages and are not part of the future without-project condition.

4.2.6. According to the 1990 census, there is an 18.3 percent vacancy rate in the study area which is defined for most purposes as the area between the Mississippi River on the south and Florida Avenue on the north and between Franklin Avenue on the west and the Orleans-St. Bernard Parish line on the east. Twenty percent of the vacant units in the area are boarded-up. Vacancy rates are higher than in the City of New Orleans as a whole, which was reported to be 16.6 percent in the 1990 census. Property values in the study area are depressed. Without a Federal project, the IHNC neighborhoods would likely

continue to experience out-migration of population. However, recent development of a number of community organizations in the study area such as neighborhood associations, community development associations, neighborhood watch groups, parent-teacher associations, and community outreach groups indicate cohesive neighborhood group activity. These organizations have successfully worked to promote various improvements in the community including streets and playgrounds, and are actively engaged in renovation efforts to restore abandoned properties. The efforts of these organizations should help to slow down or reverse the decline of the neighborhoods in the study area.

4.2.7. Noise levels in the IHNC area would be expected to remain essentially unchanged. Business and industrial activity in the study area would likely change very little. There are approximately 50 businesses located on the IHNC between the Mississippi River and Lake Pontchartrain on property owned by the Port of New Orleans. These businesses employ about 3,000 persons (minimum) and many of the establishments rely on the lock for access to the river. Employment in the area would likely remain at its current level. If the existing delays at the lock are exacerbated and, as a result, waterborne traffic selects other routes and ports, the economy dependant upon the IHNC and the MRGO could suffer.

4.3. PLANS CONSIDERED IN DETAIL

4.3.1. General

Two action plans and the no-action alternative, which involves rehabilitation of the existing lock, will be considered in detail in this report. At present, a low-level, bascule, combination vehicle and railroad bridge crosses the IHNC at Florida Avenue. Using funds provided through the U.S. Coast Guard, the Port of New Orleans will replace this bridge with a new low-level bridge that will accommodate both rail and local vehicular traffic. This bridge replacement is necessary for any one of the lock replacement alternatives to be constructed since the existing bridge does not provide sufficient horizontal clearance to float-in the lock modules. The Louisiana Department of Transportation and Development will construct a new high-level or mid-level vehicular bridge across the IHNC at Florida Avenue. At some undetermined time, an elevated extension of Florida Avenue to Paris Road may be constructed, but the timing and funding for this effort are so uncertain that it has not been made part of the future scenario. The costs of the two new bridges at Florida Avenue are not included in the lock project, and their costs are not applicable NED costs.

4.3.2. Plan 1 (No-Action)

The no-action alternative requires extraordinary maintenance expenditures for the existing IHNC Lock. It is estimated that for the existing lock to operate at full capacity over the project life, it would be necessary to make these expenditures at an estimated cost of

$16,100,000. Several canal closure periods of 1-2 month duration would be necessary to accomplish the work. The work would consist mainly of repair and replacement of machinery, and would have no social and environmental impacts on the nearby residential areas. Average annual operating and maintenance expenses for the existing lock are estimated at $1,700,000 per year, which does not include the extraordinary maintenance.

4.3.3. Plan 2 (Bridge-Only Plan)

4.3.3.1. This plan does not involve replacement of the IHNC Lock, but rather, consists of a new bridge across the IHNC at St. Claude Avenue (Plate 8). The existing low-level St. Claude Avenue bridge is an impediment to navigation traffic. In order to facilitate vehicular traffic, the bridge is not raised during rush hour traffic times. This bridge "curfew" period is regulated by an agreement between the Port of New Orleans and the U.S. Coast Guard. Since the bridge is low-level and is located immediately next to the lock, no vessels can pass through the lock while the bridge is down. A mid-level bridge at St. Claude Avenue would allow most shallow-draft vessels to pass through the lock without opening the bridge, thereby improving both vehicular and vessel traffic.

4.3.3.2. The new St. Claude Avenue bridge for this plan would be mid-level, double bascule bridge that would be sufficient for vessels currently able to use the existing lock. The bridge would have 200-foot horizontal clearance and unlimited vertical clearance. The 200-foot horizontal clearance is the minimum required for safe navigation at this location as determined by the U.S. Coast Guard.

4.3.3.3. This plan would not be compatible with future construction of a replacement lock. In order to construct a new lock at the North of Claiborne Avenue location without shutting down vessels traffic for an extended period of time, a temporary bypass channel must be constructed on the east side of the existing lock. The bridge which would be constructed under this plan would not have sufficient horizontal clearance to allow construction of the bypass channel and therefore would have to be replaced or substantially modified before a new lock could become operational.

4.3.3.4. Significant adverse impacts of this plan would include traffic delays during the construction period and the rerouting of some bridge traffic through neighborhood streets upon completion of work. The aesthetic quality of the neighborhoods adjacent to St. Claude Avenue would also be adversely affected. Noise levels that are normally considered to be unacceptable would affect people living and working in the immediate area during certain phases of bridge construction. No displacements of businesses or residents would be necessary, however, customer access and parking for several businesses along St. Claude Avenue would be reduced. The construction period for bridge replacement would be expected to take about 3 years.

4.3.3.5. The community impact mitigation plan for this alternative focuses on avoidance and compensation for impacts to vehicular traffic, community cohesion, noise, aesthetic

qualities, and police and fire protection during project construction. The cultural resources mitigation plan would involve testing for the presence of cultural resources encountered during project construction and recordation of any significant items discovered. This plan would require demolition of one property which is eligible for the National Register -- the St. Claude Avenue bridge. Prior to demolition, the property would be recorded to Historic American Building Survey and Historic American Engineering Record standards. This plan would not impact fish and wildlife habitat and no mitigation for the loss of natural habitat is proposed.

4.3.4. Plans 3a through 3f (New Lock - North of Claiborne Avenue)

4.3.4.1. A wide range of lock sizes for the North of Claiborne Avenue site have been investigated during the course of this study. Analyses have focused mainly on locks with lengths of 900 feet and 1,200 feet, widths of 90 feet and 110 feet, and depths of 22 and 36 feet. The 22-foot depth is the minimum necessary to allow safe and proper functioning of the lock for shallow-draft navigation. From the standpoint of impact analysis, locks of various sizes at a given location, and for a given construction scenario, produce very similar impacts. The main differences among the different size locks would be their effects on waterborne commerce. For details on the economic analyses performed, refer to the Main Report and the Economics Appendix. The right-of-way required for all lock sizes investigated at the North of Claiborne Avenue site would be essentially the same.

4.3.4.2. The plans designated 3a through 3f involve replacement of the IHNC lock with a new lock to be constructed within the IHNC, north of Claiborne Avenue. For most significant resources, there would be no differences among the plans. Table 3 shows the dimensions of each lock replacement plan.

TABLE 3
LOCK DIMENSIONS FOR PLANS 3a THROUGH 3f

Plan	Length	Width	Depth
Plan 3a	900'	90'	22'
Plan 3b	900'	110'	22'
Plan 3c	900'	110'	36'
Plan 3d	1,200'	90'	22'
Plan 3e	1,200'	110'	22'
Plan 3f	1,200'	110'	36'

4.3.4.3. Construction of a new lock at the North of Claiborne Avenue location would require a complex sequence of tasks that must occur in chronological order to minimize canal closure times and community impacts. The various components of the North of Claiborne Avenue plan are provided as Plates 7, 9, and 10 through 24. Also, a series of 16

computer-enhanced, project construction sequence illustrations are provided at the end of the Main Report. The following description of the construction sequence contains only the major actions which would occur.

4.3.4.4. The Galvez Street wharf and the U.S. Coast Guard facility on the west bank of the IHNC, along with businesses along the east side of the IHNC between the river and Florida Avenue, would be demolished and removed. A temporary bypass channel (the north bypass channel) would be excavated on the east side of the site designated for the new lock. The site for the new lock would be prepared by dredging the canal bottom, placing bedding material, and driving pilings. Material dredged for the bypass channel and from the canal bottom would be hydraulically deposited along the south bank of the MRGO in an area previously used for dredged material disposal and in a shallow open water area to develop marsh as mitigation for impacts of an offsite construction yard. Meanwhile, reinforced concrete lock modules would be partially constructed at the offsite construction yard (graving site) along the MRGO/GIWW near Paris Road. The four partially completed lock modules would be individually floated to the present site of the Galvez Street wharf where lock walls and accessories would be added. (In order for the lock sections to be floated into place, the Florida Avenue bridge would already have been removed and replaced by others.) The completed modules would be floated to the prepared foundation site and ballasted into position.

4.3.4.5. A detour road would be constructed through an undeveloped area in St. Bernard Parish to link St. Bernard Highway, Judge Perez Boulevard, and Florida Avenue. The road would allow commuters to easily access the Florida Avenue bridge and thereby bypass the chronically congested St. Claude and Claiborne Avenue bridges. Temporary, single-bascule bridges would be constructed adjacent to the St. Claude Avenue bridge to provide a comparable level of traffic flow at this location while the St. Claude Avenue bridge is replaced with a low-level, double-bascule bridge. The towers and lift-span of the Claiborne Avenue bridge would be replaced. The new towers and lift-span would be prefabricated off-site and floated into position on barges. The closure time of the bridge to vehicular traffic for this work would be 2-4 weeks. Levees and floodwalls would be relocated and upgraded as necessary to provide uninterrupted hurricane and river flood protection. The new lock would become operational and the north bypass channel would be back-filled mainly with material taken from a south bypass channel (demolition bypass channel) to be excavated around the east side of the old lock.

4.3.4.6. The existing lock would be demolished and material hauled away. Final dredging would be required in the vicinity of the old lock site, the old lock fore-bay, the new lock fore-bay. Some of this material would be used for additional backfill around the new lock site, with the excess pumped to the Mississippi River. The new lock guide walls would be installed and permanent mooring facilities would be constructed. The entire construction phase is expected to take about 11 years.

4.3.4.7. Industrial facilities or shipyards capable of constructing the lock modules are not readily available in the vicinity of the IHNC. In order to assure that the lock modules could be constructed, a site was selected in proximity to the IHNC, and plans have been developed for preparing the site for lock module construction. This site is referred to henceforth as the graving site. The graving site, known as the Aurora Property, is located on the north bank of the GIWW/MRGO just west of the Paris Road bridge. The site was selected from a list of alternatives suggested by the Port of New Orleans. The sites were subjected to a screening analysis to determine the best overall location Table 4.

4.3.4.8. The graving site is located within the New Orleans Business and Industrial District (NOBID). Mitigation for impacts to wetlands within the NOBID was accomplished in the 1980's by donation of funds to the Nature Conservancy for the purchase of the White Kitchen wetland in St. Tammany Parish, Louisiana. At the time, the graving site was under forced drainage and was not identified as a jurisdictional wetland. Therefore, the mitigation did not account for the graving site. Since then, drainage patterns have changed, and the area has reverted to a consistently flooded condition, providing suitable habitat to a wide variety of wetland-dependent wildlife species.

4.3.4.9. Engineering investigations to be conducted during preparation of detailed designs could indicate that other locations for the graving site would be less costly and less environmentally damaging. Also, the successful bidder on the lock module construction contract could devise a method to construct the lock modules at an existing industrial facility. Although there is a strong possibility that the designated graving site would not be used, a mitigation plan for impacts to the site has been developed. Impacts to the site would be minimized by restricting the area to be impacted to the minimum necessary for graving site construction and associated staging and stockpile areas. Direct impacts would be restricted to 25 acres of freshwater wetlands.

4.3.4.10. The tentative dredged material disposal plan for most of the soil and sediment excavated during the early stage of project construction is to dispose of the material, either hydraulically or by hauling, in previously-used disposal areas for the MRGO. Use of the material for wetland restoration has been investigated in detail, but the USFWS has determined that canal bottom sediment and some of the soil (the uppermost 5 feet) from the east bank of the IHNC is too contaminated for use in wetland restoration. The material contains heavy metals, volatile organic compounds, and polycyclic aromatic hydrocarbons.

4.3.4.11. Mitigation plans for impacts of the graving site focused on beneficial use of the material to be dredged for project construction. The soil from the east bank of the IHNC, below 5 feet in depth, is uncontaminated and suitable for wetland restoration. This material would be used to develop between 31 and 41 acres of vegetated wetland (the amount varies with lock size). Habitat evaluation procedures of the USFWS were used to verify that the use of the clean, east-bank soils for wetland restoration would adequately mitigate for adverse project impacts of the graving site.

TABLE 4
IHNC LOCK REPLACEMENT - GRAVING SITE SELECTION EVALUATION
QUALITATIVE RANKING

Site Description	Port of New Orleans Ranking	Space Available	Disposal Available/ Refill Slip	Foundation Conditions	HTRW Status	Levee Protection Impacts	Utilities Relocation Impacts	Proximity to Lock Site	Wetland Impacts
Site 1 - Aurora MRGO @ Paris Road, Northwest	1	Yes	Yes/No	Fair	Good	Yes	No	6.2 miles	Yes
Site 2 - Newport, MRGO @ Paris Road. Southeast		Yes	Yes/No	Fair	Good	Yes	No	6.5 miles	Yes
Site 3 - Gott, MRGO @ Paris Road, Southwest	3	Yes	Yes/No	Fair	Good (Oil Tanks?)	Yes	Yes Natural Gas and Communication Lines	6.3 miles	Yes
Site 4 - Public Bulk Terminal, MRGO - North Bank	4	Yes	Yes/No?	Fair-Good	Fair	Yes	Yes 54" Forced Main, Rail	3.1 miles	Possibly
Site 5 - Barriere, MRGO @ IHNC, Northeast	5	Possibly	Possibly/ Probably	Good	Fair	Probably	Yes Roadway, Utility Poles	1.6 miles	No
Site 6 - Gulf Outlet Fuel Dock, MRGO @ IHNC, Southeast	6	Marginal	No* / Probably	Good	Needs Work	No	No	1.5 miles	No

* Alternate offsite disposal by truck hauling or hopper barge is available. Dredged soil material (high clay content) is merchantable.

Note: Another site considered on the IHNC (not listed herein) is Slip No. 4 located along the east bank of the IHNC. This site has a 99-year lease which doesn't expire until 2047. Any temporary usage would have to be negotiated.

4.3.4.12. A broad-based community impact mitigation plan is an integral part of this plan. The plan in this final report is substantially different from that proposed in the draft, with changes prompted by public comments made during the public review period for the draft report. The mitigation plan now includes temporary bridges that eliminate bridge closure periods, and many items in the draft mitigation plan were transferred into the category of normal construction activities. Funding for most of the items remaining in the mitigation plan were increased. The current mitigation plan calls for specific actions to minimize and compensate for adverse impacts to the local community that are expected from project construction, mainly in areas of community facilities and services, community cohesion, noise, police and fire protection, aesthetics, and pedestrian access.

4.3.4.13. Lock replacement plans would require the demolition of three National Register eligible properties. Prior to project construction, these properties would be recorded to Historic American Building Survey and Historic American Engineering Record standards.

4.3.5. National Economic Development Plan

Plan 3b, the shallow-draft (22-feet deep) lock with a length of 900 feet and width of 110 feet, is designated as the National Economic Development (NED) plan because it produces the greatest net benefits over costs of any of the plans considered in detail. It is considered to be a socioeconomically and environmentally acceptable plan. The cost of Plan 3b would be allocated equally between the General Fund of the U.S. Treasury and the Inland Waterways Trust Fund. The Federal government (Corps of Engineers) would be responsible for obtaining all lands, easements, and right-of-ways required for project construction, the costs of which would be included in the overall project cost.

4.3.6. Locally Preferred Plan

The plan preferred by the Port of New Orleans, the local project sponsor, is Plan 3f. Plan 3f is the largest lock size investigated in detail (1200- by 110- by 36 feet). This plan would provide the flexibility and capacity preferred by the Port of New Orleans, and it would produce the greatest net benefits of any deep-draft lock investigated in detail. The 36-foot lock depth is compatible with the controlling depth of the MRGO and would allow deep-draft vessels using the MRGO and docks along its banks, to pass to and from the Mississippi River.

4.3.7. Environmentally Preferred Plan

From a natural environment perspective, all of the lock replacement alternatives (Plans 3a through 3f) would have similar impacts. A graving site would be required for all lock replacement alternatives, and disposal of contaminated soils and sediments would be necessary. Plan 2 (Bridge-Only) is designated as the environmentally preferred plan because it is less disruptive of the social and cultural aspects of the human environment,

compared to the lock replacement plans, and it would have no direct impacts on the natural environment.

4.3.8. Recommended Plan

The recommended plan (TSP) is Plan 3f, which provides for a new lock with dimensions of 110 feet wide by 1,200 feet long by 36 feet deep. It is also the locally preferred plan, favored by the Port of New Orleans, the local sponsor. From an economic perspective, Plan 3f would produce greater gross economic benefits, but is not incrementally justified over Plan 3b. The Port of New Orleans would be responsible for the incremental cost of Plan 3f over Plan 3b.

4.4. COMPARATIVE IMPACTS OF ALTERNATIVES

Table 5 provides a summary of the impacts associated with alternatives investigated in detail on significant resources and issues. The table lists the impacts expected without mitigation. However, a community impact mitigation plan and fish and wildlife mitigation plan are integral parts of all action alternatives considered. A description of each significant resource and a more detailed analysis of the impacts are contained in Section 5, Affected Environment/Environmental Effects. Table 6 provides a comparative view of the costs and benefits associated with the action alternatives investigated.

TABLE 5
COMPARATIVE IMPACTS OF ALTERNATIVES

RESOURCE	EXISTING AND FUTURE WITHOUT-PROJECT CONDITION	PLAN 2 BRIDGE ONLY	PLANS 3a THROUGH 3f NEW LOCK
Waterborne Transportation	Continued increases in commerce on the Mississippi River and the GIWW would increase the average delay times at the IHNC lock. As delay times increase, some tows would switch to alternate waterways or products would be diverted to other forms of carriage.	The new bridge would reduce, but not eliminate, future transit delays.	The expected level of shallow-draft transit delays would be reduced considerably with the shallow-draft lock plans. Deep-draft lock plans would also considerably reduce transit times for deep-draft vessels between the MRGO and Mississippi River.
Flood Protection Systems	Mississippi River levees, hurricane protection levees, and internal drainage systems would be maintained and upgraded as necessary to protect developed areas.	A relatively minor amount of Mississippi River levee modification would be necessary in the vicinity of the St. Claude Avenue bridge. Flood protection would be maintained throughout construction period.	Flood protection levees and floodwalls would be modified between the river and the new lock site to accommodate Mississippi River floods. Some realignment would be necessary on the west side of the IHNC. The hurricane protection levee at the graving site would be re-aligned. Adequate flood protection would be maintained during the construction period.
Business and Industrial Activity	A wide variety of businesses and industries are located along and in the vicinity of the IHNC. Business activity would likely change very little in the near future.	Activity at some businesses in the vicinity of the IHNC would be impacted during periods of bridge closure by traffic delays and detours and noise. After project construction, altered traffic patterns would continue to affect some local businesses near St. Claude Avenue.	Project construction, including bridge work, could adversely affect businesses in the vicinity, especially those dependent upon trans-canal traffic. After project construction, no adverse impacts to local businesses would be expected.
Employment	Available information indicates that unemployment rates in the study area are higher than the average in metropolitan New Orleans. This condition would likely continue.	Employment at local businesses that depend on trans-canal customers could be adversely affected during the period of bridge closure.	Employment at local businesses could be adversely affected during the construction period, especially during bridge work. Effects to employment at the two businesses to be relocated cannot be determined.
Land Use	No significant changes are expected in the industrialized corridor along the IHNC or in the urban residential communities of the area.	No significant change in the mix of land uses would be expected.	Publicly-owned lands along both sides of the IHNC would be converted to an alternate use as part of the inland waterway system.

TABLE 5
COMPARATIVE IMPACTS OF ALTERNATIVES

RESOURCE	EXISTING AND FUTURE WITHOUT-PROJECT CONDITION	PLAN 2 BRIDGE ONLY	PLANS 3a THROUGH 3f NEW LOCK
Property Values	Property values in the study area reflect a range of influences, many of which are regional in nature. A 1991 study suggests continuing property value decline in the study area.	Property values would likely be adversely, though temporarily, affected by bridge closures. Increased traffic congestion would tend to discourage potential residents.	Property values could be adversely, though temporarily, affected by project construction. Increased traffic congestion would tend to discourage potential residents. Long-term, adverse effects from more frequent bridge openings at Claiborne Avenue also possible.
Public/ Community Facilities and Services	Existing facilities and services which are typical for an urban community are expected to continue in the vicinity of the IHNC.	The bridge closure period would adversely affect access to community facilities. Police, EMS, and fire fighting services would also be adversely affected.	Project construction, especially bridge work, could adversely affect access to community facilities. Police, EMS, and fire fighting services could also be adversely affected.
Tax Revenues	No significant change in existing tax revenues is expected. State and local governments are heavily dependent on sales taxes which approach 10 percent.	No net effect on tax revenues is expected although individual businesses may experience increased or decreased sales.	No net effect on tax revenues is expected although individual businesses may experience increased or decreased sales.
Population	The neighborhoods around the IHNC are expected to continue experiencing an out-migration. Vacancy rates are expected to remain high.	No residential relocations would be required. Traffic congestion associated with bridge closure could influence some residents to move elsewhere.	No residential relocations would be required. Perceived and real inconveniences could influence some residents to move elsewhere.
Community and Regional Growth	Neighborhoods around the IHNC are mature. Community growth depends on redeveloping or intensifying the existing neighborhoods.	The potential for community growth would be diminished during periods of bridge closure. Long-term beneficial effects may result from improved vehicular access across the IHNC.	The potential for community growth would be diminished during the construction period. No long-term adverse effects on community growth are expected.
Vehicular Transportation	A new bridge, to be constructed across the IHNC at Florida Avenue by others, will not significantly reduce existing traffic delays for commuters and residents crossing the IHNC.	Closure of the St. Claude Avenue bridge would significantly increase trans-canal traffic congestion. Long-term beneficial effects would be expected from a more efficient crossing at St. Claude Avenue. Pedestrian access across the IHNC would be significantly impacted both during construction and over the long term.	The bridge restriction period required for up to 4 months at St. Claude Avenue would adversely affect vehicular traffic. In the post-construction period, traffic across IHNC should be improved. Eventually, with projected increases in navigation traffic, the total amount of time that the bridges would be in the open position, would be higher than what would occur in the no-action scenario.

TABLE 5
COMPARATIVE IMPACTS OF ALTERNATIVES

RESOURCE	EXISTING AND FUTURE WITHOUT-PROJECT CONDITION	PLAN 2 BRIDGE ONLY	PLANS 3a THROUGH 3f NEW LOCK
Housing	Housing varies from well-maintained residences to vacant, abandoned houses. Vacancy rates are relatively high. The housing market is depressed.	No residential relocations would be necessary and no damage to residential structures would be expected.	No residential relocations would be necessary and no damage to residential structures would be expected.
Community Cohesion	The presence of a large number of community organizations indicates cohesive neighborhood group activity. Neighborhoods have developed individual identities.	Bridge closure would disrupt some routine daily activities such as shopping, visiting with neighbors, and walking.	Bridge work at St. Claude Avenue, requiring a reduction to two lanes of traffic, would disrupt some routine daily activities such as shopping, visiting with neighbors, and walking for up to a 4 month period.
Noise	Noise levels are commensurate with the urban setting of the IHNC. Vehicular traffic is the largest noise generator. Existing noise levels are expected to continue in most areas.	Under a worst-case scenario, as many as 315 housing units could be affected by "normally unacceptable" noise levels. The duration of the noise impacts would vary along the bridge construction corridor.	Under a worst-case scenario, "normally unacceptable" noise levels from lock construction could impact 286 housing units. St. Claude Avenue bridge replacement could affect 315 housing units. Refitting of the Claiborne Avenue bridge would affect an undetermined number of housing units.
Air Quality	Orleans and St. Bernard Parishes are classified as non-attainment areas for air quality. Ozone is the problem constituent. A request for reclassification to attainment status is being prepared. Conditions are expected to continue without significant change.	Traffic delays during bridge construction would increase pollutants in the immediate vicinity. Construction equipment would add additional emissions and cause an increase in dust (particulate) levels during the 2-3 year construction period.	Extensive demolition of buildings and structures, hauling of fill material, and general construction would increase emissions and dust during the 11-year construction period. Emissions from construction equipment would not violate air quality regulations.
Forested Areas	Small forested areas occur along the banks of canals and bayous and in remnant tracts in St. Bernard Parish. These forested areas provide habitat for a variety of wildlife species.	No effect -- same as future without-project condition.	A detour road planned to connect Florida Avenue to Judge Perez Boulevard and St. Bernard Highway would skirt the western edge of a 155-acre forested area. At most, 2.8 acres of forested land would have to be cleared. Dredged material disposal would impact MRGO disposal areas which contain early successional woody vegetation.

TABLE 5
COMPARATIVE IMPACTS OF ALTERNATIVES

RESOURCE	EXISTING AND FUTURE WITHOUT-PROJECT CONDITION	PLAN 2 BRIDGE ONLY	PLANS 3a THROUGH 3f NEW LOCK
Coastal Wetlands	The coastal wetlands (especially marsh) to the east of the IHNC will continue to be lost to soil compaction and subsidence, erosion by wave action, and developmental activities.	No effect -- same as future without-project condition.	The graving site necessary for lock module construction would destroy 25 acres of freshwater wetland. Clean soil from the east bank of the IHNC would be used to build vegetation wetlands and mitigate for lost habitat value.
Water Quality	The IHNC, tidal wetlands, and the Mississippi River are negatively affected by pollutants in urban runoff, industrial discharge, and vessel waste. Conditions are expected to remain the same or improve slightly.	Impacts to water quality would be localized, minor, and of short duration. Some turbidity would occur during construction.	Dredging and disposal activities would increase concentrations of several constituents, namely chromium, copper, and zinc in the Mississippi River, and copper and zinc in the IHNC. Short-term increases in turbidity and decreases in dissolved oxygen are also expected.
Aesthetic Values	The two historic neighborhoods in the IHNC vicinity offer a unique aesthetic value. Other aesthetic resources are the Holy Cross levee and batture area and the grove of live oak trees next to the IHNC lock. No significant changes are expected to these areas.	The new St. Claude Avenue bridge would have various effects, both positive and negative, on the aesthetic appeal of the area. The new bridge would be larger and higher but new open areas would be created under the bridge approach ramps.	The new St. Claude Avenue bridge would have both positive and negative aesthetic effects. The grove of oak trees next to the existing lock would be removed. A fold-down floodwall on top of a section of levee near the Holy Cross neighborhood, would have adverse effects only when raised during high-water conditions.
Recreational Opportunities	Recreational opportunities in the IHNC area include activities at neighborhood playgrounds and gyms, and activities associated with the levee and batture areas such as walking, bicycling, picnicking, fishing, and relaxing. No significant changes are expected.	Both long and short-term adverse impacts to recreational pursuits would be expected. During bridge construction, pedestrian and bicycle traffic across the IHNC would be virtually eliminated. After the construction period, the mid-rise bridge would be difficult, at best, to cross by foot or bicycle.	Crossings of the IHNC by foot or bicycle would be greatly impaired, if not eliminated, during bridge construction but would be restored afterward. A fold-down floodwall on top of a section of levee near the Holy Cross neighborhood, would have adverse effects only when raised during high-water conditions.

TABLE 5
COMPARATIVE IMPACTS OF ALTERNATIVES

RESOURCE	EXISTING AND FUTURE WITHOUT-PROJECT CONDITION	PLAN 2 BRIDGE ONLY	PLANS 3a THROUGH 3f NEW LOCK
Cultural Resources including National Register Sites	Two historic neighborhoods adjacent to the IHNC are listed in the National Register. Also, the Galvez Street Wharf, St. Claude Avenue Bridge, the existing IHNC lock, and a sewage pumping plant are all eligible for listing in the Federal Register.	The St. Claude Avenue bridge, which is eligible for the Federal Register would be demolished. It would be documented to accepted standards. The replacement bridge would have an adverse visual impact on the nearby historic neighborhoods.	The IHNC lock, St. Claude Avenue bridge, and Galvez Street wharf, all eligible for the Federal Register, would be demolished. They would be recorded to accepted standards. No significant adverse post-construction impacts expected.

TABLE 6
COMPARATIVE ECONOMIC CHARACTERISTICS OF ALTERNATIVES
(Based on 1996 price levels, 7.375% interest rate, and 50 year project life)
(x $1,000)

ALTERNATIVE	FIRST COST	TOTAL ANNUAL COSTS	TOTAL ANNUAL BENEFITS[1]	NET BENEFITS[1] ADJUSTED TO 2010	BENEFIT / COST RATIO
Plan 2	61,056	5,465	20,973	20,614	3.84
Plan 3a	410,707	49,352	97,117	47,765	1.97
Plan 3b (NED)	443,907	53,146	104,379	51,233	1.96
Plan 3c	462,307	57,846	106,823	45,613	1.85
Plan 3d	430,907	54,745	108,365	49,937	1.98
Plan 3e	458,307	58,086	109,410	47,799	1.88
Plan 3f (Recommended)	512,107	63,438	110,427	43,762	1.74

[1] Bridge curfews are assumed to be abolished for Plan 2. For Plans 3a through 3f, bridge curfews are assumed to remain in effect.

5. AFFECTED ENVIRONMENT/ENVIRONMENTAL EFFECTS

5.1. ENVIRONMENTAL CONDITIONS

5.1.1. The study area, for socioeconomic impact analysis purposes, is Orleans and St. Bernard Parishes. Discussions will be limited mainly to the area between the Mississippi River on the south, Florida Avenue on the north, Franklin Avenue on the west, and the Orleans-St. Bernard Parish line (Jackson Barracks) on the east. This is an area of about 4.5 square miles. The biological study area includes the Mississippi River from the IHNC to the river's mouth, the IHNC, Orleans Parish east of the IHNC, and St. Bernard Parish west of Paris Road (Louisiana Highway 47).

5.1.2. The land in Orleans and St. Bernard Parishes was created relatively recently in geologic history by sedimentary processes of the Mississippi River. Land elevations within the area range from below sea level to a maximum of 15 to 20 feet above sea level. The higher lands are the natural and man-made levees along the Mississippi River and its inactive distributaries. The area immediately adjacent to the IHNC is totally developed for industrial, commercial, and residential usage. The undeveloped portions of the biological study area contain large areas of shallow brackish water, bayous, canals, freshwater wetlands, brackish marsh, vegetated canal banks, and scrub/shrub wetlands.

5.1.3. Levees along the Mississippi River protect Orleans and St. Bernard Parishes from river flooding. Hurricane protection levees and floodwalls protect portions of these parishes from storm-induced tidal flooding. All of Orleans Parish west of the IHNC is protected by levees and is under forced pumping to remove excess rainwater. Developed portions of Orleans and St. Bernard Parishes, east of the IHNC, are also leveed and under forced drainage. During normal meteorological conditions, floodgates allow tidal fluctuation within some parts of the hurricane levee system to maintain wetland characteristics and allow access by vessels. A secondary, local levee and floodwall system separates most of the developed area from the tidal wetlands within the larger hurricane protection system.

5.1.4. Climatically, the area is warm and humid with mild winters and hot summers. Rainfall is high, averaging about 60 inches per year, and tropical storms and hurricanes periodically cross the area. The biological study area contains populations of resident and transient estuarine fish and shellfish, small mammals, resident and wintering waterfowl, and wading birds, and many other avian species.

5.2. ITEMS NOT SIGNIFICANTLY AFFECTED

5.2.1. Several items that are often affected by large civil works projects would not be affected by any of the alternatives under consideration, mainly because of the urban, developed conditions of the IHNC area. No agricultural lands and farms are present in the area near the IHNC. Correspondence with the Department of Agriculture, Soil Conservation Service confirmed that no prime or unique land subject to provisions of the Farmland Protection Policy Act are located in the vicinity of the IHNC. Documentation is provided in Appendix D, Section 6.

5.2.2. Consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service revealed that no threatened or endangered species are likely to be affected by any project alternative. There are several listed species that may be found in the area, but most occur as strays or vagrants from areas where they are more likely to be found. The only listed species that is normally found in the area is the endangered brown pelican. Brown pelicans occasionally forage in the tidal wetlands and water bodies of the study area, especially during winter, but breed on islands closer to the Gulf of Mexico. No adverse impacts to this species is anticipated from any alternative under consideration. Documentation of compliance with the Endangered Species Act is provided in Appendix D, Section 2.

5.2.3. Seven bayous that are part of the Louisiana Scenic Rivers System are located in the tidal wetlands of St. Bernard Parish. These streams are far removed from the areas that would be affected by the alternatives under consideration and no impacts to these streams are expected. No Federally listed scenic rivers are located in Louisiana.

5.2.4. The Bayou Sauvage National Urban Wildlife Refuge is located in eastern Orleans Parish. A large part of the refuge is located within the Lake Pontchartrain and Vicinity Hurricane Protection levees. This part of the refuge is drained by both gravity drainage and forced pumping systems. The refuge also includes tidal, brackish marshes between the GIWW and Lake Borgne and between the hurricane protection levee and Lake Pontchartrain. The refuge is sufficiently removed from IHNC that no effects to the refuge would occur from any of the alternatives under consideration. No other Federal or State wildlife refuges, management areas, or parks are located in the vicinity of the IHNC.

5.3. SIGNIFICANT RESOURCES AND ALTERNATIVE EFFECTS

5.3.1. Introduction.

5.3.1.1. A resource is considered significant if it is identified in the laws, regulations, guidelines, or other institutional standards of national, regional, and local public agencies; if it is specifically identified as a concern by local public interests; or if it is

judged by the Corps of Engineers to be of sufficient importance to be designated as significant. The attributes and recognition of significant resources discussed in this report are displayed in Tables 7 and 8. The following sections discuss each significant resource occurring in the study area and listed previously in Table 5, Comparative Impacts of Alternatives. The significance of each resource and existing conditions are described, then the effects of the no-action alternative and each of the other alternatives are analyzed. Operation and maintenance activities are included in the discussion of alternative plan effects.

5.3.1.2. The impacts discussed in the following sections represent those which would occur without the implementation of the proposed community impact mitigation plan. However, none of the construction plans described herein would be implemented without community impact mitigation. Immediately after the presentation of effects in many of the following sections, the components of the mitigation plan which would minimize and compensate for the impacts are described.

5.3.1.3. As for social and economic impacts, fish and wildlife habitat impacts discussed in the following sections relate to impacts in the absence of a mitigation plan. Mitigation plans for fish and wildlife impacts are presented following the discussions of impacts.

5.3.2. Waterborne Transportation

5.3.2.1. Affected Environment. The IHNC and associated lock, opened in 1923, serves as a critical link on the Gulf Intracoastal Waterway and provides passage between the Mississippi River and Lake Pontchartrain with a connection to the MRGO and the GIWW. Primarily serving shallow-draft barge traffic, the IHNC lock is capable of accommodating a limited number of deep-draft vessels that operate on the MRGO. A variety of recreational vessels, commercial fishing vessels, and U.S. Government vessels also use the lock.

5.3.2.2. Plan 1 (No Action). Shallow-draft traffic would experience increasing transit delays and higher transportation costs as longer lock processing times and more frequent lock operations reflect the growing volume of future traffic over this portion of the GIWW. As transit delays and transportation costs increase over time, some tows would switch to alternative waterways or products would be diverted to rail carriage.

5.3.2.3. Plan 2. Under this plan, future transit delays for waterborne traffic would be lower as the mid-level replacement bridge at St. Claude Avenue reduces the incidence of interference with waterborne traffic. While transit delays under this plan would be less than under Plan 1, the delays would be higher than under plans which include a lock replacement.

TABLE 7
ATTRIBUTES OF SIGNIFICANT RESOURCES

SIGNIFICANT RESOURCE	ECOLOGICAL ATTRIBUTES	CULTURAL ATTRIBUTES	AESTHETIC ATTRIBUTES
Socioeconomic Resources	Socioeconomic resources are generally not associated with ecological significance.	The cultural attributes of some areas are principal reasons for human habitation.	—
Air Quality	Non-polluted air is essential for human health and quality fish and wildlife habitat.	—	Non-polluted air provides a pleasing environment.
Wooded Lands	Provides habitat for terrestrial and avian species. In tidally-influenced areas, this habitat provides escape cover for marsh animals during storms.	Native Americans and early immigrants settled in forested areas along natural ridges. Remaining forested areas support traditional hunting pursuits.	Provides a pleasing visual contrast to expanses of marsh, open water, and urbanized areas.
Coastal Wetlands	Detrital input from the marsh to estuarine waters is a basic element of the food web. Coastal marshes support a multitude of avian species.	Consumptive use of wetland-related fish and wildlife resources is a key component of the local heritage.	Provides a typical Louisiana wetlands setting.
Aquatic Habitats	Shallow protected areas are used as nursery areas for estuarine fish and shellfish. Tidal channels are used as primary migration routes by migratory estuarine fish and shellfish.	Used for recreational and commercial fishing, part of the cultural heritage. Provides traditional trade and navigation routes.	Water bodies surrounded by emergent vegetation provide aesthetically pleasing views. Vessels cruising through deep water passes are pleasing sights.
Aesthetic Values	—	Cultural resources are often high in aesthetic appeal.	—
Recreational Opportunities	Recreational harvest of fish and wildlife is an important component of the area's ecology.	Outdoor recreational activities are an important part of the area's culture.	Outdoor recreational activities flourish in areas of high aesthetic quality.
Cultural Resources including National Register Sites	—	—	Many cultural resources have high aesthetic value.

TABLE 8
RECOGNITION OF SIGNIFICANT RESOURCES

SIGNIFICANT RESOURCE	INSTITUTIONAL RECOGNITION	TECHNICAL RECOGNITION	PUBLIC RECOGNITION
Socioeconomic Resources	River and Harbor Flood Control Act of 1970, National Environmental Policy Act.	Important for social harmony in highly urbanized areas.	Social and economic factors affecting the community structure are of great concern to the general public and elected officials.
Air Quality	Clean Air Act.	Poor air quality has been shown to have adverse effects on humans and wildlife.	The public desires clean air for health and aesthetic reasons.
Wooded Lands	Clean Water Act, EO 11990, Fish and Wildlife Coordination Act.	Provides nesting, resting, and escape habitat for marsh species. Provides essential habitat for many terrestrial and avian species.	Environmental groups and the public support preservation of forested areas.
Coastal Wetlands	Clean Water Act, Estuary Protection Act, Coastal Zone Management Act, EO 11990, Coastal Wetlands Planning, Protection and Restoration Act.	Studies by government agencies have shown Louisiana is losing about 25 square miles of coastal wetlands per year. Vital habitat for estuarine species.	Environmental groups and the general public support preservation and restoration of coastal wetlands.
Aquatic Habitats	Clean Water Act, EO 11990, Estuary Protection Act, Fish and Wildlife Coordination Act, River and Harbor Act of 1899 (Section 10).	Important as nurseries for estuarine species and as feeding areas for avian species. Passageways for migratory estuarine-dependent fish and shellfish species.	Environmental groups and the public use and support the preservation of fish and wildlife habitats and deep water passes.
Aesthetic Values	—	—	The public desires preservation of the aesthetic values associated with urban neighborhoods and nearby fish and wildlife habitats.
Recreational Opportunities	Land and Water Conservation Fund Act.	Facilities for recreational activities are very important in urban settings.	The public makes high demands on recreation areas.
Cultural Resources including National Register Sites	National Historic Preservation Act, Archeological Resource Protection Act.	Study area is rich in cultural resources, including listed historic neighborhoods and structures.	Preservation groups support the protection and enhancement of cultural resources.

5.3.2.4. Plans 3a through 3f. The future expected level of transit delays for shallow-draft traffic would be considerably reduced for all of these plans. For Plans 3a, 3b, 3d, and 3e, which would provide for a shallow-draft lock, deep-draft traffic would be required to use the MRGO as an alternative route to the IHNC. As a result, deep-draft traffic could incur higher transportation costs.

5.3.3. Flood Protection Systems

5.3.3.1. Affected Environment. Flood protection for the neighborhoods surrounding the IHNC is provided by the Mississippi River levees which connect to the existing lock chamber. On the tidewater side of the lock, hurricane protection levees and floodwalls protect the adjacent neighborhoods from storm-induced flooding. Floodgates allow motor vehicle access to the industrial facilities located between the IHNC and the flood protection system. The Mississippi River levees in the vicinity of the IHNC provide flood protection to a level of +22.1 feet NGVD. The hurricane protection levees and floodwalls provide protection up to +14 feet NGVD along the east bank of the IHNC and +15 NGVD feet on the west bank. The last time that substantial flooding occurred in the area was a result of floodwater from Hurricane Betsy in 1965. Since that time, the hurricane flood protection system has been substantially upgraded.

5.3.3.2. Plan 1 (No Action). The current level of flood protection would not be expected to change in absence of Federal action.

5.3.3.3. Plan 2. The level of flood protection currently provided would be maintained. The hurricane protection system would be unaffected. The Mississippi River protection system would require a relatively minor amount of levee modification, as compared to the lock replacement plans. The levee currently ties into the foundation and approaches to the St. Claude Avenue bridge and the existing lock. The levee would have to be reconfigured for the new bridge, but proper safeguards would be provided at all times to prevent flooding of developed areas or otherwise compromising the protection system.

5.3.3.4. Plans 3a through 3f. Lock construction would result in higher river stages in that portion of the IHNC that lies between St. Claude Avenue and the replacement lock. Extensive modifications to the existing levee system would be necessary to extend the Mississippi River flood protection system to the new lock. Modifications would mainly be in the form of upgrading the existing hurricane protection system to standards applicable to the Mississippi River levee system. In most areas, floodwalls would be constructed on top of existing hurricane protection levees. In other areas, existing floodwalls and floodgates would be upgraded. The new protection system would be constructed along the same alignment as the existing hurricane protection levees and floodwalls except for an area on the west side of the IHNC in the vicinity of Claiborne Avenue. The new floodwalls would be built approximately along the right-of-way required for each of these plans and all of these plans would require the same right-of-

way requirements. Plates 12 and 13 show some of the details of the new flood protection system. Additional plates are contained in the Engineering Appendix.

The proposed graving site would require realignment of the hurricane protection levee protecting the part of New Orleans east of the IHNC and north of the MRGO/GIWW (Plate 28). The levee would be realigned to form a loop, within which the graving site would be located. The new levee loop would be built to the design standards of the rest of the levee system. Depending on construction scheduling, the section of the levee around the graving site may not meet final design standards during the non-hurricane season, but adequate protection would be maintained during the hurricane season.

While no mitigation is proposed or necessary for the flood control function of the levees and floodwalls, mitigation for the loss of the aesthetic attributes of the existing levees is part of the community impact mitigation plan. Please refer to Section 5.3.20.

5.3.4. Business and Industrial Activity

5.3.4.1. Affected Environment. Businesses and industries located within the IHNC study area include small neighborhood businesses, construction-related businesses and repair services, auto services, wholesaling and warehousing, and light industry. Small neighborhood businesses include corner grocery stores, pharmacies, neighborhood bars, cafes, barber shops, beauty salons, launderettes and dry cleaners. Construction-related businesses and repair services include plumbing companies, ornamental iron works, and heating and air conditioning companies. Auto services include towing services, auto repair services, wreckers, tire companies and gasoline stations. Wholesalers and warehousing concerns include marine-related businesses and seafood suppliers. Light industries include bag manufacturers, fabricators of iron and steel products, coffee plants, and asphalt and gravel plants.

Retail businesses within the neighborhoods immediate to the IHNC consist of grocery stores, dry cleaners, day care centers, bars, convenience stores and gasoline stations. Most of the retail establishments in the study area are neighborhood businesses that do not depend upon commuter or transient customers. Located in the Bywater neighborhood are an animal shelter and an independent cinema which serve residents throughout New Orleans. In addition, approximately 15 companies hold leases from the Port of New Orleans for waterfront facilities along the IHNC between the lock and Florida Avenue bridge. Of these 15 companies, only two are actively engaged in operations from the facilities that they lease on the IHNC.

5.3.4.2. Plan 1 (No Action). Under the no-action scenario, business and industrial activity in the study area would likely change very little in the near future (Rigamer, 1991). Ultimately, the viability of the businesses that depend on the patronage of residents and other businesses in the study area would reflect future trends in local population, employment, and income.

5.3.4.3. Plan 2

5.3.4.3.1. Short-term Effects. During the period of bridge closure that is required for implementation of this alternative, local pedestrian and vehicular access to and from a number of local businesses would be hindered. In addition, construction noise could impact those businesses that are in close proximity to the approaches to the St. Claude Avenue bridge. The severity of these impacts to a given commercial enterprise would depend upon the nature of the business, the degree to which customers are drawn from the opposite side of the IHNC, and the proximity of the business to the closed crossing. Reduced vehicular and pedestrian access could lead to lower retail sales. It is probable, however, that a portion of sales lost by affected retail firms would be captured by competing retail establishments elsewhere.

5.3.4.3.2. Long-term Effects. Although the proposed mid-level St. Claude Avenue bridge would require neither access ramp loops nor real estate acquisitions, the configuration of the approach ramp on the west side of the IHNC has the potential, after construction is completed, to significantly impact a number of business in the immediate area. The touch-down point of the replacement ramp on the west side of the IHNC is between Lesseps Street and France Street which is one and one half blocks west of the existing touchdown point at Poland Avenue (Plate 8). As a result, access to and from the St. Claude Avenue bridge from Lesseps Street, Poland Avenue, Kentucky Street and Japonica Street would be possible only through France Street. Required alterations in traffic circulation patterns in this area could impede access to local businesses. Reduced vehicular and pedestrian access would lead to lower retail sales. It is probable, however, that a portion of sales lost by affected retail firms would be captured by competing retail establishments elsewhere. In contrast, the touchdown point of the replacement bridge ramp on the east side of the IHNC is approximately the same as for the existing touchdown point. Therefore, no adverse impacts would be expected for businesses in that area after the project is completed.

A mitigation plan for impacts to businesses and industries, comparable to that described in Section 5.3.4.4.2., would be an integral component of this alternative.

5.3.4.4. Plans 3a through 3f

5.3.4.4.1. Effects
These plans incorporate a temporary bridge at St. Claude Avenue during construction of the permanent St. Claude Avenue bridge, and modifications at the Claiborne Avenue bridge, that would involve minimal disruptions to the existing level of service (four months of two lanes only instead of four at the St. Claude Avenue bridge, and two to four weeks of complete closure at the Claiborne Avenue bridge). As a result, adverse effects on local pedestrian and vehicular access to and from local businesses would be largely avoided during the construction period. However, construction noise would impact those businesses that are in close proximity to the approaches to the St. Claude

Avenue bridge. The severity of these impacts to a given commercial enterprise would depend upon the nature of the business and the proximity of the business to the construction activity.

The new St. Claude Avenue bridge would not require a change in traffic patterns after construction is complete because the touch-down points would be the same as for the existing bridge. Therefore, no adverse impacts to local businesses would be expected after project construction.

This plan would also require demolition of the Galvez Street wharf and improvements on land owned by the Port of New Orleans on the IHNC between the existing lock and the Florida Avenue bridge. According to the Port of New Orleans, only two tenants in this area are still actively operating from these facilities. As a consequence of this plan, the leases would be terminated and the tenants would be required to relocate.

5.3.4.4.2. Proposed Mitigation

a. Monetary compensation would be provided to commercial establishments and landlords that experience a demonstrable decline in sales and rents during the periods of bridge construction. Direct monetary compensation could occur prior to bridge construction on the basis of a percentage of net receipts that are expected to be lost during the period of bridge construction, although the procedures and criteria for a settlement have not been determined.

b. Displaced lessees on the IHNC would be encouraged to relocate in Orleans Parish. Incentives may include new port leases on concessionary terms. This mitigation feature is to be accomplished in cooperation with the Port of New Orleans.

c. A business assistance program would be established in the area to serve as a stimulus for local business development. This mitigation feature is to be accomplished in cooperation with the Port of New Orleans.

5.3.5. Employment

5.3.5.1. Affected Environment. In 1980, the civilian labor force of the IHNC study area comprised 19,971 persons. The labor force participation rate for the IHNC study area was 35.8 percent in 1980, lower than the 40 percent rate for Orleans Parish. The unemployment rate ranged from 7.1 percent in Holy Cross to 11.5 percent in the Lower Ninth Ward. The rate in Bywater was 7.4 percent and in St. Claude it was 9.4 percent. Similar figures are unavailable for 1990 since the Bureau of the Census no longer compiles these data by census tract. There are no alternative sources of data which are specific to the study area.

The unemployment rate in Orleans Parish fell from 7.0 percent in 1980 to 5.3 percent in 1991. To the extent that the direction of change in the unemployment rate of the study

area follows that for the parish as a whole, current unemployment rates are, at worst, no higher than they were in 1980.

5.3.5.2. Plan 1 (No Action). Future levels of employment in the area would likely remain at its current level (Rigamer, 1991).

5.3.5.3. Plan 2. During the period of bridge closure, employment could be adversely affected at the businesses on both sides of the canal that depend on trans-canal traffic for a significant portion of sales. No significant impacts to the general level of long-term future employment would be expected as a result of this plan.

A mitigation plan for impacts on employment, comparable to that described in Section 5.3.5.4.2., would be an integral component of this alternative.

5.3.5.4. Plans 3a through 3f

5.3.5.4.1. Effects

These plans incorporate a temporary bridge at St. Claude Avenue during construction of the permanent St. Claude Avenue bridge and modifications at the Claiborne Avenue bridge that would involve minimal disruptions to the existing level of service (four months of two lanes only instead of four at the St. Claude Avenue bridge, and two to four weeks of complete closure at the Claiborne Avenue bridge). As a result, adverse effects on employment would be largely avoided during the construction period.

This plan would require demolition of the Galvez Street wharf and facilities on property owned by the Port of New Orleans on the IHNC between the lock and the Florida Avenue bridge. According to the Port of New Orleans, only two tenants are actively operating from their leased facilities in this portion of the IHNC. As a consequence of this plan, the leases would be terminated and the tenants would be required to relocate. The effect of this action on employment levels for the two affected firms cannot be determined.

5.3.5.4.2. Proposed Mitigation

a. Contractors would be required to give preference to fully-qualified residents in order to achieve minority and local resident participation goals.

b. The skilled labor workforce of the affected community would be expanded. Citizens who meet local residency requirements would be eligible for tuition grants for training at existing vocational-technical or similar type schools in skills that would be needed in project construction. Contractors would be required to give preference in hiring to any fully-qualified resident of the community. Hiring preferences would replace quotas as the means to include local residents in the project workforce.

5.3.6. Land Use

5.3.6.1. Affected Environment. For the St. Claude neighborhood, current land uses include: 1) a significant industrial area along the west side of the IHNC from Claiborne Avenue to Florida Avenue; 2) a commercial area along St. Claude Avenue; 3) scattered public facilities with few parks and playgrounds; and 4) residential development of primarily single-family and two-family structures.

For the Bywater neighborhood, current land uses include: 1) residential development (single-family and two-family structures); 2) an industrial area along Press Street and the riverfront, including the U.S. Coast Guard facility; 3) the Hebert Defense Complex (Naval Support Facility) where the Mississippi River and the canal intersect; and 4) neighborhood commercial properties, warehouses, and public facilities.

For the Lower Ninth Ward neighborhood, current land uses include: 1) residential development (single-family and two-family structures); 2) an industrial area along the IHNC between Claiborne Avenue and Florida Avenue; 3) a commercial area along St. Claude Avenue; 4) a concentration of public and private uses within an eight block area; and 5) a government facility (Jackson Barracks) along the eastern border of the neighborhood.

For the Holy Cross neighborhood, current land uses include: 1) residential development (single-family and two-family structures); 2) recreational space along the levee from St. Claude Avenue around the IHNC and river to about three blocks downriver to Egania Street; 3) the Holy Cross High School Complex at Reynes and the levee; 4) a government facility (Jackson Barracks) along the eastern boundary of the neighborhood; and 5) riverfront industrial area (wharves and warehouses) from Egania Street to Delery Street.

5.3.6.2. Plan 1 (No Action). No significant change in the mix of land uses in the vicinity of the IHNC is expected in the absence of Federal action.

The proposed graving site is located in the New Orleans Business and Industrial District (NOBID). The graving site would be on vacant land which is very low in elevation. The site would require extensive filling and infrastructure improvements before it could be used for industrial purposes. Since other, higher, areas within the NOBID are available for industrial purposes, no development of the graving site is anticipated in the absence of a Federal project.

5.3.6.3. Plan 2. No significant change in the mix of land uses is expected as a result of this plan.

5.3.6.4. Plans 3a through 3f. Under this plan, land-side publicly-owned commercial/ industrial facilities along the IHNC, including the Galvez Street wharf, the U.S. Coast

Guard Station, and industrial sites along the east bank of the IHNC, would be converted into an alternative public use as part of the inland waterway transportation system. Land uses in other parts of the study area are not expected to change. The U.S. Coast Guard Station is not expected to be relocated within the study area. The identity and current land use characteristics of the area to which the station would be relocated is not known. The public uses represented by the Galvez Street wharf would probably not be replaced.

The proposed graving site, which is undeveloped but classified as industrial land, would be converted into a temporary construction facility. After the construction of the lock modules is complete, the site would be abandoned. It would then become available for whatever uses the landowner would deem appropriate. Potential uses include a shipyard, barge repair facility, or docking facility.

5.3.7. Property Values

5.3.7.1. Affected Environment. Property values, in particular residential property values, within the study area reflect a range of influences, an important component of which is the general trend in employment and income growth experienced by the metropolitan area as a whole. In the New Orleans area, real estate values have declined significantly from levels reached in the mid-1980's. The regional recession brought about by the decline in oil and gas prices, high unemployment, increased crime, the resultant exodus from the metropolitan areas, and the substantial number of foreclosures combined to depress real estate values. Most, if not all, neighborhoods comprising the metropolitan area shared in this decline. Since then, property values in some parts of the metropolitan area, particularly in the suburban parishes, have begun to stabilize and even show signs of increasing. The results of the Rigamer study, conducted in 1991, suggest continuing declines in the study area. More recently, the oil and gas industry in Louisiana has begun to recover and in view of the significant reductions in home mortgage interest costs since 1991, property values may have stabilized.

The U.S. Census reported that the median values of owner-occupied housing within each neighborhood in the study area was, in fact, higher in 1990 than it was in 1980. The 1990 Census reported the median value of owner-occupied housing in the study area in a range between $43,240 in the Lower Ninth Ward to $53,350 in the Bywater neighborhood. The median value in St. Claude was $45,550 and in Holy Cross it was $49,150. The median value in the City of New Orleans in 1990 was $69,600.

5.3.7.2. Plan 1 (No Action). Future trends in the value of properties in the study area would continue to be subject to both the broad economic forces at work in the regional and national economies and the particular quality of life that is unique to each of the neighborhoods in the study area. Since there is little new homebuilding in the area, the degree of maintenance for existing structures relative to those in other city

neighborhoods would also be an important factor affecting the trend in property values. The rate of removal for abandoned or uninhabitable housing units also represents a significant factor. While the number of residents has declined over the past decade, continued and significant loss of population and occupied housing are not forecast. Over the time frame represented by this project, uncertainty associated with the future supply of housing units and the future trends in the components of housing demand (population, average household size, employment and income) requires that predictions of future property values (a reflection of the convergence of housing supply and demand) be a very speculative exercise. Under a more limited time frame, such as over the next decade, no circumstances are evident that suggest that the trend in property values in each of the IHNC neighborhoods would significantly diverge from one another or from most of the remaining neighborhoods within New Orleans.

5.3.7.3. Plan 2. Property values would be adversely, though temporarily, affected during project construction, most directly during the period of bridge closure. During bridge closure, construction noise and higher levels of traffic congestion would reduce the desirability of living or operating a business in the affected neighborhoods.

Subsequent to project construction, the mid-level St. Claude Avenue bridge, as a replacement for the current low-level bridge, would have an undetermined net effect on property values in the study area. The elimination of most vehicular traffic delays associated with the current bridge, and the improved vehicular access across the canal that results, would tend to increase the desirability of living in the study area. In contrast, the mid-level bridge, which features two vertical lift towers, may be seen by residents, and potential lessors and purchasers, as detrimental to the aesthetic character of the adjacent historic neighborhoods. The mid-level structure would also diminish pedestrian traffic across the canal. Finally, the alteration in the pattern of traffic circulation surrounding the west-side bridge access ramps would likely be viewed very negatively by residents and motorists alike. To this extent, the desirability of living in the study area, particularly in areas closest to the bridge, would be lessened. The net effect of these two impacts over the study area as a whole is not discernable.

A mitigation plan for impacts on property values, comparable to that described in Section 5.3.7.4.2., would be an integral component of this alternative.

5.3.7.4. Plans 3a through 3f

5.3.7.4.1. Effects

Property values would be adversely, though temporarily, affected during project construction, most directly during the period of bridge construction. During bridge construction, construction noise would reduce the desirability of living or operating a business in the affected neighborhoods. These plans incorporate a temporary bridge at St. Claude Avenue during construction of the permanent St. Claude Avenue bridge and modifications at the Claiborne Avenue bridge that would involve minimal disruptions

to the existing level of service (four months of two lanes only instead of four at the St. Claude Avenue bridge, and two to four weeks of complete closure at the Claiborne Avenue bridge). As a result, adverse effects on property values from higher levels of traffic congestion should largely be avoided.

Subsequent to project construction, property values would continue to be adversely affected. The configuration of the reconstructed floodwalls from St. Claude Avenue to Claiborne Avenue, the double bascule bridge that replaces the existing single bascule bridge at St. Claude Avenue, and the raised towers on the Claiborne Avenue bridge would permanently change the aesthetic landscape of adjacent portions of the neighborhoods. To the extent that these changes are viewed by the public as detrimental to the aesthetic character of the affected areas, the desirability of living in the affected area would be diminished and an adverse impact on property values could be expected. Furthermore, after project completion, at a point significantly into the project life, the total open time for both St. Claude Avenue and Claiborne Avenue bridges would be greater compared to the no action plan. This situation would contribute to traffic congestion that could negatively impact property values.

5.3.7.4.2. Proposed Mitigation
A neighborhood housing revitalization program would be established to serve as a source of seed money for a program of progressive housing rehabilitation. The program would be developed in cooperation with the Port of New Orleans and local groups and agencies.

5.3.8. Public/Community Facilities and Services

5.3.8.1. Affected Environment

5.3.8.1.1. Police Protection. The IHNC neighborhoods are served by the 5th District Police Station, located at Claiborne Avenue between Bartholomew and Alvar Streets. There are 117 officers assigned to this station. Twenty-five officers are on duty at any given time and approximately 15 to 20 are on patrol duty each day. Eighteen patrol cars are assigned to the 5th District. One patrol car is kept on the east side of the IHNC at all times, except during emergencies.

5.3.8.1.2. Fire Protection. The IHNC neighborhoods are served by Fire Protection District No. 3 which has five stations. The stations serving the IHNC area are Headquarters Station No. 27 (Elysian Fields Avenue and Interstate-610); Station No. 8 (Florida Avenue and Desire Street); Station No. 24 (Poland Avenue and St. Claude Avenue); Station No. 22 (Egania Street and Florida Avenue); and Station No. 39 (Tupelo Street and St. Claude Avenue). The first three stations listed are located west of the IHNC while the last two are located east of the canal. There are four staff persons at each station, except for the headquarters station which has a staff of eleven. Stations Nos. 8, 22 and 39 are equipped only with a single engine. Station No. 24 is equipped

with an engine and a ladder. Station No. 27 has a salvage unit in addition to an engine and ladder.

5.3.8.1.3. Schools. There are ten public schools and eight private and parochial schools in the IHNC study area. These institutions include St. Mary of the Angels, Lockett Elementary School, Frantz Elementary School, and Palmer Elementary School in the St. Claude Neighborhood; St. Paul's First English School, St. Vincent de Paul, George Washington Elementary School, Nicholls Senior High School and St. Cecilia School in the Bywater neighborhood; Ephesus Junior Academy, Holy Cross School and the Semmes School in the Holy Cross neighborhood; and McDonough 19 Elementary School, Edison Elementary School, Lawless Junior and Senior High School, Hardin School and St. David School in the Lower Ninth Ward neighborhood. The Martin Luther King Middle School for Science and Technology has recently been constructed.

5.3.8.1.4. Social Services. The social service agencies include the Lower Ninth Ward Multi-Service Center, the Lower Ninth Ward Neighborhood Health Center, and the Lower Ninth Ward Head Start Program. They are located east of the canal in a single center at Claiborne and Caffin Avenues. The United Medical Center (at St. Claude Avenue and Desire Street) is the only major medical facility located west of the canal within the IHNC study area. Others outside the study area are the Katherine Benson Health Center (Claiborne Avenue and Elysian Fields Avenue), the Desire-Florida Multi-Service Center, the Desire Mental Health Clinic, and the Helen Levy Health Clinic (Florida Avenue and Louisa Street).

5.3.8.1.5. Recreational Facilities. There are ten parks/playgrounds, two recreation centers, and several pools operated by the New Orleans Recreation Department in the IHNC area. In addition to the parks/playgrounds, recreation centers, and pools there are open space areas that provide passive recreation for local residents. These open space areas include the levee and batture south of St. Claude in the Holy Cross neighborhood. There is a jogging and walking path along the levee crown.

5.3.8.1.6. Other Facilities. Other publicly-owned facilities in the IHNC area include the U.S. Coast Guard Station, Bywater U.S. Post Office, the Society for the Prevention of Cruelty to Animals, and the F. Edward Hebert Defense Complex, all located west of the IHNC. The Jackson Barracks, which functions primarily as a training center for National Guard units, is located east of the canal. There are also an estimated 36 churches located within the area bounded by Pauline, Prieur, Andry and Chartres Streets.

5.3.8.2. Plan 1 (No Action). No change in the current level of community services would be expected under the no action scenario.

5.3.8.3. Plan 2. During the period of closure for the St. Claude Avenue bridge, trans-canal vehicular traffic would be required to divert to the Florida and Claiborne Avenue

bridges. Pedestrian traffic across the canal would also be interrupted. As a result, trans-canal access to public and community facilities would we impeded. Response times for emergency vehicles would also be adversely affected.

In the period following bridge construction, improved vehicular access across the canal at St. Claude Avenue would tend to improve access to community services and facilities and improve emergency response times. However, pedestrian access would be diminished which, for those affected residents, would reduce access to community services and facilities on the opposite side of the canal. Mitigation for this alternative would be the same as described in Section 5.3.8.4.2.

5.3.8.4. Plans 3a through 3f.

5.3.8.4.1. Effects.
These plans incorporate a temporary bridge at St. Claude Avenue during construction of the permanent St. Claude Avenue bridge and modifications at the Claiborne Avenue bridge that would involve minimal disruptions to the existing level of service (four months of two lanes only instead of four at the St. Claude Avenue bridge, and two to four weeks of complete closure at the Claiborne Avenue bridge). As a result, adverse effects on pedestrian traffic access across the canal, trans-canal access to public and community facilities, and response times for emergency vehicles traveling across the canal would largely be avoided during the construction period.

After project completion, at a point significantly into the project life, the total open time for both St. Claude Avenue and Claiborne Avenue bridges would be greater compared to the no action plan. This would negatively affect access to emergencies and community facilities and services.

5.3.8.4.2. Proposed Mitigation.
a. Community facilities, such as playgrounds, gardens, tot lots, and linear parks, would be provided. Facilities would be operated by non-Federal interests.

b. Additional police, emergency medical, and possibly fire protection would be provided over the period of the construction period.

5.3.9. Tax Revenues

5.3.9.1. Affected Environment. The analysis of tax revenues has indicated a very limited property tax base for residential properties within the study area because of the statewide $75,000 homestead exemption. This tax feature provides homeowners with an exemption from property taxes on the first $75,000 of value. With recent average residential sales prices well below that figure and with generally conservative assessments of property, very little tax is generated on residential property within the

study area. As a result, the City of New Orleans relies on sales taxes from retail sales more than on residential property taxes for revenues from the IHNC study area.

In 1989, retail sales for the Holy Cross and Lower Ninth Ward neighborhoods were $16.5 and $25.1 million, respectively. These figures are higher than those reported in 1980 although the number of retail establishments declined in Holy Cross from 45 to 35 and in the Lower Ninth Ward from 88 to 68. From 1980 to 1989, the number of retail establishments in the Bywater neighborhood, declined from 107 to 95 and in the St. Claude neighborhood, the number fell from 153 to 123. Over the same period, retail sales in the Bywater and St. Claude neighborhoods fell from the 1980 levels to $52.5 and $54.1 million, respectively.

5.3.9.2. Plan 1 (No Action). Under the no action scenario, business activity in the study area would likely change very little in the near future (Rigamer, 1991). As a result, the tax revenues generated by this activity would change little. Over the longer term, the level of tax revenues as a function of commercial activity would reflect future trends in local population, employment, and income.

5.3.9.3. Plan 2.

5.3.9.3.1. Short-term Effects. During the period of bridge closure that is required by implementation of this alternative, local pedestrian and vehicular access to and from a number of local businesses would be hindered. In addition, construction noise would impact those businesses that are in direct proximity to the approaches of the St. Claude Avenue bridge. The severity of these impacts to a given commercial enterprise would depend upon the nature of the business, the degree to which customers are drawn from the opposite side of the IHNC, and the proximity of the business to the closed crossing. To the extent that these impacts lead to lower retail sales, tax revenues generated through the sales of affected businesses would be lower. It is probable, however, that a portion of sales lost by affected retail firms would be captured by competing retail establishments elsewhere. For this reason, sales tax revenues generated for the city would, on the whole, be unaffected.

5.3.9.3.2. Long-term Effects. Although the proposed mid-level St. Claude Avenue bridge would require neither vehicular access loops nor real estate acquisitions, the configuration of the approach ramp on the west side of the IHNC has the potential to significantly impact a number of businesses in the immediate area. The touchdown point of the replacement ramp on the west side of the IHNC is between Lesseps Street and France Street which is one and one half blocks from the existing touchdown point at Poland Avenue. As a result, access to and from the St. Claude Avenue bridge from Lesseps Street, Poland Avenue, Kentucky Street and Japonica Street would be possible only through France Street. Required alterations in traffic circulation patterns in this area would impede access to local businesses. To the extent that reduced access leads to lower retail sales, tax revenues generated through the sales of affected businesses

would be lower. It is probable, however, that a portion of sales lost by affected retail firms would be captured by competing retail establishments elsewhere. For this reason, sales tax revenues generated for the city would, on the whole, be unaffected. In contrast, the touchdown point of the replacement ramp on the east side of the IHNC is approximately the same as for the existing touchdown point. Therefore, no adverse impacts to businesses, retail sales, and tax revenues in this area, attributable to altered traffic circulation patterns on the east side of the IHNC after project completion, would be expected.

5.3.9.4. Plans 3a through 3f. These plans incorporate a temporary bridge at St. Claude Avenue during construction of the permanent St. Claude Avenue bridge and modifications at the Claiborne Avenue bridge that would involve minimal disruptions to the existing level of service (four months of two lanes only instead of four at the St. Claude Avenue bridge, and two to four weeks of complete closure at the Claiborne Avenue bridge). As a result, adverse effects to local pedestrian and vehicular access to and from local businesses would largely be avoided. However, construction noise could impact those businesses that are in direct proximity to the approaches to the St. Claude Avenue bridge. The severity of these impacts to a given commercial enterprise would depend upon the nature of the business and the proximity of the business to the construction. To the extent that these impacts lead to lower retail sales, tax revenues generated through the sales of affected businesses would be lower. It is probable, however, that a portion of sales lost by affected retail firms would be captured by competing retail establishments elsewhere. For this reason, sales tax revenues generated for the city would, on the whole, be unaffected. During the period following bridge construction, no effect on tax revenues would be anticipated.

5.3.10. Population

5.3.10.1. Affected Environment. Census data show that the population for the IHNC study area declined by approximately 18 percent, to 45,718 in 1990 from 55,702 in 1980. The Lower Ninth Ward neighborhood experienced the most dramatic decrease in population, with a loss of 4,600 persons, representing 22.1 percent of its 1980 population. In 1990, the Census reported 16,207 persons residing in the Lower Ninth Ward. The Holy Cross neighborhood had the smallest change, losing only 381 persons or 5.9 percent of its 1980 population. In 1990 the population of Holy Cross stood at 6,101. Bywater and St. Claude also lost population from levels reported in 1980 at rates of 19.1 and 17.2 percent, respectively. The 1990 population estimate for Bywater was 5,381, and for St. Claude was 18,209.

The overall population of the IHNC study area continues to increase in age. The percentage of the population under 18 years declined from 34.1 percent in 1985, as reported by the Regional Planning Commission, to 32.5 percent in 1990, as reported in the 1990 Census. Bywater has the smallest percentage of persons under 18 (27.8 percent) and St. Claude has the largest percentage (35.1 percent).

In 1990, the black population reported by the Census represented 88.8 percent of the total population in the study area. The white population represented 10.3 percent of the total and other races represented 0.9 percent. The Lower Ninth Ward has the largest percentage of total population which is black with 99.1 percent. Bywater has the smallest percentage of black population with 65.4 percent.

Nearly half of all households in the IHNC study area are headed by females. This compares to 44 percent in Orleans Parish. The highest percentage of female heads of household is in the St. Claude neighborhood where 52 percent are in this category.

Population densities have decreased somewhat since the 1980 Census, reflecting the decline in study area population. The 1990 Census reported an overall density of 13.8 persons per acre for the study area. In 1980, the Census reported 14.5 persons per acre.

5.3.10.2. Plan 1 (No Action). The 1991 Socio-Economic Impact Analysis prepared by Gregory C. Rigamer and Associates predicted a continued, significant out-migration from the study area, reflecting the cumulative impact of worsening housing stock, poor educational and employment opportunities, and rising crime. The Rigamer study did not quantify this predicted decline. However, the population declines suggested by the Rigamer study appear to be inconsistent with contemporaneous projections of stable employment, business and industrial activity, and tax revenues.

The September 1993 Traffic Impact Analysis prepared for the Corps of Engineers by the Regional Planning Commission (RPC) provides the most recent estimates of population growth in the study area. The RPC predicts that the population of the study area would fall from the 1990 reported figure of 45,718 to 34,740 in the year 2000, a decline of 24 percent over ten years (2.7 percent annually). By the year 2010, the RPC predicts that population would recover to 40,905 persons and then rise again to 44,643 persons in the year 2020.

5.3.10.3. Plan 2. No change in population attributable to residential relocation is expected to occur since no additional rights-of-way are required to implement this plan. However, it is possible that the traffic disruption created by bridge closure and the noise associated with the construction of bridge approaches would compel some residents to move elsewhere in the study area, or out of the study area entirely. Since renters are more mobile than homeowners, it possible that vacancies in rental units would increase. (More than half the housing in the study area is rental housing.)

The effect of this plan on population in the post-construction period is correlated to the effects of this plan on property values which was discussed previously.

5.3.10.4. Plans 3a through 3f. No change in population attributable to residential relocation is expected to occur since no additional rights-of-way are required to implement this plan. However, it is possible that the general disruption created by

bridge construction and the noise associated with the construction of bridge approaches, bridge towers and floodwalls would compel some residents to move elsewhere in the study area or out of the study areas entirely. Since renters are more mobile than homeowners, it possible that vacancies in rental units would increase. (More than half the housing in the study area is rental housing.)

The effect of this plan on population in the post-construction period is correlated to the effects of this plan on property values which was discussed previously.

5.3.11. Community and Regional Growth

5.3.11.1. Affected Environment. The neighborhoods comprising the IHNC study area are mature, developed areas. With little opportunity for expansion, efforts at community growth must be focused on redeveloping or intensifying existing community resources. The Comprehensive Management Plan, adopted in 1980, is the official land use plan for the City of New Orleans. This plan outlines the current policies guiding future growth within New Orleans. Policies for a regionally managed growth plan include: 1) maintaining the Central Business District as the regional center, 2) utilizing transit facilities and services to reduce use of the automobile as the primary transportation mode, 3) expanding industrial land opportunities within the developed and developing sections of the city, 4) limiting development in environmentally sensitive areas, 5) providing for expansion of the City within the hurricane protection system, and 6) conserving existing neighborhoods generally at their current densities and redeveloping existing neighborhoods where conditions so warrant. This plan supports a continuation of the current mix of residential, commercial, and industrial uses. Particular emphasis is given to protecting the character and quality of the older neighborhoods such as those found in the IHNC study area. Buffering and screening between residential and industrial uses is presented as a major long range goal for the IHNC neighborhoods, as well as preserving open space along the Mississippi River levee south of St. Claude Avenue.

5.3.11.2. Plan 1 (No Action). No significant change is expected to existing regional development plans of City and State governments and agencies. The planned construction of a new Florida Avenue vehicular bridge is intended to alleviate vehicular traffic congestion and contribute to continued regional growth.

5.3.11.3. Plan 2. The potential for growth in the communities adjacent to the IHNC would be diminished during the period of bridge closure when increased traffic congestion interrupts patterns of interaction across the canal. In the post-construction period, improved vehicular access across the IHNC would tend to contribute to community and regional growth.

5.3.11.4. Plans 3a through 3f. The potential for growth in the communities adjacent to the IHNC could be diminished during the period of construction due to the general

level of disruption associated with construction. In the post-construction period, it is not expected that the nature and scale of any of these plans would adversely affect the potential for community and regional growth.

5.3.12. Vehicular Transportation

5.3.12.1. Affected Environment. The study area has a well-defined street grid composed of several arterial streets and a dense pattern of neighborhood and local streets. The major east-west arterial routes in the IHNC study area include Florida Avenue, North Claiborne Avenue, North Robertson Street, and St. Claude Avenue. On the east side of the IHNC, North Claiborne Avenue is a wide boulevard. On the west side of the IHNC, North Claiborne Avenue is one way westbound and North Robertson Street is one-way eastbound. The Claiborne and St. Claude Avenue bridges are four-lanes each and the Florida Avenue bridge is a two-lane roadway. The bridge at Claiborne Avenue is a mid-level structure while the other crossings are low-level bridges which are subject to frequent openings to accommodate marine traffic. With respect to bridge openings, rush-hour curfews are in effect on weekdays for the St. Claude and Claiborne Avenue bridges. During curfews the bridges remain in the down position to accommodate vehicular traffic.

Traffic volumes for these crossings have not fluctuated significantly over the past decade. The Regional Planning Commission, in the September 1993 Traffic Impact Analysis, estimated that in 1990, 30,053 passenger vehicles and trucks crossed the St. Claude Avenue bridge daily, 43,696 crossed the Claiborne Avenue bridge daily, and 11,607 crossed the Florida Avenue bridge daily. The Louisiana Department of Transportation and Development (LDOTD) has estimated that 91 percent of the vehicles crossing the St. Claude Avenue bridge are passenger vehicles, 8 percent are trucks and 1 percent are buses. For vehicles crossing the Claiborne Avenue bridge, LDOTD estimated that 83 percent are passenger vehicles compared to 15 percent for trucks and 2 percent for buses.

The major north-south arterial routes include Franklin and Almonaster Avenues, Louisa Street, Piety Street, Poland Avenue, Forstall Avenue, Caffin Street, and Tupelo Street. These roadways primarily serve as feeders to the major east-west arterials. These roadways have more capacity than the present demand and operate at a level of service that is acceptable in an urban environment.

The Regional Planning Commission estimates that approximately 30 percent of the trips across the IHNC bridges (St. Claude, Claiborne and Florida) are non-local commuter traffic and 70 percent is local traffic. The percentage of commuter traffic is low because of the above-average public transit modal split for Lower Ninth Ward residents. The percentage is based on home-based work trips for residents of Lower Ninth Ward and St. Bernard Parish.

The study area is served by a public transit system operated by the Regional Transit Authority (RTA). The system is well-utilized, providing service to the New Orleans Central Business District and system transfer points with ten routes. The RTA routes include Franklin Local, Franklin Express, Louisa, Almonaster, Desire, Galvez, Barracks, Lower Ninth Ward Express, St. Claude Delery and St. Claude Refinery. Transit service is provided seven days a week and generally operates until midnight. Two of the routes provide 24-hour service (St. Claude Delery and Galvez). While six of the transit routes operate only on one side of the IHNC, four use the IHNC crossings on their route. The St. Claude Avenue bridge is used by both St. Claude transit routes. The Claiborne Avenue bridge is used by the Lower Ninth Ward Express and the Galvez transit routes.

Pedestrian traffic across the St. Claude Avenue bridge is estimated to be approximately 750 per day (Rigamer, 1991). Pedestrian traffic includes bicyclists and persons on foot. The mid-level Claiborne Avenue bridge is not designed to accommodate pedestrian traffic.

5.3.12.2. Plan 1 (No Action). The U.S. Coast Guard has designated the existing Florida Avenue railroad/vehicular bridge as a hazard to navigation. As a result of this action, the Federal government has made a commitment to replace the bridge under authority provided in Congressional legislation in the form of the Truman-Hobbs Act. The replacement bridge would feature a 300-foot horizontal clearance (to facilitate navigation), two railroad lines, and two vehicular lanes.

The State of Louisiana and the City of New Orleans plan to construct new mid-level or high-level bridge at Florida Avenue. Some funds have been appropriated for construction of a new bridge, but not enough for the entire project. The long-term plan includes an extension of Florida Avenue to Paris Road, a tie-in with Interstate-10 to the east, and a tie-in with Interstate-610 to the west.

The RPC has estimated that with the construction of the Florida Avenue bridge, traffic across this corridor is expected to increase from 11,610 trips in 1990 to 20,960 trips by the year 2000. Associated with this increase in bridge traffic would be an increase of traffic through the residential neighborhoods of the study area that serve as feeder routes to Florida Avenue. It is probable that most of this traffic would use Caffin Avenue and Tupelo Street which are divided streets. As a consequence of the new Florida Avenue vehicular bridge, traffic on the St. Claude and Claiborne Avenue crossings would not increase as much as it would have if no new bridge were constructed. The RPC estimates that the number of trips across the St. Claude bridge would increase from 30,050 in 1990 to 30,560 in 2000. For the Claiborne Avenue bridge, the RPC estimates the number of trips to drop from 43,700 in 1990 to 41,960 in 2000.

Despite the construction of a new vehicular bridge on Florida Avenue, it is anticipated that the vehicular component of the low-level, replacement Florida Avenue Railroad

bridge would continue to be available to local traffic. The railroad bridge will only be raised during passage of waterborne traffic.

5.3.12.3. Plan 2.

5.3.12.3.1 Effects
Replacement of the existing St. Claude Avenue bridge with a mid-level structure would require that vehicular and pedestrian access over the canal at this location be interrupted for approximately two years. During the period of bridge closure, trans-canal vehicular traffic would be rerouted to the existing Claiborne Avenue bridge and the planned Florida Avenue vehicular bridge through the designation of detour routes on existing feeder streets. The level of vehicular traffic congestion that would result is expected to be severe even with the implementation of a detour plan.

Using the volume of traffic expected to exist in the year 2000, the RPC estimates that the temporary closure of the St. Claude Avenue bridge would cause total traffic through the IHNC corridor to drop from 93,490 to 84,170 vehicles, as some commuter traffic would divert to alternative links to the west (Paris Road and Interstate-10). The Claiborne Avenue bridge would experience an increase in traffic from 41,970 to 52,430 vehicles. Traffic on the new bridge planned at Florida Avenue would also increase, from 20,960 to 31,740.

Also during the construction period, pedestrian access across the IHNC would be virtually eliminated since the Claiborne Avenue bridge and the planned Florida Avenue vehicular bridge are not designed to accommodate pedestrian traffic. It is not certain whether the low-level, replacement railroad bridge at Florida Avenue will accommodate pedestrians. Even so, this bridge would be far less accessible to most area residents than is the St. Claude Avenue bridge.

After construction of the mid-level St. Claude Avenue bridge is completed, the incidence of bridge openings would be significantly reduced, thereby reducing vehicular traffic delays. However, this plan also assumes the bridge curfews now in effect would be removed. As a result, some bridge openings would probably occur during peak hours of commuter traffic, a situation that does not occur under existing conditions.

The completed mid-level bridge would include stairways for pedestrian traffic. However, pedestrians would be required to travel greater distances and along much steeper inclines than under existing conditions. As a result, pedestrian access would be diminished.

5.3.12.3.2. Proposed Mitigation
a. Traffic signals in the vicinity of the IHNC would be re-programmed and synchronized to facilitate traffic flow. Also, a minimum of four computerized message

boards would be erected. The message boards would be located on both sides of the canal on St. Claude and Claiborne Avenues.

b. An incident management plan would be implemented. The plan would include a police detail and two tow trucks that operate on standby during peak traffic hours for accident reporting and response.

c. Shuttle van service would be provided to accommodate pedestrian traffic across the IHNC on St. Claude Avenue during closure of the St. Claude Avenue Bridge. The service would consist of two 12-passenger vans operating from 6 a.m. to 10 p.m., seven days a week. The service is designed to shuttle pedestrians between the eastern and western termini of the St. Claude Avenue Bridge approaches. The route would be non-stop and free of charge. The Corps would contract the service specifically to local companies that employ area residents.

d. A plan for hurricane/emergency evacuation during periods of bridge closure would be developed with appropriate agencies, especially the New Orleans Office of Emergency Preparedness.

e. Additional school crossing guards would be provided on each side of the IHNC along designated detour routes where crossing guards are not currently stationed.

f. A total of five miles of local streets would be resurfaced prior to project construction to serve construction-related traffic. Also, about 2 miles of streets that would have increased usage would be resurfaced.

g. Four additional traffic-control officers (two on each side of the canal) would be provided to facilitate the flow of traffic on detour routes. The officers would be on duty during peak traffic hours during periods of bridge closure.

h. The RTA would be reimbursed for lost revenues resulting from diminished ridership on affected lines during the period of bridge closure.

5.3.12.4. Plans 3a through 3f.

5.3.12.4.1. Effects

These plans incorporate a temporary bridge at St. Claude Avenue during construction of the permanent St. Claude Avenue bridge and modifications at the Claiborne Avenue bridge that would involve minimal disruptions to the existing level of service (four months of two lanes only instead of four at the St. Claude Avenue bridge, and two to four weeks of complete closure at the Claiborne Avenue bridge). As a result, adverse effects on vehicular transportation would be largely avoided during the construction period.

In addition, these plans would include other construction feature intended to minimize negative impacts to vehicular traffic. These features are described as follows.

a. Interference of construction employee-related traffic with neighborhood traffic would be limited as much as possible. An offsite parking area would be provided on the east side of the IHNC for workers involved in constructing levees and floodwalls. The area would be fenced-in and patrolled by security personnel. A shuttle service would be provided to carry workers from the parking area to construction sites. For lock and bridge construction personnel, a cleared area on the west side of the IHNC at Galvez Street would serve as a dedicated parking area. This site would also serve as the staging area for lock construction.
b. Specific routes for construction-related traffic would be designated in order to minimize traffic congestion.

c. Appropriate detour signs would be erected to preserve access to local streets during periods when individual streets may be closed due to utility relocations.

d. Damage to roads caused by construction activities would be repaired.

e. Contract specifications would include requirements to move as much material and equipment by barge as is practicable, including all demolition debris from buildings on the east side of the IHNC, the Galvez Wharf, the U.S. Coast Guard station, and the existing lock.

After project completion, at a point significantly into the project life, the total open time for both St. Claude Avenue and Claiborne Avenue bridges would be greater compared to the no action plan. This would negatively affect traffic congestion.

5.3.12.4.2. Proposed Mitigation
a. A new, permanent detour route would be constructed to link Florida Avenue to West Judge Perez and St. Bernard Highway in St. Bernard Parish. The new road would improve circulation of commuter traffic and relieve neighborhood traffic congestion.

b. Traffic signals in the vicinity of the IHNC would be reprogrammed and synchronized to facilitate traffic flow. Also, a minimum of four computerized message boards would be erected. the message boards would be located on both sides of the canal on St. Claude and Claiborne Avenues.

c. An incident management plan would be implemented. The plan would include a police detail and two tow trucks that operate on standby during peak traffic hours for accident reporting and response.

d. Additional school crossing guards would be provided on each side of the IHNC along designated detour routes where crossing guards are not currently stationed.

e. Local streets that would serve construction-related traffic would be resurfaced prior to initiation of project construction. Maintenance of these streets during project construction would also be provided.

f. Four additional traffic control officers (two on each side of the canal) would be provided to facilitate the flow of traffic on detour routes. the officers would be on duty during peak traffic hours during periods of bridge construction.

g. Accommodation for a light rail line would be built into the new St. Claude Avenue bridge. The Regional Transit Authority has long-term plans for implementing a streetcar service across the IHNC into the Lower Ninth Ward and Holy Cross neighborhoods.

h. A program of street resurfacing and drainage improvements within an area on each side of the IHNC, yet to be determined, would be implemented.

5.3.13. Housing

5.3.13.1. Affected Environment. The residential structures within the study area vary from well-maintained single and double residences to vacant, abandoned houses and apartments. There are areas where homes, cottages, and streets are well-maintained and others where homes are deserted and vandalized, the yards overgrown and littered, and the streets in poor condition.

According to the 1980 Census, there were 20,412 residential units in the study area. However, the 1990 Census reported 18,986 units, a decline of 1,426 units, or 7 percent. Of the four neighborhoods comprising the study area, only Holy Cross showed a gain in the number of housing units, from 2,373 to 2,385. In contrast, the number of housing units during this period fell in the Lower Ninth Ward from 6,894 to 6,350, in Bywater from 3,171 to 2,899, and in St. Claude from 7,974 to 7,352.

Over the last decade, vacancy rates increased for each neighborhood. From 1980 to 1990, the vacancy rate increased in Holy Cross from 8.4 to 19.6 percent, in the Lower Ninth Ward from 8.9 to 16.4 percent, in Bywater from 14.7 to 23.1 percent and in St. Claude from 8.7 to 17.6 percent. The vacancy rate in 1990 for the study area as a whole was 18.3 percent. Of total housing units in the study area in 1990, renter-occupied units comprised 43.4 percent and owner-occupied units comprised 38.3 percent.

5.3.13.2. Plan 1 (No Action). The future inventory of housing in the study area is uncertain. The level of housing stock reflects both broad trends in migration, employment, income, and real estate trends and specific circumstances such as the age, quality, and degree of maintenance of individual structures. Prior discussion on future population, employment and property value trends serves as an indicator of the future of available housing.

5.3.13.3. Plan 2. The implementation of this plan would not require the acquisition of any residential real estate. Also, construction activity is not expected to result in any damage to residential structures.

5.3.13.4. Plans 3a through 3f. The implementation of any of these plans would not require the acquisition of any residential real estate. Also, construction activity is not expected to result in any damage to residential structures, as might be expected from vibrations emitted from pile drivers.

5.3.14. Community Cohesion

5.3.14.1. Affected Environment. The presence of a number of community organizations in the study area such as neighborhood associations, community development associations, neighborhood watch groups, parent-teacher associations, and community outreach groups indicate cohesive neighborhood group activity. These organizations have successfully worked to promote various improvements in the community including streets and playgrounds, and are actively engaged in renovation efforts to restore abandoned properties. Other, unofficial groups associated with schools and churches are also active. The listing of historic districts within the Bywater and Holy Cross neighborhoods in the National Register of Historic Places contributes to residents' sense of community and continuity. Most of the residential and commercial development within the study area occurred subsequent to the opening of the IHNC in 1923 and, as a result, the communities on each side of the canal were disposed to develop individual identities. Furthermore, the historic attributes of the Bywater and Holy Cross neighborhoods helps distinguish them as communities from most of the remaining portions of the study area that are located north of St. Claude Avenue. The existence of the Holy Cross, Bywater and Lower Ninth Ward neighborhood associations indicate separate, but strong, community identities.

5.3.14.2. Plan 1 (No Action). No change in community cohesion would be expected to occur in the absence of Federal action.

5.3.14.3. Plan 2. Bridge closure and a limited amount of construction noise would disrupt routine daily activities of study area residents such as shopping, visiting with neighbors, and walking in the area.

5.3.14.4. Plans 3a through 3f. Traffic congestion and construction noise would disrupt routine daily activities of study area residents such as shopping, visiting with neighbors, and walking in the area.

5.3.15. Noise

5.3.15.1. Affected Environment. Traffic noise serves as the primary source of ambient noise in the study area. The principal corridors generating traffic noise in the IHNC

area include the IHNC, the Southern and Illinois Central Railroad lines, and the major arterials -- St. Claude Avenue, North Robertson Avenue, Claiborne Avenue, Florida Avenue, Franklin/Almonaster Avenues, Chartres Street and Poland Avenue. Noise created by the movement of tows and ships within the IHNC is not normally great enough to intrude into the adjacent neighborhoods, with the exception of blasts from horns and sirens. Railroad passage on the west side of the IHNC is a more likely source of industrial noise, although little, if any, rail traffic is associated with facilities terminating at the Galvez Street wharf. Nevertheless, the volume of local and commuter automobile and truck traffic is the most direct source of ambient noise to residents in the study area.

In this assessment, sound or noise measurements are expressed in terms of the day-night sound level (DNL) and expressed mathematically (in decibels) as Ldn. Thus, 50 Ldn means a day-night sound level of 50 decibels (dB). The expression DNL is defined as the A-weighted equivalent sound level for a 24-hour period with 10 dB added for nighttime sounds (10:00 p.m.-7:00 a.m.). The day-night sound level is used to characterize average sound levels in residential areas throughout the day and night. The A-weighted sound level is the momentary magnitude of sound weighted to approximate the human ear's frequency sensitivity, which is better in the 500 Hz to 8,000 Hz range. The DNL sound level includes a 10 dB penalty because people are more disturbed by noise at night but no construction would occur at night for any of the alternatives evaluated. In evaluating noise impacts, the U.S. Department of Housing and Urban Development (HUD) has set down noise standards to be used in evaluating new housing construction assisted or supported by HUD financing. These standards are as follows:

65 Ldn or less is considered acceptable;
>65 Ldn but not >75 Ldn is considered to be normally unacceptable;
>75 Ldn is considered unacceptable.

Although HUD participation in this project is not anticipated, noise impacts for this effort are appropriately evaluated utilizing HUD standards.

5.3.15.2. Plan 1 (No Action). Under this scenario, where no Federal action is taken, the State of Louisiana will construct a new mid-level or high-level bridge at the Florida Avenue crossing. This project will not include connections to existing interstate highways or expressways on either side of Florida Avenue. However, the Regional Planning Commission expects that this new corridor will capture a significant share of trans-canal traffic (see Transportation). When compared to the current configuration of traffic flows, the redistribution of traffic through the St. Claude Avenue, Claiborne Avenue, and Florida Avenue corridors will increase vehicle-generated noise in some areas and decrease vehicle-generated noise in other areas. Residents adjacent to feeder streets, such as Franklin/Almonaster, Caffin and Tupelo, will most likely experience an increase in traffic and associated noise.

5.3.15.3. Plan 2. The most severe noise associated with the construction of a mid-level St. Claude Avenue bridge would occur as piles are driven for the bridge piers. It is expected that the pile drivers that are required for this task would emit "normally unacceptable" levels of noise within a distance of approximately 800 feet from the source (Rigamer, 1991). While field tests have not yet been conducted to obtain empirical data, preliminary calculations suggest that approximately 315 housing units, with a total population of 759, are located within 800 feet from the source of construction (Plate 25). It is important to note that the 800-foot estimate represents a worst-case scenario: no factors that would contribute to the buffering or suppression of pile driving noise (such as levees, floodwalls, below-water hammering, and modified construction equipment) are taken into account.

In an effort to limit the amount of unacceptable noise, pile tests would be performed using a variety of pile drivers at selected locations, prior to lock and bridge construction, in order to measure noise levels and delineate the area exposed to an unacceptable level of noise which is defined as the 65 Ldn contour or comparable measure.

Residents would also be exposed to noise generated by vehicular traffic to and from the construction site. The construction plan includes the designation of dedicated routes for construction traffic which is isolated, to the maximum extent possible, from neighborhood streets and residences.

Traffic-generated noise would increase for those residents that live on streets that motorists would use as detours to alternative routes during the period of bridge closure. These streets include, but are not limited to, Caffin Avenue and Tupelo Street.

Because the replacement of the current low-level bridge with the mid-level structure would facilitate traffic flow along the St. Claude Avenue corridor, it would be expected that the volume of traffic would also increase, and with it, the level of traffic-related noise.

A mitigation plan for noise impacts, comparable to that described in Section 5.3.15.4.2., would be an integral component of this alternative.

5.3.15.4. Plans 3a through 3f

5.3.15.4.1. Effects

The most severe noise associated with the construction of a replacement, low-level St. Claude Avenue bridge would occur as piles are driven for the bridge piers. It is expected that the pile drivers that are required for this task would emit "normally unacceptable" levels of noise (Rigamer, 1991) within a distance of approximately 800 feet from the source. While field tests have not yet been conducted to obtain empirical data, preliminary calculations suggest that approximately 315 housing units, with a

total population of 759, are located within 800 feet from the source of construction. It is important to note that the 800-foot estimate represents a worst-case scenario: no factors that would contribute to the buffering or suppression of pile driving noise (such as levees, floodwalls, below-water hammering, and modified construction equipment) are taken into account. Pile tests would be performed using a variety of pile drivers at selected locations, prior to lock and bridge construction, in order to measure noise levels and delineate the area exposed to an unacceptable level of noise which is defined as the 65 Ldn contour or comparable measure.

Approach ramps for the Claiborne Avenue bridge would not be replaced under this plan, but the bridge would require modification. Current construction plans call for the replacement of the bridge lift-span and towers. The new bridge components would be prefabricated off-site and floated on barges into position next to the existing bridge. No pile driving or other re-enforcement of the bridge piers is expected to be necessary. Therefore, noise impacts from modifications to the Claiborne Avenue bridge are not expected in the adjacent neighborhoods.

Noise generated by lock construction is expected to intrude into the neighborhood on the east side of the IHNC. The severity of this impact is uncertain. Under a worst-case scenario, pile driving activity at the construction site, which is situated near the center of the canal, has the potential to emit "normally unacceptable" levels of noise into a residential area that lies one or two blocks east of the IHNC and within 1280 feet of the construction site. This area encompasses 286 housing units and 689 residents (Plate 25). However, the construction techniques used would require only a nominal number of piles, far fewer than required for the St. Claude Avenue bridge, indicating a minimal pile driving program.

In contrast to the lock site, the location of the new floodwall on the east side of the IHNC between the St. Claude Avenue and Claiborne Avenue bridges is more immediate to the local residents. An undetermined number of residents would be exposed to noise associated with general construction and in particular with the noise generated by pile driving. The severity of the pile driving noise that is expected to encroach into the neighborhood has not been determined. The explanation for this lies in the fact that the sheet piles that are required for floodwall construction would only require the smallest and hence, quietest pile drivers available. Furthermore, it is known that "ultra-quiet" pile drivers have been recently designed for "light" or "small" construction projects that take place within dense, urban environments. The availability and applicability of this technology for this construction plan is not currently known. However, the potential exists that "normally unacceptable" levels of noise emitted may not extend far from the floodwall construction site. Pile driving activity along any section of the floodwall would occur only during a portion of the time scheduled for floodwall construction which is not expected to last longer than one year.

Several features are included in the project plan to avoid and minimize noise impacts from construction of the lock, St. Claude Avenue bridge, and floodwalls. These items are as follows:

a. Contract specifications would include limitations on noise levels at a given distance from the construction site. Unacceptable noise levels attributable to lock construction or bascule bridge construction would generally not be allowed to invade residential areas. With respect to the St. Claude Avenue Bridge approaches, exposure to unacceptable noise levels would be limited to those receptors adjacent to the construction site if the total elimination of unacceptable noise levels is not possible. While the contractor would be given discretion in the manner of compliance with the standard, the form of compliance would likely include the employment of specialized, quieter equipment, remote deployment or isolation of some equipment and the placement of baffle walls.

b. Contract specifications would require verification of the noise level containment. Contractors would be required to use noise monitoring equipment to verify adherence to contract specifications that limit unacceptable levels of noise at given distances from construction sites.

c. Wherever possible, the use of the vibratory hammers or other pile driving equipment that is designed to minimize noise emissions would be required by contract specifications. Recognizing the adverse impacts associated with pile driving with standard equipment within an urban environment, the construction industry and construction equipment manufacturers have in recent years modified pile driving technology. These specialized pile drivers significantly reduce noise, particularly for jobs that require relatively smaller piles as is typically required for the construction of floodwalls and bridge approaches.

Residents would also be exposed to noise generated by vehicular traffic to and from the construction sites. The construction plan would include the designation of dedicated routes for construction traffic would be isolated, to the maximum extent possible, from neighborhood streets and residences.

Traffic-generated noise would increase for those residents that live on streets used as detours during the period of bridge closure. With the proposed bridge replacement and modification plan, this impact is expected to be minimal. These streets include, but are not limited to, Caffin Avenue and Tupelo Street.

5.3.15.4.2. Proposed Mitigation

a. Soundproofing any residential or commercial structure that lies within the area of unacceptable levels of noise would be accomplished to the extent that it is not possible to entirely eliminate unacceptable noise levels under normal procedures.

b. Pile driving for the new St. Claude Avenue bridge would be done only during the summer to avoid impacts to children in neighborhood schools.

5.3.16. Air Quality

5.3.16.1. Affected Environment. The Clean Air Act of 1970, as amended, requires the establishment of National Ambient Air Quality Standards (NAAQS). Both primary and secondary standards are now in effect. Primary standards define levels of air quality that the Administrator of the Environmental Protection Agency (EPA) judges to be necessary, with an adequate margin of safety, to protect the public health. Secondary standards define levels of air quality that the Administrator of the EPA judges to be necessary to protect the public from any known or anticipated adverse effects of a pollutant. The NAAQS pollutants are monitored in Louisiana by the Louisiana Department of Environmental Quality (LDEQ) include carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, total suspended particulate, particulate matter less than 10 microns, and lead. The current ambient air quality standards for these pollutants and yearly summaries of data collected at sites in Orleans and St. Bernard Parishes are included in Appendix D, Section 7.

Orleans and St. Bernard Parishes are designated as ozone attainment parishes operating under a full maintenance plan. As such, these areas are monitored for violations of NAAQS, and any Federal actions that could affect ozone levels in these parishes must be in compliance with the State Implementation Plan. At the regional level, motor vehicle emissions can have a significant effect on the ambient air quality. Motor vehicles directly emit carbon monoxide (CO) and nitrogen dioxide (NO_2) and contribute to ozone levels in the atmosphere by emitting two precursors to ozone: volatile organic compounds (VOC) and nitrogen oxides (NO_x). In the atmosphere, these two pollutants can react in a series of photo-chemical reactions to produce ozone. The ozone standard at monitoring sites located in Orleans and St. Bernard Parishes has not been exceeded since 1984. All other pollutants measured in Orleans and St. Bernard Parishes are within the established standards.

5.3.16.2. Plan 1 (No-Action). The study area would likely continue to be in attainment for all ambient air quality standards except ozone. With a new Florida Avenue bridge to be constructed by other parties, traffic flow patterns within the study area are expected to improve, resulting in somewhat less overall emissions from motor vehicles. Localized, non-significant increases in air pollutants emitted from internal combustion engines would be expected along the Florida Avenue and Tupelo Avenue corridors due to increases in the number of vehicles using these routes after completion of the Florida Avenue bridge.

5.3.16.3. Plan 2. Bridge replacement at St. Claude Avenue could create localized increases in levels of air pollutants during the construction period from the exhaust of construction equipment. Additionally, more traffic congestion on detour routes and on

the Claiborne and Florida Avenue bridge approaches would be expected during the closure of St. Claude Avenue. Motor vehicle emissions are higher under low-speed, congested traffic conditions, particularly when idling is involved. After the construction period, a decrease in the number of bridge openings with the mid-level bridge would cause a decrease in the emissions associated with vehicular traffic.

A mitigation plan for air quality impacts, comparable to that described in Section 5.3.16.4.2., would be an integral component of this alternative.

5.3.16.4. Plans 3a through 3f

5.3.16.4.1. Effects

Construction activities would increase air pollutant levels in and near the construction sites. Lock and channel excavation, demolition of structures, replacement of bridges, construction equipment exhaust, and motor vehicle exhaust would cause particulate matter to be released into the air. Engine exhausts would introduce such substances as carbon monoxide, lead, and nitrous and sulfurous oxides.

An analysis of the volatile organic compound emissions from equipment to be used for project construction was conducted to determine if the proposed action conforms to the State Implementation Plan. Tables showing the details of this analysis are included in Appendix D, Section 7. The analysis was conducted for the most intense four-year period of project construction. The amount of VOC emissions during the intense period of new lock, levee, floodwall, and channel construction would be 18.6 tons. The amount of VOC emissions during any typical year of relocations and bridge construction would be 32.3 tons. The total amount of VOC emissions during the most intensive period of project construction is obtained by adding these two emission estimates together. The result is 50.9 tons.

The temporary bridges to be constructed at the St. Claude Avenue and Claiborne Avenue crossings of the IHNC would provide a level of traffic flow comparable to the existing bridges. There would be no significant increase in traffic delays, and associated increases in vehicular emissions, during construction of the new St. Claude Avenue bridge and retrofitting of the Claiborne Avenue bridge. The total amount of VOC emission during project construction would therefore be limited to the emissions from construction equipment.

The State Implementation Plan requires Federal agencies to conduct conformity determinations for actions in maintenance or non-attainment areas that would result in a release of pollutants equal to or exceeding certain specified limits. For Orleans Parish, the threshold level of VOC emission is 100 tons per year. Since the maximum estimated total VOC emission during any year of project construction is 50.9 tons, a conformity determination is not required.

The effect of the project, after all new bridges are in place (including a new Florida Avenue bridge), would be an improvement in traffic flows, and a long-term reduction in vehicle emissions (compared to without project condition). The traffic flow patterns with a project in place have been modeled by the Regional Planning Commission and have been found to be in compliance with the Traffic Implementation Plan.

Earth-moving equipment, hauling, and concrete mixing activities could create large amounts of dust in the vicinity of the IHNC. Mitigation measures are proposed to avoid and minimize this potential problem.

5.3.16.4.2. Proposed Mitigation
Construction contract specifications would include requirements to maintain dust levels within specified levels. Contractors would be required to monitor dust levels in order to verify compliance. Measures to minimize dust generated by construction equipment may include the wetting of levees and access roads and installation of mesh barriers. Also, contractors would be required, through contract specifications, to properly maintain all equipment used for project construction, so that emissions of air-borne pollutants are minimized.

5.3.17. Wooded Lands

5.3.17.1. Affected Environment. Wooded lands occur in remnant tracts in the biological study area. There are two remaining tracts of undeveloped wooded land within the forced drainage area of St. Bernard Parish, upriver of Paris Road (Louisiana Highway 47). One tract is about 24 acres and the other is about 155 cares. The area around the lock construction site is highly urbanized and industrialized, hence no wooded areas occur adjacent to this site. Although the proposed graving site has been designed to avoid wooded land, this habitat does occur in its vicinity.

The dominant species of trees in the wooded lands are sugar-berry, live oak, water oak, sweet pecan, green ash, black willow, red maple, cypress, American elm, box elder, and roughleaf dogwood. Chinese tallow, an exotic species, often out-competes native species during early successional stages in regenerating areas. Understory species in the woods include elderberry, Japanese honeysuckle, blackberry, roughleaf dogwood, ligustrum, palmetto, hawthorn, and poison ivy. Groundcover species include Virginia creeper, peppervine, goldenrod, trumpet creeper, day flower, eastern false-willow, smartweed, and ferns. This habitat supports some avian species, including wrens, buntings, vireos, warblers, woodpeckers, and predatory birds such as hawks and owls. Mammals include rabbits, opossums, squirrels, armadillos, and raccoons.

Wooded land also occurs along the south bank of the MRGO where dredged material has been deposited. The dominant vegetation in this area is Chinese tallow and black willow. Most other trees are unsuited to the saturated soil conditions of this area. In some of the more chronically saturated areas, even the tallows and willows remain

stunted, and the could be considered as scrub/shrub wetlands. These habitats are of particularly low quality for most species of wildlife. Groundcover is usually low. These areas are elevated to the point where tidal waters, even during storm events, do not inundate them, but the soils remain saturated because of the nearly flat surface. Surface waters are restricted to borrow ditches excavated to construct dredged material retention dikes. Fisheries usage of this habitat is restricted to small, freshwater species tolerant of shallow, isolated ditches and pools.

5.3.17.2. Plan 1 (No-Action). The remaining wooded land within the leveed and drained part of the study area would continue to be developed for commercial and residential use. Terrestrial wildlife living in these areas would be killed when these areas are developed since no escape corridors are left for emigration. Some avian species would also be lost because of the loss of suitable nesting and foraging habitat. It is expected that the two remaining undeveloped tracts of land in the forced drainage area of St. Bernard, upriver from Paris Road (Highway 47), would be developed during the next 50 years. Exactly when these areas would be developed would depend on the goals of the individual landowners. Development plans are being formulated for the larger tract of land which is owned by a single landowner.

Wooded land along the MRGO would remain mostly undisturbed due to isolation and poor soil conditions. The reach of the MRGO above Paris Road would not likely need to be dredged in the foreseeable future, therefore no dredged material would likely be placed in these areas anytime soon.

5.3.17.3. Plan 2. Same as no-action. No project-induced effects are expected.

5.3.17.4. Plans 3a through 3f. Approximately 240 acres of previously-used disposal area along the south bank of the MRGO would be used for disposal of sediment and soil dredged from the new lock site and from the top 5 feet of soil in the alignment of the north bypass channel. The disposal site contains early successional stage woods consisting mainly of Chinese tallow and black willow. No mitigation is proposed for the use of this site because of its low habitat quality for wildlife and minimal quality habitat value for fisheries. The area to be impacted would be minimized, and any restriction or conditions imposed by the LDEQ to prevent the degradation of coastal water quality as a result of effluent from dredging operations would become part of the disposal plan. After dredged material deposition, these areas would revert back to habitat similar to what currently exists.

A proposed motor vehicle detour route, which is a component of these plans, would skirt the western edge of an undeveloped tract of woods within the leveed and drained area of St. Bernard Parish. This 155-acre tract, located between Patricia Street and the Florida Walk Canal, is the largest remaining tract of undeveloped wooded land in St. Bernard Parish, upriver of Louisiana Highway 47. The road is planned as a permanent route to alleviate traffic congestion on existing residential roads and would connect St.

Bernard Highway and Judge Perez Boulevard with Florida Avenue. A wetland determination conducted by the New Orleans District in response to a request by a private party found that the wooded area is not a jurisdictional wetland subject to Section 404(b)(1) of the Clean Water Act.

A local drainage canal (the Guerenger Canal) separates the wooded tract and the residential development to the west. A cleared strip of land, strewn with municipal trash and construction debris, lays between the wooded area and the Guerenger Canal. The detour route would be built on the western edge of the wooded area, through the cleared strip of land adjacent to the drainage canal. The cleared strip is approximately 100 feet wide and extends the full length of the wooded tract. A 90-foot right-of-way is needed for construction of the detour road. The road would be constructed as close to the canal as possible, while leaving enough space for safety. Depending on the final alignment of the road, a very narrow strip of woods may have to be removed to allow sufficient right-of-way for the road. In addition, a minor amount of clearing may be necessary to remove or trim trees leaning over the proposed roadway. Assuming that, at most, an additional 50-foot strip may be needed, 2.8 acres of wooded land would be cleared. No compensatory mitigation is planned for the potential loss of this wooded land. The mitigation plan for the graving site would over-compensate for those impacts. The excess mitigation would provide out-of-kind mitigation for the loss of this wooded land.

The proposed graving site has the potential to affect adjacent wooded lands if care is not taken to prevent draining. The adjacent wooded land remains very wet throughout the year and supports a variety of plant and animal species tolerant of, or requiring, saturated soil conditions. No draining of adjacent wooded lands would be allowed for site preparation.

5.3.18. Coastal Wetlands

5.3.18.1. Affected Environment. The biological study area contains extensive freshwater and brackish marsh and shallow, open water areas. Some of the wetlands are located within a hurricane levee protection system, but normal tidal flows are allowed through floodgates and the areas remain part of the tidal system. Most of the freshwater wetlands are located within the Bayou Sauvage National Wildlife Refuge and are maintained through water control structures and pumps. Some small freshwater wetlands are scattered throughout the remaining undeveloped areas within the hurricane protection systems. One such wetland would be affected by the proposed graving site.

Although within a forced drainage area, the graving site is isolated from drainage canals by filled land and the area remains flooded by rainwater. The area was once had its own pumping facility, but it has fallen into disrepair. The general area of 103 acres, within which the graving site would be built, contains a variety of wetland types

including aquatic bed (floating aquatic vegetation), wooded ridges (remnant canal banks), bottomland hardwood forest, herbaceous wetlands dominated by sedges, and scrub/shrub areas dominated by buttonbush and eastern baccharis. The direct impact site is restricted to the south-west corner of the wetland, which includes mainly aquatic bed and wooded ridges. Details are shown on Plate 28.

Field investigations of the graving site wetland show that a variety of wildlife utilize the area. Species observed include swamp rabbits, nutria, mottled ducks, wood ducks, alligators, black-crowned night herons, great egrets, great blue herons, snowy egrets, little green herons, tricolored herons, little blue herons, glossy ibis, white ibis, snakes, and frogs. Fish resources are limited by the high coverage of floating aquatic vegetation and the shallow nature of the site.

In the brackish marsh of the study area is saltmeadow cordgrass or wiregrass. Other species in the brackish marshes of the study area include saltmarsh cordgrass or oystergrass, saltgrass, black rush, and leafy three square. Scrub/shrub habitat occurs along canal and bayou banks that are slightly higher in elevation than the areas dominated by marsh species. Freshwater wetlands contain a variety of annual plant species including sedges, rushes, alligatorweed, deerpea, rattlebox, coffeeweed, and cattail. The scrub/shrub areas are dominated by eastern baccharis.

The tidal wetlands of the study area provide habitat for populations of recreationally and commercially important species of wildlife, including nutria, muskrat, raccoon, mink, otter, and alligator. Wintering and resident waterfowl, shorebirds, wading birds, and songbirds are common. The tidal wetlands also function as nursery areas for important fishery species, such as blue crab, brown and white shrimp, menhaden, striped mullet, Atlantic croaker, spotted and sand seatrout, black and red drum, and southern flounder.

The tidal wetlands within the study area are being lost to open water. A variety of factors contributes to this problem. Subsidence and compaction of underlying sediments, the lack of sediment input from river systems, saltwater intrusion, and wave erosion are likely the main reasons for the loss of marsh in the study area.

Prominent features in the biological study area are three large bodies of shallow open water. A triangular area of about 400 acres, and two square areas, each covering about 500 acres, are located just north of the Back Protection Levee protecting Orleans and St. Bernard Parish, east of the IHNC. Although these areas are now open water, they were covered by cypress swamps not long ago. Photos from the 1960's show most of the trees were still alive, although they were standing in water and no understory or groundcover was present. Hundreds of dead cypress trees and cypress stumps are still noticeable in these areas. The water depth of these areas ranges from less than one foot to about four feet. Some of the open water areas contain aquatic vegetation, mainly widgeongrass. Widgeongrass, which is common in brackish water, is normally

considered to be a desirable aquatic plant. It is a sought-after food by many species of waterfowl and provides forage and shelter for estuarine fish and shellfish.

These open water areas receive a significant amount of urban storm water runoff from two pumping stations. One pumping station, which drains most of the lower Ninth Ward of Orleans Parish, discharges into the headwater of Bayou Bienvenue. The other pumping station, which drains a large portion of Arabi and Chalmette in St. Bernard Parish, discharges into a canal that separates the two large square-shaped areas of open water. Two major landfills and a sewerage treatment plant are also located in this area.

5.3.18.2. Plan 1 (No-Action). The existing condition of the biological study area is not expected to change significantly. No development of the graving site is projected for the future without project condition, and only minor changes in the habitat values of the area were predicted. The tidal marshes would continue to be lost to open water due mainly to land subsidence and erosion but much of the existing marsh would likely still exist at the end of the project life. Significant urban expansion into the tidal wetlands is not likely because of inadequate flood protection, low elevation, and lack of drainage. The freshwater wetlands of Bayou Sauvage National Wildlife Refuge will be affected beneficially by pumping facilities which will allow increased water level manipulation.

The operator of the sewage treatment facility, mentioned under Existing Conditions, has been granted a Section 404(b)(1) permit to deposit biosolids and ash generated at the facility in the open water immediately west and north of the facility. As much as 45 acres of the open water could be used for disposal. The disposal would serve a dual purpose: to dispose of the waste product and to determine if the material is suitable for wetland development. Test plantings and treatments would be undertaken to determine the best methods for vegetating the material.

5.3.18.3. Plan 2. This plan would have no effect on coastal wetlands.

5.3.18.4. Plans 3a through 3f

5.3.18.4.1. Effects

The graving site impact area was evaluated with the U.S. Fish and Wildlife Service's Habitat Evaluation Procedures (HEP). HEP is a species-based evaluation system, wherein habitat quality is determined for key species that are representative of the habitat. The suitability of a habitat or Habitat Suitability Index (HSI) is determined for each species evaluated. HSI ratings range from zero to 1.0, with zero meaning that the habitat is worthless and 1.0 meaning that the habitat is optimal. One acre of the best possible habitat would therefore yield one habitat unit. Habitat units annualized for the life of the project are referred to as average annual habitat units (AAHU's).

The species chosen for use in the HEP were great egret (feeding) and mink. Both of these species are common in the study area. Models for other species were not applicable because of the isolated nature of the wetland, its permanently flooded nature, and proximity to disturbance. The area was found to have an HSI value of 0.61 for great egret and 0.28 for mink. The AAHU's provided by the impact site under future without project conditions would be 17.0 for great egret and 13.9 for mink.

5.3.18.4.2. Mitigation

The use of material from lock and bypass channel excavation has been evaluated for use in wetland restoration. Most of this material has been found to be unsuitable for wetland restoration because of contaminants. However, the soil along the east bank of the IHNC below a depth of 5 feet has been determined suitable for aquatic disposal and wetland restoration. This material would be used beneficially as mitigation for impacts attributable to the graving site. Dredged material would be discharged into a confined site within a large triangular-shaped area of open water located northeast of the new lock site (Plate 26). Shallow-draft lock plans would require less excavation than deep-draft plans, hence less material would be available for mitigation and wetland restoration. Shallow draft lock plans would generate enough material to create about 31 acres of marsh, whereas about 41 acres could be developed with the deep-draft plans. Wetlands in excess of those necessary for mitigation of graving site impacts would be developed because there would be ample dredged material available and there would be no incremental cost involved. This is because once the dredging operation is setup for discharge into the mitigation site, the cost of disposal would be comparable to the cost of depositing the material in the least costly, environmentally acceptable manner (in confined MRGO disposal areas). Additional information on the graving site and mitigation plan are presented in Appendix D, Section 10.

The goal at the mitigation site would be to create emergent wetlands in an area which now contains shallow brackish water. The site would be built adjacent to the perimeter of the large triangular area so that the existing land would act as a corridor for animals to colonize the mitigation site, and so that the site would not be isolated. The dredged material would be deposited so that, after a period of settling, the elevation would be suitable for colonization by marsh plant species. Low-level dikes constructed to contain the material would be higher in elevation, and would be colonized by scrub/shrub and pioneer tree species. An overflow structure or spill-box would be placed in the containment dike for excess water discharge. The ideal situation for evaluated species would be for the dredged material to vary somewhat in settled elevation so that most of the area develops into marsh, and some of the area remains shallow water suitable for foraging. Scrub/shrub and trees growing on the containment dike would provide escape cover for terrestrial animals during storms and perching and nesting sites for avian species.

Use of uncontaminated soils as mitigation for the deep-draft lock plans, including the tentatively selected plan (Plan 3F) would provide 30.5 AAHU's for great egret and

45.3 AAHU's for mink. For the shallow-draft lock plans, 26.2 AAHU's for great egret and 39.1 AAHU's for mink would be provided. The mitigation plan would fully compensate for impacts of the graving site. Excess habitat created through the beneficial use of dredged material has no definitive cost attached to it since any difference in cost between wetland restoration and the least costly, environmentally acceptable plan (disposal into the confined MRGO disposal area) has not been determined.

5.3.19. Aquatic Habitats

5.3.19.1. Affected Environment

5.3.19.1.1. General. Major water bodies in the study area include the MRGO, the IHNC, the GIWW, and the Mississippi River. In addition, there are lagoons, ponds, bayous, canals, and open water-subsided marsh areas within the study area. The major waterways provide migratory paths for many estuarine and freshwater species of fish, shellfish and other aquatic organisms. The smaller water bodies provide shallow, protected nursery habitat for many of the same species. A large proportion of these aquatic species are commercially and recreationally important. In addition to freshwater aquatic habitat, the Mississippi River provides the municipal water supply for Orleans, Jefferson, St. Bernard, and Plaquemines Parishes. A number of industries use water from the Mississippi River for various industrial purposes, and river and the IHNC receive significant amounts of pollutants from these industrial sources. The IHNC and the brackish waters of the study area receive stormwater runoff pumped from the developed sections of the study area.

5.3.19.1.2. Fisheries Resources. The major freshwater habitat of the study area is the Mississippi River. A limited recreational and commercial fishery occurs in the river and its associated batture areas and borrow pits. The primary species targeted are channel catfish, blue catfish, and flathead catfish. Other species harvested include largemouth bass, alligator gar, spotted gar, black crappie, white crappie, white bass, yellow bass, striped bass, and various species of sunfish. In some years during low river stages, saltwater species of fish ascend the river well above New Orleans. At these times, red drum, striped mullet, southern flounder, and other species are caught.

The MRGO, the GIWW, and the IHNC, between Lake Pontchartrain and the intersection with the GIWW, are artificial channels which directly connect Lake Pontchartrain with the Gulf of Mexico. Migratory estuarine species utilize these waterways for seasonal movements. Important species found in these waterways include spotted seatrout, sand seatrout, Atlantic croaker, red drum, black drum, southern flounder, striped mullet, blue crab, and white and brown shrimp. Since the main purpose of the IHNC, GIWW, and MRGO is navigation, a large number of industries, including a large bulk terminal, container terminal, and marine repair and service facilities, are located on the banks of these waterways. Due to the large amount

of commercial traffic in the IHNC, the Port of New Orleans prohibits all types of fishing activities in the waterway. This is mainly for safety reasons, since the tidal current in the IHNC between Lake Pontchartrain and the GIWW can cause problems for vessels navigating this channel. Recreational and commercial fishing activities in the GIWW and MRGO are common.

5.3.19.1.3. Water Quality. An analysis of water quality data was conducted to determine existing water resource conditions and to develop a background for water quality projections. In-situ water quality has been determined using available data from various stations which are sampled at periodic intervals. Stations have been established by the U.S. Army Corps of Engineers, the U. S. Geological Survey, the Louisiana Department of Health and Hospitals, and the Louisiana Department of Natural Resources. Data from these stations have been compared with appropriate State and Federal criteria for aquatic life and human health to evaluate existing water quality and determine whether criteria are met.

Specific samples were also collected for this study. Water samples were collected from the Mississippi River, the IHNC, and the area designated for mitigation. Bottom sediment samples were collected from the IHNC and the mitigation site. The sediment samples were mixed with ambient water to produce elutriate samples which simulate the short-term, worst-case effect of dredging and disposal.

Potential water quality problems in the Mississippi River in the vicinity of New Orleans include heavy metals, pesticides, and pathogens. Trace metal concentrations occasionally violate criteria levels. However, with the exception of minor increases in concentrations of lead, zinc, and iron, trace metal concentrations have shown a decreasing trend with time because of improved industrial waste water treatment. Most pesticides and other synthetic organic compounds are only detectable, if at all, at very low concentrations. Pesticide levels have been decreasing with time because of prohibitions on the most toxic and persistent compounds, and improved treatment of industrial waste water has reduced the average concentrations of most other organic compounds. This segment of the Mississippi River is currently classified by LDEQ as fully supporting its designated uses of secondary contact recreation, fish and wildlife propagation, and drinking water supply, but not supporting primary contact recreation. The level of fecal coliform bacteria is the primary parameter for determining primary contact recreation support. Data from the Mississippi River downstream of New Orleans indicates that fecal coliform levels are violated approximately 16 percent of the time. According the LDEQ criteria, this segment of the river partially supports its use for primary contact recreation.

The water quality of the IHNC is influenced by discharges directly into the canal and inputs from connecting streams, especially the Mississippi River. Direct discharges include stormwater runoff, industrial point sources, and vessel discharges. There are no municipal waste discharges into the IHNC, although small quantities of local

domestic wastes may be discharged. Historic water quality data indicate the presence of magnesium, manganese, iron, lead, zinc, chromium, cadmium, copper, mercury, and nickel. EPA saltwater aquatic life criteria levels have been exceeded for copper and lead, and possibly for mercury. Thus, historically, there is an indication that the IHNC is subject to periodic metals contamination. Analysis of the water sample collected from the IHNC during the 1993 sampling effort showed results similar to historic data. Fecal coliform bacteria levels in the IHNC are high, probably from influxes from the Mississippi River, domestic wastes from developments along the IHNC, and accumulated benthic deposits conducive to coliform re-growth. The LDEQ has classified the IHNC as water quality limited.

No sampling stations are located in the proposed mitigation site. The water sample collected in 1993 for this study showed the presence of many of the same metals found in the IHNC. Since there was only a single sample analyzed, a generalization cannot be made about the existing water quality in the area. However, the water quality appears to be similar to the quality of water in the IHNC, although fluctuations do exist. The quality of this aquatic habitat is negatively affected by urban stormwater runoff from a large pumping station and possibly by leachate from a closed landfill located in the vicinity. As a result, the mitigation site provides low quality habitat for estuarine fish and shellfish species.

In general, the dissolved oxygen content (DO) of the water in the study area is high and the biological oxygen demand (BOD) is low. One problem area is the IHNC between the GIWW and the lock, where most of the water movement comes through the IHNC lock from the Mississippi River. Pollutants contained in the Mississippi River water, combined with industrial, stormwater, and non-point source discharges and the low flushing action in this part of the IHNC, result in DO values as low as 0.1 milligrams/liter (mg/l) and BOD values as high as 10.6 mg/l. These problems decrease as the GIWW flows eastward.

Average tidal flow in the IHNC between the GIWW and Lake Pontchartrain is approximately 14,000 cfs. There is evidence of saltwater stratification in Lake Pontchartrain near the IHNC and in the IHNC. The direct connection of the IHNC with the gulf via the GIWW and MRGO allows saline, and hence more dense gulf water, to work its way along the bottom of the pass toward Lake Pontchartrain.

5.3.19.2. Plan 1 (No-Action). Occasional DO and fecal coliform bacteria violations would likely occur in the Mississippi River during periods of low flow. Such violations would be reduced by continued improvements in sewage treatment practices. Pesticide exceedances of EPA criteria should be greatly reduced due to prohibitions of the most toxic and persistent compounds. Occasional violations of criteria in the Mississippi River for chromium, copper, mercury, and lead would likely continue, as would violations for copper, mercury, and lead in the IHNC. Continued implementation and enforcement of EPA effluent limitation requirements should result

in a gradual reduction of heavy metals and the number of carcinogens, but it is unlikely that they would be completely eliminated. Use of the study area by aquatic species is expected to continue similar to existing conditions.

5.3.19.3. Plan 2. Bridge replacement at St. Claude Avenue would disturb bottom sediments in a small area of the IHNC. A relatively small amount of dredging in the IHNC to increase the width of the channel where the existing bridge is located would likely be necessary. Impacts on water quality would be localized, minor, and of short duration. Some turbidity increases during construction would occur. Whatever material is excavated would be hauled or barged away and deposited in an upland site. No significant effects on the water quality of the area would be anticipated.

5.3.19.4. Plans 3a, 3b, 3d, and 3e. These plans are all for shallow draft locks. The quantity of material to be excavated for each is similar and hence, potential impacts on aquatic resources are similar. The quantity of material to be excavated during various construction phases for the different lock sizes are shown in Table 9.

Impacts to the aquatic environment would result from dredging and filling activities and other construction activities. Data from detailed studies, especially the 1993 elutriate testing, have been used to project impacts to the aquatic habitat that would reasonably be expected from project implementation. The elutriate test is a simplified simulation of the dredging and disposal process wherein predetermined amounts of dredging site water and sediment are mixed together to approximate a dredging slurry. The test provides an indication of the chemical constituents likely to be released into the water column during a dredging or filling operation.

Five disposal sites would be utilized for project construction as shown on Plate 26. The sites are referred to as the river site (hydraulically pumped into the main channel of the Mississippi River); the mitigation site (hydraulically dredged and used to restore wetlands); the MRGO site (hydraulically dredged and disposed in a previously-used, confined site); the IHNC site (material excavated by bucket dredge and used for backfill); and the graving site (bucket dredged and used for levee construction and grading).

Impacts to the water quality at the mitigation site, MRGO site, and the IHNC site are expected to be related mainly to increased concentrations of ammonia, copper, manganese, and zinc, and suspended sediments. Elutriate data from a mixture of IHNC water and sediment taken from the bottom in 1982 indicate that problem constituents would be ammonia, copper, and manganese. Elutriate data from 1993 indicate that copper, manganese, and zinc are potential problem constituents. Ammonia was not analyzed in the 1993 effort. The 1982 elutriate copper concentrations were about six times the level of the ambient water and the 1993 elutriates were two to fourteen times the levels found in ambient water. These elutriate levels, although higher than the acute criteria level, are generally within the range of concentrations

TABLE 9
ESTIMATED DREDGING QUANTITIES IN CUBIC YARDS FOR PLANS 3a THROUGH 3f

Area to be Dredged	Plans 3a and 3b (900x90x22) (900x110x22)	Plan 3c (900x110x36)	Plans 3d and 3e (1,200x90x22) (1,200x110x22)	Plan 3f (1,200x110x36)
Utility Corridors				
St. Claude Avenue (Stockpiled for Backfill)	45,000	75,000	45,000	75,000
Claiborne Avenue (Stockpiled for Backfill)	60,000	87,000	60,000	87,000
Florida Avenue (Stockpiled for Backfill)	20,000	38,000	20,000	38,000
North Bypass Channel				
(Top 5 feet of Soil - Pumped to MRGO Site)	190,000	206,000	190,000	206,000
(Below 5 feet - Pumped to Mitigation Site)	500,000	667,000	500,000	667,000
New Lock Excavation				
(Pumped to MRGO Site)	210,000	883,000	310,000	1,100,000
Main Channel North of New Lock				
(Pumped to MRGO Site)	0	56,000	0	58,000
South Bypass Channel (Random Backfill)	145,000	145,000	145,000	145,000
Main Channel Between Old Lock and New Lock				
(Random Backfill)	213,000	338,000	213,000	440,000
(Pumped into River)	0	110,000	0	
0				
Main Channel from Old Lock to the River				
(Random Backfill)	150,000	0	150,000	55,000
(Pumped into River)	0	227,000	0	172,000
Total Dredged			1,633,000	3,043,000

found in the Mississippi River, the IHNC, and surrounding areas. Historic monitoring shows that copper levels in the waters of the project area frequently exceed applicable acute criteria under ambient conditions.

Elutriate samples from 1982 and 1993 showed high levels of manganese in the upper sediment samples. The relatively small amount of material containing high levels of manganese would be dredged in short time frame, and its effluent would be diluted from the continued placement of dredged material. Zinc is abundant in surface waters and is known to accumulate in animal tissue. Elutriate testing shows that the zinc concentrations for some samples exceed the acute criteria level.

The most obvious effect during, and for some time after disposal, would be significantly increased levels of turbidity from clay and silt particles. The water in this area is normally quite turbid from high concentrations of phytoplankton, zooplankton, and organic detritus, and high winds increase turbidity levels considerably above normal levels by suspending bottom sediments containing a high percentage of organic material and fine mineral sediments. The ability to see more than 1.5 feet into the water in this area is very unusual, with visibility limits of 0.5-1.0 feet being the average. The high ambient turbidity of this site reduces the net effect of dredging-induced turbidity levels.

The marsh vegetation which would establish in the mitigation site would provide desirable marsh-edge habitat for estuarine fish and shellfish. The long-term effect of dredged material disposal at the mitigation site is expected to be an improvement in the quality of the aquatic habitat. Up to 3 years may be required for dredged material to become completely vegetated and for the area to reach its optimal level of quality for aquatic species.

These plans would not require disposal of dredged material in the Mississippi River. The deep draft lock alternatives, discussed next, would require disposal in the river.

5.3.19.5. Plans 3c and 3f. The impacts of these plans would be similar, but more pronounced than those impacts discussed for Plans 3a, 3b, 3d, and 3e. The total amount of material which must be excavated and disposed for these plans is 2,832,000 cubic yards for Plan 3c and 3,043,000 for Plan 3f. For the previously discussed plans, the total quantity of material to be excavated ranges between 1,533,000 cubic yards and 1,633,000 cubic yards. This increased amount of material would require a longer period of dredging. The short-term, adverse impacts of disposal described for the shallow-draft plans would be extended for a longer period of time. For these deep-draft alternatives, dredging would be required in the channel of the IHNC, north of the new lock site, whereas no dredging in this area is necessary for the shallow-draft lock alternatives. Also, some of the material dredged between the old lock site and the Mississippi River would be disposed in the river.

Water quality impacts from material disposed there are expected to be minimal, mostly related to the potential temporary increased concentrations of ammonia, chromium, copper, and zinc. The degree of increase in the concentration of ammonia would depend on the water temperature at the time of disposal with cooler temperatures reducing the potential for elevating the concentration.

During the period of dredged material disposal into the Mississippi River, suspended sediment concentrations would increase and DO would tend to decrease in the immediate area of disposal. Disposal of material into the river would increase the river's sediment load by as much as 27,000 tons per day which represents about 4 percent of the river's average sediment load in the vicinity of New Orleans. A total of about 172,000 cubic yards of material would be disposed in the river for Plan 3f (TSP). Plan 3c would require disposal of 227,00 cubic yards into the river. All of this material would be dredged near the end of the construction period and is expected to take several weeks. No measurable adverse effects to the aquatic life in the Mississippi River or drinking water supply intakes downstream would be expected.

5.3.20. Aesthetic Values

5.3.20.1. Affected Environment. A significant aesthetic resource of the study area is the Holy Cross levee and batture area - a passive recreational area used for fishing, picnicking, jogging, and walking. This area provides a visual amenity for residents of the Holy Cross neighborhood, who view the river, watch barges and ships passing, and catch a glimpse of downtown New Orleans. It is estimated that 20 percent of the Holy Cross residents and 5 percent of the Lower Ninth Ward residents, or about 2,000 people, use the levee and batture. Another significant aesthetic resource in the IHNC area is the stand of 18 live oaks located north of the St. Claude bridge on the east bank of the IHNC. This site is owned and maintained by the U.S. Army Corps of Engineers. 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.

The Bywater and Holy Cross Districts are two neighborhoods in the IHNC study 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. Trees are present along the streets in both neighborhoods. They provide shade and a visual softness to the street environment.

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.

5.3.20.2. Plan 1 (No Action). Aesthetics of the study area would remain unchanged. Passive use of the batture/levee area for walking and viewing the river would continue at its present use. Batture vegetation, consisting mainly of willow trees, would continue to grow, blocking some views. Selective pruning of the trees would likely occur to maintain the current viewing level. The stand of 18 live oak trees, located north of the St. Claude bridge on the east bank of the IHNC, would continue to grow, thereby maintaining and enhancing the aesthetic values of this resource. Neighborhood architectural aesthetics would continue to reinforce the historic district's unique character and charm.

5.3.20.3. Plan 2.

5.3.20.3.1. Effects.
Construction of the new bridge would impose short and long-term visual impacts within the corridor of development. Short-term negative impacts would occur from the operation of heavy construction equipment. Over the long-term, occupants of adjacent residences would experience a larger and higher bridge than the St. Claude Avenue bridge which they have become accustomed to. This new bridge would dominate adjacent homes by its height and proximity. However, the access ramps for the new bridge offer potential positive attributes. Through the replacement of two 10-foot-high parallel walls existing beneath the old bridge, views would become open under the bridge toward homes on both sides. Improved pedestrian accessibility and air circulation beneath the bridge would likely be viewed positively by nearby residents. The new vertical supporting columns would be enhanced by the application of a textured surface, brick facade treatment, or painting. The area beneath the bridge ramps would be lighted and landscaping would be included where appropriate.

5.3.20.3.2. Mitigation.
Mitigation for loss of aesthetic values would be less extensive than that planned for lock replacement alternatives. The following mitigation features are proposed.

a. Exterior surfaces of bridge approaches and bridge piers would be textured for appearance and to discourage graffiti.

b. Areas surrounding bridge approaches would be landscaped.

c. Lighting along existing roads to be used for detour routes would be improved. Lighting along new detour roads would be provided.

d. Existing detour roads would be landscaped.

e. Lighting and open space would be provided in vacant areas created by reconstruction of the St. Claude Avenue bridge approaches.

f. A program of street resurfacing and lighting and drainage improvements would be implemented within a four-block area on each side of the IHNC.

5.3.20.4. Plans 3a through 3f

5.3.20.4.1. Effects.
These plans would reduce access to sections of the levee and batture adjacent to the IHNC due to realignment of levees and replacement of levees with combination levee/fold-down floodwalls. Floodwalls when raised, would extend about 4 feet above the new levees, presenting a physical and visual barrier to persons walking across the levee. This barrier will exist only in times of high water and would be temporary. There would be a reduction in the aesthetic appeal of the levee and batture during levee and fold-down floodwall construction. This unique fold-down floodwall will provide a hard-surfaced, raised walking platform for residents to stroll along the IHNC and river during normal river levels. Benches and landscaping will be included along this area providing shade and creating a promenade for residents and visitors to use. Walks would be developed connecting the fold-down floodwall promenade to adjacent pedestrian sidewalks, and streets.

The stand of 18 live oak trees situated between Sister Street and the IHNC lock would be lost with implementation of the project. These trees are approximately 75 years old and their life expectancy is at least another 25 years or more. The community garden located in this same area would not be affected.

Adverse impacts would occur to the visual environment in the vicinity of the St. Claude Avenue bridge. This bridge would be replaced with another low-level bridge, but the height of the new bridge would be approximately 18 feet higher in the center than the existing structure. The slope of the approaches to the new bridge would be slightly steeper than the existing approach ramps and the new ramps would reach ground level at the same points as the existing ramps. The lower sections of the existing approach ramps would likely remain in place. Residents whose houses face the higher portions of the approach ramps would be most directly impacted by this visual intrusion into their neighborhood.

The Holy Cross Historic District is already visually impacted by the St. Claude Avenue bridge approach. Still, there would be an additional visual impact to the Holy Cross neighborhood due to the heightening of the east side bridge approach. Aesthetic improvements would result with the removal of a large portion of the "concrete wall" under the bridge approaches facing homes. This wall supporting the upper roadway

would be eliminated and open space created beneath these ramps on both the east and west side of the new St. Claude Avenue bridge. The new bridge approaches would allow passage beneath its deck providing unrestricted access between neighborhoods on either side of St. Claude Avenue. Lighting would be provided to improve safety under the new bridge ramps and help deter vandalism and dumping of trash.

Several features which are appropriate for construction projects in an urban environment are included in the project construction plan. These features are designed to avoid and minimize adverse effects on the adjacent community. They are as follows:

a. Exterior surfaces of lock walls, floodwalls, bridge approaches, and bridge piers would be finished with textured surfaces and shadow patterns to add visual appeal and discourage graffiti.

b. Areas surrounding levees, floodwalls, and bridge approaches would be landscaped.

c. Lighting along existing roads to be used for detour routes would be improved. Lighting along new detour roads would be provided.

d. Green space at the new lock site would be created by back-filling the area created by tying the lock walls to the Claiborne and Florida Avenue Bridges on the east side and the Claiborne Avenue Bridge on the west side. The area would be made available for local agencies to develop into ball fields, walking paths, playgrounds, etc.

5.3.20.4.2. Proposed Mitigation

a. Compensation for the loss of the stand of live oak trees near the existing lock would involve either transplanting some of the trees to nearby public lands, or if this is not feasible, planting of nursery stock.

b. A walking, jogging, and biking path would be built as part of the fold-down floodwall, replacing potentially lost recreational opportunities associated with the placement of a floodwall on the levee. The path would be extended to the Chalmette Unit of the Jean Lafitte National Park in St. Bernard Parish.

c. One or more observation decks, with interpretive displays and benches, would be constructed near the new floodwall to preserve the current recreational viewing opportunities.

d. Lighting and green space would be provided in vacant areas created by reconstruction of the St. Claude Avenue bridge approaches.

e. Areas within the public right-of-way along existing streets would be landscaped to add green spaces and visual buffers between the road and houses.

5.3.21. Recreational Opportunities

5.3.21.1. Affected Environment. Ten parks/playgrounds, two recreation centers, and several pools operated by the New Orleans Recreation Department are located in the IHNC area. In addition to the parks/playgrounds, recreation centers, and pools, there are limited open spaces that provide areas for local residents to enjoy passive recreation. These open areas include the levee and batture south of St. Claude Avenue in the Holy Cross neighborhood. On the levee within the Holy Cross neighborhood, a jogging and walking path is well used. Residents fish along the banks of the river and picnic in the grassy field on the protected side of the levee. In conjunction with enlargement of the Mississippi River levee immediately downstream of the lock, a series of eight benches have been recently installed on the levee crown. These benches provide a promenade area with passive rest spots for residents and visitors to sit and view river activity.

Although most of the recreational facilities primarily serve the adjacent neighborhoods, the Oliver Stallings Center and the Stallings Pool serve a large area and attract residents from the Lower Ninth Ward and Holy Cross neighborhoods. These facilities are more regional in their appeal, requiring some residents to cross the IHNC in order to use them. Activities at the Stallings Center include volleyball, basketball, exercise programs, weight lifting, swimming, and bingo. These activities are planned for all age groups, including senior citizens. The director of the Stallings Center reports that the facilities are extensively used by area residents on both sides of the canal. Neighborhood schools use the gym for intramural games.

5.3.21.2. Plan 1 (No Action). Recreational use of the study area would remain relatively unchanged. Residents and those working at the U.S. Coast Guard Station would continue using the levee crown for walking, jogging, and bicycling. The parks, playgrounds, recreation centers, and public pools would likely continue to operate without significant change. Field sports and batture activities, such as fishing, would continue to exist, similar to current conditions.

5.3.21.3. Plan 2. Pedestrian activity would change around the new St. Claude mid-level bridge and its approach ramps. During construction of the new bridge, pedestrian and bicycle traffic across the canal would be eliminated. After the new bridge is operational, residents on the up-river side of the canal who walk or bicycle across the St. Claude bridge to access the levee in the Holy Cross neighborhood would be required to use stairways or a long ramp to reach the bridge deck where a protected walkway would be provided to cross the canal.

The mitigation plan for this alternative would include construction of playgrounds, gardens, tot lots, and linear parks in the four nearby neighborhoods. These facilities would be operated by non-Federal interests.

5.3.21.4. Plan 3a through 3f. Residents of nearby neighborhoods who must cross the IHNC at St. Claude Avenue to reach community recreation facilities would find them less accessible during the construction period due to temporary bridge closures and construction traffic. Pedestrian access will continue across the temporary St. Claude Ave. bridge while the permanent bridge is being constructed. Increased traffic during temporary closure of the Claiborne Avenue bridge would also negatively affect accessibility to the recreational facilities. Recreational use of the levee in the form of walking, jogging, bicycle riding, and other activities would be temporarily impacted during construction. A fold down floodwall will be installed with implementation of this plan. This floodwall when raised, would extend about 5 feet above the new levee, presenting a physical and visual barrier to persons walking across the levee. This unique fold-down floodwall when not raised will provide a hard surface raised walking platform for residents to stroll along the IHNC while viewing the working lock. Benches and landscaping will be included in this area providing positive aesthetic conditions, while creating a sitting/viewing promenade for residents and visitors to use. Walks would be developed connecting the fold-down floodwall/promenade to adjacent pedestrian sidewalks, and streets.

The walking/jogging/biking path and the green space to be created near the new lock, mentioned in Section 5.3.20.4.2., would mitigate for impacts to recreational opportunities as well as aesthetic values. Likewise, the community facilities to be constructed, mentioned in Section 5.3.8.4.2, would also mitigate for impacts to recreational opportunities.

5.3.22. Cultural Resources including National Register Listings

5.3.22.1. Affected Environment. The area around the IHNC is a diverse region containing several properties eligible for the National Register of Historic Places. These properties have been identified by a number of cultural resource investigations sponsored by the New Orleans District and coordinated with the State Historic Preservation Office (SHPO) and provided to the Advisory Council on Historic Preservation (ACHP).

Two districts listed in the National Register of Historic Places are located in the project area: the Holy Cross Historic District and the Bywater Historic District. Their locations are displayed on Plate 27. The Holy Cross Historic District is significant for its classic New Orleans architectural patterns. The majority of the homes are single and double shotguns which possess either Italianate or Eastlake details. The Bywater Historic District is architecturally significant for the quality of its mixed collection of residential and commercial buildings dating from the period 1907 to 1935. In addition to commercial buildings, four major building types are found in the area: shotguns, camelbacks, bungalows, and pyramidal cottages.

The IHNC Lock, constructed between 1918 and 1921, was the subject of a comprehensive study by the New Orleans District completed in 1987. The study determined that the lock is eligible for inclusion in the National Register of Historic Places. The St. Claude bridge, a Strauss Heel Trunnion Bascule bridge built between 1918 and 1921, has also been determined eligible for the National Register of Historic Places as a result of a 1991 study by the New Orleans District.

The Galvez Street wharf, designed by the office of the Board of Commissioners of the Port of New Orleans in 1922 and erected by 1929, was among the first improvements to the IHNC area after the canal was constructed. This rectangular, multi-bay industrial structure is supported by a metal frame with a roof of corrugated zinc. The building is significant for its historical associations with the early period of development along the IHNC. The building was determined eligible for the National Register of Historic Places after a comprehensive architectural assessment and preliminary archeological review of the area west of the IHNC was completed. That assessment and review was conducted from November 1991 to January 1992 and was followed by consultation with the SHPO.

An evaluation of Sewerage Pumping Station "B" to determine if the structure is eligible for inclusion in the National Register of Historic Places was also conducted under contract to the New Orleans District. This study was based on archival research, including architectural and engineering aspects of the structure, and on-site evaluations of Station B. Upon completion of the study, the contractor recommended that it be considered eligible for inclusion in the National Register of Historic Places. These recommendations were coordinated with the SHPO.

Review of archaeological studies and intensive background research in the area revealed no prehistoric or historic archeological sites. The project area is located adjacent to the Mississippi River in a section of the Mississippi River delta plain which was deposited only a few thousand to a few hundred years ago. The extensive disturbance resulting from construction at the existing lock and other factors has destroyed any prehistoric sites that may have existed in the project area.

A cultural resources investigation of the proposed detour road between St. Bernard Highway and Florida Avenue was completed and coordinated with the State Historic Preservation Office. The detour route would traverse an area that consisted of unimproved land and a cypress swamp throughout much of its recent history. Geomorphological analysis indicates that no crevasse splays, former distributaries, or subsided natural levees that could have been occupied by Native Americans exist in the area of the proposed road. An examination of historic maps and a number of primary and secondary sources shows no evidence of habitation, agricultural production, or military activity in the project area in the eighteenth and nineteenth centuries. The Battle of New Orleans in 1815 was fought close to the area but there is no evidence of military activities in the immediate area of the proposed road. No improvements were

made in the area until the second half of the twentieth century. Any cultural resources in the path of the proposed detour road would date from the very recent past and would not be eligible for the National Register of Historic Places. Field investigations would be necessary to verify that no cultural resources exist in the detour route area. The results of this study would be coordinated with the SHPO.

A cultural resources investigation of the graving site has been completed. Background information has been gathered to develop a comprehensive understanding of the area. Research included a review of historic maps, aerial imagery, the State Archeologist's site files, the National Register of Historic Places, geological and geomorphological data, archeological reports, archives, and public records. Background research and field inspection indicates that no cultural resources exist in the project area. A report recommending no further cultural resources investigations would be coordinated with the SHPO.

5.3.22.2. Plan 1 (No Action). The study area has been impacted by a number of historic developments that have destroyed both prehistoric and historic cultural resources. This trend would continue. Minor changes to the IHNC lock would continue as required for operations and maintenance purposes. Eventually the IHNC lock would have to undergo a major rehabilitation. This would require coordination with the SHPO and ACHP and documentation to the standards of the Historic American Engineering Record.

At some time in the future, the St. Claude bridge would require extensive rehabilitation or replacement with a new bridge. This would also require coordination with the SHPO and ACHP and documentation to the standards of the Historic American Engineering Record.

Historic structures in the Holy Cross and Bywater Historic Districts would continue to deteriorate or to be modernized. While the Historic Districts Landmark Commission would prevent some modifications, continued changes would be inevitable. Over time, the historic districts would be adversely impacted by these changes, leading to a deterioration of the unique historic character of the area.

5.3.22.3. Plan 2. This alternative would require demolition of the St. Claude bridge, a property eligible for the National Register of Historic Places. After additional consultation with the SHPO and the ACHP, the bridge would be documented to Historic American Engineering Record standards.

Construction of a mid-level replacement for the St. Claude bridge could have a negative visual impact on the Holy Cross and Bywater Historic Districts. An assessment of the visual impacts of mid-level bridge construction was conducted under contract to the New Orleans District. The results of this study indicate that the potential for visual impacts to the Bywater Historic District is greatest within the eastern portion of the

district. From more central and western portions of the district, the bridge would not be visible or would be only a minor element of the visual landscape. St. Claude Avenue is one exception to this conclusion. The avenue crosses the district, and a relatively unobstructed view of the new structure would be possible at any point on the avenue west of the bridge

In order to reduce visual impacts of new bridge construction on the eastern portions of the Bywater District, foliage would be planted to shield the bridge from the neighborhood and the bridge would be designed in a manner to reduce visual impacts as much as possible.

The potential for visual impacts to the Holy Cross Historic District as also been investigated. From the central and eastern portions of the district, new bridge construction has little potential for visual impact to the historic setting. A mid-level bridge from these areas would generally be only a minor element in the visual background. In addition, foliage that is present within these areas would, from many vantage points, totally shield the viewer from all of the elements of the new bridge

From the western portion of the Holy Cross District, there is greater potential for visual impact. From some vantage points, most elements of the bridge may be visible. From other points, at least some of the taller elements may be visible. In order to reduce visual impacts of the new bridge on the Holy Cross Historic District, foliage would be used to shield the neighborhood from the view of the bridge and the bridge would be designed to reduce visual impacts as far as possible.

5.3.22.4. Plans 3a through 3f

5.3.22.4.1. Effects

This alternative would require demolition of the IHNC lock, the St. Claude Avenue bridge, and the Galvez Street wharf. All of these properties have been determined eligible for the National Register of Historic Places. The loss of these three structures would be mitigated by recordation to Historic American Engineering Record standards prior to demolition. In addition, the Galvez Street would be documented to Historic American Building Survey standards before demolition. Additional consultation with the SHPO and the ACHP would be necessary in order to reach agreement on the details of the mitigation plan for each of these structures.

There would be no significant impact to any historic or prehistoric archeological properties in the project area other than the three structures mentioned above. No structures in either the Bywater or Holy Cross Historic Districts would be moved or destroyed. The visual impacts described for Plan 2 are not applicable to these plans since this plan includes a low-level bridge at St. Claude Avenue.

5.3.22.4.2. Proposed Mitigation

a. One or more key, historically-significant components of the existing lock and/or the St. Claude Avenue Bridge would be salvaged.

b. A brochure addressing various historical features of the existing lock and St. Claude Avenue bridge as well as significant historical attributes of the surrounding community would be published. This brochure may be featured in a visitor information center at the new lock or other suitable locations.

c. Historical markers and displays which feature appropriate information concerning the existing lock, St. Claude Avenue bridge, and/or the surrounding neighborhoods would be erected. The markers would be patterned on those associated with National Register locations.

d. Oral histories would be collected from residents of the neighborhoods to preserve the history of the area around the IHNC. Interviews would be conducted with knowledgeable residents of the area, transcribed, and deposited in repositories in the neighborhood.

e. A large display concentrating on maritime history would be constructed in the area. This display would interpret the history of navigation in New Orleans and the south Louisiana area. It could incorporate some part of the mechanism of the existing IHNC Lock in the interpretive program.

5.4. SECONDARY/CUMULATIVE EFFECTS

5.4.1. All Plans including No-Action.

Changes in both vehicular and navigation traffic would occur in the IHNC vicinity from bridge improvements by others. The replacement bridge at Florida Avenue for trains and local vehicular traffic will remove a navigation hazard. The replacement bridge will also be more reliable than the existing bridge, significantly reducing detours and delays during closure periods for bridge repair. The adverse impacts from this replacement bridge would be minimal, as the U.S. Coast Guard has authorized it under a categorical exclusion to NEPA documentation.

The new high-rise or mid-rise bridge at Florida Avenue to be built by the State of Louisiana will also improve traffic flow across the IHNC. The alignment and construction details of this bridge are still being studied. Therefore, little can be determined concerning the impacts of the structure at this time.

5.4.2. Plan 2

At the present, the bridge crossings of the IHNC are a bottleneck to vehicular traffic, and the new bridge at St. Claude Avenue would facilitate traffic flow. Improved traffic patterns would make commuting from points downstream of the IHNC more attractive and could contribute to residential and commercial development. Remaining tracts of wooded and cleared lands would likely be targeted for development.

5.4.3. Plans 3a through 3f

5.4.3.1. Vicinity of the IHNC. The geography and social patterns in vicinity of the IHNC are defined to a large degree by the canal itself. There are many local residents who still feel that the construction of the lock and canal in the early 20th Century was a great injustice to the peaceful community which existing at the time, and that the community has suffered ever since because of the canal and lock.

5.4.3.2. Graving Site. The graving site is owned by the Port of New Orleans. The Corps of Engineers would obtain a temporary easement on the site to construct the lock modules. After completion of work necessary for the lock project, the site would be available for the Port of New Orleans to use or lease at their discretion. The development of the site for lock construction would make it more attractive to potential users including vessel repair companies and shippers. Industrial usage of the graving site could cause additional development of nearby land. The adjacent lands are zoned industrial.

5.4.3.3. Along Connecting Waterways. Lock replacement plans would tend to increase the attractiveness of the GIWW for moving cargos. It is possible that an increase in the number of businesses and industries, compared to the no action scenario, establish along banks of the GIWW in the vicinity of New Orleans after a new lock is constructed.

The existing lock on the IHNC is known to be restricting navigation traffic. A new larger and more efficient lock would relieve the bottleneck and allow more traffic to flow through connecting waterways. Data used for economic benefit calculations was used to determine the projected increase in the number of shallow and deep-draft trips which would be made on connecting waterways. Traffic projections were based on implementation of Plan 3f, the largest lock considered. The incremental changes in shallow-draft traffic are shown in Table 10. Changes in deep-draft traffic are shown in Table 11.

TABLE 10
PREDICTED CHANGES IN NUMBER OF TOWS
ON CONNECTING WATERWAYS FOR PLAN 3f

Year	GIWW East of IHNC	GIWW West of IHNC	Miss. River North of IHNC
2012 (Base Year)	+1,750	0	+1,750
2020	+2,850	0	+2,850
2030	+4,590	+160	+4,440
2040	+6,640	+60	+6,580
2060	+11,390	+320	+11,080

TABLE 11
PREDICTED CHANGES IN NUMBER OF
ONE-WAY, DEEP DRAFT TRIPS ASSOCIATED WITH PLAN 3f

Year	Miss. River South of IHNC	MRGO
2012 (Base Year)	-20	-100
2020	-20	-110
2030	-20	-140
2040	-30	-160
2060	-40	-230

Table 10 shows that there would be 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 implementation of Plan 3f, compared to the no-action condition. No attempt was made to determine destination points for these tows. The number of tows using the GIWW west of the IHNC would increase somewhat in outlying years. No difference in the number of tows using Baptiste Collette Bayou or the Mississippi River south of New Orleans is predicted.

Table 11 shows that the number of deep-draft trips would decrease in the Mississippi River south of the IHNC and in the MRGO from project implementation. A decrease in trips is expected because ships would be able to use the new lock to move between the two waterways. At present, ships which must be moved between docks on the Mississippi River and docks along the IHNC or MRGO must make a circuitous trip out one channel to the gulf and up the other channel. No divergence from the no-action condition would be expected in the Mississippi River north of the IHNC.

Vessel traffic on the GIWW and MRGO causes erosion of unprotected banks. Bank erosion along the MRGO is especially severe, mainly from ship traffic. Erosion along the GIWW varies from minimal to severe depending on the reach and the soils found along its banks. The reach of the GIWW between the IHNC and Lake Borgne is experiencing minor to moderate rates of bank erosion. Barge traffic on the GIWW has been identified as one of the factors causing erosion of the wetlands adjacent to the channel although others types of vessels and wind-generated waves also contribute to the problem.

The indirect effects of a new deep-draft lock would be a decrease in the amount of erosion which would occur along the MRGO and an increase in the amount of erosion along the GIWW. Effects along the GIWW would be concentrated in the reach between the IHNC and Lake Borgne. The net effect of a new lock on coastal wetlands erosion has not been determined and no mitigation for the changes in vessel traffic on connecting waterways is proposed.

6. PUBLIC INVOLVEMENT, REVIEW, AND CONSULTATION

6.1. PUBLIC INVOLVEMENT PROGRAM AND STUDY HISTORY

6.1.1. The initial public meeting on the MRGO new lock and connecting channels study was held in the St. Bernard Parish Courthouse, Chalmette, Louisiana, on February 1, 1960. St. Bernard Parish officials and representatives were opposed to any site located in St. Bernard Parish and expressed the opinion that the site for a new lock should be adjacent to the existing IHNC lock. They were unalterably opposed to the "Upper Site", located upstream of community of Violet, Louisiana, because it would involve and inconvenience a large number of St. Bernard Parish residents, would interrupt traffic to and from areas below (down-stream of) the lock, and would necessitate relocations of drainage, sewerage, and water facilities. While the "Lower Site", located downstream of Violet, was also objectionable for the same reasons, the magnitude of the undesirable features would be less. Therefore, the St. Bernard Parish interests stated that if they were forced to accept construction of a lock in the parish, the Lower Site would be preferred. The Meraux location, mentioned in the authorizing legislation was deemed unsatisfactory because of industrial development and adverse river conditions at the site.

6.1.2. Navigation interests expressed a preference for the Upper Site in St. Bernard Parish because it offered the best river conditions for accessing the lock. Representatives of the Port of New Orleans, expressed no preference between the Upper and Lower Sites but stated that they would attempt to secure the necessary rights-of-way along either route.

6.1.3. A Lock Study Report, which was produced by the New Orleans District in March 1961, addressed three alternative sites: a site adjacent to the existing IHNC lock and the Upper and Lower Sites in St. Bernard Parish. The site in the vicinity of Meraux was eliminated after preliminary study because of the industrial development in the area and certain adverse river conditions which made this location impracticable. The report recommended construction of a barge lock at the Upper Site in St. Bernard Parish. After thorough review of the report within the Corps, the New Orleans District informed the local assuring agency (Port of New Orleans), that no authority existed for the construction of a barge lock. Planning was curtailed until late 1964 when the Port of New Orleans requested that the New Orleans District re-initiate planning for a ship lock based on new data.

6.1.4. The Port of New Orleans furnished new data for justification of a ship lock in June 1966 and requested that a new ship lock be considered near the existing IHNC lock. In September 1966, the New Orleans District completed a report entitled "Mississippi River, Baton Rouge to the Gulf of Mexico, Mississippi River Gulf Outlet, Report on the Need for a New Ship Lock". The report recommended that a general design memorandum (GDM) be prepared as soon as practicable for a new ship lock at the IHNC location. The Chief of

Engineers authorized preparation of a GDM subject to the resolution of certain comments regarding size and alternate alignments. The Chief of Engineer's authorizing memo contained comments to the effect that limitations on vessel size imposed by the present small lock has, in all probability, caused ship traffic to remain at a fairly low level and that much more detailed study of anticipated traffic, growth of port activity, and growth of industry should be made to support any conclusion as to what the most feasible and desirable plan should be and as to what size lock should be adopted.

6.1.5. During 1967, three alignments for a new lock and connecting channels in the vicinity of the IHNC were investigated. Sites 375 feet, 500 feet, and 1,750 feet east of the existing lock were studied. During a conference concerning the project, the Port of New Orleans representative reported that the Port would not participate in the development of the alignment 1,750 feet downstream of the existing lock due to the vast disruption of the community that would result. The consensus of the conference was that the plan for a lock 500 feet below the existing lock would be further developed, provided it could be demonstrated that rail traffic over the canal would not impair the canal's utility.

6.1.6. Planning for a new lock at the IHNC site proceeded with contracts awarded for surveys and a rail and marine traffic interference study. The Corps began to compile data for parts of the GDM and a combined 7-year, planning-construction schedule was approved by the Corps' Lower Mississippi Valley Division Office. In July 1969, the Port of New Orleans was informed by the Corps that, due to foundation considerations, and using conventional construction methods, a new lock could be constructed no closer than 750 feet from the existing structure (centerline to centerline distance). The Port of New Orleans determined that their responsibilities to provide real estate, bridge replacements, and other relocations were excessive. Furthermore, the social and economic impact to the adjacent community, as well commuters and railroads, would be tremendous. The Port of New Orleans withdrew the State of Louisiana's support for a new lock at the IHNC Site and requested that sites in St. Bernard Parish be re-evaluated in accordance with authorizing legislation.

6.1.7. The first step taken in evaluating potential St. Bernard Parish sites for a new lock was to begin updating the information for the sites studied earlier: the Upper and Lower Sites. During 1969, the Port of New Orleans suggested that a new site in St. Bernard Parish, the Saxonholm Site, might be worthy of evaluation. This site is located up-stream of the Upper and Lower Sites and, as such, more of St. Bernard Parishes' residents reside below this site. The Saxonholm Site would therefore be the most disruptive of the St. Bernard sites to the orderly development of the parish. Due to the relatively greater impact on local residents by this alignment and the conflict with the proposed interstate highway, planning for the Saxonholm Site was discontinued.

6.1.8. During the period of 1969 to 1972, the Upper and Lower Sites in St. Bernard Parish were further refined. Also during this period, considerable opposition from citizen groups and elected officials developed. Congressman F. Edward Hebert requested the Corps, by

letter, to delay a planned public meeting in order to develop more ". . . definitive information on the project which would resolve the questions of the people of St. Bernard . . . ." He also urged ". . . full-scale planning to proceed at the Lower Site in St. Bernard Parish where the impact on the community would be least so that the urgent economic and national defense need for the project could be expeditiously satisfied . . . ."

6.1.9. A public meeting scheduled for April 1972, was postponed at the request of St. Bernard Parish officials so that they could study the proposed plan further. The meeting was rescheduled for November 15, 1972, but was again postponed when the St. Bernard Parish Police Jury demanded that the meeting be canceled and that only alternate sites be the topic of such meeting. Stalling tactics on the part of St. Bernard Parish were obvious. Two public meetings were eventually held; one in New Orleans on November 29, 1972, and another in Chalmette (St. Bernard Parish) on December 9, 1972. Both meetings were well attended with a total of about 1,600 people attending the two meetings. Voluminous and vociferous testimony was presented. The first meeting lasted 12 hours and the second meeting lasted over 15 hours. Both meetings were continued until no persons remained to testify.

6.1.10. In general, those opposed to a new lock in St. Bernard Parish included the political leadership and citizens of the parish, a number of environmental organizations, and a small segment of local shallow-draft navigation interests. They were well organized and very vocal. Petitions against the project being located in St. Bernard Parish, containing over 18,000 names, were presented by the President of the St. Bernard Parish Police Jury and other police jurymen. The major concerns voiced at the meetings were the fear of environmental damage to wetlands, disruption of transportation and utilities by cutting the parish in half, and a fear of increased danger of flooding. Those in favor of the project included the Governor of Louisiana backed by all state agencies (with the exception of the Louisiana Department of Wildlife and Fisheries which took no position at the time, but subsequently went on record favoring the IHNC site on environmental grounds), the Port of New Orleans, Congressman F. Edward Hebert, the Mayor of New Orleans, organized labor, the shallow-draft navigation industry (American Waterway Operators), numerous shipping firms, civic groups, and individuals.

6.1.11. The official statement of the State of Louisiana formally recommended the construction of a deep-draft lock at the Lower Site provided certain conditions were met. The conditions are summarized as follows:

A 4-lane, high-level highway bridge would be constructed at Federal expense over the new channel;

- All utilities, such as gas and water lines and railroads, would be relocated so that no interruption of services would occur to residents;

Construction of the lock and channels would not commence until construction of the highway bridge and relocation of all utilities and traffic arteries are completed;

- Construction of levees along the connecting channels would be constructed to project grade and section to withstand the project design hurricane, and that these levees be completed before the hurricane protection levee along the MRGO is cut;
- The EIS would be prepared prior to the start of construction of the project so that the EIS may be thoroughly considered and reviewed by all appropriate state agencies, and;
- Upon completion of the project, the connecting channel and the land immediately adjacent to the channel would be placed under the jurisdiction and control of the appropriate St. Bernard Parish authorities.

6.1.12. The formal statement of the St. Bernard Parish Police Jury declared that ". . . The Jury stands unanimous in its opposition to the construction of any new lock within the boundaries of St. Bernard Parish . . . . Its construction within our parish would destroy our most valuable resource, our marshlands, and would create hazards for and problems to every citizen . . . ." The Police Jury reserved the right to file suits challenging any phase of the project. They further stated that the long-term impact (to St. Bernard) would indicate that any site other than the IHNC Site, ". . . is so disastrous that it prohibits any further consideration by reasonable men . . . ." The parish's statement went on to list a variety of reasons why the new lock should not be built in St. Bernard Parish.

6.1.13. In view of the considerable controversy raised by St. Bernard Parish officials and other opponents to a site in St. Bernard Parish, investigations were made of some possible new sites suggested during the 1972 public meetings and some sites previously studied. The sites studied are listed below and shown on Plate 2.

IHNC Site, Orleans Parish;
Saxonholm Site, St. Bernard Parish;
Upper Site, St. Bernard Parish;
Lower Site, St. Bernard Parish;
- Caernarvon Site, St. Bernard and Plaquemines Parishes;
- Scarsdale Site, St. Bernard and Plaquemines Parishes, and;
- Bohemia Site, St. Bernard and Plaquemines Parishes.

6.1.14. Fourteen alternative plans comprising the above-mentioned sites were compared and ranked independently by the Corps and the Port of New Orleans. The criteria by which the alternative plans were ranked included cost, construction difficulty, navigation benefits, navigation adequacy, local economics, relocations, social impacts, ecological impacts, operation and maintenance difficulties, and public sentiment.

6.1.15. A Corps of Engineers planning conference to discuss IHNC Site construction techniques was held on March 27-28, 1973, with representatives of the Office of Chief of Engineers, Lower Mississippi River Valley Division, Vicksburg District, and New Orleans District attending. The consensus of expert technical opinion was that by using a unique

cofferdam construction method, a ship lock could be constructed on the east side of the IHNC within real estate limitations previously determined to be the maximum acceptable. The limits extend to Jourdan Avenue between the MRGO and St. Claude Avenue and the center of the block between Jourdan Avenue and Deslonde Street between St. Claude Avenue and the Mississippi River.

6.1.16. Successive screening of the fourteen alternative plans resulted in the elimination of plans at Saxonholm, Caernarvon, Scarsdale, and Bohemia and carrying four plans forward for continued analysis:

IHNC Site - east of channel center, opposite Galvez Street Wharf;
- IHNC Site - east of the existing lock;

Lower Site with a land bridge at the IHNC, and;
Lower Site.

The Lower Site with a land bridge at the IHNC included demolition of the existing lock and filling-in the lock area and part of the IHNC to build a park. Bridges crossing the IHNC would be demolished and replaced with ground-level boulevards eliminating the traffic delays common at the IHNC crossings.

6.1.17. An interim report, containing relative considerations of various plans and modes of operation for a new lock at the IHNC and Lower Sites, was sent to city, parish, state, and Federal agencies and officials directly concerned or representing a segment of the public potentially impacted by a new lock. Additionally, the Port of New Orleans, navigation interests, and conservation interests were sent copies of the report. Of the 72 packages mailed, 27 responses were received. Congressman F. Edward Hebert continued to support a new lock at the Lower Site. Congresswoman Lindy Boggs stated that she would rely heavily on the Corps' judgement. The Governor of Louisiana continued to favor the Lower Site, although the Director of the Louisiana Wildlife and Fisheries Commission supported the IHNC Site on ecological grounds. The Port of New Orleans supported a lock at the Lower Site with modified operation of the IHNC Lock. The St. Bernard Parish Planning Commission and St. Bernard representatives maintained their support for a lock at the IHNC. In general, those persons representing or living in St. Bernard Parish, and ecologists were against a new lock in St. Bernard, while those persons living in Orleans Parish and elsewhere, and those persons associated with the State of Louisiana and the transportation industry were in favor of a St. Bernard Site.

6.1.18. As a result of the responses from the interim report and from continuing studies made during 1973, two plans were selected for more detailed study; the IHNC - east of Galvez Wharf Site and the Lower Site. These two plans were compared, in detail, in the Mississippi River - Gulf Outlet, New Lock and Connecting Channels, Site Selection Report, prepared by the New Orleans District in March 1975. The conclusions of the report state that the District Engineer considered the views of other agencies and the concerned public relative to a site selection, in particular as regards the possible consequences of the

alternatives with respect to both regional and national well-being, and economic effects with respect to both regional and national development. Based on these deliberations and the sheer weight of evidence, the District Engineer considered the Lower Site Plan to provide the best solution to the total problem and one that offered the most effective means of achieving the purposes of the authorized project. The recommendations included construction of a barge canal to connect the MRGO with the GIWW; the purchase and mothballing of the IHNC Lock by the Federal Government; and the provision for ecological mitigation.

6.1.19. In April 1976, the St. Bernard Parish Police Jury released the "Official Presentation of the Governing Authority and the People of St. Bernard Parish Opposing the Construction of a Ship Lock and Canal Within St. Bernard Parish, State of Louisiana", an 8-page denouncement of the proposed lock project in St. Bernard Parish. Nevertheless, preparation of a General Design Memorandum for construction of a lock at the Lower Site proceeded with the approval of the Chief of Engineers.

6.1.20. In April 1977, President Jimmy Carter, citing environmental considerations, directed the Corps to undertake further studies of a replacement lock at the IHNC Site with emphasis on actions to minimize the displacement and disruption of residents. Planning efforts then shifted back to the IHNC Site. The Steering Committee for a New Ship Lock (SCANS) was formed in 1978 by the Port of New Orleans to provide a forum for exchange of information between interested parties and the Corps and Port of New Orleans. On May 2, 1978, shortly after the formation of SCANS and after general guidance from the Corps' Washington headquarters was received by New Orleans District relative to President Carter's instructions, SCANS and the Dock Board held a public meeting for the purpose of soliciting feedback from the community around the IHNC. The primary concern voiced by the local community representatives was that they wanted the opportunity to make community and neighborhood desires known before any decisions were made. Responding to this request, the Port of New Orleans, in conjunction with the City of New Orleans and with Corps participation, hired the consulting firm of EDAW, Incorporated, to prepare a Community Development Plan for the Ninth Ward (IHNC site) and a Social Impact Assessment of the possible alternatives. EDAW developed and instituted an involvement program consisting of three main communication elements: workshops, newsletters, and a project field office. The program resulted in direct citizen participation in a study of the Ninth Ward, local resident's recognition of common neighborhood problems and issues, and cognizance of the status of various planning efforts by government agencies.

6.1.21. Information gathered by the SCANS and extensive comparative economic analysis were used by the Corps to prepare a preliminary draft, feasibility-level report with accompanying EIS in 1982, with the tentatively selected plan being a new lock at the IHNC Site, adjacent to and east of the existing lock. The New Orleans District identified this site as the National Economic Development plan on the basis of economic considerations but also recognized that this site had the most severe negative impacts on local neighborhoods.

After the draft report had been reviewed by the Corps' Lower Mississippi River Valley Division office, and subsequently revised by the New Orleans District, the District was instructed not to release the report to the public and to cease working on the study because of unresolved issues. The study was put on-hold from 1982 until 1987 when planning efforts resumed after passage of the Water Resources Development Act (WRDA) of 1986 (PL 99-662) and receipt of a letter of support from the Governor of Louisiana. The Water Resources Development Act of 1986 modified Public Law 455 of 1956 ". . . to provide that the replacement and expansion of the existing Industrial Canal lock and connecting channels or the construction of an additional lock and channels shall be in the area of the existing lock or at the Violet site . . . The Secretary is directed to make 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 . . . ."

6.1.22. A Notice of Intent to prepare an EIS was published in the Federal Register on April 11, 1988. A scoping input request was mailed to Federal, state, and local elected officials and government agencies, local news media, concerned citizens, residents of the Ninth Ward near the IHNC, affected industries, and other interested parties on June 6, 1988. From the 595 letters sent, 19 responses were received. A Scoping Document, summarizing the comments, was sent to all of the persons who responded to the original request. Copies of the Scoping Input Request and Scoping Document are included in Appendix D, Section 9.

6.1.23. From 1987 to 1990, various lock sizes and construction techniques at both the IHNC site and the Violet site were investigated. Efforts were made to minimize environmental impacts and socioeconomic disruption at the Violet site while planning efforts for the IHNC alternatives concentrated on minimizing impacts to local residents. In January 1989, a meeting of various local, state, and Federal agencies was convened by the District to discuss environmental mitigation options for impacts of a lock and connecting channels at the Violet Site. With the exception of the U.S. Fish and Wildlife Service, who, by law, must assist the Corps in mitigation planning for impacts to natural resources, the other agencies offered little help in identifying potential mitigation options. In fact, the Governor's Assistant for Coastal Affairs stated that it was a waste of time to even discuss the subject because a lock at Violet would never be consistent with Louisiana's Coastal Resources Program. On April 18, 1989, the St. Bernard Parish Police Jury unanimously passed a resolution that reiterated its previous stand opposing a connecting link at Violet or any other site in the parish. In addition, the St. Bernard Planning Commission stated in a letter dated August 21, 1989, that a parish-wide planning study would be necessary to identify impacts of a lock at Violet and to identify potential mitigation sites for losses to fish and wildlife resources. The letter contained numerous other demands, some of which are not within the Corps' authority. During meetings with residents and elected officials of St. Bernard Parish, criticism of the Corps was repeatedly raised regarding the construction of the MRGO through St. Bernard Parish. These people believe that they were misled with promises of economic development that never materialized. Also, the long-term adverse environmental effects of the MRGO continue to anger the local populace. It

is for these reasons that many residents are opposed to any new Federal navigation project in their parish.

6.1.24. At the March 27, 1990, meeting of the Inland Waterway User Board, the New Orleans District announced the decision to consider any plans for a new lock in the vicinity of Violet as un-implementable on environmental grounds. Public comments at the meeting were in favor of constructing a new lock at the IHNC as soon as possible. A "mini-report" justifying the elimination of the Violet Site as a viable alternative was prepared by the New Orleans District in January 1991, and sent to the higher authority for approval. The Assistant Secretary of the Army for Civil Works office concurred with the District's recommendation but instructed that the rationale for eliminating the Violet Site from further consideration must be detailed in the feasibility report/EIS.

6.1.25. The Committee on Appropriations of the U.S. House of Representatives, in conjunction with the FY 1991 Appropriations Act, directed the Corps ". . . in conjunction with the local project sponsor . . . to implement a community participation process with affected residential, business, and governmental entities . . . The Corps shall designate an advisory group for the purposes of exchanging information and receiving community opinion and advising the District Engineer on various aspects of the project. The Corps shall give maximum consideration to lock replacement alternatives which minimizes (sic) residential and business disruption while meeting the goals of improving waterborne commerce . . . ."

6.1.26. In an initial response, the Corps established the Industrial Canal Lock Advisory Council made up of four community representatives, three business representatives, four navigation industry representatives, and four local elected officials. The Council held two contentious public meetings in February and June 1991, that underscored the extent of opposition in the neighborhoods to construction of a replacement lock and the depth of distrust that the neighborhood residents had for the other stakeholders in the process. The lack of progress by the Council prompted the District to try a more direct approach in communicating with local interests. A Neighborhood Working Group (NWG) was established with representatives of the Holy Cross Neighborhood Association, the Lower Ninth Ward Neighborhood Council, the Bywater Neighborhood Association, the St. Claude Avenue Business Association, the Historic Districts Landmark Commission, the New Orleans City Planning Commission, the Regional Planning Commission, the Port of New Orleans, and the Corps as members.

6.1.27. At the first meeting of the NWG held in August 1991, the District representatives explained that the group was established to provide a more direct and effective means of communicating with the community. Although local community representatives on the NWG repeated their determined opposition to building a replacement lock and bridges within their neighborhoods, they approved of the new, direct approach and indicated their willingness to listen and work with the Corps. Subsequent meetings were held every two weeks over a period of four months. Local representatives repeatedly asked why a

location in the IHNC, north of Claiborne Avenue, which had been identified in a socioeconomic impact evaluation and mitigation plan prepared by a local consultant for the Corps, was not being presented as an alternative construction site. According to the consultant's report, a site for a new lock north of Claiborne Avenue had the potential to significantly reduce project-related impacts on the community. Although the Corps explained that previous design studies showed that lock construction at this location would be more costly and would require the closure of the IHNC for a period of up to six years, community representatives insisted that the North of Claiborne Avenue site represented the least objectionable location from a community impact standpoint. Community leaders also voiced strong opposition to a mid-level replacement bridge at St. Claude Avenue which was a critical feature of plans for a new lock adjacent to the existing one. As a result of the group's deliberations, the Corps agreed to further investigate the prospect of constructing a replacement lock north of Claiborne Avenue with a low-level replacement bridge at St. Claude Avenue. At a meeting of representatives of the Corps, the Port of New Orleans and local elected officials in December 1991, the elected officials expressed a desire to be more involved with the project. At the request of the Port of New Orleans, the District delayed any further meetings of the NWG to give the elected officials the opportunity to become more involved in the planning process. At a follow-up meeting, the Port of New Orleans and local elected officials agreed that only the North of Claiborne Avenue plan is implementable and refused to support other plans at the IHNC because of intolerable and un-mitigable neighborhood impacts.

6.1.28. During 1992 and the first half of 1993, while the NWG was inactive, the Corps developed a new plan for constructing a replacement lock at the North of Claiborne Avenue site. In August 1993, the Port of New Orleans, in conjunction with the Corps, re-activated the Neighborhood Working Group in an attempt to identify community needs and mitigation requirements for the North of Claiborne Avenue site. On the basis of the NWG meetings, the Corps formulated a comprehensive mitigation plan that incorporates many of the ideas, concerns, and desires of local residents. The action by the Corps to consider input from the NWG in the preparation of a comprehensive plan complies with the guidance outlines in the FY 1991 reports of the House and Senate Appropriations Committees. Consequently, the tentative selection of the North of Claiborne Avenue site, coupled with the process used to develop the project mitigation plan, fulfill Congressional guidance.

6.1.29. The District has also established a Navigation Working Group that includes representatives of the American Waterway Operators, the Gulf Intracoastal Canal Association, the Louisiana Association of Waterways and Shipyards, the Louisiana Intracoastal Seaway Association, the Inland Waterway Users Board, the New Orleans Steamship Association, the Port of New Orleans, the U.S. Coast Guard, the Greater New Orleans Barge Fleeting Association, the Corps, and other users of the IHNC. The Navigation Working Group has met on several occasions since December 1991, for productive discussions on a variety of topics. The group's position to date is that, even if the North of Claiborne Avenue alternative causes some inconveniences to the navigation

users during construction, it is the alternative that has the best potential of being constructed.

6.1.30. In August 1994, the Port of New Orleans and the New Orleans District opened a project information office in the Sanchez Center, a community center located in the Lower Ninth Ward. The office provided an easily-accessible location for local residents and served as a clearinghouse for information about the lock replacement plan. Community representatives had requested such an office. Office staff provided information about the lock replacement plan and received feedback from residents. In addition, informational brochures and a display were located in the Alvar Street Library.

6.1.31. Many of the meetings at which representatives of the New Orleans District met in recent years with interested parties concerning lock replacement are recorded in Appendix A, Mitigation Plan. Meetings with local interests to discuss the project and associated community impact mitigation plan took place up to the release of the draft document and continued during preparation of this final report.

6.1.32. A public meeting to present the tentatively selected plan to the public and for the public to voice their comments and concerns was held on January 27, 1997, at the Holy Cross Middle and High School, at 7:00 p.m. Approximately 300 people attended the meeting, with 48 people presenting oral comments. The majority of the commentors were residents of the neighborhoods adjacent to the IHNC who voiced their opposition to the tentatively selected plan. Their opposition was mainly due to the disruption of their communities that would occur during project construction. Specific comments voiced were decreased real estate values, increased vacancy rates, loss of customers at local businesses, increased travel times, traffic delays, loss of access across the canal, decreased school enrollment, noise, vibrations, loss of greenspace, destruction of the historic neighborhoods, and release of contaminated sediments. Traffic detours and delays during the bridge outage periods were the basis for most of the concerns expressed by local residents. Several commentors criticized the mitigation plan for containing items which are not mitigation, but rather are required features of a project in an urban environment. There were some representatives from the shallow-draft navigation industry who spoke in favor of the project. A complete transcript of the public meeting, and responses to the comments presented, is contained in the Public Views and Responses Appendix. Also included in the appendix are letters received on the draft report and responses to them.

6.1.33. The major differences between this final report and the draft report are the inclusion of a temporary bridge at St. Claude Avenue during the replacement of the existing bridge; a revised plan for modifying the Claiborne Avenue bridge which reduces the outage time; a fold-down floodwall in the Holy Cross area in lieu of a fixed floodwall; and a revised community impact mitigation plan. The community impact mitigation plan has been revised considerably, with some mitigation items contained in the draft mitigation incorporated as part of the construction plan. The funding amounts for some of the items remaining in the mitigation plan have been increased, and some new items

have been added. The total estimated cost of the mitigation plan has remained the same, at $33 million.

6.2. REQUIRED COORDINATION

6.2.1. This final EIS is being furnished to Federal, state, and local agencies and to other interested parties for review and comment. The U.S. Fish and Wildlife Service (USFWS) has provided a final Fish and Wildlife Coordination Act Report that is included in Appendix D, Section 11. All coordination required for this final report has been accomplished with the State Historic Preservation Officer and the Advisory Council on Historic Preservation concerning National Register properties and other cultural resources. Consultation concerning endangered and threatened species and prime and unique farmlands is complete.

6.2.2. Table 12 shows the Federal laws, executive orders, and state laws that apply to this study and the status of compliance with each. The table shows that required compliance with the Clean Water Act is not complete. The Louisiana Department of Environmental Quality has not made a determination as to whether or not the recommended plan will be issued State Water Quality Certification.

6.3. STATEMENT RECIPIENTS

6.3.1. Copies of the draft EIS were provided to U.S. Senators and Congressmen representing Louisiana; Departments of Interior, Commerce, Energy, and Housing and Urban Development; Federal Emergency Management Administration; and Environmental Protection Agency. Copies were also sent to state and local elected officials, state agencies, environmental groups, local libraries, and other interested groups and individuals. Recipients of the draft EIS are listed in Appendix D, Section 5.

6.3.2. This final document, or a notice of its availability, has been distributed to state and Federal agencies, libraries, and those who provided comments on the draft report/EIS.

6.4. PUBLIC VIEWS AND RESPONSES

6.4.1. Views of the various parties that could be affected by a new lock have been described in detail in Section 6.1, Public Involvement Program and Study History. In summary, the widespread and long-standing opposition of locally elected officials and residents of St. Bernard Parish to a new lock in that parish, along with the irreparable damage that would occur to coastal wetlands, has resulted in a determination by the Corps of Engineers that a new lock in St. Bernard Parish is un-implementable. Involvement of the residents living in the vicinity of the IHNC and their locally elected officials, along

with navigation interests, the local sponsor, and other affected parties has resulted in the determination by the Corps of Engineers that the only reasonable location for a replacement lock at the IHNC is the North of Claiborne Avenue alternative. Local residents and locally elected officials from the IHNC area continue to oppose any plans to replace the IHNC lock that would disrupt their communities.

TABLE 12
COMPLIANCE WITH ENVIRONMENTAL STATUTES

STATUTE	COMPLIANCE DOCUMENT	LOCATION	STATUS[1]
Federal			
Abandoned Shipwreck Act of 1988	EIS		Full
Archeological and Historic Preservation Act of 1974	EIS		Full
Bald Eagle Act	USFWS response to request	APPENDIX D	Full
Clean Air Act, as amended	EIS		Full
Clean Water Act of 1977, as amended	404(b)(1) evaluation	APPENDIX D	Partial
Coastal Zone Management Act of 1972, as amended	Consistency Determination	APPENDIX D	Full
Endangered Species Act of 1973, as amended	USFWS & NMFS responses	APPENDIX D	Full
Estuary Protection Act	EIS		Full
Farmland Protection Policy Act	EIS	APPENDIX D	Full
Federal Water Project Recreation Act, as amended	EIS		Full
Fish and Wildlife Coordination Act, as amended	USFWS Coord. Act Report	APPENDIX D	Full
Floodplain Management (Executive Order 11988)	EIS		Full
Land and Water Conservation Fund Act of 1965, as amended	EIS		Full
National Environmental Policy Act of 1969, as amended	EIS		Full
National Historic Preservation Act of 1966, as amended	EIS		Full
Protection and Enhancement of the Cultural Environment, 1971 (Executive Order 11593)	EIS		Full
Protection of Wetlands (Executive Order 11990)	EIS		Full
River and Harbor and Flood Control Act of 1970	EIS		Full
Water Resources Development Acts of 1976, 1986, and 1990	EIS		Full
Wild and Scenic River Act, as amended	EIS		Full
State			
Air Control Act	EIS		Full
Louisiana State and Local Coastal Resources Management Act of 1978	Consistency Determination	APPENDIX D	Full
Louisiana Natural and Scenic Rivers System Act	EIS		Full
Louisiana Water Control Act	EIS		Full

6.5. FISH AND WILDLIFE COORDINATION ACT

6.5.1. The USFWS has provided a final Coordination Act Report which is contained in Appendix D, Section 11. The USFWS has coordinated their report with the National Marine Fisheries Service and the Louisiana Department of Wildlife and Fisheries and incorporated their comments. The Coordination Act Report contains specific recommendations for minimizing adverse impacts to the natural environment. The recommendations and the Corps of Engineers' responses are as follows:

6.5.2. Recommendation #1: Further investigate alternative locations (e.g., Barriere Site) for the graving site that have minimal fish and wildlife habitat value. If the Corps determines

that the proposed graving site is the only feasible alternative, minimize impacts to fish and wildlife resources by confining the graving and staging areas to the minimum necessary for project completion. The Corps should ensure that the site preparation does not adversely affect (i.e., drain or fill) the adjacent emergent marsh and forested wetlands. In that event, the Corps should coordinate with the Service to quantify any such losses and develop appropriate compensation measures.

Response: Alternative locations for the graving site would be investigated during preparation of the design memorandum for the lock construction contract. If no feasible alternatives are available, a commitment has been made to restrict the adverse effects of the graving site to the minimum necessary for lock module construction (25 acres). If, during detailed design of the project, a determination is made that additional area would be adversely affected, NEPA documentation would be prepared and coordinated with appropriate agencies. If the final design would adversely affect additional fish and wildlife habitat, impacts would be mitigated.

6.5.3. Recommendation #2: Minimize potential impacts from contaminated spoil placed in the confined disposal facilities (CDF's) by designing those disposal areas to ensure that the material will remain within those areas. That may include constructing internal diking structures to increase effluent retention time in the CDF's. The Service is available to work with the Corps in refining spoil disposal plans for those areas.

Response: The Corps would design diking systems to retain the material within the disposal site. Design of the confined disposal area would be coordinated with the Service and other interested agencies during preparation of the design memorandum for the channel dredging.

Recommendation #3: Use uncontaminated material dredged from the lower east bank to create emergent marsh in shallow open water northeast of the IHNC. The proposed creation of approximately 41 acres of marsh with the material would fully compensate for currently anticipated habitat losses. The Corps should conduct post-construction surveys of the marsh creation area to ensure that those losses are fully compensated.

Response: The plan is to use the material as recommended. Plans to survey the area to determine the success of the marsh creation (mitigation) effort would be developed during the project construction phase.

Recommendation #4: Minimize the right-of-way needed (in forested and marsh areas) for the St. Claude Avenue and North Claiborne Avenue detour road.

Response: The detour road would be constructed with the minimal right-of-way necessary for safety and along the edge of a forested tract. If for some unforeseen reason the road cannot be constructed in the location currently envisioned, additional consultation and NEPA documentation will be necessary, along with possible mitigation.

7. LIST OF PREPARERS

The following persons were primarily responsible for preparation of the Environmental Impact Statement:

NAME	DISCIPLINE/EXPERTISE	EXPERIENCE	ROLE IN PREPARING EIS
Mr. Richard E. Boe	Estuarine Fishery Biology	11 years, Marine Fisheries Research, Louisiana Dept. Wildlife & Fisheries; 8 years, Fishery Biologist, Corps of Engineers, New Orleans District	EIS Coordinator and Primary Author, Environmental Resources Analysis, Responses to Public Comments
Mr. Leslie S. Waguespack	Landscape Architecture, Water Resources Planner	4.5 years, U.S. Forest Service; 2 years, Corps of Engineers - Military; 25 years, Corps of Engineers, New Orleans District	Study Manager, Engineering Input to EIS, Socioeconomic Mitigation Planning
Mr. Gerald J. Dicharry, Jr.	Civil Engineering and Environmental Engineering	28 years, Civil Engineering and Project Management, Corps of Engineers, New Orleans District	Project Manager, Engineering Design, Socioeconomic Mitigation Planning, Responses to Public Comments
Mr. Keven M. Lovetro	Economics	12 years, Regional Economist, Corps of Engineers, New Orleans District	Socioeconomic Impact Analysis, Socioeconomic Mitigation Planning
Mr. Richard J. Manguno	Economics	20 years, Regional Economist, Corps of Engineers, New Orleans District	Socioeconomic Impact Analysis, Socioeconomic Mitigation Planning, Responses to Public Comments
Mr. Stephen F. Finnegan	Recreation Planning/Resource Development	19 years, Recreation Planner, Corps of Engineers, New Orleans District	Esthetics, Recreation, Socioeconomic Mitigation Planning

7. LIST OF PREPARERS
(Continued)

NAME	DISCIPLINE/EXPERTISE	EXPERIENCE	ROLE IN PREPARING EIS
Ms. Julie Z. LeBlanc, P.E.	Civil and Environmental Engineering	2 years, Civil Engineer, J.J. Krepps and Sons, Inc., 1 year, Civil Engineer, Hartman Engineering, Inc., 6 years, Environmental Engineer, Corps of Engineers, New Orleans District	Water Quality Input; Section 404(b)(1) Input
Dr. Edwin A. Lyon	Archeology and History	3 years, Historian, Corps of Engineers, New Orleans District; 11 years, Archeologist, Corps of Engineers, New Orleans District	Cultural Resources and National Register Sites, Socioeconomic Mitigation Planning

8. LITERATURE CITED

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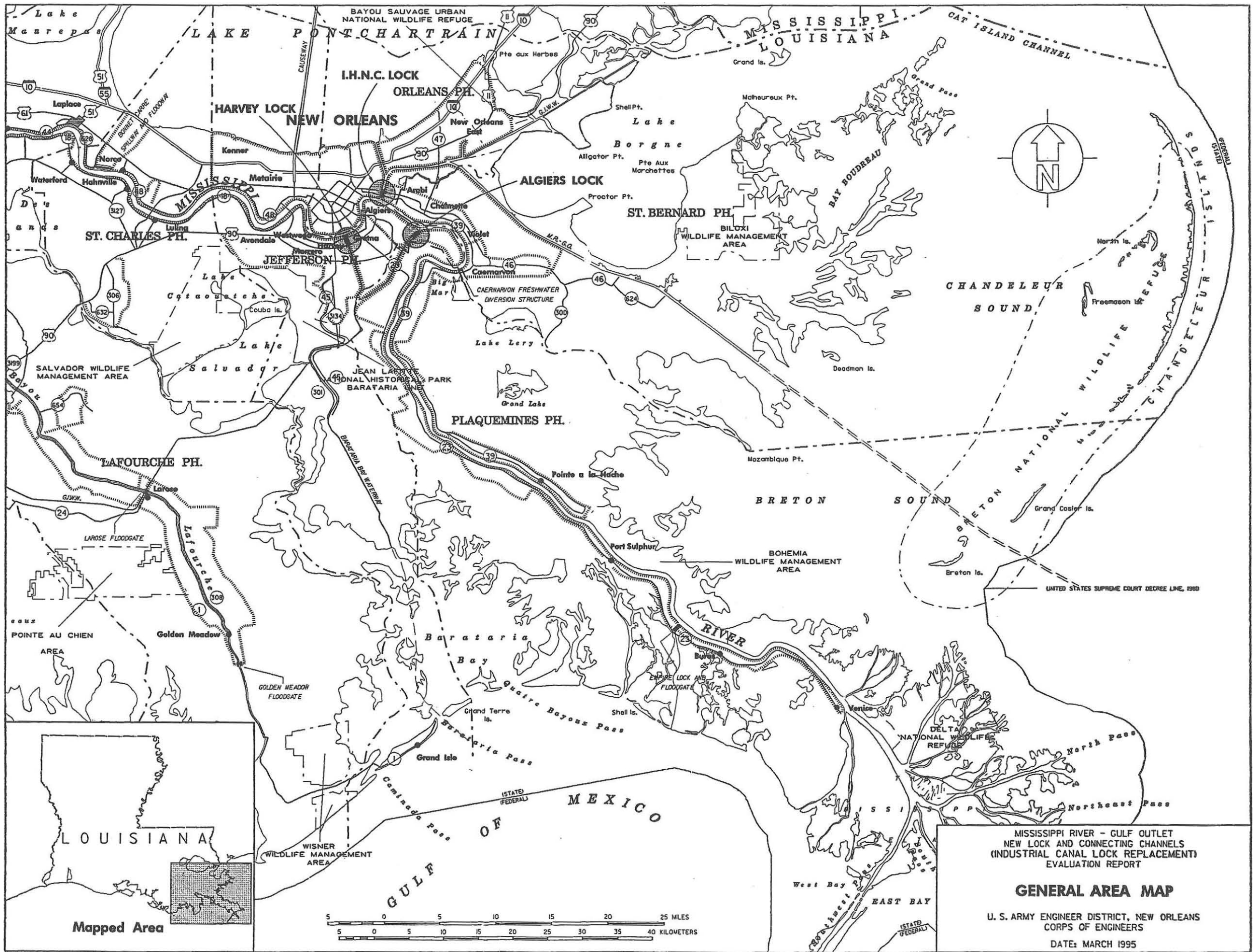


MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

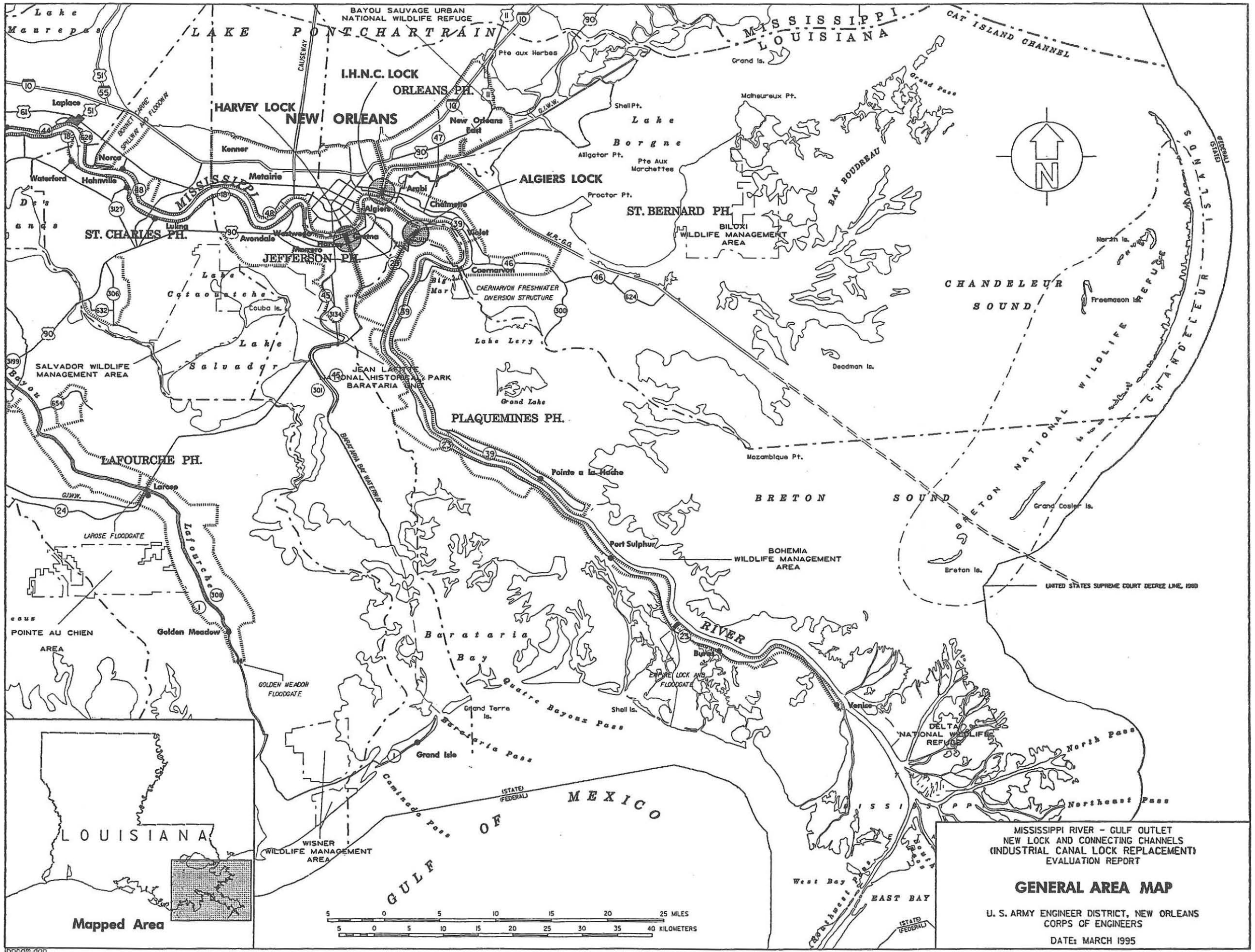
GENERAL AREA MAP

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

lhncgm.dgn

PLATE 1



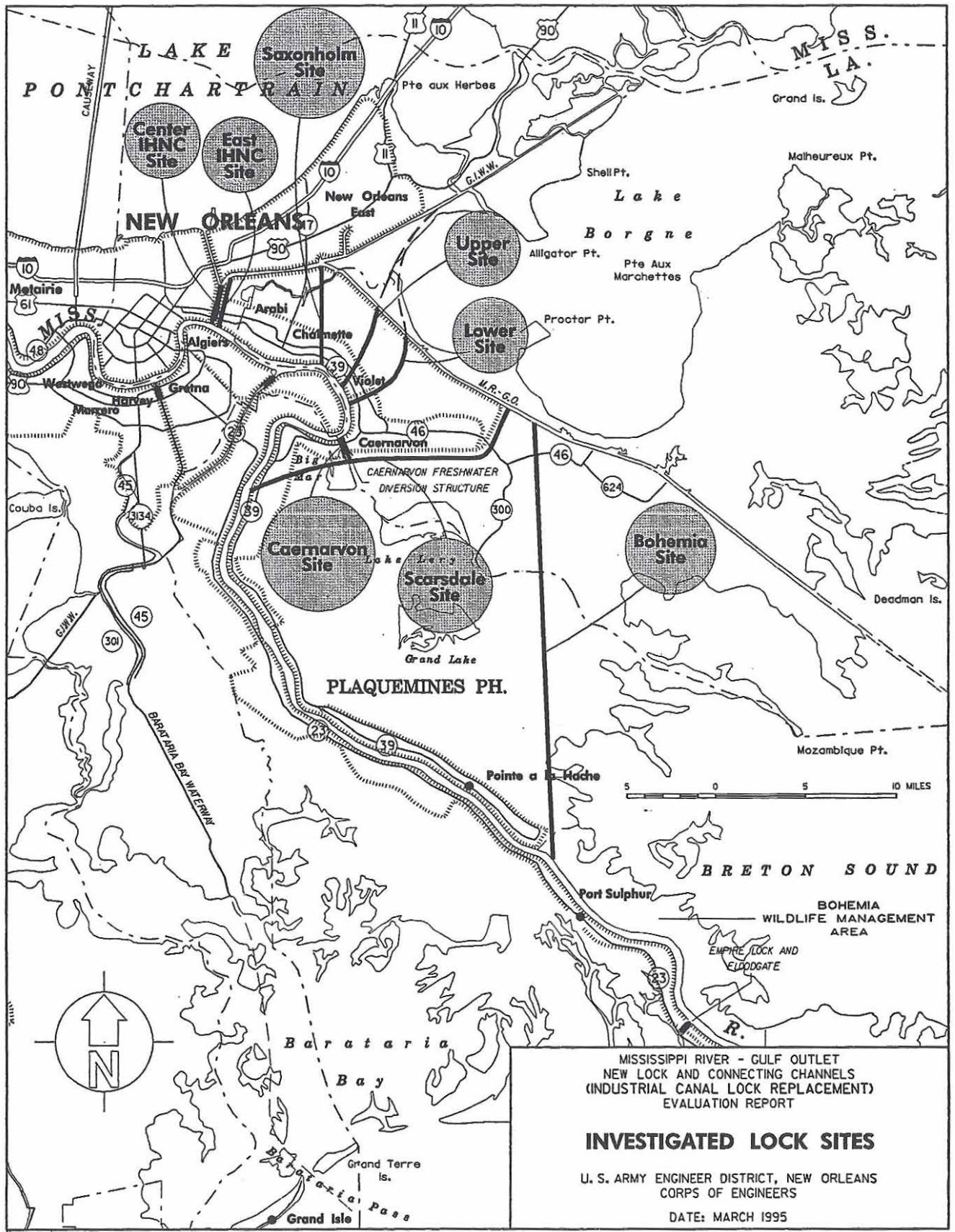
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

GENERAL AREA MAP

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

PLATE 1



MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

INVESTIGATED LOCK SITES

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

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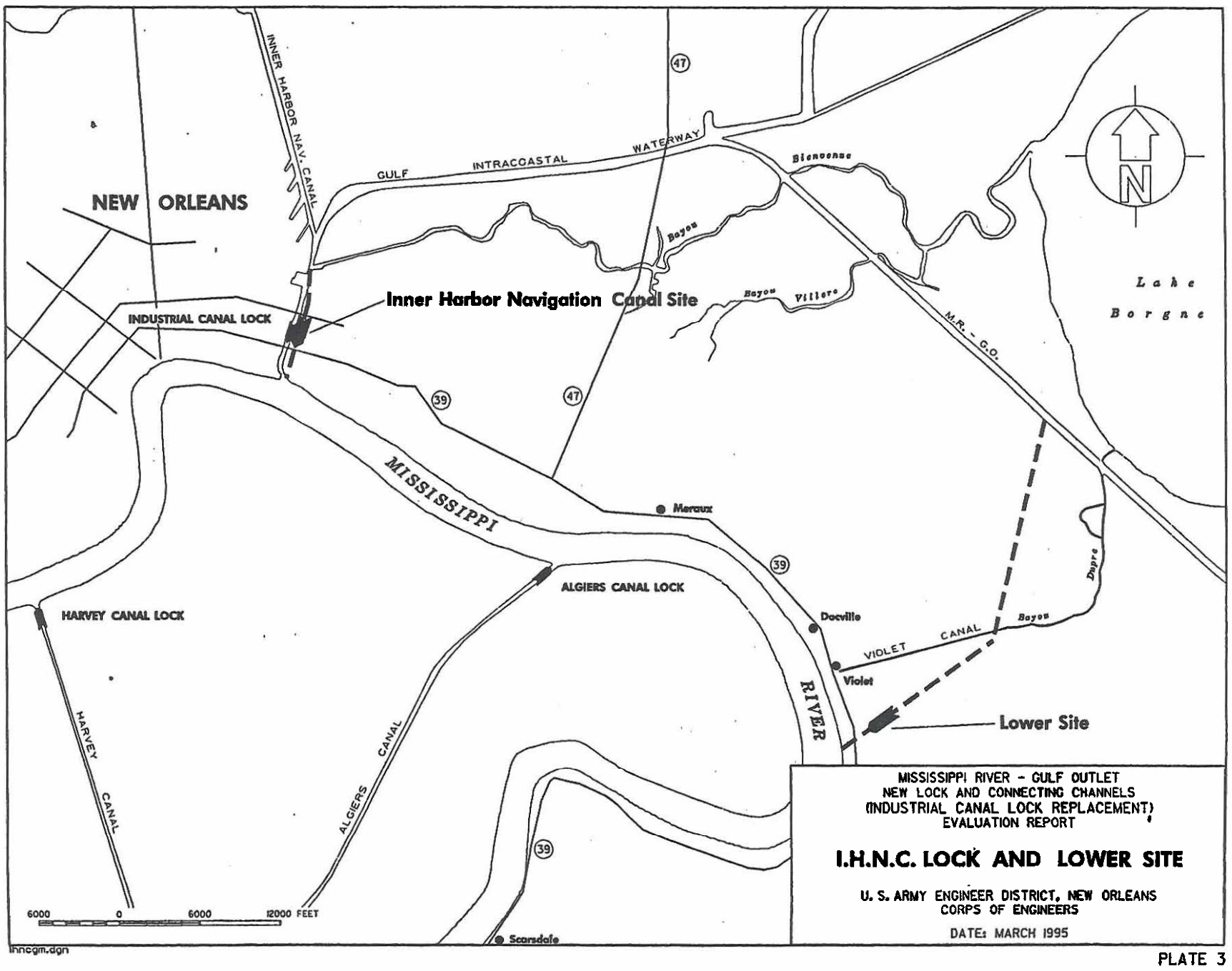
PLATE 2



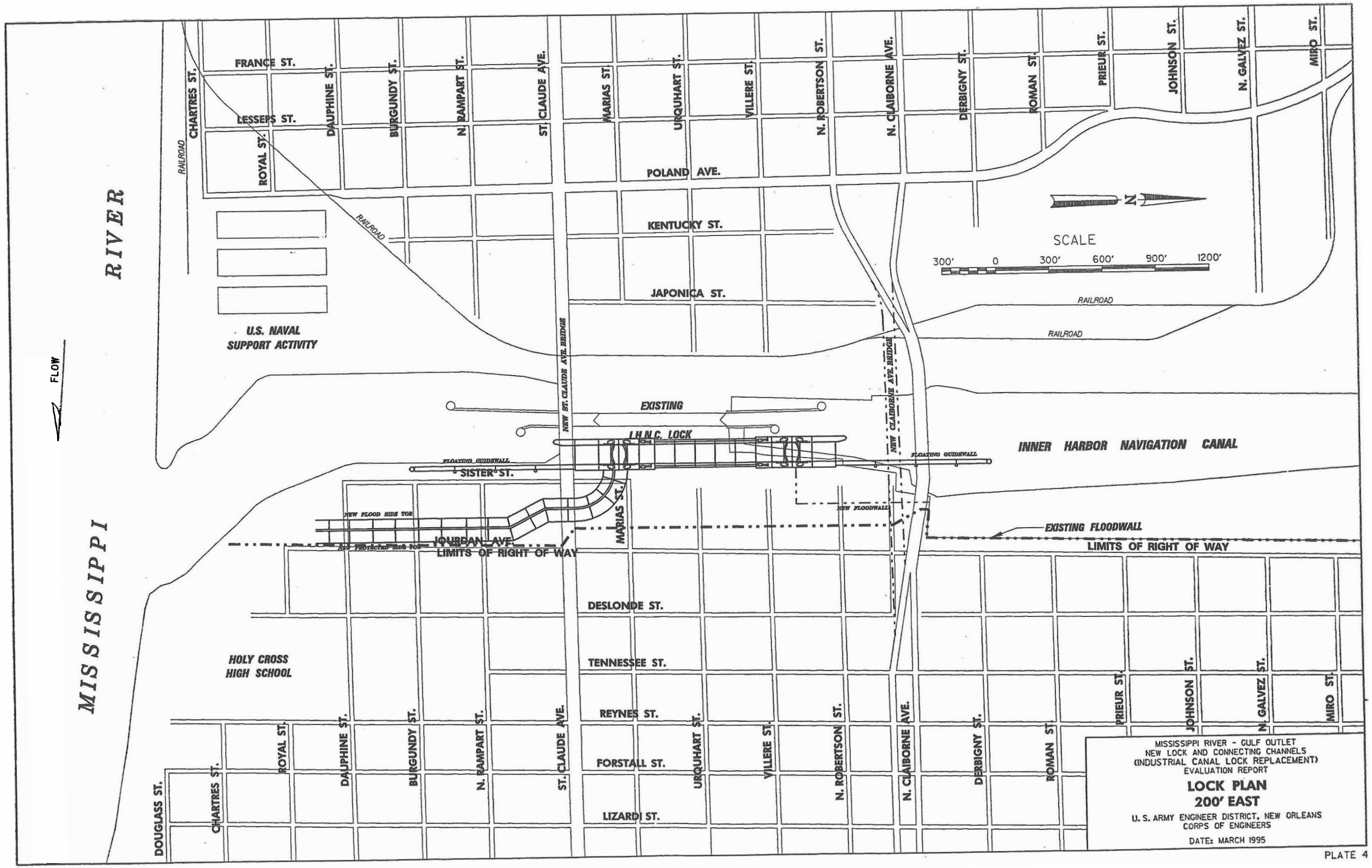
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

I.H.N.C. LOCK AND LOWER SITE

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

PLATE 3



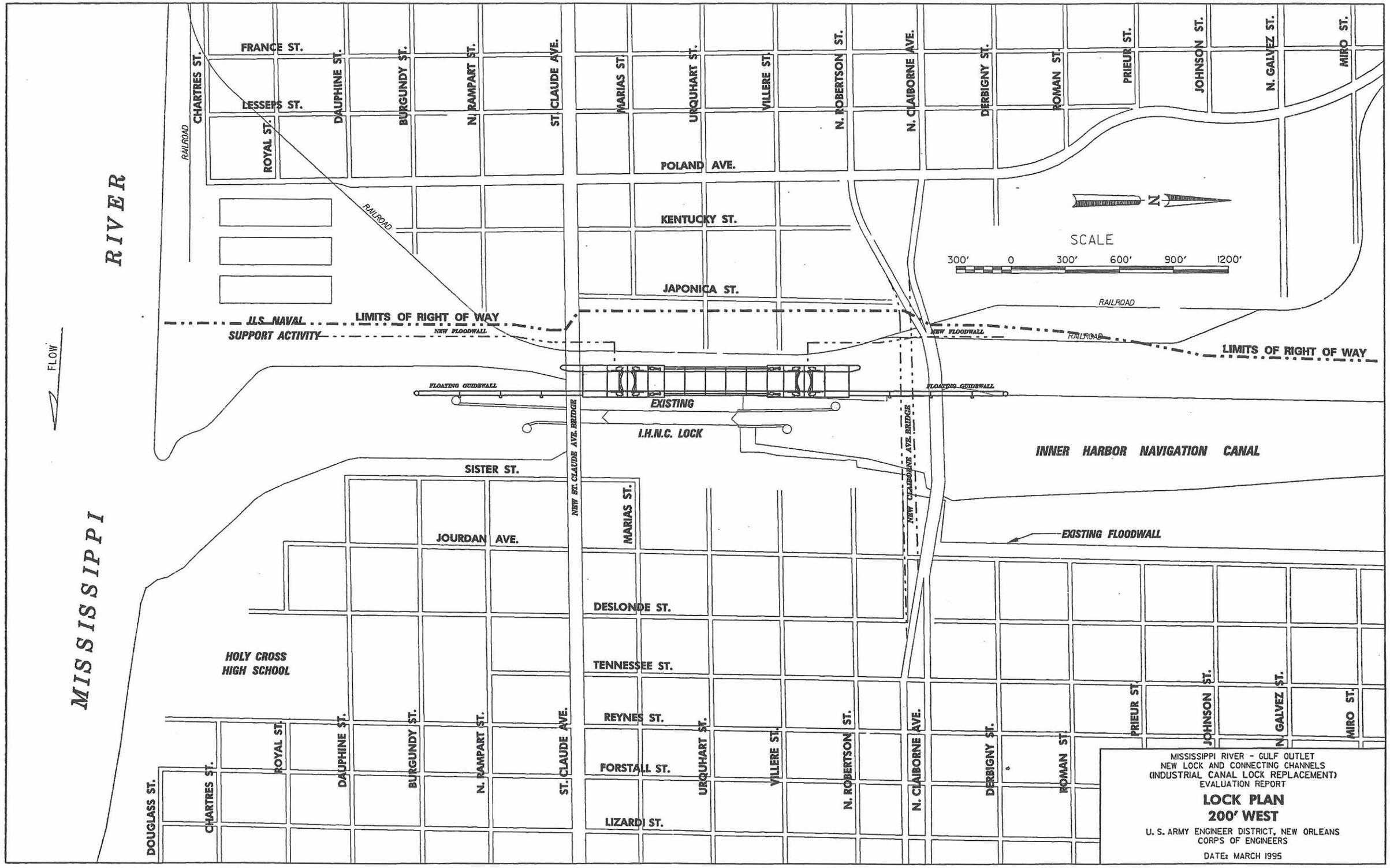
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

LOCK PLAN
200' EAST

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

PLATE 4



MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

LOCK PLAN
200' WEST

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

MISSISSIPPI RIVER

FLOW

FRANCE ST.

LESSEPS ST.

CHARTRES ST.

ROYAL ST.

DAUPHINE ST.

BURGUNDY ST.

N. RAMPART ST.

ST. CLAUDE AVE.

MARIAS ST.

URQUHART ST.

VILLERE ST.

N. ROBERTSON ST.

N. CLAIBORNE AVE.

DERBIGNY ST.

ROMAN ST.

PRIEUR ST.

JOHNSON ST.

N. GALVEZ ST.

MIRO ST.

RAILROAD

POLAND AVE.

KENTUCKY ST.

JAPONICA ST.

U.S. NAVAL SUPPORT ACTIVITY

LIMITS OF RIGHT OF WAY

EXISTING L.I.N.A.V.C. LOCK

FLOATING GUIDEWALL

NEW FLOODWALL

NEW ST. CLAUDE AVE. BRIDGE

NEW CLAIBORNE AVE. BRIDGE

INNER HARBOR NAVIGATION CANAL

EXISTING FLOODWALL

SISTER ST.

JOURDAN AVE.

DESLONDE ST.

TENNESSEE ST.

REYNES ST.

FORSTALL ST.

LIZARDI ST.

DOUGLASS ST.

HOLY CROSS HIGH SCHOOL

N

SCALE

300' 0 300' 600' 900' 1200'

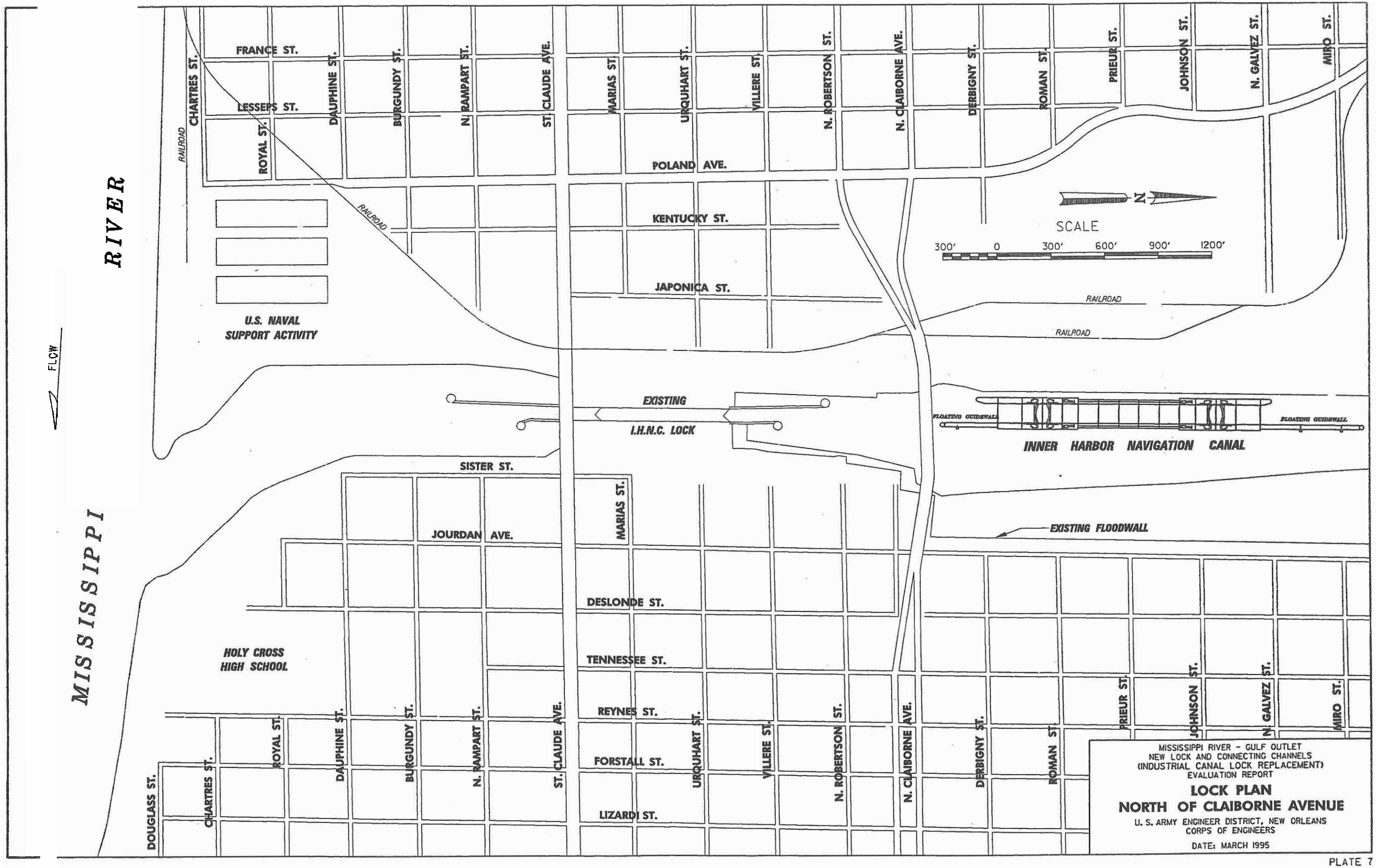
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

LOCK PLAN
INSITU

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

PLATE 6

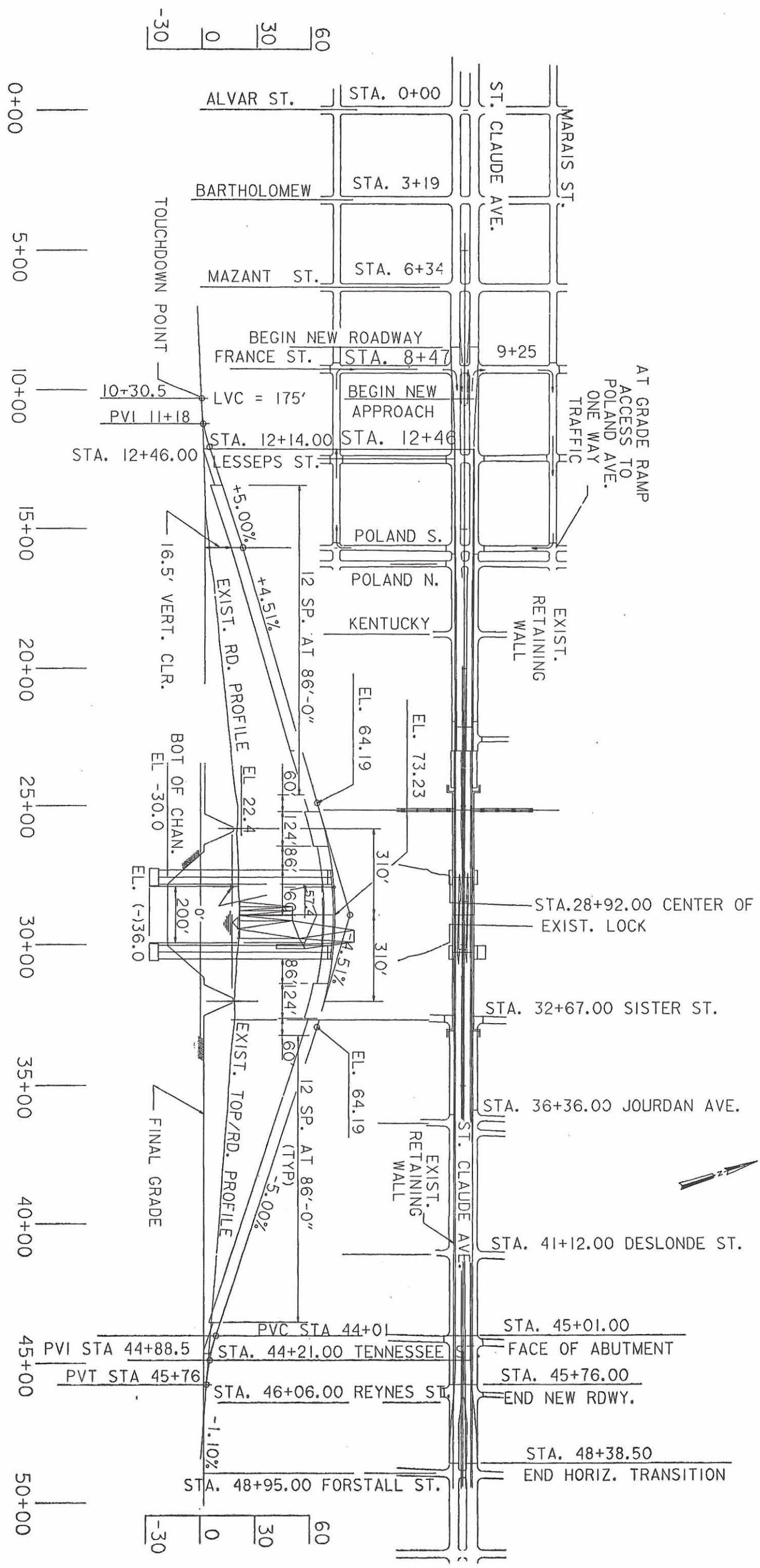


MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

LOCK PLAN
NORTH OF CLAIBORNE AVENUE

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995



200' HORIZ. 40' VERT. CLR.
BRIDGE TYPE: DOUBLE BASCULE

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

BRIDGE-ONLY PLAN

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

PLATE 8

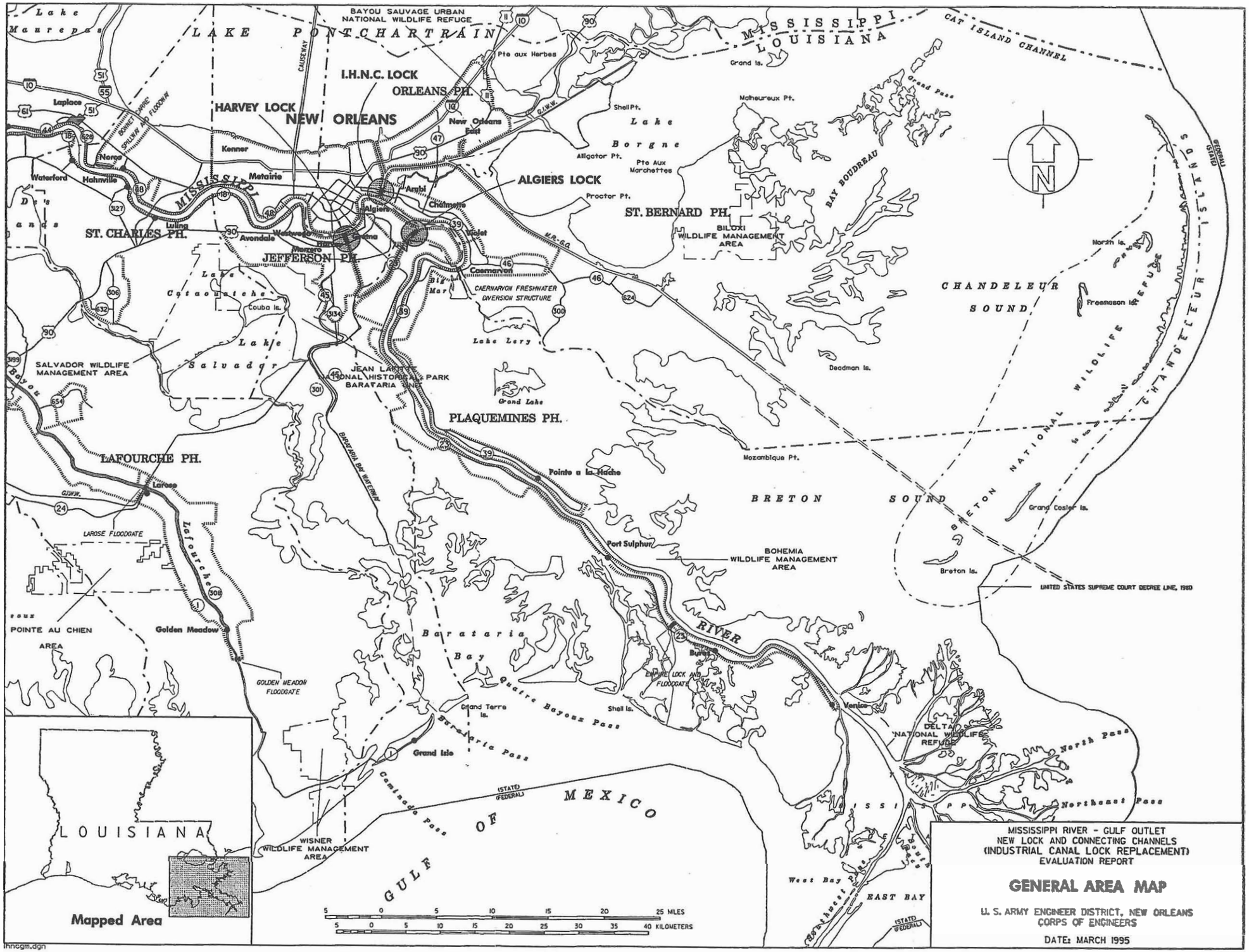
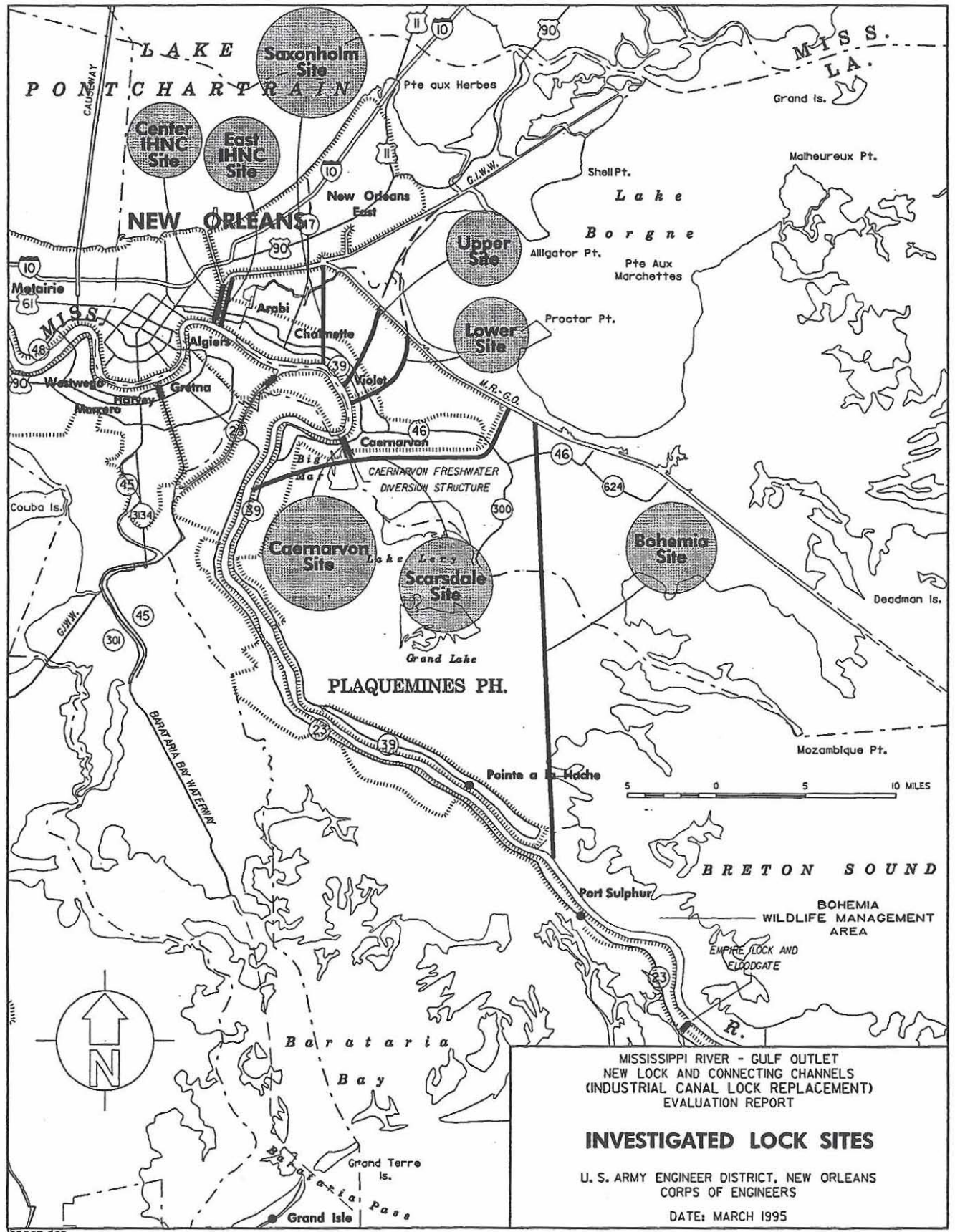

BAYOU SAUVAGE URBAN NATIONAL WILDLIFE REFUGE
LAKE PONTCHARTRAIN
MISSISSIPPI
LOUISIANA
CAT ISLAND CHANNEL
I.H.N.C. LOCK
ORLEANS PH.
HARVEY LOCK
NEW ORLEANS
CAUSEWAY
SPILLWAY AND FLOODWAY
BONNET CARRE'
Pte aux Herbes
Grand Is.
Laplace
Kenner
New Orleans East
G.I.W.W.
Shell Pt.
Malheureux Pt.
Grand Pass
Lake Borgne
Alligator Pt.
Pte Aux Marchettes
ALGIERS LOCK
Proctor Pt.
ST. BERNARD PH.
BAY BOUDREAU
BILOXI WILDLIFE MANAGEMENT AREA
Norco
Waterford
Hahnville
Metairie
Algiers
Chalmette
ST. CHARLES PH.
Luling
Avondale
Westwego
Harvey
JEFFERSON PH.
M.R.-G.O.
Violet
Caernarvon
CAERNARVON FRESHWATER DIVERSION STRUCTURE
Lake Cataouatche
Couba Is.
Lake Salvador
SALVADOR WILDLIFE MANAGEMENT AREA
JEAN LAFITTE NATIONAL HISTORICAL PARK
BARATARIA UNIT
Lake Lery
Grand Lake
PLAQUEMINES PH.
LAFOURCHE PH.
Larose
LAROSE FLOODGATE
Lafourche
Golden Meadow
POINTE AU CHIEN AREA
GOLDEN MEADOW FLOODGATE
Pointe a la Hache
Mozambique Pt.
Deadman Is.
CHANDELEUR SOUND
North Is.
Freemason Is.
NATIONAL WILDLIFE REFUGE
CHANDELEUR ISLANDS
BRETON SOUND
Grand Coaster Is.
Breton Is.
UNITED STATES SUPREME COURT DECREE LINE, 1980
Port Sulphur
BOHEMIA WILDLIFE MANAGEMENT AREA
Barataria Bay
Quatre Bayous Pass
Barataria Pass
Grand Terre Is.
Grand Isle
Shell Is.
EMPIRE LOCK AND FLOODGATE
RIVER
Buras
Venice
DELTA NATIONAL WILDLIFE REFUGE
North Pass
Northeast Pass
Southwest Pass
West Bay
EAST BAY
Caminada Pass
(STATE) (FEDERAL)
GULF OF MEXICO
WISNER WILDLIFE MANAGEMENT AREA
LOUISIANA
Mapped Area
5 0 5 10 15 20 25 MILES
5 0 5 10 15 20 25 30 35 40 KILOMETERS
N
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT
GENERAL AREA MAP
U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
DATE: MARCH 1995
lhngm.dgn

PLATE 1



MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

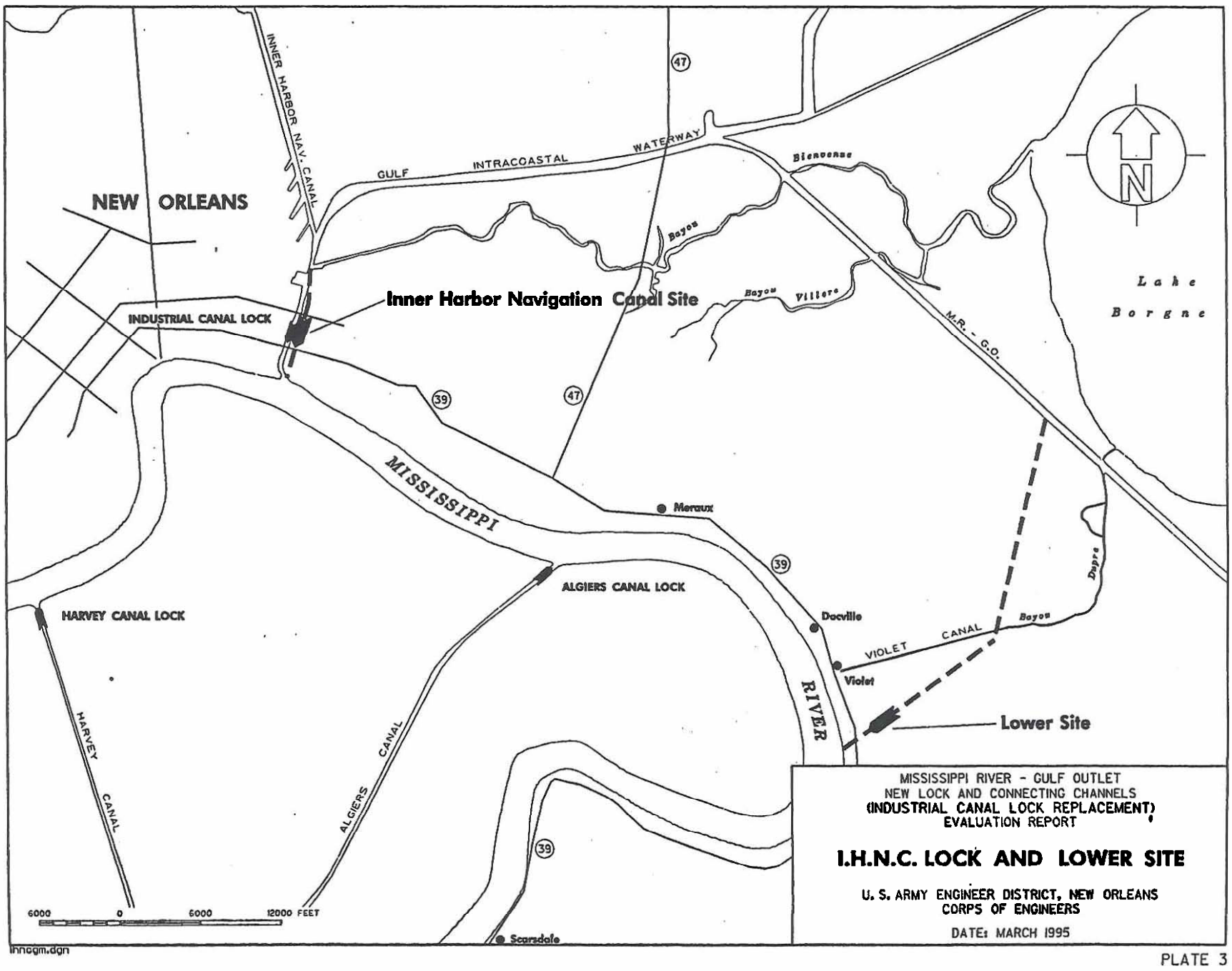
INVESTIGATED LOCK SITES

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

lnncgm.dgn

PLATE 2



MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

I.H.N.C. LOCK AND LOWER SITE

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

PLATE 3

MISSISSIPPI RIVER

FLOW

FRANCE ST.

LESSEPS ST.

CHARTRES ST.

ROYAL ST.

DAUPHINE ST.

BURGUNDY ST.

N. RAMPART ST.

ST. CLAUDE AVE.

MARIAS ST.

URQUHART ST.

VILLERE ST.

N. ROBERTSON ST.

N. CLAIBORNE AVE.

DERBIGNY ST.

ROMAN ST.

PRIEUR ST.

JOHNSON ST.

N. GALVEZ ST.

MIRO ST.

RAILROAD

POLAND AVE.

KENTUCKY ST.

JAPONICA ST.

U.S. NAVAL SUPPORT ACTIVITY

N

SCALE

300′ 0 300′ 600′ 900′ 1200′

RAILROAD

RAILROAD

NEW ST. CLAUDE AVE. BRIDGE

NEW CLAIBORNE AVE. BRIDGE

EXISTING

I.H.N.C. LOCK

FLOATING GUIDEWALL

FLOATING GUIDEWALL

INNER HARBOR NAVIGATION CANAL

SISTER ST.

NEW FLOOD SIDE TOE

NEW FLOODWALL

EXISTING FLOODWALL

JOURDAN AVE.

LIMITS OF RIGHT OF WAY

LIMITS OF RIGHT OF WAY

DESLONDE ST.

HOLY CROSS HIGH SCHOOL

TENNESSEE ST.

REYNES ST.

FORSTALL ST.

LIZARDI ST.

DOUGLASS ST.

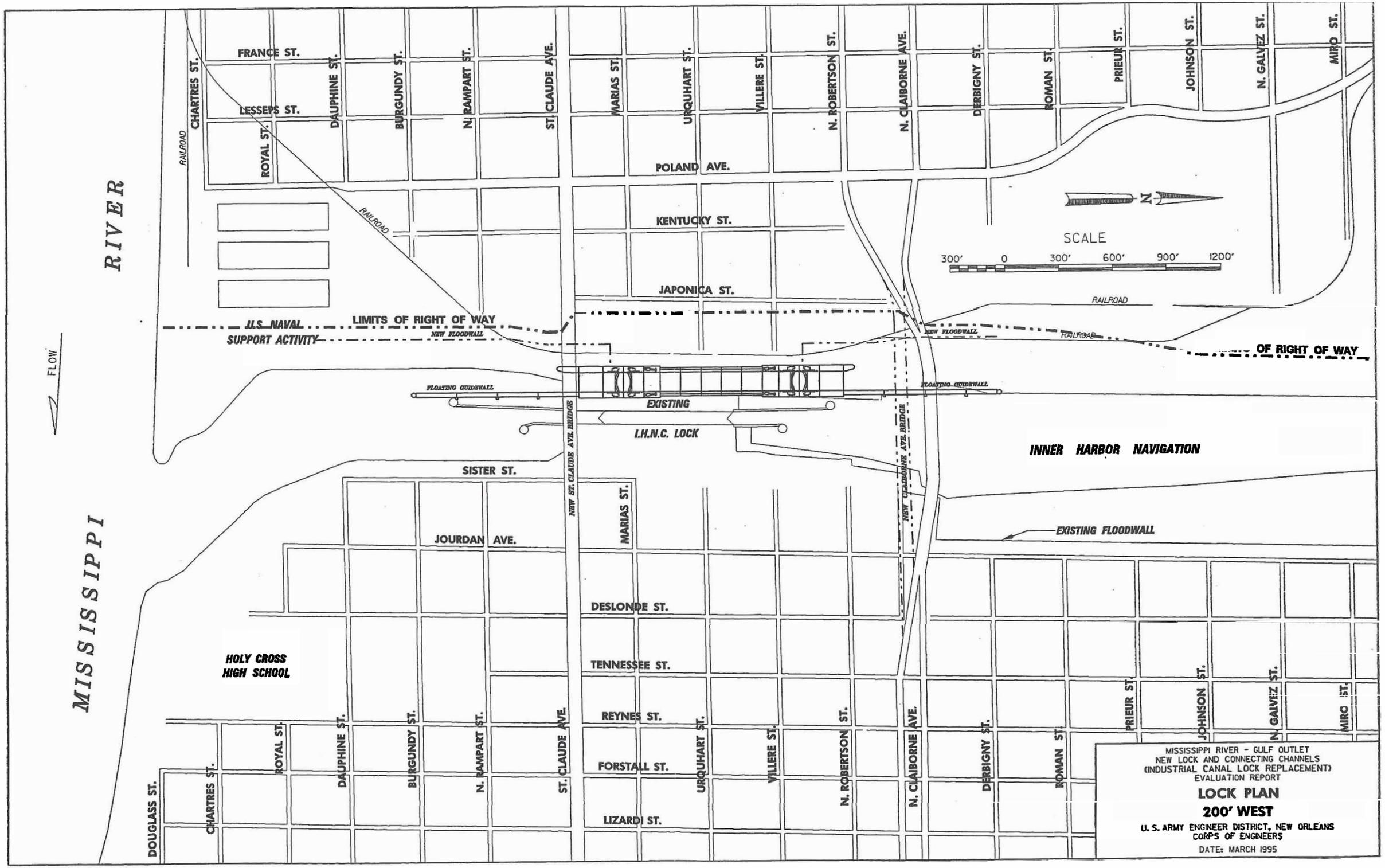
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

LOCK PLAN
200′ EAST

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

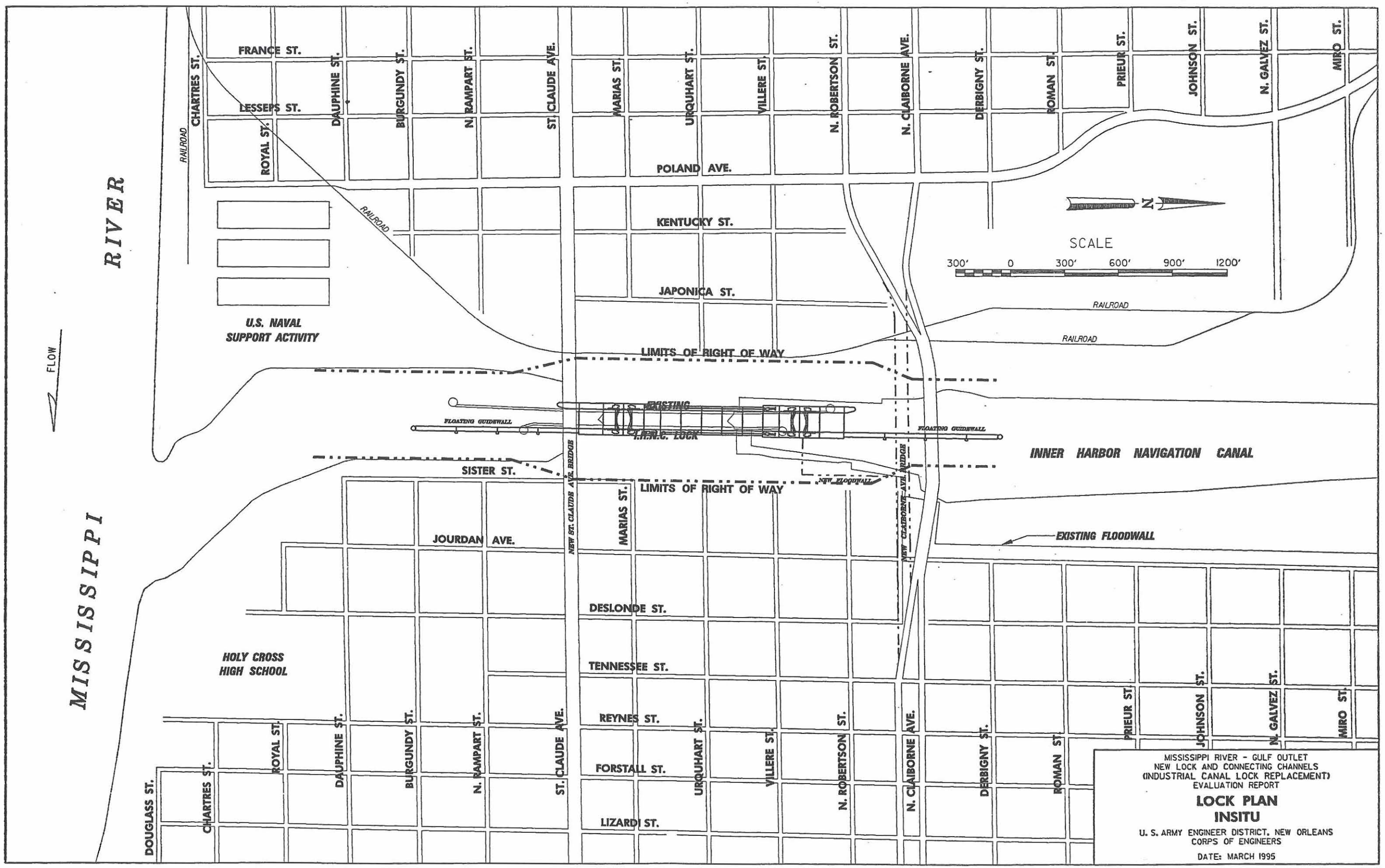
PLATE 4



MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

LOCK PLAN
200' WEST

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
DATE: MARCH 1995



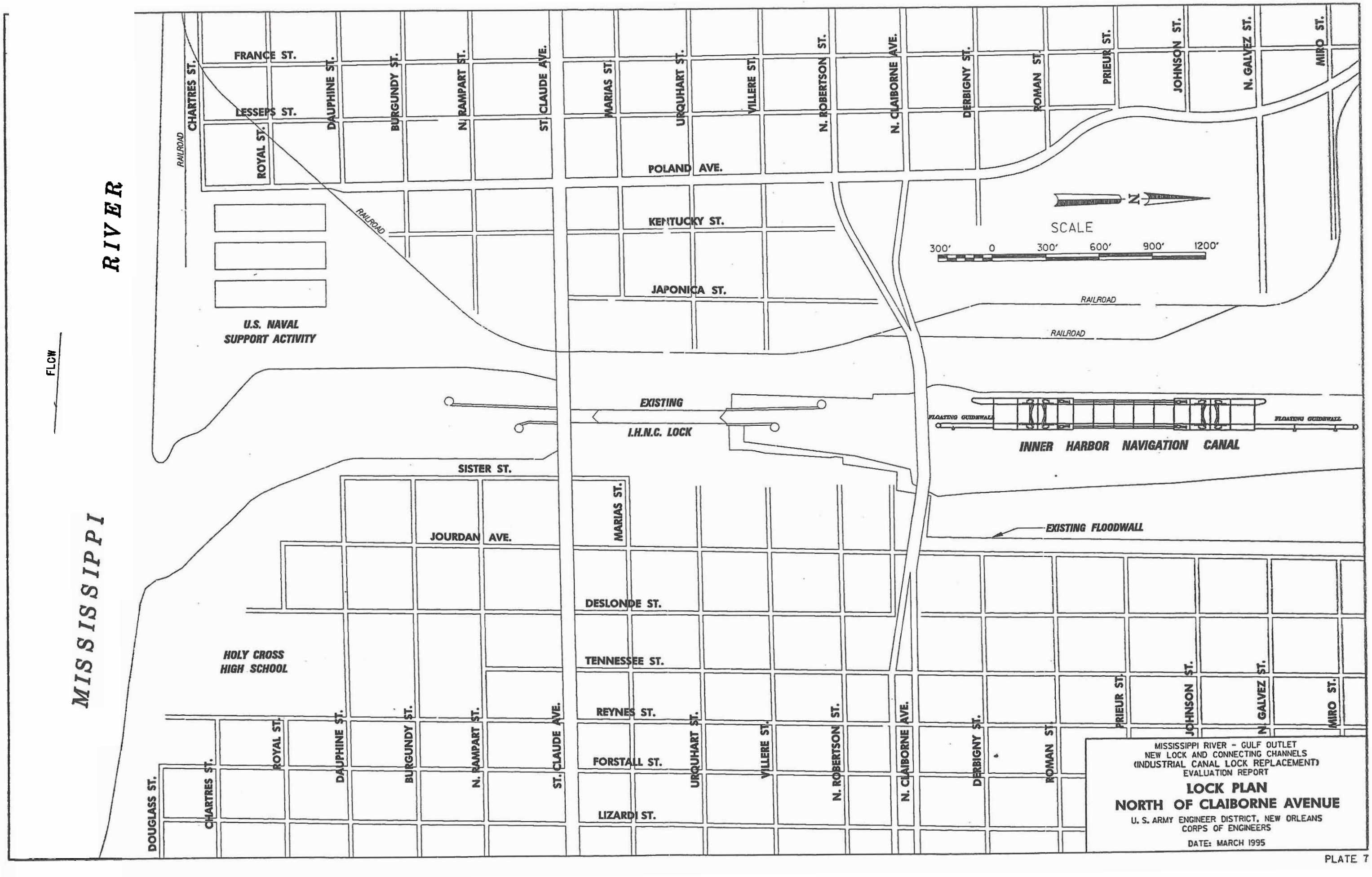
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

LOCK PLAN
INSITU

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

PLATE 6



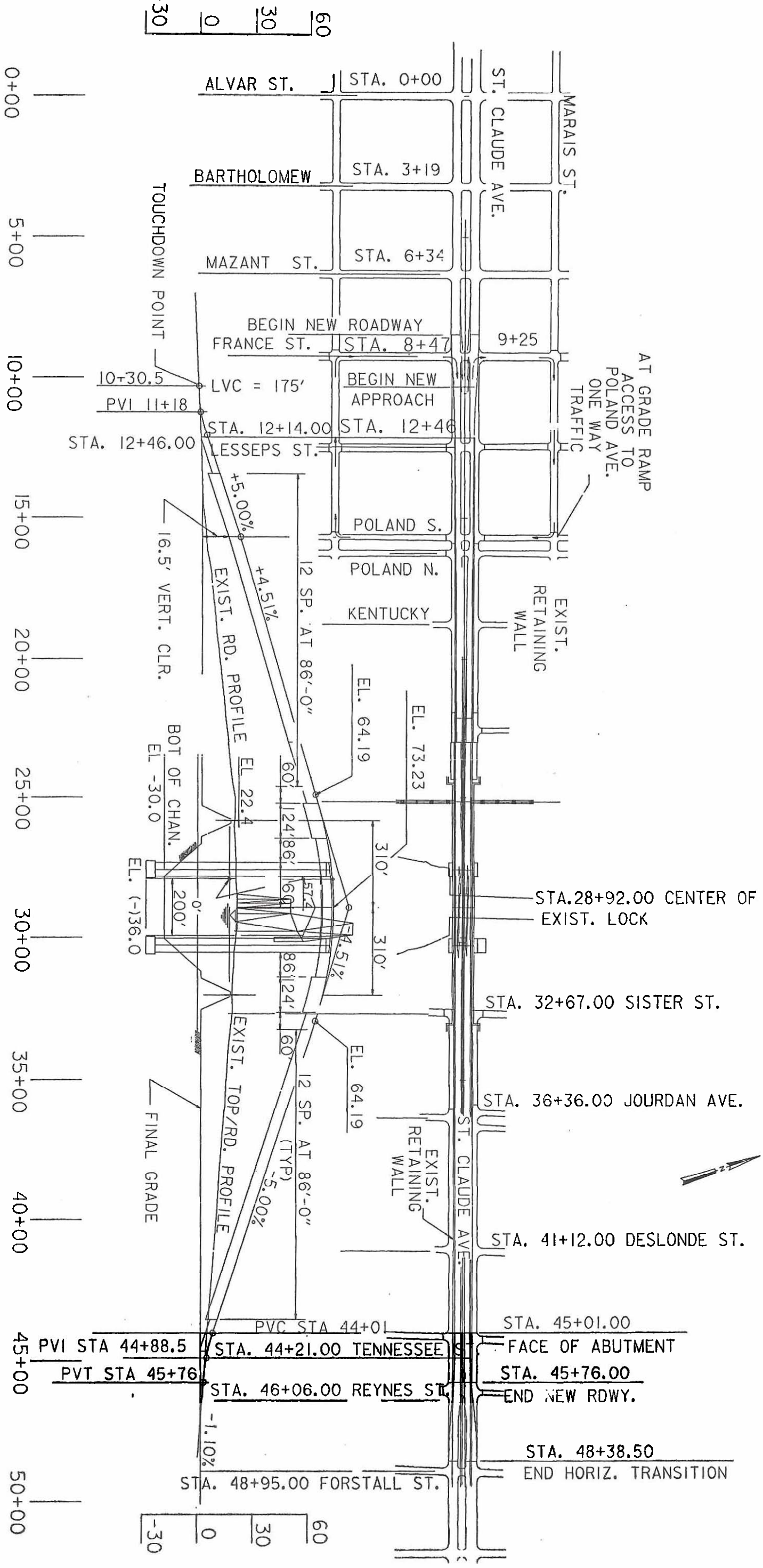
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

LOCK PLAN
NORTH OF CLAIBORNE AVENUE

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

PLATE 7



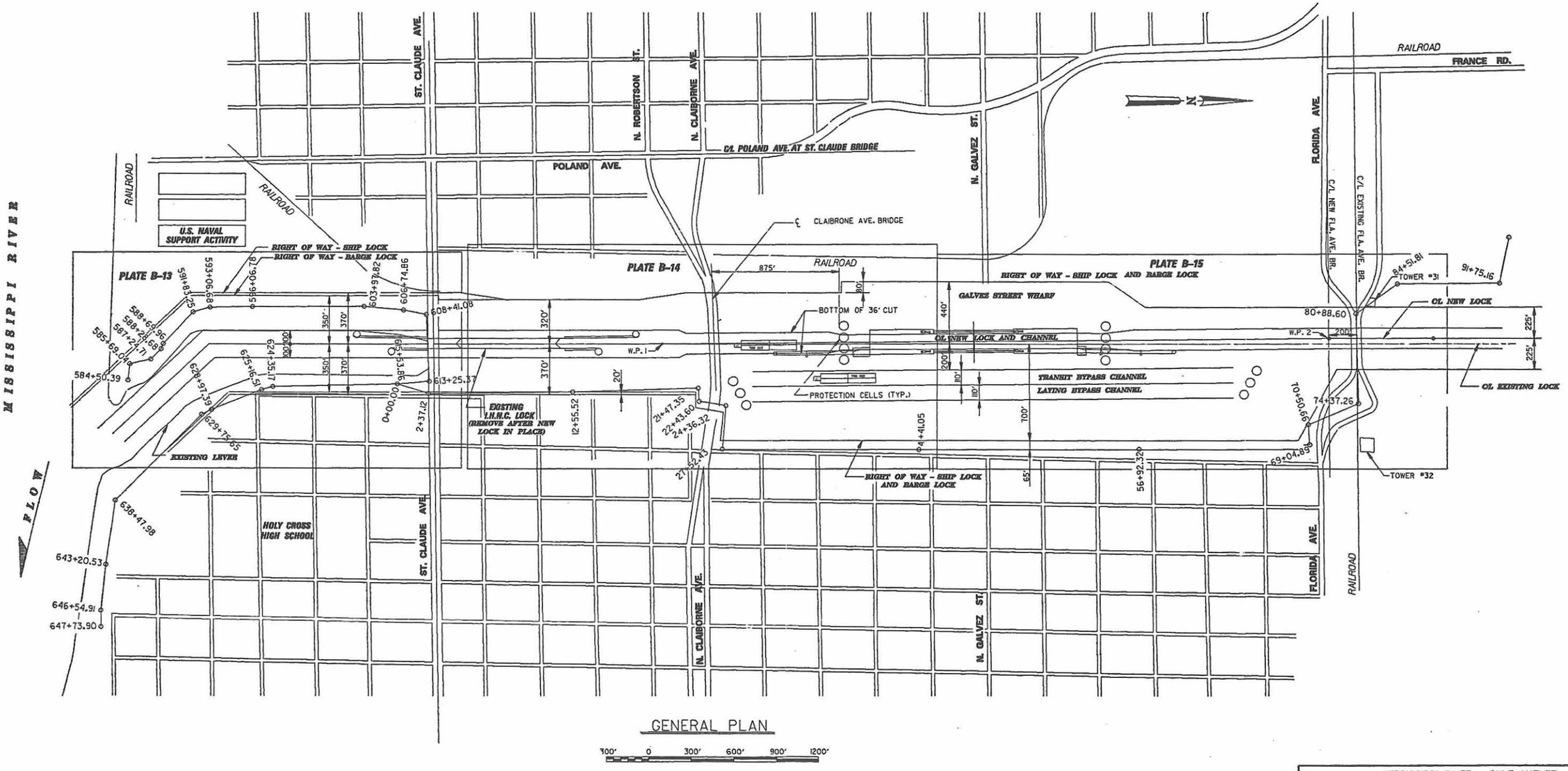
200' HORIZ. 40' VERT. CLR.
BRIDGE TYPE: DOUBLE BASCULE

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

BRIDGE-ONLY PLAN

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995



GENERAL PLAN

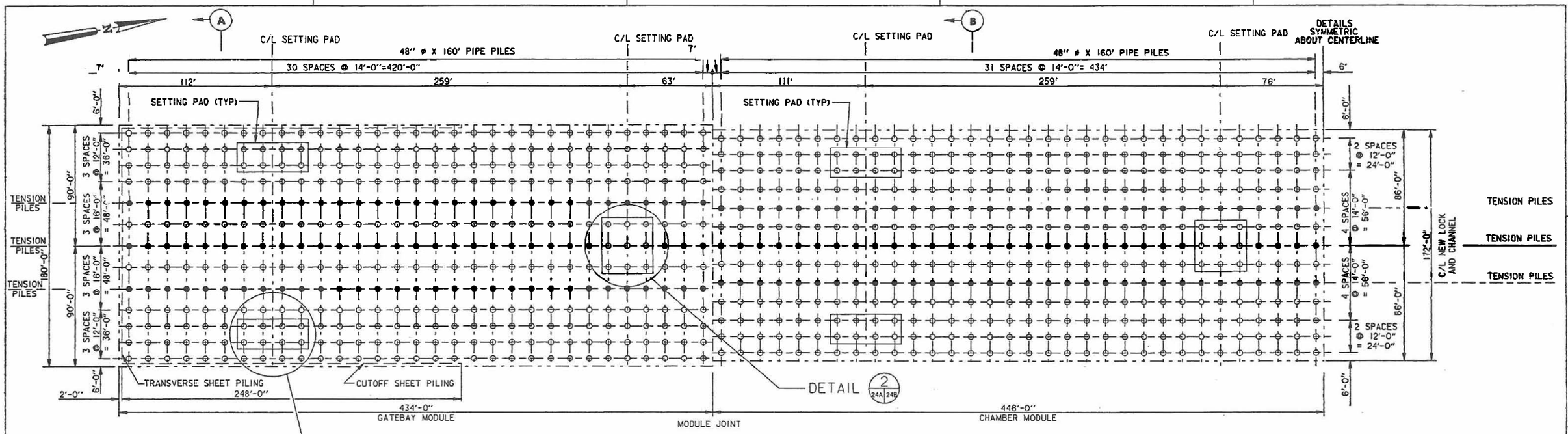
300' 0 300' 600' 900' 1200'

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

GENERAL PLAN
NEW LOCK AND CHANNEL

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

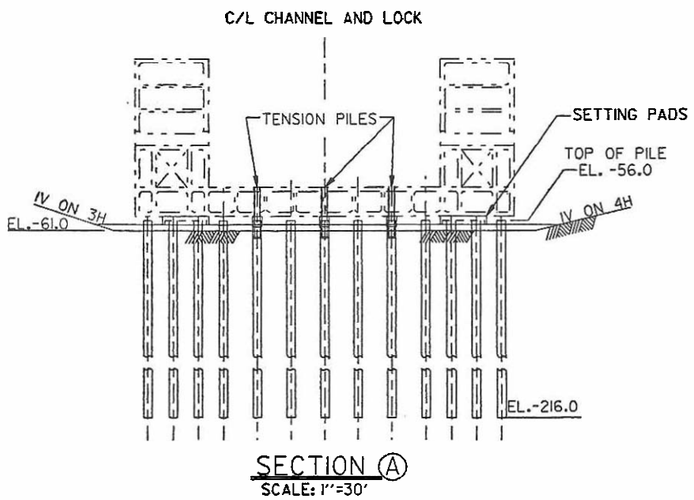
DATE: MARCH 1995



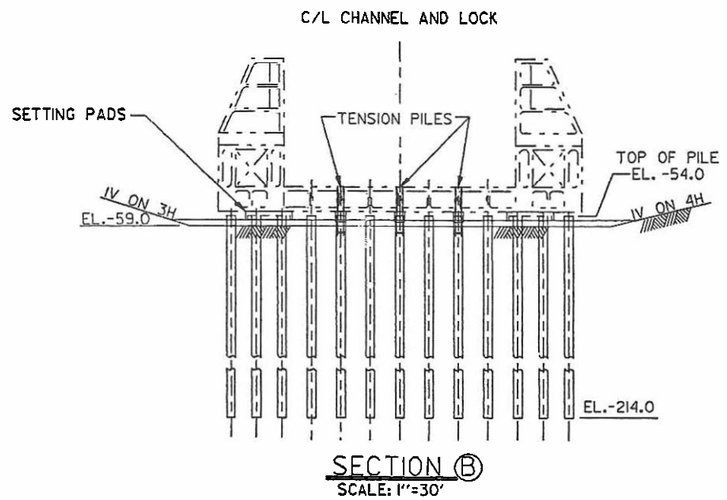
RIVER SIDE

PILE LAYOUT

SCALE: 1"=30'



SECTION (A)
SCALE: 1"=30'



SECTION (B)
SCALE: 1"=30'

SCALE: 1" = 30'

30' 0 30' 60' 90' 120

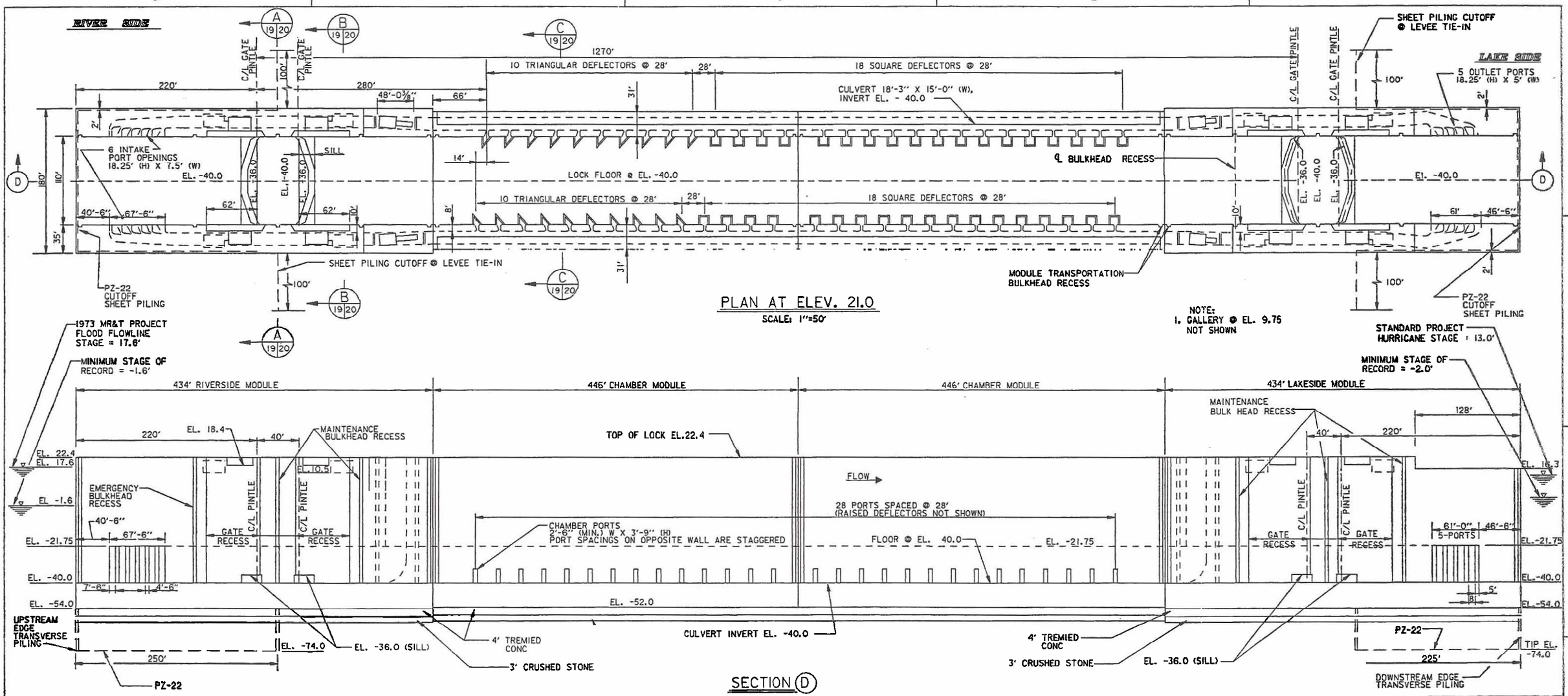
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
INDUSTRIAL CANAL LOCK REPLACEMENT
FEASIBILITY STUDY
NORTH OF CLAIBORNE AVENUE SITE

PILE FOUNDATION PLAN
1200' CONCRETE SHIP LOCK

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: MMG	PLOT SCALE: 360	PLOT DATE: SEPT 1996	CADD FILE: PLATE24A.DGN
DRAWN BY: TMJ			FILE NO. H-2-40392
CHECKED BY: MMG	DATE: OCTOBER 1996		

PLATE 10



PLAN AT ELEV. 21.0

SCALE: 1"=50'

NOTE:
1. GALLERY @ EL. 9.75 NOT SHOWN

SECTION (D)

FILLING AND EMPTYING SYSTEM

SCALE: HORIZ. 1"=50' VERT. 1"=20'

NOTE: 48"ø PILES AT 14' O. C. NOT SHOWN FOR CLARITY

SCALE: 1" = 20'

20' 0 20' 40' 60' 80'

SCALE: 1" = 50'

50' 0 50' 100' 150' 200'

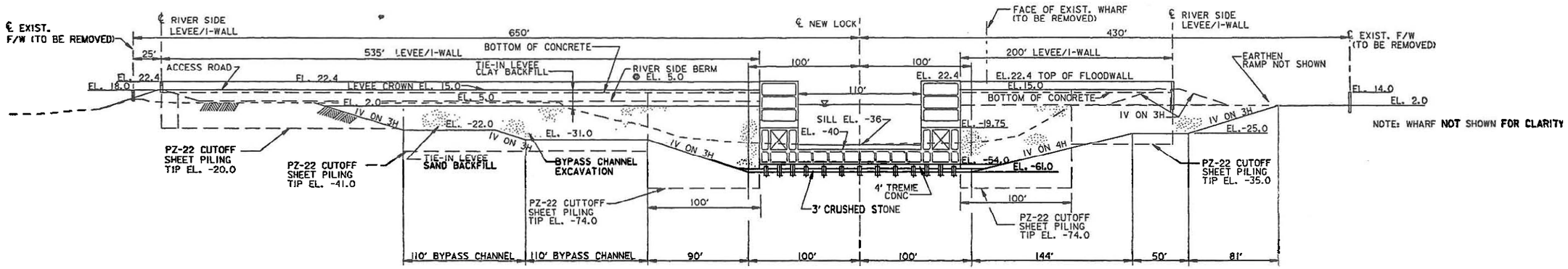
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
INDUSTRIAL CANAL LOCK REPLACEMENT
FEASIBILITY STUDY
NORTH OF CLAIBORNE AVENUE SITE

PLAN AND WALL PROFILES
1200' CONCRETE SHIP LOCK

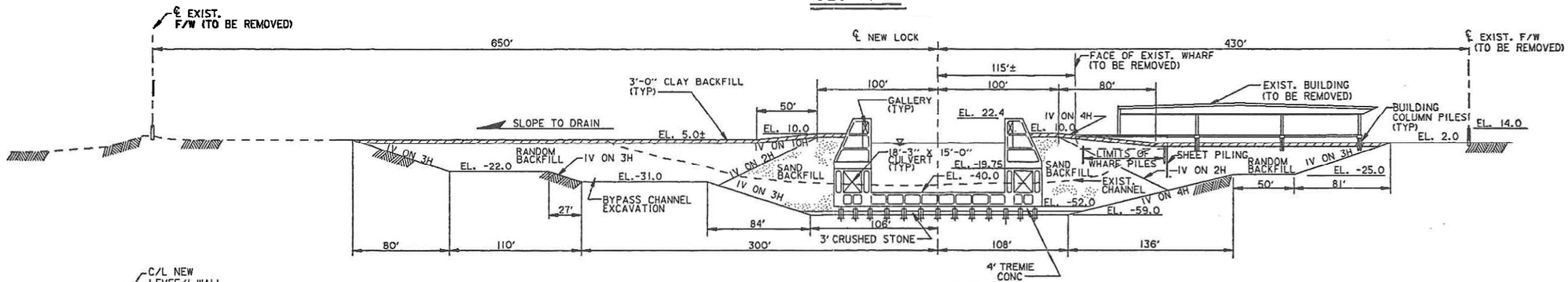
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: MMG	PLOT SCALE: 600	PLOT DATE: JULY 1996	CADD FILE: PLATE9.DGN
DRAWN BY: RMD & TMU	DATE: OCTOBER 1994		FILE NO. H-2-40392

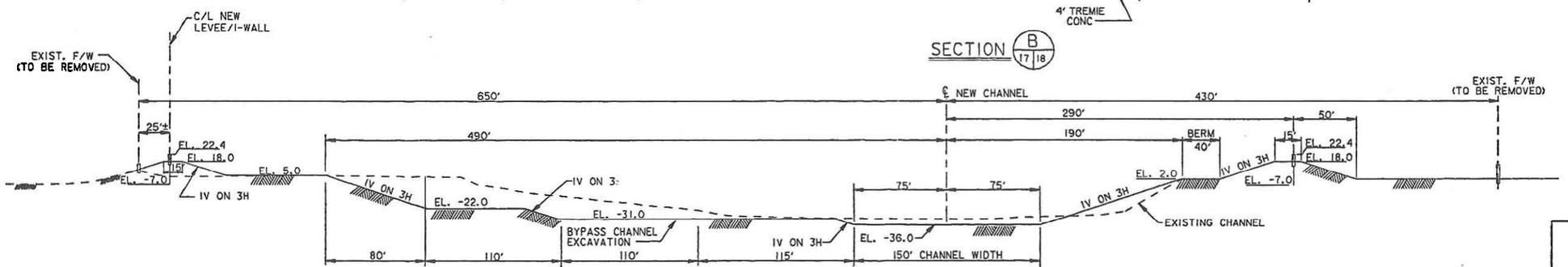
PLATE 11A



SECTION



SECTION B (17 | 18)



SECTION C (17 | 18)

SCALE: 1" = 40'

40' 0 40' 80' 120' 160'

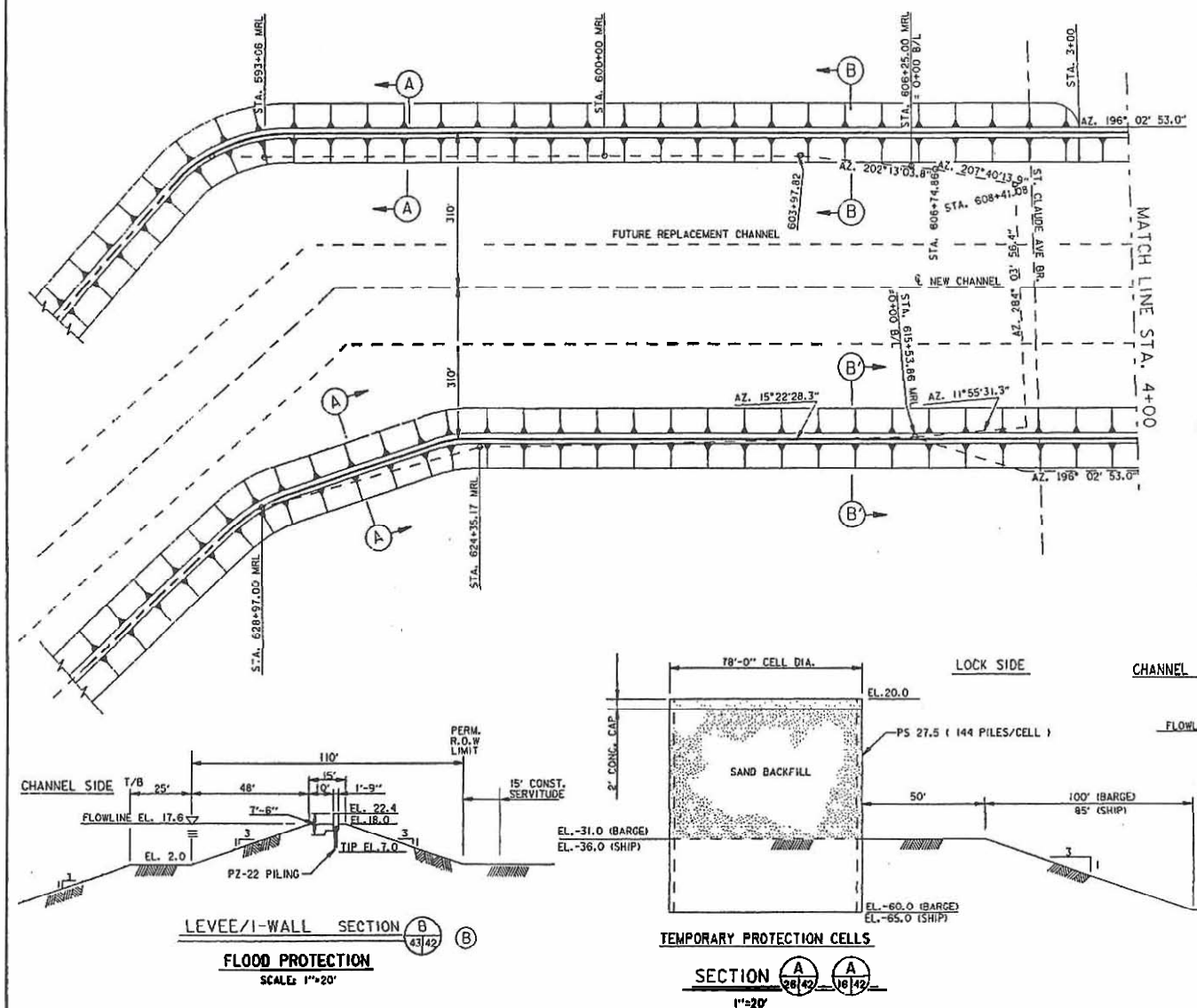
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTION CHANNELS
INDUSTRIAL CANAL LOCK REPLACEMENT
FEASIBILITY STUDY
NORTH OF CLAIBORNE AVE. SITE

CROSS SECTIONS
1200' CONCRETE SHIP LOCK

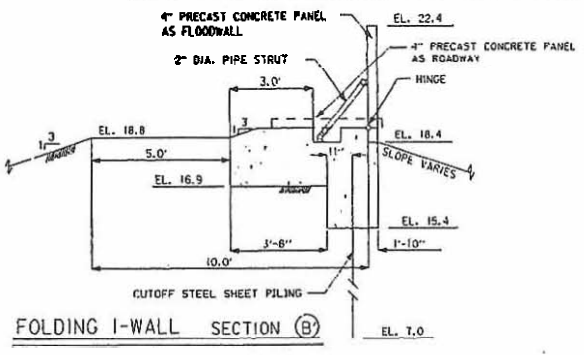
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: MHG	PLOT SCALE: 480	PLOT DATE: SEPT 1996	CADD FILE: PLATE11B.DGN
DRAWN BY: TMJ			FILE NO. H-2-40392
CHECKED BY: MHG	DATE: OCTOBER 1996		

PLATE 11B



FLOOD PROTECTION			
EAST BANK REACH	SECTION LENGTH	WEST BANK REACH	SECTION LENGTH
628+97 MRL B/L To 624+35.17 MRL	(A) 461.8'	593+06 MRL B/L To 600+00 MRL B/L	(A) 694'
624+35.17 MRL B/L To 615+53.8 =0+00 LOCK B/L	(B) 882'	600+00 MRL B/L To To 606+25 MRL B/L= 0+00 LOCK B/L=	(B) 625'
0+00 TO 13+05.5	(B) 1305.5'	0+00 LOCK B/L To 3+00 LOCK B/L	(B) 300'
13+05.5 TO 24+00	(C) 1094.5'	3+00 LOCK B/L To 23+00	(D) 2000'
24+00 TO 39+50 (LOCK TIE-IN LEVEE)	(B) 1550'	23+00 LOCK B/L TO 39+50 (LOCK TIE-IN LEVEE)	(B) 1300'



FOLDING I-WALL SECTION (B')

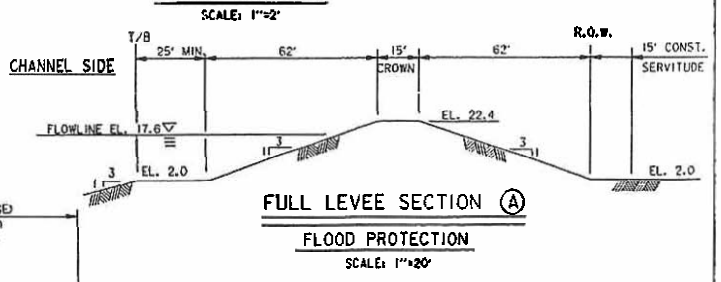
LEVEE/I-WALL SECTION (B) 43|42 (B)

FLOOD PROTECTION
SCALE: 1"=20'

TEMPORARY PROTECTION CELLS

SECTION (A) 28|42 (A) 10|42

1"=20'



FULL LEVEE SECTION (A)

FLOOD PROTECTION
SCALE: 1"=20'

SCALE: 1" = 100'

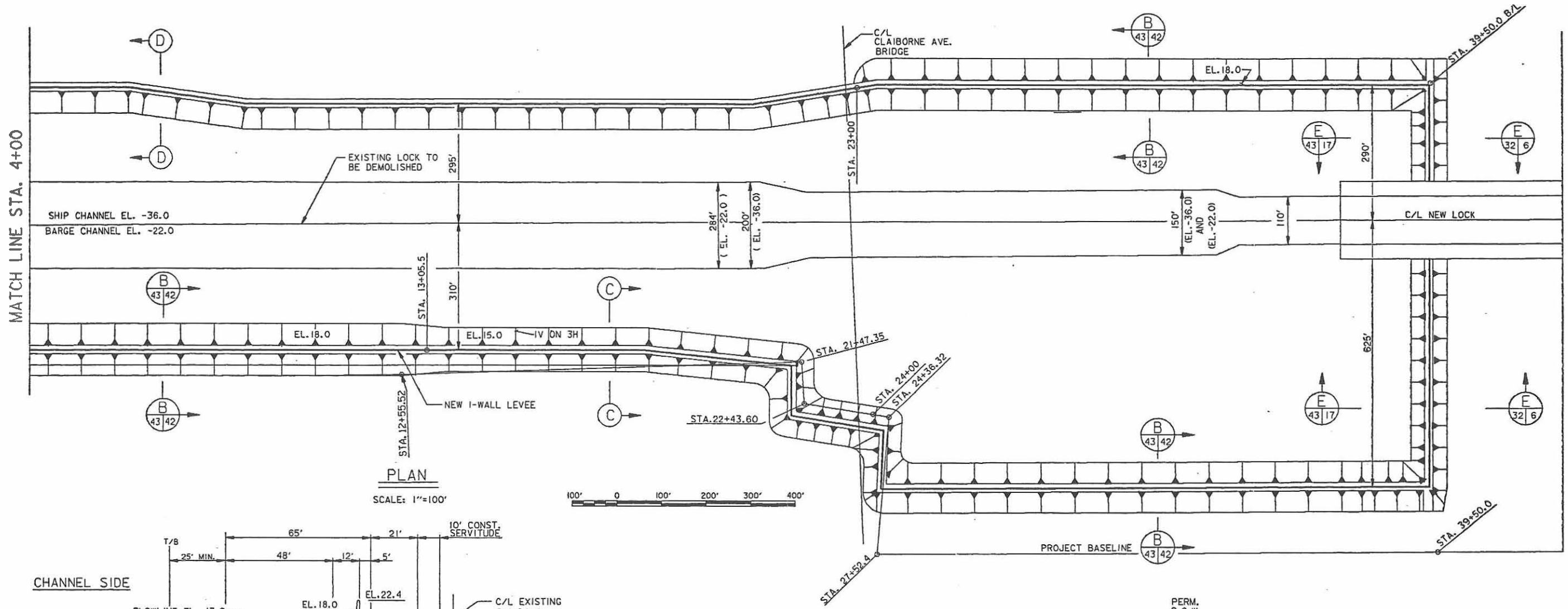
100' 0 100' 200' 300' 400'

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
FEASIBILITY STUDY
NORTH OF CLAIBORNE AVE. SITE

RIVERSIDE FLOOD PROTECTION SHIP AND BARGE LOCK

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

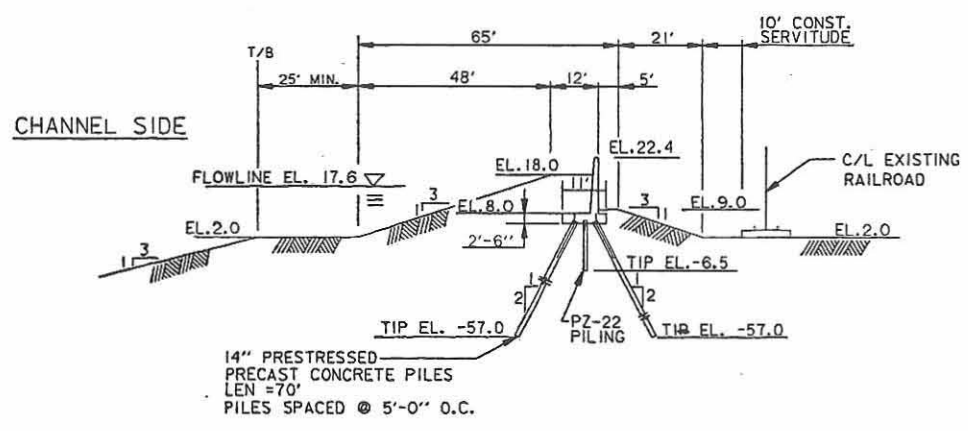
PLATE 12



PLAN

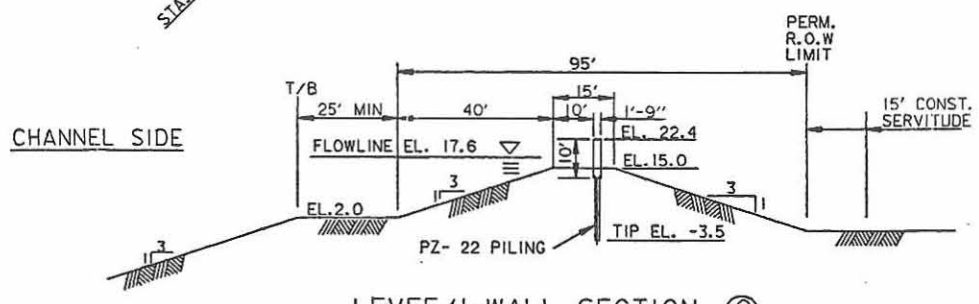
SCALE: 1"=100'

100' 0 100' 200' 300' 400'



FLOOD PROTECTION SECTION (D)

T-WALL W/ BERM



LEVEE/I-WALL SECTION (C)

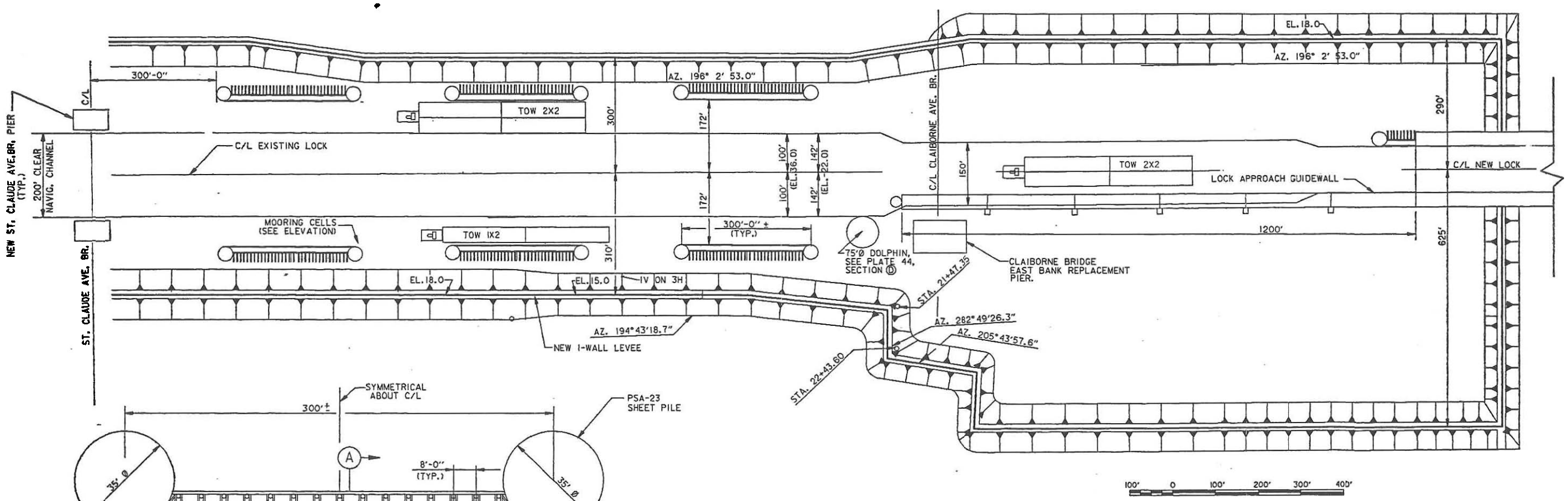
FLOOD PROTECTION

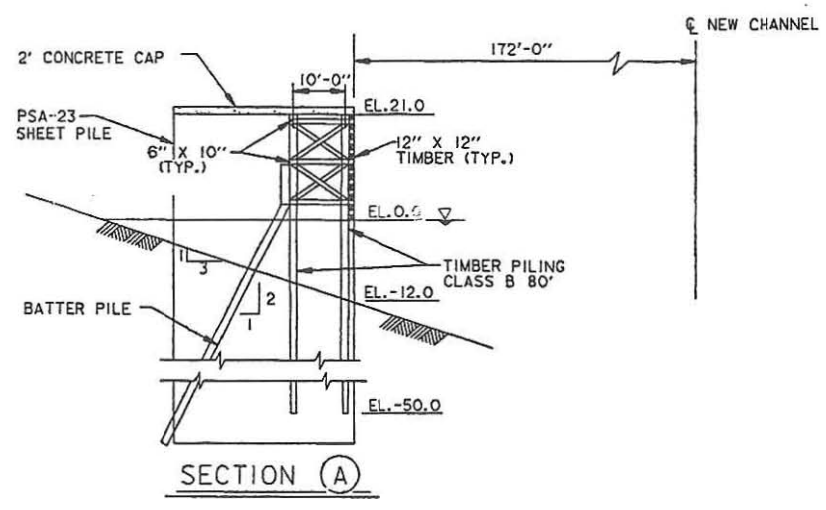
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

RIVER SIDE FLOOD PROTECTION

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995



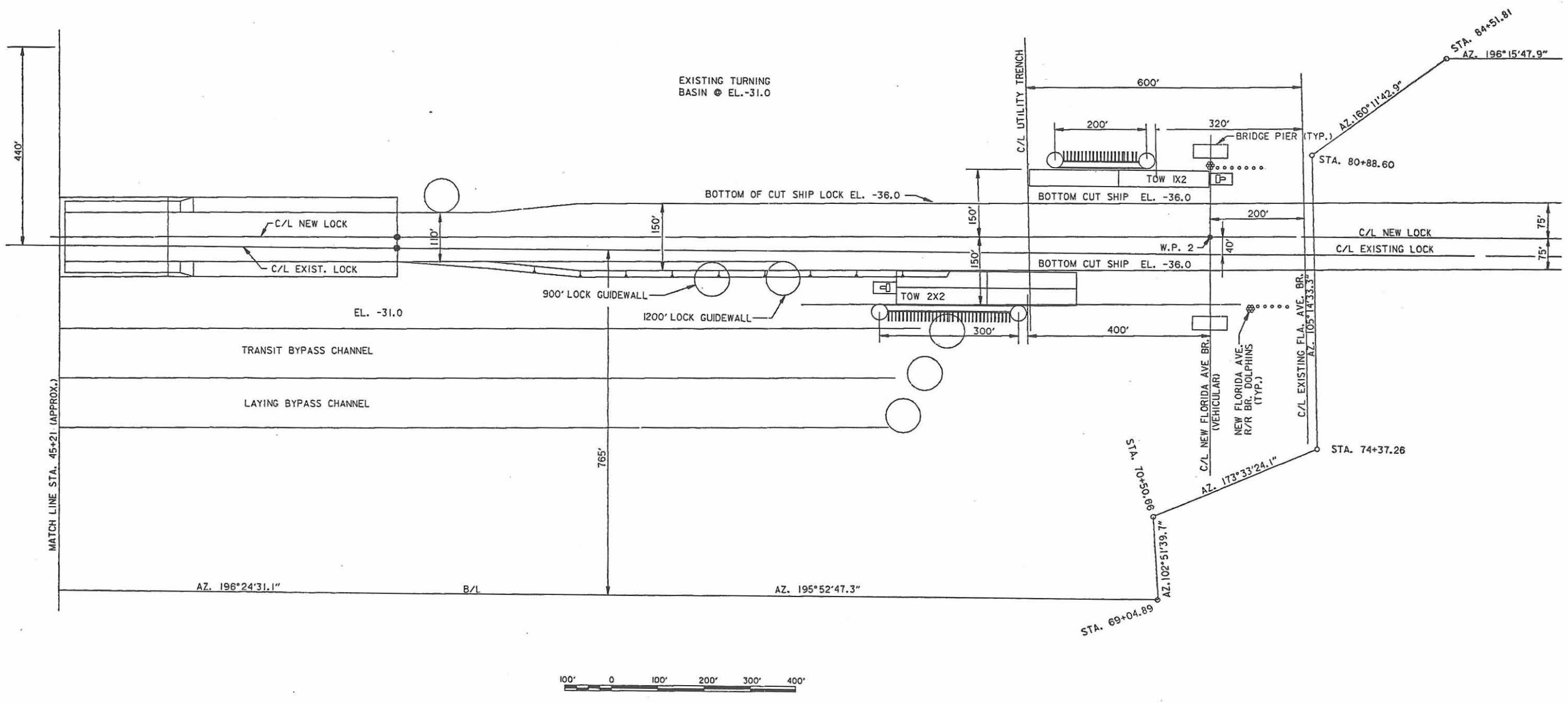


MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

PERMANENT MOORING DETAILS RIVERSIDE OF LOCK

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995



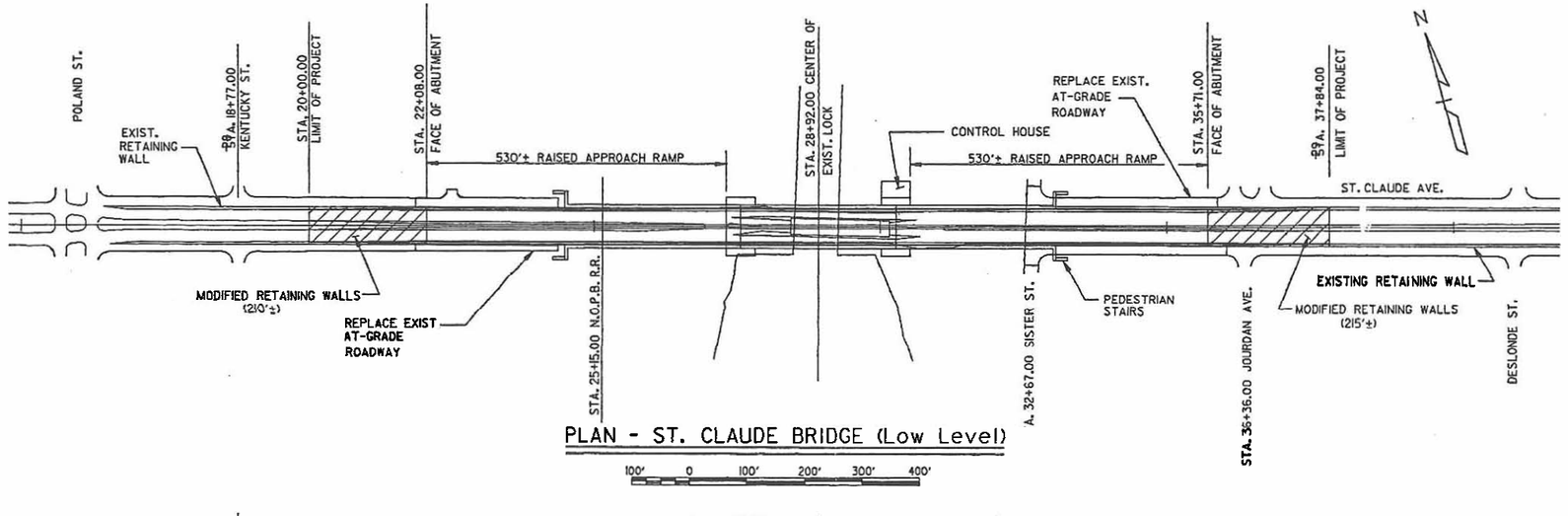
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

PERMANENT MOORING DETAILS
N. END NEW LOCK TO FLORIDA AVE.

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

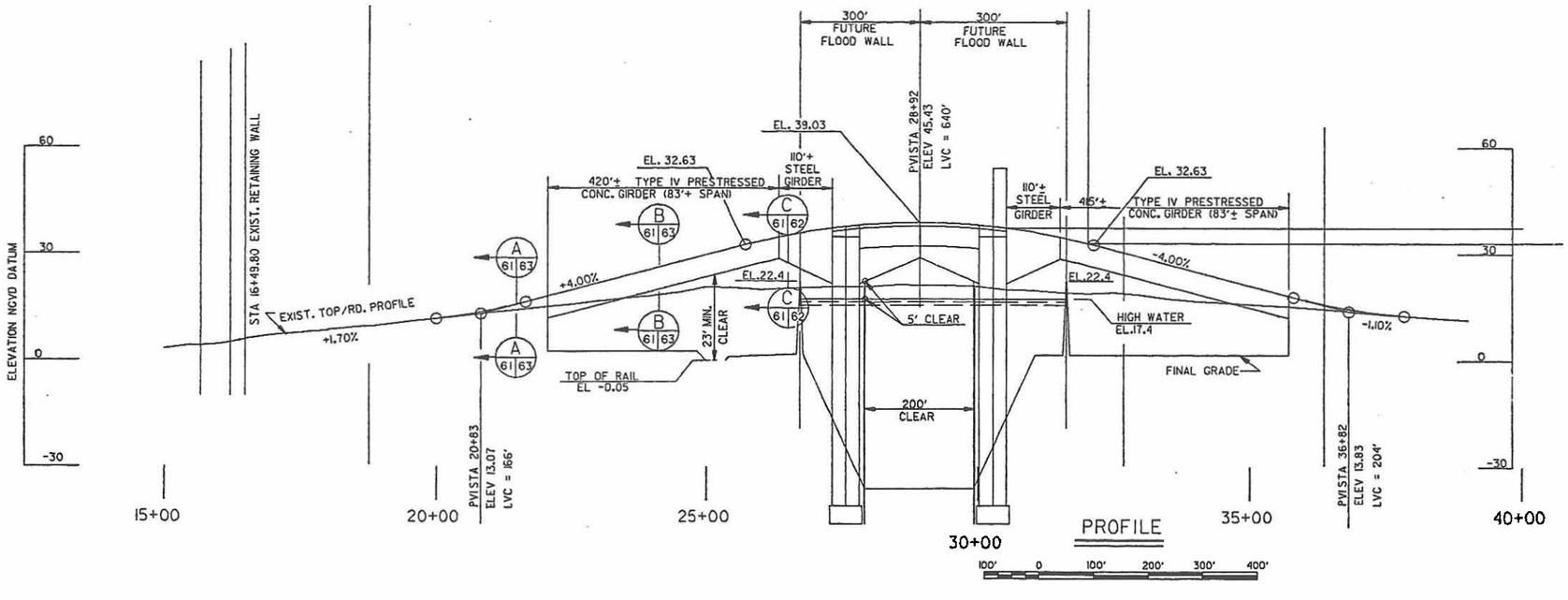
DATE: MARCH 1995

PLATE 15



PLAN - ST. CLAUDE BRIDGE (Low Level)

100' 0 100' 200' 300' 400'



PROFILE

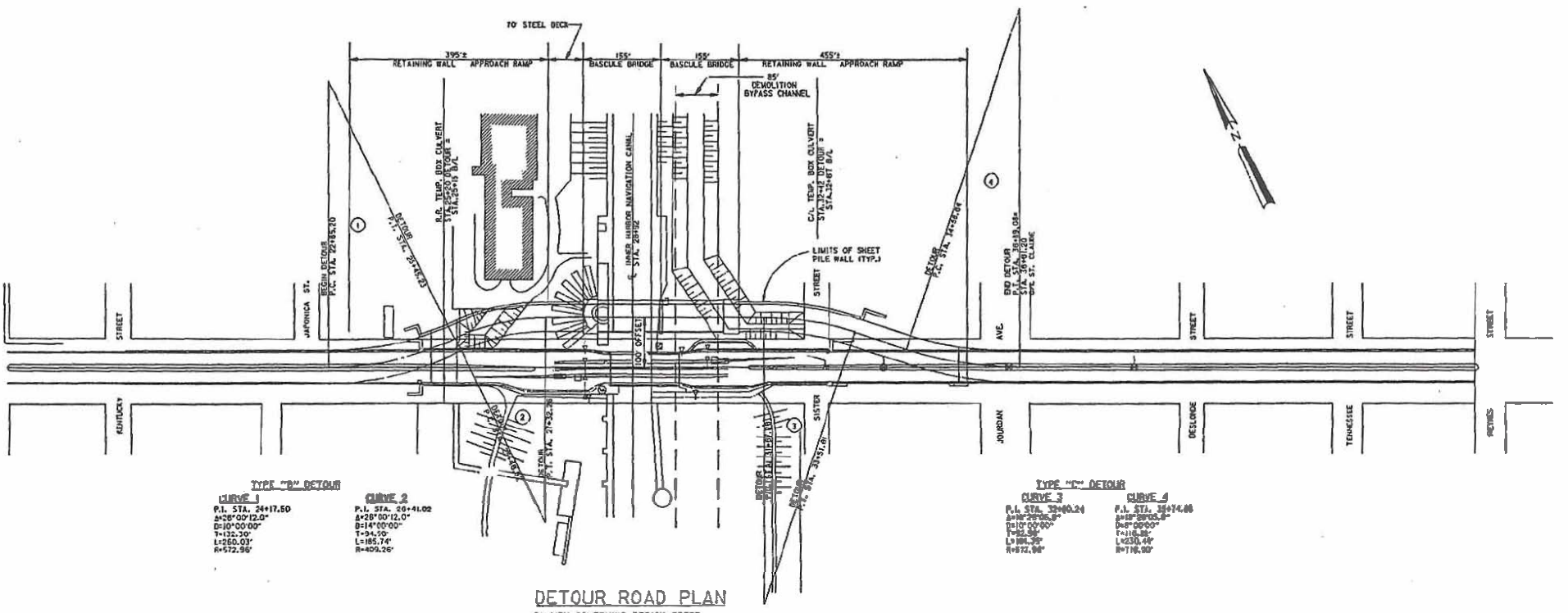
100' 0 100' 200' 300' 400'

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

PLAN AND PROFILE
ST. CLAUDE AVE. BRIDGE REPLACEMENT

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995



DETOUR ROAD PLAN

30 MPH GOVERNING DESIGN SPEED
25 MPH POSTED SPEED

SCALE: 1" = 20'

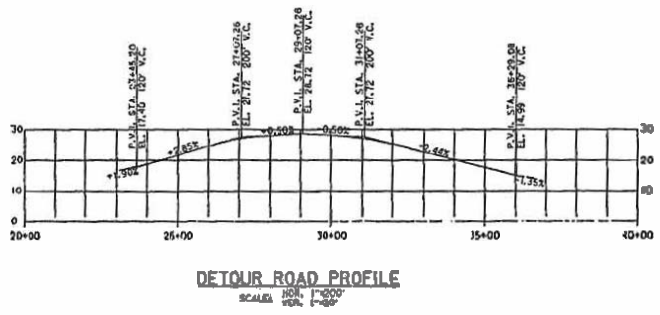
20' 0 20' 40' 60' 80'

SCALE: 1" = 200'

200' 0 200' 400' 600' 800'

SCALE: 1" = 100'

100' 0 100' 200' 300' 400'



DETOUR ROAD PROFILE

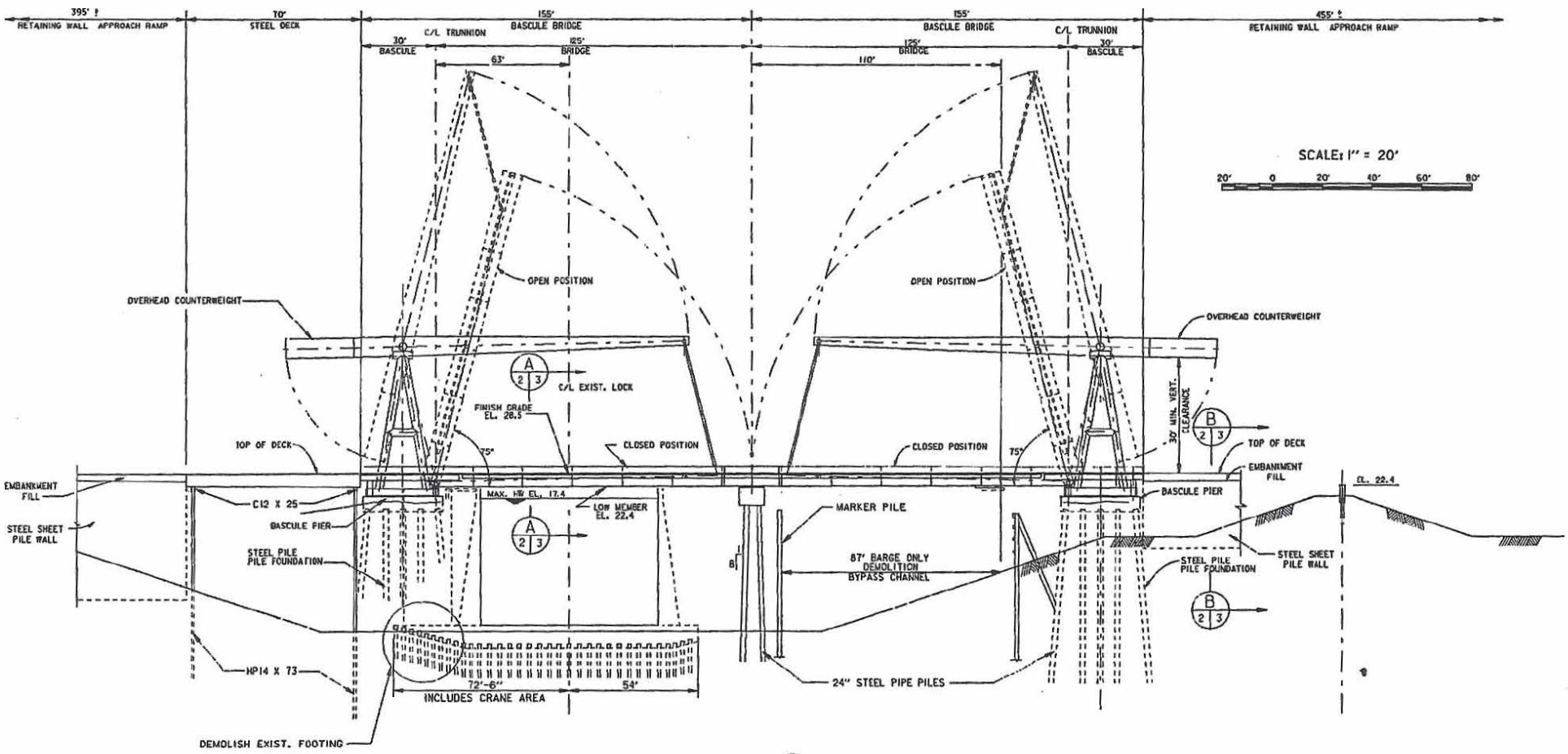
SCALES: HOR. 1"=200'
VER. 1"=20'

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
FEASIBILITY STUDY
NORTH OF CLAIBORNE AVE. SITE

DETOUR ROADWAY GEOMETRY
ST. CLAUDE AVE. BR. REPLACEMENT

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLATE 17



ELEVATION (B 8|2)

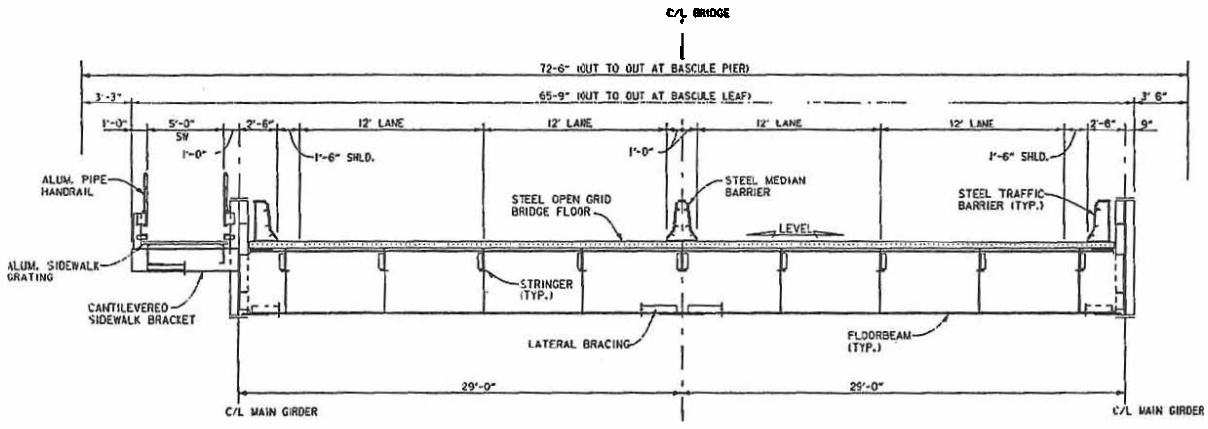
TWO SINGLE-LEAF TRUNNION BASCULES WITH OVERHEAD COUNTERWEIGHT

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
FEASIBILITY STUDY
NORTH OF CLAIBORNE AVE. SITE

DETOUR BRIDGE ELEVATION
ST. CLAUDE AVE BRIDGE REPLACEMENT

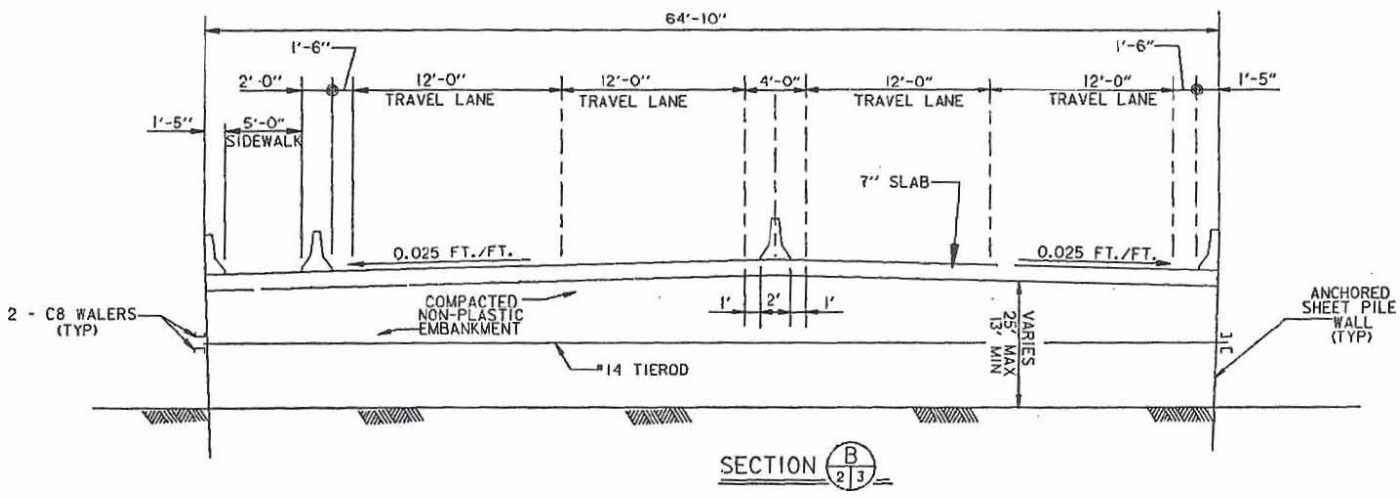
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLATE 18



TYPICAL SECTION THRU BASCULE LEAF

SECTION A 2 3



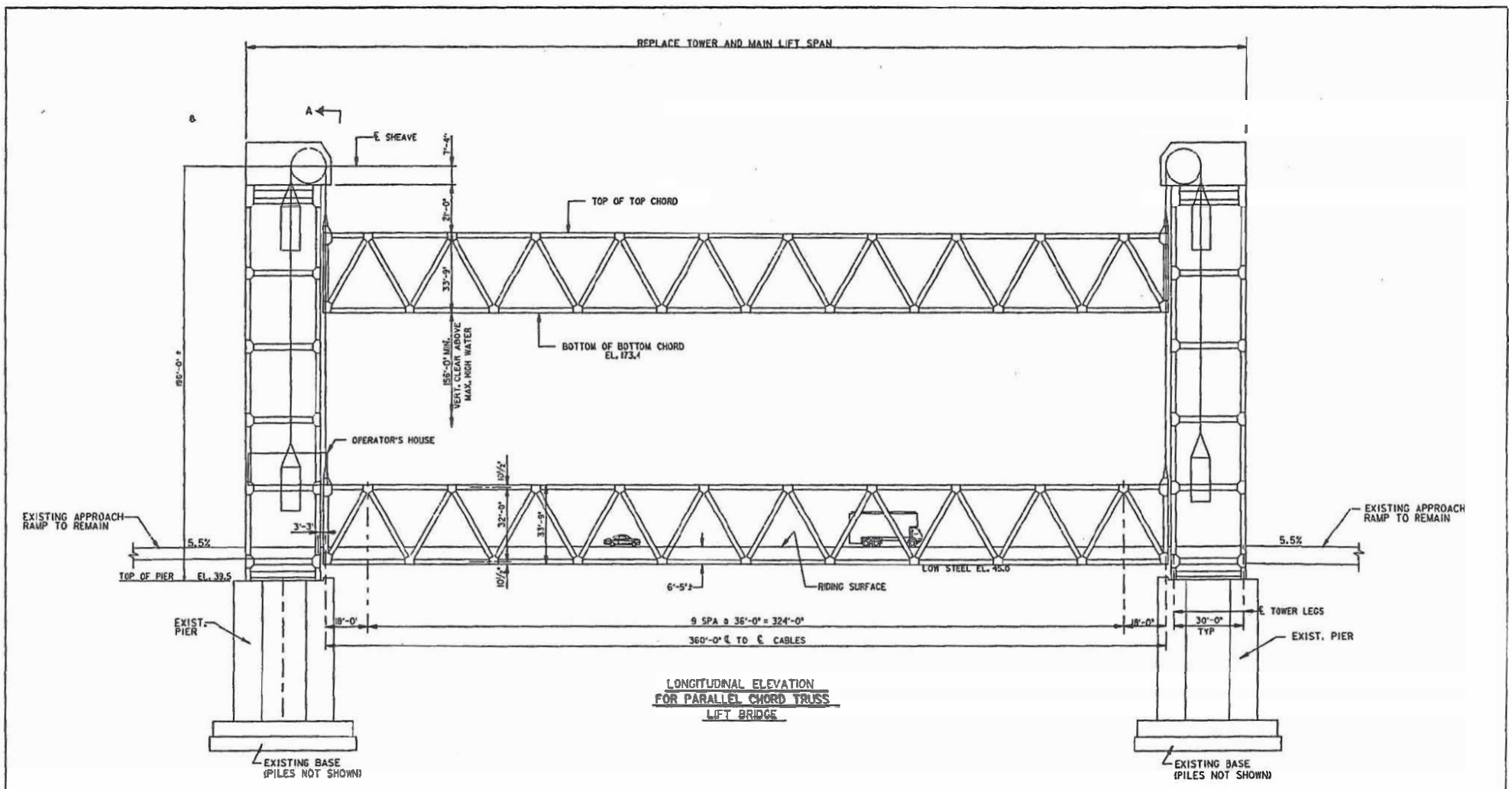
SECTION B 2 3

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
FEASIBILITY STUDY
NORTH OF CLAIBORNE AVE. SITE

DETOUR BRIDGE SECTIONS
ST. CLAUDE AVE. BR. REPLACEMENT

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLATE 19



LONGITUDINAL ELEVATION
FOR PARALLEL CHORD TRUSS
LIFT BRIDGE

SCALE: 1" = 20'

20' 0 20' 40' 60' 80'

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
FEASIBILITY STUDY
NORTH OF CLAIBORNE AVE. SITE

CLAIBORNE AVE BRIDGE
MAIN SPAN REPLACEMENT

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PLATE 20

1000 0 1000 2000 3000 4000 Feet

N

Legend

New construction Meraux Tract.

New Florida Ave. High Rise (LADOTD Project).

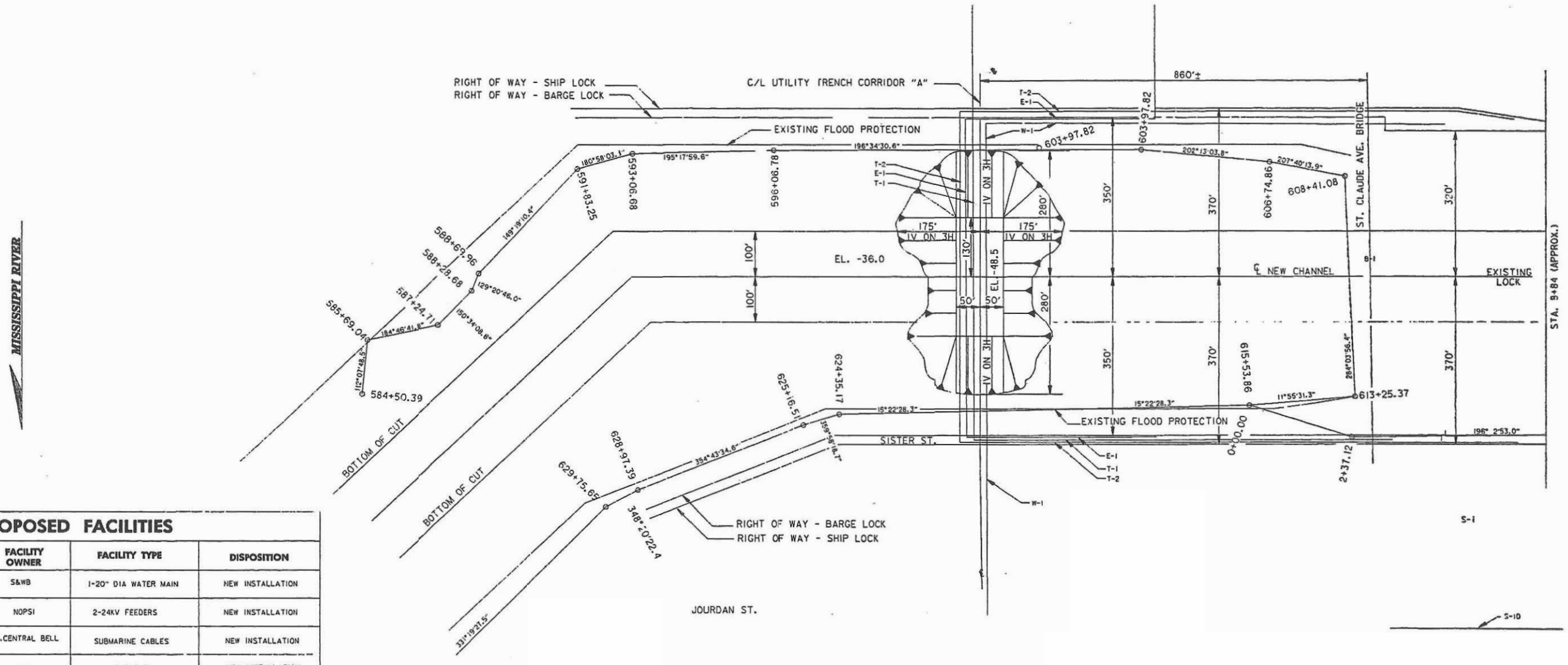
MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

NEW ROADWAY IN ST. BERNARD PARISH

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1997

PLATE 21



NEW CHANNEL PLAN

SCALE: 1"=100'

NOTE:
CHANNEL MINIMUM SECTION SHOWN.
ASSUME NATURAL GROUND @ EL. 2.0

PROPOSED FACILITIES

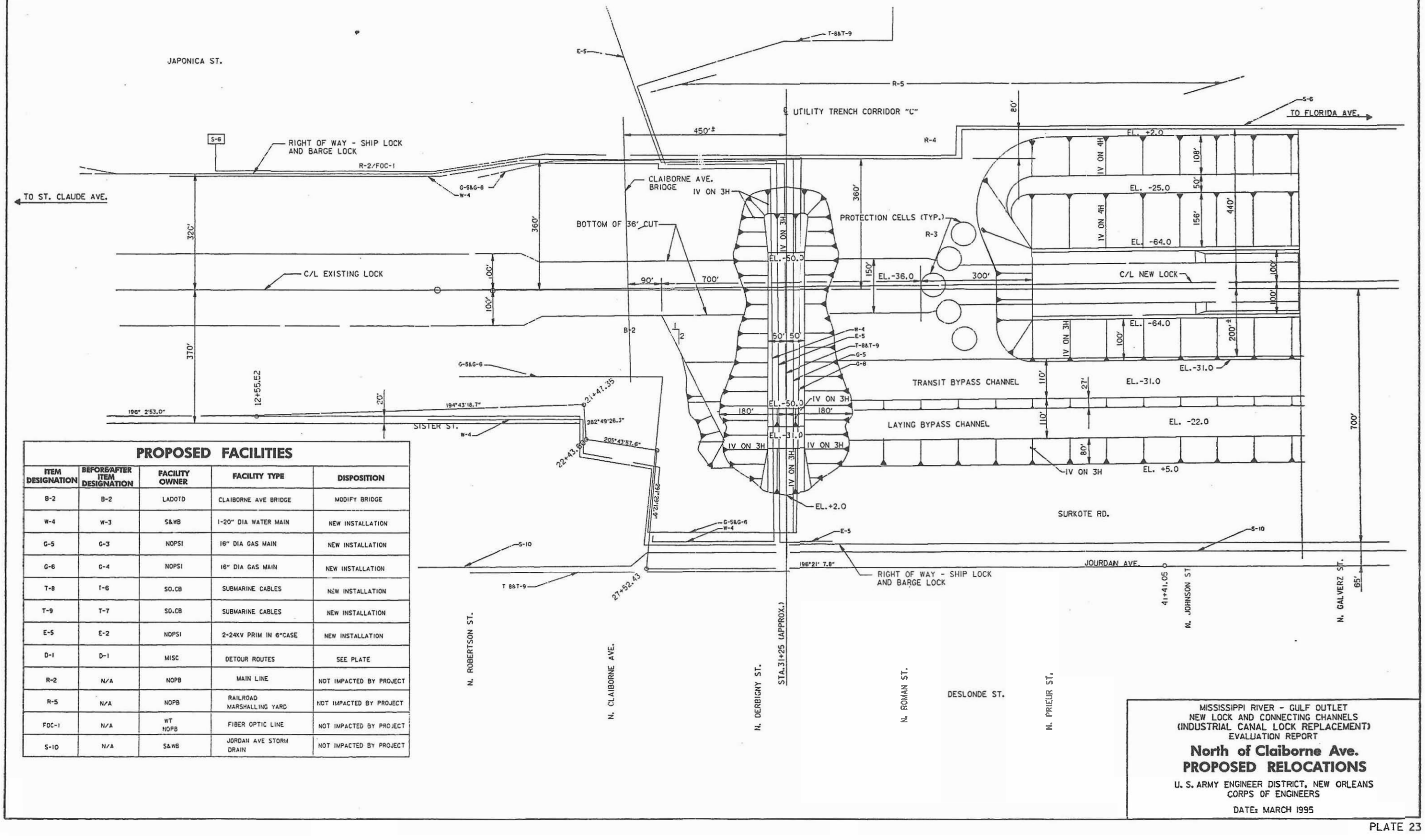
ITEM DESIGNATION	BEFORE/AFTER ITEM DESIGNATION	FACILITY OWNER	FACILITY TYPE	DISPOSITION
W-1	W-2	S&WB	1-20" DIA WATER MAIN	NEW INSTALLATION
E-1	E-2	NOPSI	2-24KV FEEDERS	NEW INSTALLATION
T-1	T-4	SO.CENTRAL BELL	SUBMARINE CABLES	NEW INSTALLATION
T-2	T-3	COX	CABLE TV	NEW INSTALLATION
B-1	B-1	PNO	ST. CLAUDE AVE. BRIDGE	DEMOLISH/REMOVE (NEW BRIDGE)
D-1	D-1	MISC	DETOUR ROUTES	SEE PLATE
S-1	N/A	S&WB	8.8 MGD SEWAGE PUMP STATION 14 CFS.	NOT IMPACTED BY PROJECT.
S-10	N/A	S&WB	JORDAN AVE STORM DRAIN	NOT IMPACTED BY PROJECT

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

North of Claiborne Ave.
PROPOSED RELOCATIONS

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995



PROPOSED FACILITIES

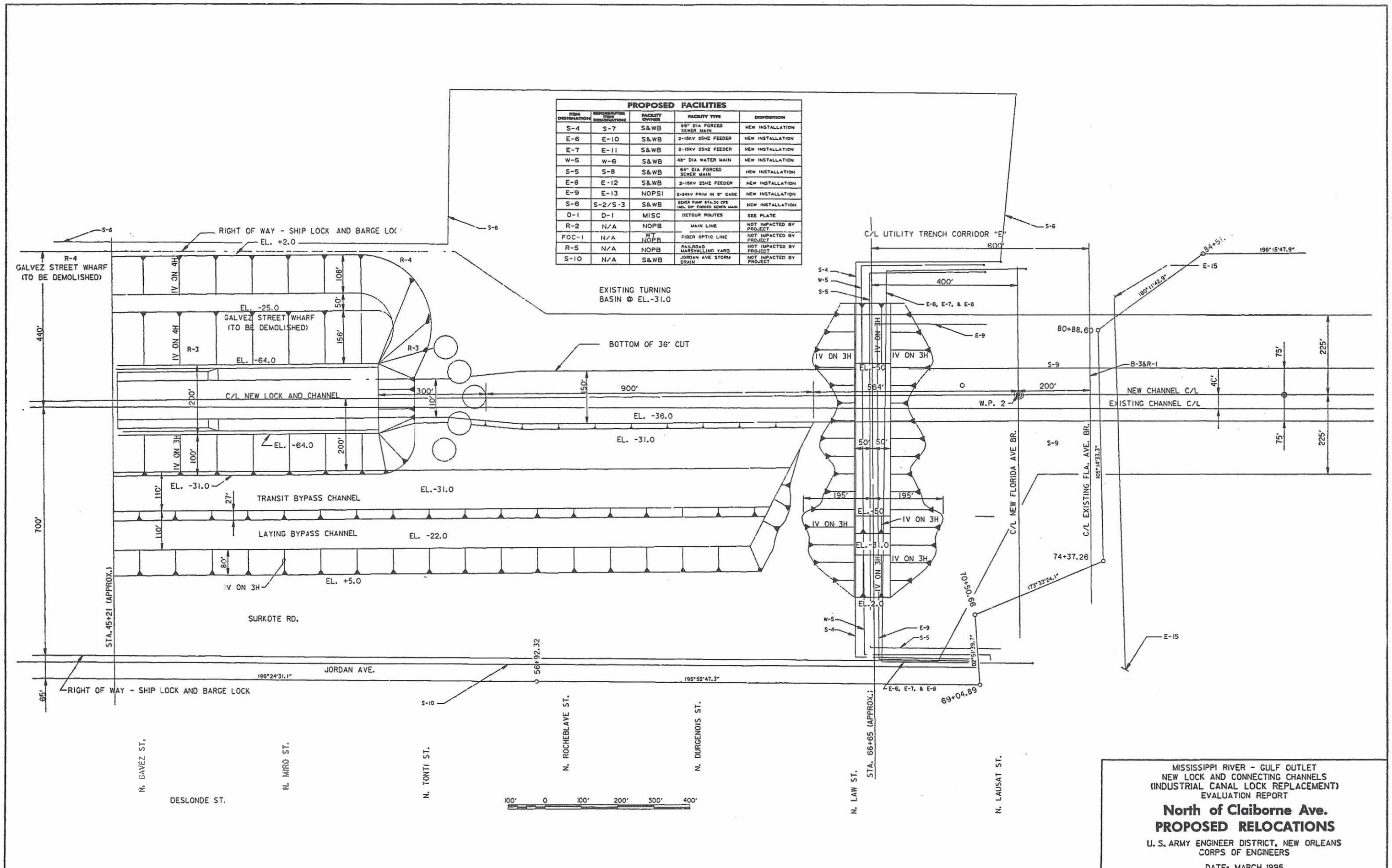
ITEM DESIGNATION	BEFORE/AFTER ITEM DESIGNATION	FACILITY OWNER	FACILITY TYPE	DISPOSITION
B-2	B-2	LADOTD	CLAIBORNE AVE BRIDGE	MODIFY BRIDGE
W-4	W-3	S&WB	1-20" DIA WATER MAIN	NEW INSTALLATION
G-5	G-3	NOPSI	16" DIA GAS MAIN	NEW INSTALLATION
G-6	G-4	NOPSI	16" DIA GAS MAIN	NEW INSTALLATION
T-8	T-6	SO.CB	SUBMARINE CABLES	NEW INSTALLATION
T-9	T-7	SO.CB	SUBMARINE CABLES	NEW INSTALLATION
E-5	E-2	NOPSI	2-24KV PRIM IN 6"CASE	NEW INSTALLATION
D-1	D-1	MISC	DETOUR ROUTES	SEE PLATE
R-2	N/A	NOPB	MAIN LINE	NOT IMPACTED BY PROJECT
R-5	N/A	NOPB	RAILROAD MARSHALLING YARD	NOT IMPACTED BY PROJECT
FOC-1	N/A	WT NOPB	FIBER OPTIC LINE	NOT IMPACTED BY PROJECT
S-10	N/A	S&WB	JORDAN AVE STORM DRAIN	NOT IMPACTED BY PROJECT

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

North of Claiborne Ave.
PROPOSED RELOCATIONS

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995



PROPOSED FACILITIES

ITEM DESIGNATION	DEPOSIT/AFTER ITEM DESIGNATION	FACILITY OWNER	FACILITY TYPE	DISPOSITION
S-4	S-7	S&WB	66" DIA FORCED SEWER MAIN	NEW INSTALLATION
E-6	E-10	S&WB	2-15KV 25HZ FEEDER	NEW INSTALLATION
E-7	E-11	S&WB	2-15KV 25HZ FEEDER	NEW INSTALLATION
W-5	W-6	S&WB	48" DIA WATER MAIN	NEW INSTALLATION
S-5	S-8	S&WB	54" DIA FORCED SEWER MAIN	NEW INSTALLATION
E-8	E-12	S&WB	2-15KV 25HZ FEEDER	NEW INSTALLATION
E-9	E-13	NOPSI	2-24KV PRIM IN 8" CASE	NEW INSTALLATION
S-6	S-2/S-3	S&WB	SEWER PUMP STA.30 CFS INCL 20" FORCED SEWER MAIN	NEW INSTALLATION
D-1	D-1	MISC	DETOUR ROUTES	SEE PLATE
R-2	N/A	NOPB	MAIN LINE	NOT IMPACTED BY PROJECT
FOC-1	N/A	WT NOPB	FIBER OPTIC LINE	NOT IMPACTED BY PROJECT
R-5	N/A	NOPB	RAILROAD MARSHALLING YARD	NOT IMPACTED BY PROJECT
S-10	N/A	S&WB	JORDAN AVE STORM DRAIN	NOT IMPACTED BY PROJECT

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

North of Claiborne Ave.
PROPOSED RELOCATIONS

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

MISSISSIPPI RIVER

FLOW

ST. CLAUDE AVE.
N. ROBERTSON ST.
N. CLAIBORNE AVE.
N. GALVEZ ST.
FLORIDA AVE.
RAILROAD
FRANCE RD.
POLAND AVE.
C/L POLAND AVE. AT ST. CLAUDE BRIDGE
U.S. NAVAL SUPPORT ACTIVITY
RIGHT OF WAY - SHIP LOCK
RIGHT OF WAY - BARGE LOCK
PLATE B-13
PLATE B-14
PLATE B-15
℄ CLAIBRONE AVE. BRIDGE
875'
80'
GALVEZ STREET WHARF
BOTTOM OF 36' CUT
440'
C/L NEW LOCK AND CHANNEL
W.P. 1
W.P. 2
200'
320'
370'
350'
TRANSIT BYPASS CHANNEL
LAYING BYPASS CHANNEL
PROTECTION CELLS (TYP.)
220'
110'
700'
20'
C/L NEW FLA. AVE. BR.
C/L EXISTING FLA. AVE. BR.
TOWER #31
C/L NEW LOCK
C/L EXISTING LOCK
TOWER #32
75 LDN
65 LDN
EXISTING I.H.N.C. LOCK (REMOVE AFTER NEW LOCK IN PLACE)
EXISTING LEVEE
HOLY CROSS HIGH SCHOOL
RIGHT OF WAY - SHIP LOCK AND BARGE LOCK
584+50.39
585+69.04
587+21.71
588+29.68
588+69.96
591+93.75
593+96.78
595+96.78
603+97.82
606+74.86
608+41.08
613+25.37
624+35.17
625+46.51
628+97.39
629+75.65
638+47.98
643+20.53
646+54.91
647+73.90
0+00.00
2+37.12
12+55.52
21+47.35
23+43.60
24+36.32
27+52.43
41+41.05
56+92.32
69+04.89
70+50.56
74+37.26
80+88.60
84+51.81
91+75.16
225'

GENERAL PLAN

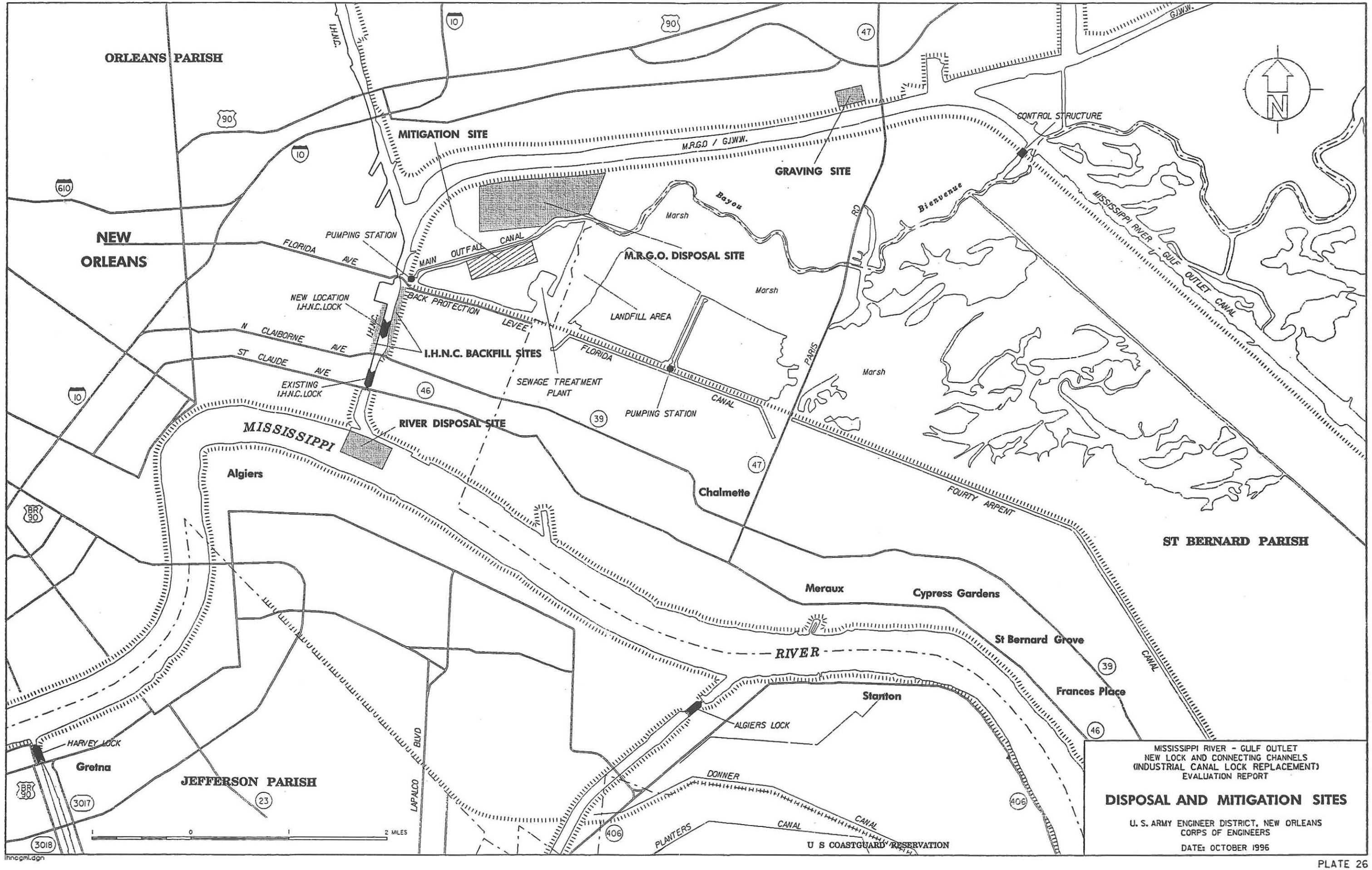
300' 0 300' 600' 900' 1200'

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

POTENTIAL NOISE IMPACT AREAS
(Worse Case Scenario)

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995



MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

DISPOSAL AND MITIGATION SITES

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: OCTOBER 1996

PLATE 26



MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION REPORT

NATIONAL REGISTER PROPERTIES

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: MARCH 1995

Gentilly

Road

Almonaster Ave. Extension

Grant Ave. Canal

Filled Commercial Land

Woods

Trucking Facility Paved and Developed

Canal

Marsh

Canal

Shallow Water

Woods

Paved Rd.

Paris Rd. Bridge

NEW ORLEANS PUBLIC SERVICE POWER PLANT

Remains of Pumps and Pipes used for drainage

Active Pump Station

STAGING AREA

EXCESS MATERIAL STOCKPILE AREA

EL.-26

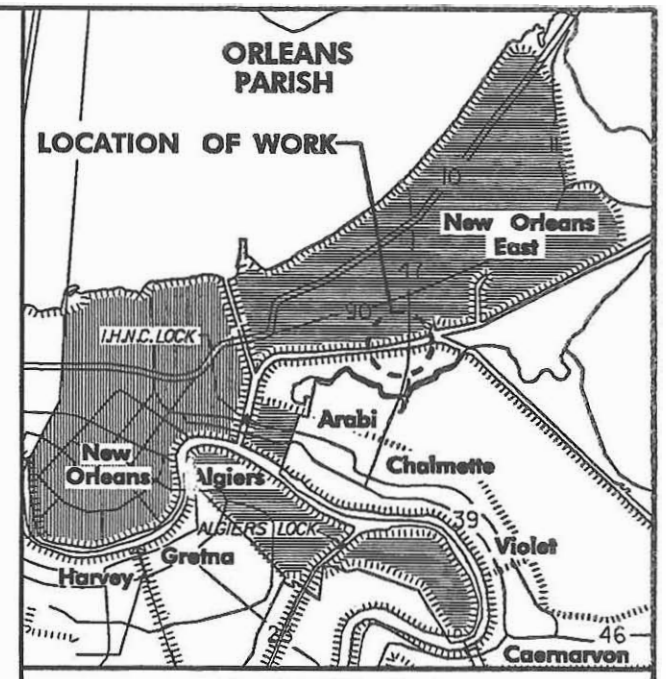
CLOSURE

LIMIT OF DIRECT WETLAND IMPACTS

LEVEE

MISSISSIPPI RIVER GULF OUTLET

N



VICINITY MAP

MISSISSIPPI RIVER - GULF OUTLET
NEW LOCK AND CONNECTING CHANNELS
(INDUSTRIAL CANAL LOCK REPLACEMENT)
EVALUATION AND MITIGATION REPORT

GRAVING SITE
HABITATS AND IMPACT AREA

U.S ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

DATE: SEPTEMBER 1996

PLATE 28